



DISSERTATION

Generic Institutionalism

Evolution – Institution – Complexity

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We're all gonna be ... Just dirt in the ground
Tom Waits

Kurzfassung

Die vorliegende Dissertation beschäftigt sich mit dem wissenschaftlichen Feld der evolutionären institutionellen Ökonomie. Generell verteidigt sie die Idee eines ‚*Generischen Institutionalismus*‘, welcher auf folgenden Ebenen wissenschaftstheoretisch kritisch hinterfragt wird: *Ontologie, Heuristik und Methodologie*.

Die ontologische Ebene setzt sich mit der Realität von ökonomischen Einheiten und Prozessen auseinander, wobei in dieser Arbeit soziale Relationen – in Welt, Geist und Natur eingebettet – und deren endogene Entwicklung als Fundament der ökonomischen Realität angenommen werden. Wir sprechen daher von einer Realitätsauffassung die dem *kritischen Naturalismus* beziehungsweise der *evolutionären Erkenntnistheorie* am ähnlichsten erscheint. Ein solches naturalistisches Realitätsverständnis muss sozial-kritisch reflektiert sein, um Determinismen vorzubeugen, die das menschliche Handlungsvermögen und dessen pfadabhängige Entwicklung absolut deklarieren möchten, insofern wird dieser Prämisse auch aktiv nachgegangen in der Arbeit.

Die heuristische Ebene beschäftigt sich mit der Problementwicklung in der evolutionären institutionellen Ökonomie, also mit der Frage wie wir gesellschaftliche Probleme beziehungsweise gesellschaftlichen Wandel als Problem konzipieren können. Zur Bewältigung dieser Frage und zur Identifikation spezifischer *heuristischer Vehikel* wird auf das Erbe einschlägiger wissenschaftlicher Größen des Feldes zurückgegriffen, wie etwa Thorstein Veblen (1857-1929), Friedrich August von Hayek (1899-1992), Joseph Alois Schumpeter (1883-1950) und Pierre Bourdieu (1930-2002). Diese Autoren widmeten einen Großteil ihres Forscherlebens der *kumulativen Dialektik menschlichen Handlungsvermögen und struktureller Veränderung*. Emergente als auch dauerhafte gesellschaftliche Strukturen werden daher in diesem Kontext als Institutionen verstanden.

Die methodologische Ebene der Dissertation geht einen Schritt weiter als die Heuristische und setzt sich mit konkreten Methoden zur ökonomischen Modellierung der heuristischen Problemwelten auseinander. Diese Methoden stammen und werden entnommen aus dem Feld der *Komplexität*, da institutionelle Systeme als komplexe adaptive Systeme hier verstanden werden. Es wird speziell verwiesen auf die Methodik der *agenten-basierten Modellierung* sowie der *dynamischen sozialen Netzwerkanalyse*. Zuletzt werden ein konkretes Modell und dessen zugehörige Computer-Simulation *generischen institutionellen Wandels* präsentiert, wo beide methodischen Ansätze integrativ eingearbeitet sind.

Abstract

The presented dissertation deals with the scientific field of evolutionary institutional economics. Its major emphasis is to defend the idea of '*Generic Institutionalism*' in terms of scientific theory, which is investigated along three meta-theoretical layers: *ontology*, *heuristics and methodology*.

The ontological level focuses on the reality of economic units and processes, whereby social relations – embedded in world, mind and nature – and their endogenous development serve as a host for economic reality in this thesis. Hence the postulated conception of reality is at best comparable with the ontology of *critical naturalism* and respectively *evolutionary epistemology*. Such a naturalistic picture of economic reality needs to be socially critically reflected in order to guard against determinisms, which want to declare human agency and its path-dependent development as absolute. Insofar this premise is actively followed in the thesis.

The heuristic level emphasises the framing of problems in evolutionary institutional economics. Therefore it deals with the question of how we may design and conceive societal problems and respectively how we may design and conceive societal change as a problem. For the problem of framing and the identification of certain *heuristic devices* it is suggested to refer to the heritage of pertinent scholars from the field, like Thorstein Veblen (1857-1929), Friedrich August von Hayek (1899-1992), Joseph Alois Schumpeter (1883-1950) and Pierre Bourdieu (1930-2002). These authors have devoted a respective part of their life-time as researchers for the *cumulative dialectics between human agency and structural change*. Conclusively, emergent as well as durable societal structures are understood as institutions in this context.

The methodological level of the dissertation goes a step further than the heuristic one and focuses on concrete methods for the economic modelling of such heuristic problem worlds. These methods stem and are taken from the field of *complexity*, because institutional systems are understood as complex adaptive systems here. Therefore it is especially referred to the methodology of *agent-based modelling* and *dynamic social network analysis*. At last, a concrete model and its corresponding computer simulation of *generic institutional change* is presented, where both methods are incorporated in an integrated way.

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1. Introduction

Generic Institutionalism claims to advance the traditional *Nomological Institutionalism*. Institutional change was majorly captured in a mere deductive way, so that pre-analytical visions form universal laws (nomos) from which all other laws or rules may be deduced. History of economic thought has proven that institutions change and appear in manifold ways. Hence it seems obvious to assume that institutional statements or situations cannot be inherited from a single law. This assumption carries properties of variety and diversity. Evolution itself is not a single law, it is a complex heuristic explaining generic change, so it is not a law producing *states* or *outcomes*; it is a principle producing *change* or *processes*. Hence the object of investigation is not the implicit outcome; it is rather the process itself. This research procedure is of generic nature and works as a heuristic frame to tackle societal problems in general. The analytical problem with institutions and with other socio-economic coherences is their relation to human agency. It is not possible to say what serves first, the institution or the human being; therefore it is not possible to suggest a deductive schema which explains their relations, because a deductive schema needs to assume something to be first. Generic represents a heuristic working with an ab-ductive schema. This idea stems from Charles Sanders Peirce and is also used in the work of Kurt Dopfer for example. Then generic means an ongoing inferential procedure involving continuous interplay between induction and deduction. Similar explanations can be also found in the work of Karl Popper and Friedrich August von Hayek. This schema grounds on an evolutionary epistemology, where insight depends on try and error.

Generic Institutionalism subsumes generative and genetic change. Generic involves a category where simple change and process is at stake and nothing else, hence the scientific location or position has to be in flow as well. To explain the rhythm of such a *heuristic interface* capable of studying institutional change, it is necessary to work out a related and appropriate *ontological strand*. Ontological strands appear out of ideological discrepancies in

the history of science. Shiping Tang (2010, p. 7) announces nine bedrock paradigms in the social sciences, as table 1 shows:

Table 1: Bedrock Paradigms of Social Sciences

	<i>First dimension:</i> material vs ideational	<i>Second dimension:</i> individual vs collective	<i>Third dimension:</i> human nature as drivers of behaviour	<i>Fourth dimension:</i> harmony vs conflict
Paradigms with less ontological priority	ideationalism	collectivism	Antisocialization	harmony paradigm
Paradigms with ontological priority	materialism	individualism	Socialization	conflict paradigm
			Biological (either evolution or determinism)	

Source: Tang (2010, p. 7)

The incentives to pick a certain domain out of these nine seem to stem out of a certain ideological conviction, this is what we will call in this thesis, a pre-analytical vision. This vision follows certain directions, but mostly does not leave its domain. Tang (2010) now suggests leaving convictions behind us, in a similar way as Schumpeter did, and trying to establish synthesis around all of these bedrock paradigms.¹ Two possible categories emerge at the ground, the first one would be called the *Social System Paradigm* (SSP) and the *Social Evolution Paradigm* (SEP). SSP denotes for example the way Luhmann (1984) considered the social sciences, as a completely interconnected complex system. SEP adds a simple thing into the idea of SSP, namely the dimension of *continuous time*. SEP is an ontological strand where interconnected complex social systems still evolve. Tang (2010, p. 25) also shows in an impressive way that neither neoclassical economics nor the rational-choice paradigm will be able to integrate such a perspective, because these approaches remain pseudo-evolutionary ones on the one hand and ignore too many of the above announced bedrock paradigms on the other hand. SEP reveals an ontological program incorporating the most bedrock paradigms as well as introducing time into its basic foundation. Hence it is argued the social sciences should integrate the very idea of SEP, capable to include the idea of *system transformation* as

¹ For a detailed analysis of all nine paradigms and their possible synthesis consider Tang (2010).

a major ontological position. These advantages make it the ultimate ontological paradigm for social sciences at the moment. The possible strands within SEP and especially within evolutionary economics will play the dominant role in part one of the thesis.

The dissertation will give a new perspective on the evolutionary theory of institutions and their role in political economy. The aim of the thesis is on the one hand to provide a decent overview of the discussion on ontological foundations of evolutionary theory in economics and to give a better understanding of how evolutionary concepts can stimulate the economic theory of institutions and economic policy in specific realms. On the other hand the thesis will explain in a heuristic way how institutions emerge due to social interaction among economic agents, their role of innovation and stability as embedded social structures in society and how they may disappear. Last but not least, the thesis will try to connect institutions with the concept of power in political economy, along the methodological approach of dynamic network analysis and agent-based modelling.

The first part emphasises the ontological foundations of evolutionary economics. Inspired by Witt (2008) the thesis will give an overview of contemporary ontological strands in evolutionary economics. This part of the dissertation shall give the reader new insights on possible ontological roots of evolutionary economics. Additionally it shall show the extreme difficulty of forming a consensus on ontological foundations within a rather young scientific community. Further, part one will be necessary to fully understand the heuristic projections of institutional change in an evolutionary way.

Part two of the thesis will provide better understandings of what are institutions and how their life-cycles look alike. Further, there will be presented four different heuristic systems of institutional change referring to the heritage of Thorstein Veblen (1857-1929), Friedrich August von Hayek (1899-1992), Joseph Alois Schumpeter (1883-1950) and Pierre Bourdieu (1930-2002). The mission of this part is to explain the major characteristics of selected heuristic devices, how they compete with agency-structure dialectics, to compare them and to work out harmonies and disharmonies for possible consensus on the economic theory of evolutionary institutional change. Building upon the significant heuristic devices it is also suggested to look into four appropriate economic policy arenas and think about possible new out ways of definitive lock-ins in global economic policy. These arenas concern: *the environment and climate change, finance and global banking, democracy design and regional innovation* and finally *education*. Institutions are not technocratic or constructed vehicles in

political economy, but rather vivid organisms embedded in society. Hence power relations force institutional innovations and institutional stability – namely peace and conflict in society.

Part three of the thesis leads us to methodology. According to Herrmann-Pillath (2002) institutions are neatly connected with the concept of power in a very dynamic way. We may also say that power is the dynamo for institutional changes. Following Herrmann-Pillath (2002), this relationship should be analysed within the approach of network analysis or more basically with graph theory. Which we will use to outline the dynamics of power networks, with institutions and organisations as nodes and power relations as edges. The major idea is to link network analysis with agent-based modelling. Agents (households) shall be able to interact and link each other in a geographical space. They will play iterated games (Prisoner Dilemma) to build institutions and organisations by the means of cooperation, equipped with social and economic capital. Further, institutions will interact along their leaders in a social network on a higher level in this artificial society (along a Hawk-Dove game); they will be equipped with relative power to gain influence on other entities in this political economy. The interaction on the more *micro* level and the interaction on the institutional level shall represent the complex, adaptive dynamics of an artificial political economy, where institutions may emerge and disappear in each turn. This approach attempts to visualise the evolutionary theory of institutions and power in a very generic and archetypical way within a computational agent-based network and should give new insights on the stability and innovative potential of a political economy.

2. Evolution – Ontological Foundations

2.1. A brief history of evolutionary economics

Evolutionary Economics got more than less prominent with the seminal work of Nelson and Winter (1982), *An Evolutionary Theory of Economic Change*. This can be seen as a starting point for a new upcoming paradigm in the economic academia. Their approach, introducing routines and dynamic capabilities into the theory of organisation and industrial economics, reached nearly every economic department in the western hemisphere and kicked off a new kind of thinking about economic phenomena. The idea was to analyse economic processes in a dynamic way, rather than focusing on economic outputs in static equilibria, as it was usual in so called orthodox or neoclassical economics. Therefore it can be seen as an alternative research agenda or programme in economic theory. Evolutionary economics should breathe new life into dominant methods and assumptions on economic analysis. It was established to offer alternatives to comparative statics, general equilibrium theory and rational choice. Not all of these proposed changes were made by Nelson and Winter, but they integrated alternative historical thoughts about economic theory into something new. So why should economists switch or have switched from the dominant neo-classical paradigm to the rather new evolutionary paradigm?

It is this tradition of 'fine tuning of realistic behavioural models', that induces most contemporary 'evolutionary' economists to use a collection of typical ingredients of models as characterizing the label 'evolutionary'. And it is this type of economic work, which seems to attract the majority of evolutionary economists. In many cases this first current of contemporary evolutionary economics tries to improve on topics somewhat neglected by neo-classics, e.g. technical progress. Hanappi (1994, p.15 f)

These alternative thoughts can be traced back to maybe the most important economists of the 20th century, namely Schumpeter, Veblen, Hayek and Simon. They all played their more than respective role. Schumpeter's (1911) '*A Theory of Economic Development*' was a new and

unique approach to the theory of business cycles. He emphasised development and economic change driven by innovation and entrepreneurship in his economic analysis. Schumpeter somehow stood in tradition of the classical economists of the 19th century, like Smith, Ricardo and Malthus, who envisaged economic analysis along coordination and change in society. Schumpeterian revolutionary thought dealt with the specific treatment of change due to economics processes. On the one hand it was the idea of triggering innovation through risk-averse entrepreneurs and on the other hand the idea of creative destruction via recombination which should lead to economic growth in a second instance. The ideas of variety, diversity and selection always lied just implicit in his work. These principles or concepts of innovation via outstanding entrepreneurs and the idea of creative destruction made his business cycle theory that unique, which will be discussed in more detail in section 3.4. Additionally Schumpeter's thought cleared the ground for scientific innovations in economics. Nelson and Winter used these concepts and reshaped them in a new evolutionary agenda.

Without the work of Veblen's institutional analysis evolutionary economics would not look the same as it is today. In his work on *'The Theory of the Leisure Class'*, Veblen (1899), he emphasised the people's behaviour or their habits as the major ingredients for institutional change in society. No theory of institutional change can neglect that these habits of thought are the most important ingredients for this kind of analysis. Veblen also made a first awakening for an evolutionary theory of economics in the scientific community in his famous article *'Why is economics not an evolutionary science?'*, Veblen (1898). There he shows that any change in society can be identified by cumulative change of institutions. These reproduction processes work along rules, habits or conducts and are somehow culturally reproduced. Veblen's model of cultural inheritance works like a top-down mechanism, sometimes also called *trickle-down model*. It means that people from the upper classes in society try out new things and induce fashions, over the years these fashions are reproduced in the lower societal classes. Veblen also explains societal hegemonies of the upper classes within this logic. He truly was one of the most important thinkers in American institutionalism and his thoughts are essential in any context of institutional analysis. Therefore Veblen's heritage and his specific way of framing societal issues will be extensively discussed in section 3.2.

Another influential thinker of evolutionary economics was Hayek, especially his later work represents cultural evolution and the idea of systems of rules of conduct. Hayek's trilogy of

'*Law, Legislation and Liberty*', Hayek (1973, 1976, 1979), opened the way for concrete evolutionary thinking. Additionally he emphasised the idea of spontaneous order, self-organisation and group selection in a new way. Hayek's fight against socialism made him to an ambiguous figure in political theory. He earned a lot of critique from the left among political economists due to his aversion against central regulation. Nevertheless his work was astonishing for this time. Hayek made a clear distinction between construction and evolution, in his view society should prevail through conductive rules or mutual institutions instead of rigid constructed vehicles. There we can also find his distinction between *Kosmos*, which represents the evolution of rules and norms through spontaneous order in an opened system, and *Taxis*, which represents constructed rules or constructed institutions in a closed system. He believed that liberty and fair legislation can only be fulfilled through cultural evolution of conductive rules in society. Hayek was one of the major architects concerning the study of the evolution of rules and norms in society, which makes him one of the founding fathers of modern evolutionary theory in economics. Hayek's work involves a lot of improvements to the idea of institutional change; hence his heuristic conceptions are extensively discussed in section 3.3.

Herbert Simon has to be mentioned as a founding father too. Unfortunately there was not enough space in this dissertation to dedicate a whole section for his thoughts on evolution, complexity and bounded rationality. Nevertheless Simon's computational approach to economics was unique in the 20th century. He focused on artificial intelligence to solve major problems of logic and mathematics. This scientific focus led him to think more and more on human decision making and its mechanisms in general, which brought him to the concept of bounded rationality. Within his works on '*The Sciences of the Artificial*', Simon (1969), and '*Models of Bounded Rationality*', Simon (1982), Simon slightly changed the dominant picture of economics, namely the assumption of rational choice. Actors make decisions on pure rational grounds and with complete information in economic models. That means in particular that they make perfect judgements and develop optimal choices. This assumption was perfectly weakened by Simon concerning his study of decision mechanisms. Bounded rational economic actors do not have complete information of the world, cannot solve problems with perfect models and do not calculate optimal choices; they usually adapt their behaviour in response to the environment. This was the rising start of computational economics, where agents use strategic algorithms to make their choices with bounded rationality, but always

with respect to changes in the environment. Hence evolutionary economics can rely on new methodological sets, developed from the science of complexity. This kind of economic methods assume different strategies for players and local neighbourhoods for their information horizons, which gets a little bit closer to reality. Such methods, like agent-based modelling or dynamic social network analysis will be discussed in the complexity section of the thesis, section 4.

Schumpeter cleared the ground for an evolutionary way of innovation economics, Veblen for an evolutionary way of institutional economics, Hayek for an evolutionary way of rule-making and legislative economics and Simon for an evolutionary perspective of decision making and a new concept of rationality. Nevertheless if you would ask young scientists in the field, what evolutionary economics is and what you can do with it, you will never get a clear-cut answer. This diffuse space of different definitions is still one major advantage of the discipline, i.e. plurality. Plurality may also lead to disadvantages, when a discipline grows out of its infancy. Chaotic and endless debates about economic reality and how to treat it may intimidate or repel newcomers to the discipline and may create a closed community. Therefore the aim of this first part of the thesis is to locate different ontological strands, to link them to their roots and to discuss their harmonies and disharmonies.

2.2. Ontological strands

As it was mentioned above evolutionary economics has many facets nowadays and intense discussion is invoked by finding an appropriate consensus on its ontological roots. Hence in this chapter main problems and issues concerning the actual and perhaps – or thankfully – never-ending debate.

According to Hanappi (2003) the young scientific community of evolutionary economists should not worry too much on finding such a deep ontological core. This rather general assumption stems from Hanappi's distinction between *paradigms* and *programs*. A paradigm consists of *Core Sentences* which are either theorems or synthetic sentences and a *Protective Belt* around the core, concerning Kuhn's analysis of scientific revolutions. What we would consider as normal science would be located in the protective belt, where the core sentences or axioms are tested and falsified via empirical observations from the real world. Additionally this belt has to produce scientific knowledge to defend the core sentences against different approaches or antithesis, as its name suggests. This principle of a paradigm fits for all analytical sciences, as well as for mainstream economics which feels at home in the analytical world of sciences. Therefore scientific revolution happens if these core sentences change over time or disappear for a new paradigm. This attempt of a scientific revolution obviously relates to '*... research in the development of formal languages*' Hanappi (2003). This is why he refers to Kant by saying that there is a second type of scientific disciplines which are concerned with the synthesis of two worlds, the world of formal representation and the world outside of language. Therefore Hanappi (2003) suggests that the evolutionary program in economics should jump from *analysis* to *synthesis*. By synthesis he also means that economists should go a different way in modelling real world phenomena. By that, he refers to programs – understood as computational programs – which are written in a language, but additionally perform something outside the language. The fundamental difference between analytical approaches and synthetic approaches is that there is no more clear distinction of the *Core Sentences* and the *Protective Belt* necessary, because the ontological root of the science swaps from discovering to interpreting the world. For those reasons axioms get less important than information processing and the formation of language, which are also *the* driving forces for cultural evolution. By that means we are also able to distinguish the evolution of mankind

from the evolution of animals and vegetative life-forms. In such an evolutionary program² of economics the scientist would design or simulate real-world phenomena within programs, rather than produce a concise and consistent mathematical framework to discover something which has not been found. These are very critical differences in scientific working itself, the proposed approach is more, so to say, experimental, by the means that scientists should find something through new interpretations and in a Schumpeterian way through new combinations; contrary to scientific work that concentrates on formal analytical models which are more or less bound to the core sentences or axioms, mentioned above. Major complications may occur when switching from paradigms to programs:

At least some sentences of programs refer to items outside the language, they try to spell out simplified non-linear dynamics that are suggested as a model of essential ‘real’ world dynamics. Since such programs are produced (not discovered) by participants in the real process, these programs contain images of their producers. They even may contain images of their own production processes. In short, the problem of self-referential circuits between real and model dynamics appears. Hanappi (2003)

This challenge makes computer simulation attractive as a language for synthetic sciences. The scientist is active part of the so-called real-world dynamics, as also the *Lucas critique*³, Lucas (1976), concludes; therefore no scientific achievement can be seen as an isolated and clean artefact; which is often the curious ambition in mainstream economic theory.

Therefore the introduction of language and the neatly connected development of human consciousness are the main triggers for the evolution of human mankind and have to be the critical factors for an ontological basis of any evolutionary program in economics. In order to give a comprehensive overview for further detailed discussion on ontological foundations it is suggested to refer to Witt (2008a) by introducing the main theoretical protagonists in evolutionary economics. The different approaches are distinguished as following:

... the *ontological* level (what basic assumptions are made about the structure of reality), the *heuristic* level (how the problems are framed to induce hypotheses), and the *methodological* level (what methods are used to express and verify theories). Witt (2008b, p. 548)

² Hanappi (2003) refers to programs in both senses, in its computational one and in the same time in its sense of a scientific program for future research.

³ Additionally we have to add here, that mere microfoundation with a representative agent – as it is the case in mainstream macroeconomic theory as e.g. in Obstfeld and Rogoff (1996) – is not sufficient to reveal or describe the dynamics of complex adaptive economic systems; therefore there is still a need for heterogeneous agent-based models of macroeconomic issues, as solid and more realistic microfoundation.

Table 2.1.: Ontological Creeds and Heuristic Twists

		Ontological Creed	
		monistic	two-tier
Heuristic Twist	Darwinian Concepts (variation, selection and retention)	<i>General Darwinism</i>	<i>Neo – Schumpeterian</i>
	Generic Concepts (novelty, emergence and dissemination)	<i>Continuity Hypothesis</i>	<i>Schumpeter's Development</i>

Source: Witt (2008a, p. 14)

In table 2.1 the different themes are categorised along two axes, an ontological and a heuristic axe. Each axe offers two options which lead us to four specific evolutionary foundations: *General Darwinism*, *Neo-Schumpeterian economics*, *Schumpeterian economics*, *the Continuity Hypothesis of evolution*.

The main ontological differences stem from perception and conception of evolution among the economic theory. Witt (2008a) supposes a distinction between a monistic and a two-tier relationship between evolution and the economy. As one can guess the monistic picture of the world offers a unified perspective on evolution and the economy. It means that the economy, all of its processes and units are part of the evolution of life; therefore the economy additionally has to behave according to evolutionary rules, because it is a part of the system of evolution, it cannot escape. Alternatively the two-tier ontological perspective views the economy and evolution as two separate systems. Therefore economists should only borrow ideas from an evolutionary theory as analogies and apply them in an economic model, but they still remain as two separate systems of thought. According to Witt (2008a, p. 10):

Constructing analogies between different disciplinary domains is a frequent *heuristic* device, that is guidance in framing problems and setting up hypotheses. A question to be distinguished from this is the *ontological* claims that theories make (often implicitly) regarding the connection between the disciplinary domains involved.

By that he makes clear that it is on the one hand necessary to borrow ideas and implement them in your, respectively the scientist's, thesis to create new hypotheses, comparable to the

Schumpeterian way of new recombinations and to the stated arguments for scientific progress at a whole made by Hanappi (2003), as it is mentioned in the previous chapter. On the other hand scientific analogies can mix up things a lot, specifically when it is not clearly defined which domain hosts the ontological core. In our case we are confronted with two domains – biological evolution and socio-economic evolution. Once a biological analogy is formalised in economics, you may benefit from a new heuristic projection in the economic domain, but you may also mess around with the ontological base, which can still represent a different world. It is exactly this synthetic problem which occurred in the evolution of evolutionary economics; additionally this synthetic problem maybe has to occur within every scientific revolution. Witt (2008a, p.11) explains the two-tier ontology along the following statement: *‘If the ontological question of how economic change relates to change in nature is not entirely ignored, a kind of two-tier ontology is usually assumed. This means that economic and biological evolutionary processes are considered independent and disconnected elements of reality.’*

On the other side we can see differences in building a theory concerning the heuristic attitudes, projections or devices as in table 2.1. *‘These attitudes determine how problems are framed and hypotheses are formed in developing a theory.’* (Witt, 2008a, p.12-13) These projections determine the mechanisms of and for change in evolutionary economics by framing the problem of change. This discussion was started here by looking into Hanappi (2003), whether there is a common mechanism of dynamic endogenous change in economics, driven by evolutionary rules or not. As Witt (2008a) follows, we may conclude that there is not a common agreement on the specific systematic of and for change in economics in evolutionary economics, as also Hanappi (2003) emphasised. Apparently there are two major outlines which can be followed; firstly there is the traditional Darwinian logic of genetic change, driven by selection pressures on a specific population via *variation-selection-retention* – briefly the genetic algorithm –; secondly there is a generic approach which has its origin more or less in classical economics and works with the terms *novelty, emergence and dissemination*, as visualised in table 2.1. General Darwinism e.g. proposes that all change in life and in living can be framed more or less by the genetic algorithm, as it works in biological evolution. Biological evolution may work pretty well within this concept, because there are populations and species out there, which are not capable to reproduce information via culture and are therefore not capable of evading natural selection pressure via technology or something else, as the human species did in its history. Hence we need a different, more

flexible or generic concept to frame systemic endogenous change in human culture. As Hanappi (2003) distinguished between E.T.1 and E.T.2, Witt (2003) shaped the Continuity Hypothesis, a hypothesis, that evolution continues in human cognitive processes, culture and so on, but it broke with biological evolution via the innovation of language or information processing via culture and technology. Hence the systemic endogenous change is driven by self-transforming and self-organising processes as emergence and novelty, which then disseminates via culture, language and so on. This heuristic attitude was also shared by Schumpeter (1911), nevertheless Schumpeter made a clear distinction between economics and evolution. Therefore he even mentioned the word evolution and alternatively he used the German word *Entwicklung* (development) to express familiar opinions and hypotheses. That is also a part of the Neo-Schumpeterian synthesis. The Neo-Schumpeterians followed the Schumpeterian ontological two-tier distinction, but stepped into a Darwinian heuristic logic. In Neo-Schumpeterian theory there are analogies and correlates from biological evolution and or genetics, e.g. Nelson and Winter (1982) introduced *genotypes* and *phenotypes* into economics, as analogies for *firms* and their *routines*. Nevertheless they remained in an ontological two-tier position.

Witt (2008a) further follows that the heuristic attitude of emergence, novelty and dissemination is a generic concept, because every evolutionary change can be explained through alternate introduction of novelty into a system and its corresponding dissemination. According to this opinion or hypothesis the *Darwinian* heuristic twist is just a biological special case of the generic concept. With respect to this, the *Darwinian* projection may postulate the same for the *generic concept*, because if we consider biological evolution as the most universal system of change on earth, then the systematic of generic change may be handled as a special case too. This discussion may remain in the eye of the observer, as we will see later in more detail. Whether the one is a special case of the other, independently Witt's *Continuity Hypothesis* proposes that the evolution of culture, hence language, is something different than *pure* biological evolution, because it generates cognitive structures in human beings that can evade the selection pressure through culture and technology, as mentioned before. This also fits in the concept of Hanappi (2003).

Witt (2008a) suggests that we have to be very careful in using specific heuristic devices. He warns the scientific community in front of using *Darwinian concepts*, because the original agenda of evolutionary economics was to create something new, something heterodox in

comparison to neoclassical economics. His awareness stems from the comparison of *rational choice* as the dominant heuristic device in neoclassical economics and the *selection* metaphor, now used as a heuristic device in many articles of evolutionary economics. In any case Witt (2008a) brings in a very important notion for future research in the discipline, namely to think about the appropriateness of *mechanic*⁴ metaphors or heuristic devices in economics at all. Nevertheless it is getting quite complex at this point, because we do not know yet, whether such a heuristic device narrows the scientific spectrum of evolutionary economics as neoclassical economics did with the orthodoxy, or not; additionally we cannot rule out that Darwinian concepts are not *mechanic* at all, but somehow biological and therefore finally humanist again.

At last, one has to mention that Witt (2008a) concludes that all evolutionary theories in economics have a tendency towards a monistic ontological position now, as one can also see in Dopfer (ed.) (2005); but still oscillating between *Darwinian* and *Generic* concepts. Hence we will leave the discussion in this phase and bring in other opinions towards the ontological and heuristic distinction in evolutionary economics now.

... that 'borrowing from evolutionary biology', in the sense of assuming that the abstract structure of evolutionary theory in biology is a useful starting-point for studying ongoing processes of economic evolution, does neither entail a denial of agency nor a commitment of reductionism. Vromen (2004, p. 216)

Here we climb up to a critical point, namely whether an ontological basis for economics should even be based on evolution at all. Critics of this approach, like Post-Keynesians as Lawson (2003), suggest a new social ontology instead of working with an evolutionary one, because the evolutionary approach would lead either into holism or reductionism. But this is the case with every social science; it is even the subject of century-long debates in sociology. It is not a good excuse to say that we do not have the problem, because the others have it too. Nevertheless an evolutionary approach emphasises the moment of change in society, endogenous dynamics; this is truly something which gives it a kind of universality, but still needs particularistic auxiliary explanations. Therefore one should take it as a starting-point and then bring in some more discipline-specific fine tuning. *General System Theory*, as developed from Bertalanffy (1968), was a new starting-point for sociology too, when we consider Luhmann's (1984) theory of social systems as a new kind of thinking in sociology.

⁴ It is clear for Witt that rational choice and the selection metaphor as well is a mechanic heuristic projection. Maybe he is looking for a more humanist tradition of thought to project systematic endogenous change.

System theory and on the whole the theory of complexity have had similar roles in the social science in the second half of the 20th century, as the theory of evolution has now. Additionally one cannot separate system theory and complexity theory from the theory of evolution. Witt's heuristic hypothesis even works with expressions inherent in system theory, like emergence, self-organisation or self-transformation. Therefore a new evolutionary ontological basis for economics has to pay its utmost attention to concepts from system theory and complexity theory as well. This will be necessary to cover the holistic dimension of an evolutionary approach, or the degree of universality. Nevertheless the ontological core has to consider individual agency on the same level, in order to evade too strong holism. Therefore a new kind of economics also has to dig into the domains of psychology and the cognitive sciences, to get full-fledged flavour of how individuals act in society, what they want and what they need. This also includes the interdisciplinary field of social psychology which analyzes the power of the masses, hence herding behaviour.

These are all necessary approaches for a new ontological core in economics, but as Vromen (2004) puts it, it does not not exclude that the ontological core consists of an evolutionary heart, because each domain has its origin in evolution itself; they are all cumulatively embedded.

Further we have to ask, if we can even think about ontology separated from methodological issues? This is a crucial question, as also Lawson (2003) emphasises, therefore he suggests starting with ontology, rather than with methodology and epistemology.

But with what ontology should we start then? What ontology has sufficient credentials to play this role? Lawson's assertion that all methods, frameworks and points of view have ontological presuppositions can also be turned upside down here. Any attempt to formulate an appropriate presupposes a point of view and has epistemic presuppositions. Vromen (2004, p.218)

By this, Vromen (2004) is completely right; the aim of building a new ontology does not have to turn into a race for a *prima philosophia* of social reality, as he puts it; and as obviously Lawson (2003) wanted to. This has to be concerned when looking for an ontological core. On the other side Vromen (2004) tries to categorise the different approaches in the ontological discussion as following:

- *The 'biological metaphor' and Universal Darwinism*
There are processes of economic evolution going on that exhibit the same essential abstract features as Darwinian evolutionary processes in biology.
- *The Continuity Thesis*
Prior non-economic evolutionary processes made ongoing economic evolutionary processes possible.

Furthermore, outcomes of prior non-economic evolutionary processes and concurrently ongoing non-economic evolutionary processes still affect ongoing economic evolutionary processes.

- *A Layered Ontology*

There are several related levels of organization in the economic realm that in turn are realized in lower levels of organization (studied by psychology, biology, chemistry and physics), and at which evolutionary processes may be going on concurrently.

Vromen (2004, p. 222 ff.)

It is surprising why Nelson and Winter are put in the same box with Hodgson and Knudsen, contrary to the concept of Witt (2008a). Maybe Vromen (2003) assumes that *Neo-Schumpeterian* economics has already changed towards a more monistic ontology of economic thought, so he can put them together now. Nevertheless for the further development of this thesis categorisation is separated in this case. It is quite difficult to find a clear-cut distinction on the one hand and appropriate unifications on the other hand. Further it is not possible to distinguish the different approaches purely on the ontological level, because heuristic projections play a crucial role here as well. Conclusively there will be a major ontological separation between *dualistic* and *naturalistic* approaches. In the dualistic section there will be a distinction between *Neo-Schumpeterian* economics – with Darwinian heuristics – and reinterpreted *Schumpeterian* economics – with generic heuristics. In the second ontological block there is a separation between *Generalized Darwinism* and *Naturalism* (understood as a superset for *Continuity Hypothesis* and *Evolutionary Realism*). The problem within this distinction is that Generalized Darwinism is naturalistic as well, as we already elaborated above. Additionally one can definitely say that Generalized Darwinism is far, far away from *biologism*, which would offer another possible superset, though this would lead into a deterministic superset. Therefore the three ontologically monistic approaches are put together in ontological terms and then separated via their heuristic projections, somehow a mixed strategy, i.e. *Darwinian Naturalism* or *Generic Naturalism*. Obviously the idea of separating the *Continuity Hypothesis* (developed by Ulrich Witt) and the *Layered Ontology*⁵ (developed by Kurt Dopfer) is not supported, both ontological outlooks do always explicitly refer to naturalistic foundations of evolutionary economics, whereas *Generalised Darwinism* may implicitly share the idea of naturalism or consilience, though does not put it straight forward. Hence *naturalism* plays the most dominant ontological role *only* in the *naturalistic generic* strands and it somehow builds the basis for them, the highest priority so-to-say. According to this crucial and critical point the *Continuity Hypothesis* and *Evolutionary*

⁵ Vromen (2003) uses the term *Layered Ontology*, where Dopfer is using the label *Evolutionary Realism*.

Realism are treated along the same superset. Finally *critical naturalism* will be more prominently discussed in a dedicated chapter with special reference to Roy Bhaskar (1989) and Herrmann-Pillath (2008).

Conclusively the separated sections on the ontological level are just *Neo-Schumpeterian economics* and *naturalistic approaches*, nevertheless there has to be a second distinctive argument, which rests on the *heuristics*. Therefore the reader will find two further logical separations in the naturalistic section, as *Darwinian naturalism* and *generic naturalism*. Finally there has to be a last classification in generic naturalism between the *Continuity Hypothesis* and *Evolutionary Realism*. The only argument, fighting the consistency of this framework, is to doubt the generic nature of *Evolutionary Realism*, which is a very crucial and critical issue.

2.3. Dualistic approaches

NEO-SCHUMPETERIAN ECONOMICS

Neo-Schumpeterian Economics has to be understood as a research program to fulfil the theoretical Schumpeterian economic system. Schumpeterian economics was about the driving forces for economic growth – or more exactly – the driving forces for economic change. Change and development is something different than growth in a first instance, change e.g. lies on a lower systematic layer than growth; it needs change for growth, but growth is not needed for change. This is a very crucial point in Schumpeterian analysis, because innovation primarily induces change and not growth. Change can be interpreted as an exogenous shock in orthodox economic terms, which changes the equilibrium state of the economy and leads to disequilibrium. But it is exactly this context which shows or reveals the dynamics of an economy in heterodox terms. In the Schumpeterian economic system we can find a progressive analysis of what may change and how it may change the economy, it is about innovation dynamics which leads to disequilibria. By that, orthodox economic instruments seemed inappropriate to describe and explain these specific dynamics.

As we stressed in Chapter 2, analysis of Schumpeterian competition has proved a difficult task using orthodox theoretical premises. ... Although these models [*models with orthodox premises of profit maximization and equilibrium*]⁶ have yielded some illuminating insights, they ignore essential aspects of Schumpeterian competition – the fact that there are winners and losers and that the process is one of continuing disequilibrium. An evolutionary analysis seems required if the model is to recognize those facts. Nelson and Winter (1982, p. 276)

This is the very crucial notion everything in economics is about, it is about winning and losing and about the sequence of games as a continuous process of disequilibrium, due to incomplete information. Therefore we may introduce the first evolutionary instrument or the first evolutionary concept, Nelson and Winter (1982) brought into the game, namely imitation. Imitation is one of the most essential skills living organisms are equipped with. If there are winners and losers, the losers will keep on imitating the winners to improve their performance.

But, as Schumpeter emphasized, a central aspect of dynamic competition is that some firms deliberately strive to be leaders in technological innovations, while others attempt to keep up by imitating the successes of the leaders. Nelson and Winter (1982, p.275)

⁶ Brackets added.

Hence, any evolutionary analysis has to involve heterogeneity of the specific entities. If all agents are the same or just represented by a single one, as it is in orthodox economic theory, there will not be a distinction between winners and losers or leaders and followers. Imitation and adaptation are central elements for this competitive logic. In order to have or get heterogeneity, the entities need to behave in different manners, due to different rules or as we will see later due to different routines.

Firms are treated as behavioural entities. Firms search to find alternatives to techniques they presently are using. Their profitability is presumed to determine whether they expand or contract.
Nelson and Winter (1982, p. 276)

Here we may introduce the next central evolutionary element, namely selection. The observed entities – in Nelson and Winter (1982) we are confronted with firms – underlie a selection process, which evolves winners and losers.

The key development process he [Schumpeter] identified as the ‘*carrying out of new combinations*,’ and in the competitive economy ‘*new combinations mean the competitive elimination of the old*’. It is the entrepreneur who carries out new combinations, who ‘*leads the means of production into new channels*’ and may thereby reap an entrepreneurial profit. Nelson and Winter (1982, p. 277)

If a firm is a successful innovator frequently enough or if one of its innovations is dominant enough, the consequences of successful innovation may be a highly concentrated industry structure. (ibid. p. 308)

Within these two quotations we can find the essential elements of the Schumpeterian economic system in a very concentrated way. We have the notion of new combinations which eliminate the old ones and we have the successful entrepreneur benefiting from surplus profits in an early monopoly, maybe leading to a new industry structure through innovativeness. This process can be interpreted as a selection process in an evolutionary way, where the fittest takes the lead and the others imitating her in a new emerging industry sector. The innovation itself emerges out of new combinations of either old products, old means of production or old modes of organisation. Bringing in the Darwinian concepts of variation, selection and retention is exactly the so-called Neo-Schumpeterian synthesis of Schumpeterian and evolutionary thoughts. Nevertheless the most innovative concepts in Nelson and Winter (1982) lie in a deeper context; they introduce heterogeneity to firms, which even makes it possible to bring in evolutionary ideas. Additionally it is their distinction between the mode of production and the mode of organisation. In the orthodox tradition extra profits may only be made by maximising the modes of production, through more efficient techniques, but Nelson and Winter (1982) additionally talk about different modes of organisation, which leads them to the concept of routines and dynamics capabilities. Those two concepts make out the most

important characteristics for heterogeneity and following evolutionary processes, it is so to say, the core of their Neo-Schumpeterian agenda.

As mentioned before, economic entities or actors should be treated with different behaviour and not just *as if* they show different behaviour. In the orthodox textbook explananda, mainly in microeconomic textbooks, there is no room for heterogeneous behaviour, because any micro-entity is subsumed to a representative agent confronted with a simple maximisation problem underlying a set of alternative choices. But choice itself is far away from behaviour; choice is only the static or discrete outcome of specific continuous behaviour or specific behaving rules. Behaviour is a dynamic concept, it evolves continuously through stepwise adaptation to the actor's or entity's environment and it is certainly never perfect, complete or fully consistent.

The postulate that firm behavior results from maximizing choice leads the theorist to analyze an optimizing decision rule for the firm, a rule that maps from market conditions and other variables external to the firm to the feasible action that scores highest on the firm's objective function. Both of the terms 'maximizing' and 'choice' warrant some scrutiny. ... It is not clear whether the new most complex models of decision making with limited and costly information are intended to capture, as well, the fact of limited information-processing capacity, or the possibility that firms may be wrong in their understanding of the decision problems they face. Nelson and Winter (1982, p. 66)

Again, this argument is very crucial for analysing economic processes. It is not possible to extend traditional text-book models with the actors' behaviours, to simply extend the conventional decision and maximisation rules. The point is to develop a new taxonomy, a new mode of modelling with new concepts that satisfy the empirically observable circumstances in real production units. Therefore Nelson and Winter (1982) introduce two very essential concepts, which may be important for a more general concept of economic behaviour. On the one hand they indicate individual skills as a basic heterogeneous characteristic for individuals inhabiting an organisation. On the other hand their theory implies a concept of organisational routines, which cumulates through individual skills and modes of organisation. First they emphasise that those skills are programmatic and that their underlying knowledge is tacit, because it evolved habitually and not by mere codified learning – pure information processing. Here, both – skill and routine – are comparable to programs, as well as computer programs. This conception of a skill or a routine marks the underlying complexity of organisational actions, where programs and units have to interact comparatively, in order to manage a complex set of actions. In their analysis Nelson and Winter (1982) additionally focus on the history or more exactly on the memory of an organisation. Individual skills and

organizational routines cumulatively sum up to a specific memory of an organisation; this is what they call the tacit knowledge of an organization, which is apparently a heterogeneous property of the specific entities. This memory and inherently the underlying learning processes shape possible evolving paths for the organisation; here path-dependency is introduced as another crucial evolutionary concept. In order to understand the logic of an enterprise, one has to gather the organisational knowledge, resulting from organisational routines, of the entity. Nelson's and Winter's (1982) Neo-Schumpeterian synthesis thus relies on an interpretation of organisational routines as genes. Hence those genes incorporate the tacit knowledge of the organisation's mode of production. Therefore we can assume that any organisation has a different genetic code, because every organisation – even if it operates in the same market segment – has to deal with different skills of its members and consequently develops different routines which may fit in the enterprise and further evolves different path-dependences. Further Nelson and Winter (1982) build up their Neo-Schumpeterian model of competition on these foundations, extend it to growth perspectives and industry evolution.

The crucial element of this analysis shall reveal the ontological foundations of their approach. Clearly, ontological issues in this matter have to deal with the units of selection and the proposed selection process itself, determining the competition dynamics of entrepreneurs. Nelson and Winter (1982, p. 135) call this ontological core issue the *subject of organisational genetics*, but they additionally notice, that '*...the subject has barely been defined and the real work remains to be done.*' By reading the seminal volume, it is clear that Nelson and Winter kicked off an avalanche for new ideas and theoretical concepts to treat economic change in an appropriate way. Nevertheless they have left a huge ontological puzzle. We may reconstruct their ontological core as the unit of selection, i.e. represented by organisational routines – in biological terms genes. But they lack in explaining the interaction of genotypes and phenotypes. The phenotype in the Neo-Schumpeterian system can be seen as the whole organisation, as the characteristic of underlying genotypes which represent the routines. Now, nearly 30 years later we can say that the genotypes are to be considered as generic elements or inhabit the generic layer of the economy, where we can find e.g. technology, culture and so on. The phenotypes inhabit the operant layer of economy, the mere organisational level of entities, understood as holistic units.

Twelve years later, Nelson and Dosi (1994, p. 155) point out four principal building blocks of an evolutionary theory, which may lead us to a more concrete understanding of ontological

foundations of Neo-Schumpeterian economics as an evolutionary strand.

- i) a fundamental unit of selection (the genes)
- ii) a mechanism linking the genotypic level with the entities (the phenotypes) which actually undergo environmental selection
- iii) some processes of interaction, yielding the selection dynamics
- iv) some mechanisms generating variations in the population of genotypes and, through that, among phenotypes

It is quite straightforward that one cannot construct a satisfactory theory of economic evolution simply by way of analogy with the biological model. Still, a reference to these four major building blocks of the biological model might help in illustrating the specificities of evolution in the social domain. Nelson and Dosi (1994, p. 155)

Remembering Witt's (2008a) categorisation of ontological strands in chapter 2.2. Witt (2008a) makes clear that Neo-Schumpeterian economics must be assigned to the dualistic-analogy-world instead of the monistic-ontology-world. Here we may find some contradictions with the Nelson and Dosi (1994) article, where they undoubtedly point out that any theory of economic evolution cannot be built upon an analogy with the biological model. In order to clear this up, we will sequentially follow all four major building blocks, proposed by them.

They intuitively assign e.g. technologies, policies, behavioural patterns and cultural traits to the units of selection, which can then be ascribed to genotypes. Whereas individuals and organisations or in general the *agents* map into the phenotypic level. The genotypes change from generation to generation. Further Nelson and Dosi (1994, p. 155) propose '*... the 'primitives' which the evolutionary process is supposed to structure, modify and select are not genes but plausibly mental categories, representations, rules.*' Among that, the authors add that the proposed selection process in the economy does not necessarily need to be directed, but can be directed, as e.g. in most technology markets with a lot of R&D budget. Additionally the selection process does reward or punish whole organisations and not just specific behaviour; which means in particular that Neo-Schumpeterian selection primarily interferes with the phenotype and not with the genotype or the organisational routines themselves.

Then Nelson and Dosi (1994) propose as a second building block for an evolutionary theory the mechanisms and criteria of selection. As we can say for now, selection is the most dominant and central element in the Neo-Schumpeterian evolutionary complex. The arguments towards the mechanisms of selection are very fuzzy. First they say that criteria

have to be multidimensional, like prices, quality and so on of market products, then Nelson and Dosi (1994, p. 157) point out: ‘... *the selection criteria – that is, the variables ultimately affecting probabilities of survival – remain relatively invariant: for example, the rates of reproduction, or the efficiency in accessing food.*’ Which is a very broad definition of selection criteria – it can be anything – but it has to be rigid concerning the argument of invariancy. Selection criteria have to be non-linear and complicated, but they may be anything.

Next, adaptation and variation comes into play as the last building block, according to Nelson and Dosi (1994). The authors argue that this block is about adaptation and learning processes of the agents. The agents’ behaviour is defined as rule-guided, context-specific and event-independent, whereas the agents are able to discover new rules and introduce new behavioural novelties into the system. Then they try to explain the proposed adaptation and variation dynamics by distinguishing them from the neoclassical concepts of behaviour and choice. On the whole their theory – shaped by these building blocks as the major concepts of an evolutionary theory – is very incomplete and far away from any ontological clarity. Nelson and Dosi (1994) explain the theoretical roots of the evolutionary concept in economics by showing what it should not be, concerning their critic on rational choice in neoclassical theory, which is necessary and undoubtedly scientifically important, but not that ontologically innovative. They propose the selection criterion as an ontological foundation, so to say as an alternative agenda to rational choice. The selection criterion is the most dominant foundation in Neo-Schumpeterian economics, as we have already seen that the authors have little to say about adaptation and variation. Learning processes of individual agents are the only focus on adaptation, where Nelson and Dosi (1994) clearly point out that learning is naturally imperfect adaptation. Nevertheless the central role in their theory may be the concept of routines and hence rule-guided behaviour, which is a big step forward in the right direction of customising the behaviour of economic agents. Patterns of organisational routinisation play the most dominant role in the selection process and therefore in technological and economic change. This is also the most active domain of Neo-Schumpeterian economics.

Nowadays most of the published work of Neo-Schumpeterian economic thought is concerned with innovation dynamics in industry sectors, clustering and agglomeration of innovation networks, industry evolution, entry and exit of firms, the study of any kind of innovation system, economic growth, technological change and hence the evolution of

learning and knowledge. There is not that much work on social and cultural innovations, such as formal and informal institutions as well as financial innovations and the study of capital accumulation, as the seminal *Elgar Companion to Neo-Schumpeterian Economics* by Hanusch and Pyka (eds.) (2007) shows.

Well, at last we even cannot say whether Neo-Schumpeterian economics follows an analogical or an ontological picture. But we know for now that ontology as such does not have that much weight in Neo-Schumpeterian publications as in other ontological strands. With creative concepts, such as organisational routines, tacit knowledge and evolutionary competition with an underlying selection heuristic, Neo-Schumpeterian economics has cleared the way, for all modern economic thinkers and theorists with an evolutionary *bias*. Nevertheless it lacks to develop or define its own ontological core as evolutionary economics.

Hanusch and Pyka (2007) stand the ground with their *Road Map to comprehensive Neo-Schumpeterian economics*, also published as Hanusch and Pyka (2005) *Principles of Neo-Schumpeterian Economics*. Those principles concentrate on heuristic and methodological possibilities of Neo-Schumpeterian economics. The primary focus of Neo-Schumpeterian economics shall be, as the reader may understand, on industry life cycles. Those life cycles change and develop over time through punctuated equilibria, as also the modern theory of evolution suggests, see Gould (2002). The authors outline the intellectual sources of Neo-Schumpeterian economics in Schumpeter's legacy, in the evolutionary economics of the 1980ies, in system theory and in complexity science.

The major focus of evolutionary economics lies in the emergence and diffusion of novelties which are driven by creation, selection and retention, the crucial forces of every evolutionary theory dealing with either biological or with cultural evolution. Hanusch and Pyka (2005, p. 4)

This quotation shows again the broadly seized definition of any evolutionary economic theory, but there is little left about some special ontological core of Neo-Schumpeterian economics. Concerning the road map, suggested in Hanusch and Pyka (2005, p. 7 ff.), they want to sketch a comprehensive picture for future developments of Neo-Schumpeterian economics with three pillars. Those pillars shall be industry development, the development of finance and the development of the public sector. This is a very ambitious claim, due to the fact that there are hardly any publications concerning finance or the public sector from Neo-Schumpeterian economists. Clearly, the authors say that the relationship between the three pillars drives or hinders the development of the whole economic system in a non-

deterministic way. But it is a different issue to model this relationship appropriately. At last Hanusch and Pyka (2005) draw the so-called Neo-Schumpeterian corridor as a tool for economic policy. According to the authors economic policy should follow this corridor, in order to keep the economy in neither overheated (increasing possibility for speculative bubbles due to over-investments) nor downside (increasing possibility for deflation and recession) macroeconomic circumstances.

Generally we can summarise that Neo-Schumpeterian economics cannot offer a clear-cut ontological core for on the one hand evolutionary economics on the whole and on the other hand particularly for an appropriate evolutionary institutional analysis as it is proposed in this work in chapter 3. Nevertheless Neo-Schumpeterian economics has developed unchallenged tools and concepts to analyse concurrent industry dynamics, the evolution of innovation systems, the evolution of organisational routines and dynamic capabilities and so on.

SCHUMPETERIAN

Finally we will discuss some outstanding reinterpretation-work of Yuishi Shionoya (2009), *Schumpeter and Evolution: An Ontological Exploration*, which will shed more light on this specific topic.⁷ According to him one may follow that Neo-Schumpeterian economics failed to fulfil Schumpeter's legacy on the whole, because Schumpeter had different ontological developments in mind. Shionoya (2009) refers to Schumpeter's ambitions for a universal social science.

Shionoya (2009, p. 1) emphasises that Neo-Schumpeterian contributions '*...are based on an interpretation of Schumpeter's contribution to economics as the exploration of a dynamic theory of innovation, entrepreneurship and competition, ...*'. Therefore it may lack on the one hand of a sociological perspective and on the other hand of a philosophical foundation. Shionoya (2009) further argues that Neo-Schumpeterian economics associates the notion of evolution with Schumpeter's dynamic economic theory, leaving out the non-economic realm. In order to grasp the whole story we have to briefly discuss Schumpeter's ontological core by excerpting Shionoya (2009, p. 1).

⁷ Shionoya's (2009) interpretation of the Schumpeterian economic system of thought concentrates on his ontological considerations and anticipations in this theory. Whereas in section 3.4 we will extensively discuss Schumpeter's heuristic achievements, which opened new ways for institutional analysis.

For Schumpeter, the idea of evolution is identified not with economic development in isolation but with processes of interrelated economic, political, social and institutional changes, because the most characteristic purpose of his work was to analyze the evolution of capitalism as a civilization.

Hence, Schumpeter was looking for a sociology-oriented universal social science. However his work can be structured in substantive theory (economic statics and dynamics, economic sociology,) and the investigation of a system of metatheory (philosophy of economics, history of economics, sociology of economics). In his famous chapter 7 (titled *Entwicklung*) in *A Theory of Economic Development* he firstly sketched such a theory, nevertheless he omitted it, because it attracted too many historians and sociologists. Schumpeter feared that his book may lose on economic influence; therefore he left this chapter out in further editions of the volume.

Schumpeter distinguished between the *hedonistic-static* economic agent and the *energetic-dynamic* agent. In the static concept the economic agent behaves to attain the maximum satisfaction of wants under given conditions, whereas in the dynamic concept the agent pursues creative forms in the economy. This differentiation accompanies him every time when he explains the most basic premises for innovation, development and evolution. According to Schumpeter, changes in technology/capital/labour/wants/organisation would cause adaptive responses of the economy involving the majority of economic agents. Therefore this analysis remains in the subject matter of static economic theory. However the essence of evolution and development does not lie in technical changes per se but in the energetic human activities, carrying out innovation – this part is truly designated to the entrepreneur – as Shionoya (2009) explains. Hence focus or mere concentration on industry evolution and technological change can be seen as the most basic lack of Neo-Schumpeterian economics, striving for an own ontological core. Schumpeter followed the static-dynamic differentiation in order to explain the crucial points of evolution. In Shionoya's (2009, p. 2 f.) words, this '*The typology of the passive and active man constitutes the ontological premise of Schumpeter's concept of evolution as a critique of the traditional concept of the economic man.*' Therefore the current Neo-Schumpeterian system of economics is too narrow, because on the one hand it eliminates the idea of development of the society as a whole and on the other hand it eliminates the Schumpeterian typology of human being. On the contrary

Schumpeter had a clear-cut economic ontology⁸ in mind, he called it a *vision*. This vision is supposed to be pre-scientific knowledge, a conception of the economic world and its processes as a whole. In this way it can be also understood as a kind of intuition about the observed structures and functions of the economic system. On the opposite of vision we find *ideology*. Here, ideology implies the historic background of the discipline in ontological terms. A scientific discipline is always entangled with its history; hence ontological investigations have to be rooted too and cannot be detached from its past epistemes. In order to derive the ontological core of a discipline or sub-discipline it will be necessary to talk about its visions as well as its ideology, in terms of Schumpeter⁹. On the other hand Schumpeter was an economist especially preferring the vision part of science; the romantic part, which was additionally enforced by his life-style¹⁰. He was a man living in two philosophical worlds, namely in analytical and in continental philosophy. Additionally he oscillated between *Romanticism* and *Historicism*, which are usually the outcome of ontological investigations, as Shionoya (2009, p. 5) puts it. Schumpeter's writings are thus fascinating, because he attracted dichotomies; between them he found scientific and economic innovation.

Further Shionoya (2009, p. 5 ff.) classifies Schumpeter's economic system of thought according to his theoretical roots and his responses to the problematic of these fields. As one can see in table 2.2. Schumpeter's vision of universal science emerges out of his ideas, critics and responses to his intellectual roots, i.e.: Neoclassicism, Marxism, Historicism.

Table 2.2.: Classification of Schumpeter's system of economic thought

<i>intellectual root/field</i>	<i>Schumpeterian ideas</i>	<i>Schumpeterian concepts</i>
Neoclassicism	dichotomy of statics and dynamics in terms of the type of agent	innovation
Marxism	evolutionary development of society through interactions between social areas	social unity
Historicism	notion of institution as the synthesis of theory and history	institutional development

Source: own table, content excerpted from Shionoya (2009, p. 5 ff.)

⁸ 'Ontological premises always underlie a vision. Ontology, a branch of philosophy, is the science of being in general. Economic ontology concerns what may be called the economic universe, which is explicitly or implicitly posited by economists as a vision concerning the subject matter and basic methods of economics.' Shionoya (2009, p. 4)

⁹ Schumpeter used the term *vision* in his last posthum published book: History of economic analysis (1954).

¹⁰ Compare Catephores (1994).

Innovation and institutional development

The neoclassical or marginal revolution can be dated back to Walras, Menger and Jevons, see also Screpanti and Zamagni (2005). *Value* was supposed to be defined objectively via the theory of labour-value in the classical system of economic thought, mostly developed and conducted by William Petty, Adam Smith and David Ricardo; then redefined by Karl Marx. However the marginalists introduced a subjective theory of value to determine prices and wages and they were indeed successful with their agenda. The famous *Methodenstreit* between the Austrian Carl Menger and the German Gustav Schmoller was more or less a scientific struggle between early neoclassical economics and the German historical school. It was also a struggle between *theory* and *history*, as it still is present in the social sciences. This struggle and especially the *Methodenstreit* was also a very important issue for Schumpeter himself. He was again in the middle of both sides and his ideas for a universal science stem out of this struggle too. On the one hand his critical thoughts on early neoclassical economics dealt with the conception of the economic agent as static and timeless. For Schumpeter it is the dynamic agent who acts as the carrier of the creative power of life. Nevertheless he supported the subjective characteristic of economic agents – the ability to even act as an entrepreneur – but then he rejected that the subjective agent has to be representative for all, because she rather represents the exception and not the rule. His conception of innovation views the world as an organism with a living unity; hence innovation and adaptation are integral parts of social life. On the other hand – which is also at most importance for this thesis – Schumpeter intuitively tried to synthesize abstract theory and history to overpower the *Methodenstreit* – which still rests very deep in economic bones – via the conception of *institutional development*, as Shionoya (2009, p. 7) points out. For him the concept of institutions is a means of generalising historical events, but it is also generally limited due to its historical relativity, understood as path-dependency; a compromise between generality/theory/globality and individuality/history/locality.

Social unity

Shionoya (2009, p. 7) additionally emphasises that the Schumpeterian system treats evolutionary development through interactions between various social areas. Therefore he is critical on Marx's perspective of historical processes for unilateral relations from productive processes to political, social and cultural processes through the pivotal position of the class

structure of capital and labour. Schumpeter's theory of social class aimed to serve as a crucial link between the concept of leadership in various areas of social life and the concept of civilisation; compare Schumpeter (2005 [1942]).

According to these deliberations we may follow that Schumpeter added heterodox elements to all of his intellectual roots; he added the concept of leadership to neoclassical theory, the perspective of social unity to Marxism and the concept of institutional development to Historicism. Starting from a philosophical perspective, Shionoya (2009, p. 8 f.) summarises that Schumpeter intuitively introduced and integrated conceptions of continental philosophy to the analytical philosophy of the *Enlightenment*.

Returning to the ontological debate, Shionoya (2009, p. 15) makes a very good point. For him the question how a specific vision emerges in the so-called pre-scientific stage is exactly the central problem of ontology concerning the object of study and can be approached from two sides: namely from the sociology of science and from the philosophy of ontology. By *vision* Schumpeter means the perception of facts as having some meaning or relevance that justifies our interest in them. This is a very essential intuitive approach to ontology. Contrary to that, he mentions *ideology* as preconceptions about economic processes, which are given to us before we start scientific work. Hence ideology and vision are interrelated ontological concepts in Schumpeter's system of thought. Ideology always intervenes in the transcendence – in the sense of exceeding the historical bounds or exceeding a specific habitus – of a vision. Ideology in the Schumpeterian sense is comparable with disciplinary tradition.

It can be argued that the relationship between creative vision and traditional convention in knowledge formation is patterned after the relationship between the creative destruction by innovations and the preservation of the existing order in economic life. Shionoya (2009, p. 17)

We can follow from this quotation that *creative destruction* is equally a universal rule as it is the *preservation of an existing order* in the Schumpeterian sense. Therefore one can say that Schumpeter's ontology stems from the linkage of those two contradictive pillars. At this point Shionoya (2009, p. 17) continues with Schumpeter's conception of the emergence of knowledge, or in philosophical terms with Schumpeter's epistemology. His epistemology can be resumed, in a nutshell, with Heidegger's hermeneutic conception of *Dasein* (being-there), as Shionoya (2009, p. 18 ff.) follows. Schumpeter stands between a historic, embedded, causal ontological conception and a phenomenological – understood as an intuitively felt perception or insight – core. Heidegger's hermeneutics overpowers this dichotomy as well,

according to Shionoya (2009). Insofar this dichotomy should be better regarded as a kind of *dialectics*.

Human-beings are historically thrown into the world, but still project themselves to the future. ... Through this attempt he finally arrived at hermeneutics, i.e., a discipline of understanding and interpretation of all human behaviour and products. Hermeneutics is the self-reflection of human-beings addressed to the historical and social world. Whereas the natural sciences are concerned with the formulation of causal relationship, the human sciences interpret the structural relationship among the objects from a teleological viewpoint and clarify their values, significance, and meanings. Shionoya (2009, p. 18 f.)

DASEIN in Schumpeter

Heidegger distinguishes between entity and its being, which is an essential ontological difference. Hence investigation of specific entities can be interpreted as an *ontical* study and investigation into the being of those entities is consequently an *ontological* study. In economic terms we may distinguish between *economics* as an ontical study of economic entities and *economics* as an ontological study of the economic processes. Therefore we can conclude that the Schumpeterian differentiation of static and dynamic agents and consequently the conception of entrepreneurial innovative activity is an ontical study, but the causes of innovation and the conception of institutional development as socioeconomic change represent an ontological agenda. Shionoya (2009, p. 23 f.) concludes that ‘*Schumpeter’s Dasein was confronted with a tension between subjective projection and social embeddedness.*’

Finally he resumes that the scientific agenda of Neo-Schumpeterian economics is a little bit paradox, because the study of innovation gets routinised, which should be rather the opposite: innovation is usually the exception than the rule, but in a world defined by growth rather than by development or change, this premise changes too.

At last we may summarise that the Neo-Schumpeterian system of economic thought mostly ignores the Schumpeterian emphasis on institutional development as *the* generic device to study socioeconomic changes via the synthesis of theory and history; which also represents the major agenda of this thesis. Additionally it fails to fulfil the Schumpeterian projection of economics as a universal social science, according to the brilliant ontological exploration of Shionoya (2009).

Nevertheless, now we are able to point out a working hypothesis for an ontological foundation of institutional development. Institutional development needs economic agents embedded in social interaction. Acting as such shall be interpreted as an intersubjective process. Therefore we can start working with *an ontology of the intersubjective*

acting/operating economic agent. This premise includes historic embeddedness through the agent's social disposition and the prospective visionary entrepreneurial part of activity/operation/agency, which leads the agent in the future, with uncertainty and/or risk.

Hence the Schumpeterian epistemology suits very well for a micro- and macro-founded ontology of the economic agent, necessarily involved in institutional development. Nevertheless we got to add that Shionoya (2009) goes a little bit too far by introducing Heideggerian hermeneutics for comparison.

2.4. Naturalistic approaches

Naturalism generally supposes a unification of the humanities and the sciences; in this special respect it means coevolution of cultural, sociologic, economic and biological, chemical, physical processes. Therefore it stands contrary to a pure social ontology as for instance Lawson (2003) assumes.

Herrmann-Pillath (2008) uses the term *consilience*, understood as the unity of knowledge, in order to bring the humanities and the sciences back together. Generally one can speak of this as an integral approach or as a holistic approach in the sense of Wilber (1995). Holism or consilience can be understood as the opposite of reductionism; hence all sciences mostly swing between those two extremes over time. Where science got more and more reductionist in the last century and disciplines lost their connections tremendously, there is also a recent trend towards consilience. E.O. Wilson (1998) exaggerated the discussion and was striking a blow for interdisciplinary, network and integral thinking once again. Otherwise, philosophical writings as Bhaskar's (1989) *The Possibility of Naturalism*, were very early indicators for a more critical realist as well as evolutionary epistemological claim. Evolutionary economics needs a naturalistic foundation, a naturalistic ontology; then it can play a pioneering role for the sciences in case of transdisciplinary integral research.

At the moment there are two major attempts which tackle such a naturalistic foundation for economics. On the one hand we can find a *Darwinian* perspective on naturalism, as *Generalized Darwinism* (GD) proposes and on the other hand we can find a *generic* (GN) perspective on naturalism, as the *Continuity Hypothesis* and *Evolutionary Realism* explains. Where the former (GD) additionally works with the Darwinian trajectory for heuristics as well, the latter (GN) tries to find different heuristic explanations for certain economic processes. The *generic naturalistic* approaches work in a very similar way, both approaches have Austrian roots, though they start with different mind sets; the *Continuity Hypothesis* mainly developed by Ulrich Witt has a stronger connection to Hayek's system of thought and the concept of self-organisation; whereas *Evolutionary Realism* mainly developed by Kurt Dopfer has a stronger connection to Schumpeter's system of thought and the concept of innovation. Therefore we will discuss them separately. Further in the end of the chapter we will explicitly discuss naturalism as an evolutionary ontology in more detail, with special reference to Herrmann-Pillath (2008), Bhaskar (1989) and others.

DARWINIAN NATURALISM

Generalized Darwinism

The most influencing supporter of Generalized Darwinism is probably Geoffrey M. Hodgson in the economic scene. In Hodgson's seminal book *The Evolution of Institutional Economics: Agency, Structure and Darwinism in American Institutionalism* (Hodgson (2004a, p. 12 ff.)) he refers to the major theoretical problem of institutional development as the gap between agency and structure. This is also comparable or at least related to the above elaborated Schumpeterian ontological working hypothesis. Hodgson's (2004a) clear-cut analysis of the *old* institutionalism in the United States is unique. His major intellectual roots can be traced back to Veblen and his more than influential institutional analysis of the American leisure class. Hodgson (2004a) identifies the logic of Veblen's thought in swapping between the conspicuously consuming individual and its socially or culturally inherited dispositions, which drive its consumption patterns.¹¹ Clearly, this perspective needs an integration of methodological individualism and collectivism, here Veblen uses the concept of sequential cumulative causation. Now, the new synthesis of the evolutionary concept with the old American institutionalism refers to a Darwinian interpretation of cumulative causal processes via the Darwinian trajectory of *Variation-Selection-Retention*. These synthetic thoughts imply nonetheless the proposal of a Generalized Darwinism in the social sciences as such.

What is especially ascribed to Generalized Darwinism, what are the proposed ontological foundations for a unified evolutionary economics, what might be the surplus of a Generalized Darwinism? These are all questions of the following chapter.

Hodgson and Knudsen (2006) argue that all statements regarding the emergence of novelties and economic change, put by evolutionary economists require the Darwinian principles of variation, selection and retention. On the opposite there is no statement which is required for the principles, therefore they insist on a Generalized Darwinism as an ontological core for evolutionary economics. As a starting point of their theory they discuss the specific systems, which should be under investigation. Here Hodgson and Knudsen (2006, p. 3) point out: *'Rather than simple, mechanical systems, the objects of our discussion are complex systems, at least in the sense that they involve a variety of entities that interact with one*

¹¹ Section 3.2 offers an extensive discussion of Veblen's heuristics of institutional change.

another.’ This proposition is foremost a clear-cut distinction from neoclassical economics and other *mechanically* thinking domains. Then they derive their argument with the concept of scarcity, in particular Hodgson and Knudsen (2006) argue that the entities populating the proposed systems face an omnipresent problem of local and immediate scarcity; therefore they are all involved in a *struggle for existence* as Darwin originally posted. Here we may find the first of Darwin’s principles, namely *selection*. The selection criterion emerges out of natural struggle and in Generalized Darwinism it represents a blind or unconscious test for adaptedness of a specific characteristic or entity in a specific environment. It is therefore not an optimisation vehicle, nor is it evolution itself. Natural selection proves something for its adaptedness in an environment, but this process is never moral, just, linear, directed or purposeful. Additionally it is necessary to distinguish between so-called *survivor-selection* and *natural selection* in a *neo-Darwinian* sense, as Knudsen (2002) demonstratively shows. The most common anticipation of selection in economics is survivor-selection, where a specific entity is selected as the surviving entity in an environment, the survival of the fittest. In that sense, the survivor is also the most efficiently working unit, because it is the fittest. On the contrary and especially in this context, there is neo-Darwinian natural selection which is promoted by Generalized Darwinism. Selection here is something different; it works on a two-layer system. Instead of genotypes and phenotypes there are used interactors and replicators.

Generalising natural selection can be accomplished by adopting ‘replicator’ and ‘interactor’ as substitutes for the genotype-phenotype distinction. ... *Replicators* are anything in the universe of which copies are made ... Genes are ‘paradigm examples’ of replicators, but other things, such as the entire genome is asexual organisms or ideas in cultural evolution, can also be replicators. ... *Interactors* are entities that interact as a cohesive whole with its environment in a way that causes differential replication. ... Evolution, then, is defined in terms of variation accumulated over time because of the independent but causally linked sub-processes of replication and interaction. Knudsen (2002, p.448- 449)

As one can see, the natural selection process accompanied here is far more complex than any survivor-selection perspective. Some problems emerging here will be dealt with in a later section of this chapter, for now we will skip to the next Darwinian principle.

When it comes to *retention*, Hodgson and Knudsen (2006) argue that any entities, involved in a struggle for existence, are able to pass on information to others, in biological evolution this is guaranteed through the inheritance of genes. But this property is not preserved for the biological domain only, as the authors argue; all complex population systems involve such a retention process, as e.g. also human institutions are hosts of information. Hodgson elsewhere

argues, that '*Institutions are durable systems of established and embedded social rules that structure social interactions*'. Hodgson (2004b, p. 655). Hence, following this logic, institutions are devices which can inherit habits, rules, routines or customs. In Hodgson's sense they are replicators in an evolutionary process. Where replication will be a crucial point later, the focus switches now to the last Darwinian principle: variation.

Variation is in biological terms established by genetic recombination and rare mutations. At the moment the authors have to make clear that there is no equivalent process in the cultural domain of the human species, yet.

Further, Hodgson and Knudsen (2006) argue that these principles provide a very basic framework for understanding speciation as well as other forms of evolution. Due to the fact that there is somehow a struggle between proponents of Generalized Darwinism and of the naturalistic approach of a Continuity Hypothesis, the authors also argue in favour of a Generalized Darwinism by criticising its counterpart. In particular the discussion continues on the objection of self-organisation. Proponents of a theory of *self-organisation* or self-transformation, such as Witt (1997) or Foster (1997), argue that self-organisation provides a very basic principle to describe evolutionary processes in economics. Stuart Kauffman (1993) mostly developed self-organisation theory as a core principle of the science of complexity; he introduced it to explain the origins of life. Self-organisation also fits in Witt's (2008a) framework of heuristic twists and ontological creeds as a more *generic* heuristic projection independent from any strict or radical Darwinian framework. On the other side Hodgson and Knudsen (2006) make clear that in order to explain the origin of a new species there is no way besides a selective argument. They ask for the sufficiency or the explanatory potential of a self-organisation theory: '*But is self-organization sufficient to explain the origin of species and all complex biological phenomena? The definite answer is no. Darwin's principle of selection is also required.*' Hodgson and Knudsen (2006, p. 6). Obviously, self-organisation theory cannot be sufficient enough to explain all biological phenomena, such as the origin of a species. Nevertheless it may fit very well for evolutionary economic or socio-economic phenomena in a more heuristic way. The selection criterion of the Darwinian trajectory is clearly the most powerful twist for evolution at all, hence it can work and need to be accepted as a universal principle of evolution; it includes the most fundamental properties of evolutionary change, i.e. death. Due to the universal fact that all life and its products must pass, the Darwinian trajectory definitely is one of the most fundamental properties of any

evolutionary theory, but is it enough for an ontological core?

Further, Hodgson and Knudsen (2006, p. 9 ff.) compare or challenge different concepts with Generalized Darwinism, such as self-organisation theory or the concept of intentionality. However this is not necessary, because they all work on different layers of evolution. Evolution understood as endogenous change is universal, but the implicit features and properties of its processes may differ.

Another emerging problem in this domain is the crucial notion of natural selection. It is ‘natural’ if human beings purposefully select their consumption behaviour or their social and economic network in a bounded way. It is still endogenously selected in the human social domain. Maybe the demon lies in the perspective of time, everything is natural *ex post*, but *ex ante*, it mostly looks artificial, especially in the cultural sphere of human evolution.

Hodgson and Knudsen (2006, p. 14 ff.) convincingly argue, that any evolutionary process has to be consistent with the Darwinian trajectory of variation-selection-retention on an abstract level, therefore it works as a *universal* principle. But they have to be very careful in using the trajectory as a *heuristic* or *ontological* vehicle in the socio-economic domain, because at the moment there is no common sense on specific *units of selection* in socio-economic evolution. Additionally an agreement, satisfying all participants of the discourse, is hardly to be expected in the future. The scientific community should be careful with transferring these very simple principles into ontological or heuristic considerations in socio-economic or cultural evolution. This also fits quite well with their conclusion, that a Generalized Darwinism is not enough; it needs more explanatory tools, heuristic devices and methodological considerations, than just a Darwinian trajectory in order to universally explain evolutionary process; either biological, economic, social or cultural. We also have to admit that Generalized Darwinism is not reduced enough to apply it for ontology, the science of being.

Generalized Darwinism from the bottom-up?

Stoehlhorst’s (2008) article wants to show what a Generalized Darwinism can offer in the economic domain. His theoretical anchor treats individual behaviour as a starting point in socio-economic evolution. Further, there has to be some kind of socio-economic fitness which implies social as well as economic selection pressures, such as status, institutions and money. This stems from the argument that we have to ‘...move beyond the truism of survivor selection

and go beyond biological metaphors.’ Stoehlhorst (2008, p. 36 f.). At first we have to admit that survivor-selection does not represent a so-called truism, as we elaborated above by reading Knudsen (2002). Stoehlhorst (2008) wants to start from the recognition of ontological similarities between all complex systems.

The author argues that evolutionary theories in economics typically focus on how markets select firms. His major argument to distance himself from Neo-Schumpeterian theories of economic evolution works on the level of economic aggregation. Stoehlhorst proposes that evolutionary economists should not start with the firm, but with the individual. Nelson and Winter (1982) start in the middle of the economy, they start with the firm. It is also their notion of routines which abstracts from individual behaviour. Hence, Stoehlhorst (2008) criticises the absence of individual agency in the theory of organisational change and more generally in evolutionary economics. His main arguments for a Generalized Darwinism from the bottom-up can be summarised as follows¹²:

- behaviour of individuals is a historical linking-pin between biological and cultural evolution
- abstracting from individual behaviour is an unfortunate way of circumventing the problem of agency
- individual behaviour is an ontological pin for changes in organisation due to the market
- the development of a theory of economic organisation from the bottom-up should be simply promoted, because it can be done now within the principles of Generalized Darwinism

Generalized Darwinism offers a general framework that is able to connect the selection of individual behaviour *within* and *between* socio-economic contexts. With this major emphasis he proposes to fulfil Nelson’s and Winter’s original agenda.

In doing so, Stoehlhorst (2008) vehemently defends the project of a Generalized Darwinism with the usual arguments. All design in our world is a result of an evolutionary process; everything is path-dependent and endogenously connected. The principles of variation-selection-retention can also explain cultural evolution. Biological and cultural evolution have to be seen as one single process. Further he argues that evolutionary processes follow a multi-level-selection logic: changes for new transitions have to be *within* and *between*. Especially in Generalized Darwinism the proponents try to understand major evolutionary transitions.

¹² Compare Stoehlhorst (2008, p. 40 f.)

Mostly it is argued that all transitions have following in common:

- involving an increased division of labour
- being made possible by a new way of transmitting information
- they result in an additional level of selection

These considerations do all share the specific attempt to explain the emergence of a new metabolism in evolution. Of course, it is possible to explain socio-economic changes within this scheme too, but such changes are rather the exception than the rule in usual human time horizons. Such changes build up slowly over long periods of time and are usually not visible for the society; they only get visible in the moment of spontaneous change, as Hayek (1973) would say, or in the moment of a punctuated equilibrium, as Gould (2002) would illustrate. Then we can speak of a new metabolism; then we can speak of change via the Darwinian trajectory *ex post*. But the path-dependent long-term process cumulating before such a change follows various, diverse and different heuristics, than such huge transitions.

It is difficult to understand why Stoehlhorst (2008) tries to link such transitions to economic agency, as an ontological pin. Such huge cuts work over cumulative causation and include a huge variety of simultaneous and counteracting processes in the socio-economic domain. Conclusively it is rather inappropriate to work with a bottom-up approach in a Generalized Darwinian framework, because it lacks arguments linking agency and structure. It is not a good idea to explain such linkages with help of a universal ontology, i.e. bottom-up design via variation-selection-retention.

The trajectory is a universal property of all evolutionary processes. Nevertheless it cannot be *applied* to anything in the human domain for the sake of simplicity¹³. Thus we have to admit that everything shares its principles on a very abstract, maybe just structural level. The genetic algorithm can be used to describe or explain structural change on a highly aggregated level, but the agents' processes, flows, discourses and functions which lead to such a complex aggregate or structure need more detailed or particular explanation via generic heuristic devices, such as e.g. self-organisation theory, intentionality or reflexive anthropological considerations. For example, the relationship between human habits and human institutions cannot be explained via a selection criterion, because there are no clear-cut units of selection at all in the socio-economic, cultural domain; such as genes.

¹³ This mistake was once done by introducing fixed preferences and rational utility-maximizing behaviour into economics with the framework of *homo-oeconomicus*. We do not have to repeat such fallacies.

The universality of a principle makes it strong and a little bit incontestable for competitors, but it is the same property which makes it weak for heuristic and methodological issues, i.e. particularity.

Stoehlhorst's (2008, p. 47 ff.) attempt to stretch the Generalized Darwinian framework towards matters of economic agency needs to involve a Darwinian explanation of learning, which he additionally introduces. This is very crucial, because such an explanation somehow presupposes an evolutionary epistemology, in the sense of e.g. Popper (2002) or Hayek (1973) had in mind. It is a logic which implies that we, as single agents, acquire information due to specific selection criteria, test them for adaptedness and generate knowledge out of it. This logic may work in a similar manner to a social learning process, where norms, customs and institutions are deliberately created over time. Nevertheless it is something different to the biological idea of natural selection, there is no unit of selection which tries to match with the environment and look for adaptedness. It is the human being as such who is able to control her environment capable of culture and technology to a certain degree and selects purposefully. Of course one can immediately conclude that this somehow *artificial* process is also an endogenous part of our whole evolution, though it rather represents a co-evolutionary process, as also Witt (2003), Dopfer (2005) would follow. The selection criterion may also delve towards neoclassical directions as an alternative to rational choice, which definitely includes some reductionist problematic. Even if it is possible to explain or prove that individual learning also consistently follows the Darwinian trajectory with the help of neuroscience and other sole-materialist techniques, there is still a huge scientific complex compound of social matters left out, such as e.g. collective intentionality. It has to be admitted here that there are socio-psychological processes going on in the human being, which still share the archaic notion of Darwinian evolution, but are also able to transcend them and invent new particular social learning techniques in a self-similar way. Self-similarity may play a crucial role here. Ontology as such is that basic that an ontological orientation cannot explain something particular, though a particular process will always share the ontology's characteristics. Similarity does imply similar epistemes, but not the same. No one will exaggerate that variation-selection-retention, self-organisation, intentionality and e.g. reflexive anthropology have nothing in common, but they work on different layers and that is for good reason.

In this context another question arises, namely, why is there so much effort to defending Generalized Darwinism at all? Aldrich et al (2008) dedicate a whole article to defending the idea of a Generalized Darwinism. They admit ‘... *cannot expect to obtain a single explanatory theory of everything.*’ Aldrich et al. (2008, p. 578). So the whole discussion rests on the dialectics between universality and particularity. Aldrich et al. (2008) also classify that any ontological evolutionary core needs to develop additional auxiliary heuristic and methodological tools and devices to tackle particular problems. This statement implies that Generalized Darwinism defends an elementary, essential, universal principle all evolutionary processes across the domains have in common, in a naturalistic way¹⁴. Nevertheless the Darwinian trajectory cannot host as an ontology, because it is not reduced enough as we will see more clearly in the next subsection, nor as an heuristic device to explain co-evolutionary processes, such as e.g. cumulative causation. Additionally Aldrich et al. (2008) are right, when they insist on clearly distinguishing between the use of evolutionary theory as an analogy or as a generalization, in their interest as ontology.

The devil lies in the details

On my own count, if Generalized Darwinism is understood as a heuristic device for the development of new theories in evolutionary economics, with providing detailed causal explanations of actual processes of change in economies as its final aim, the odds are against Generalized Darwinism. Vromen (2007, p. 1)

Vromen's article *The devil lies in the details* relaxes the discussion in this debate. It asks where Generalized Darwinism is even heading up, why do the proponents build up such a broad struggle in this rather young and prolific domain of evolutionary economics and why does not it fit for ontology?

Vromen (2007) brings the debate back to earth; he argues that there is no problem to accept the principles of variation, selection and retention as universal properties of evolution. A Generalized Darwinian framework does not imply that our economic actions are determined by our genes. Otherwise the proponents claim to identify replicators and interactors in the economic realm as a consequence to the admittance of the general Darwinian principles. Next, the author explains that the debate between Generalized Darwinism and the proponents of the Continuity Hypothesis is not necessary, because their theories apply to different clusters. In

¹⁴ Naturalism understood as a specific epistemological stance in the way of Bhaskar (1989), simultaneously rejecting reductionism and scientism. Compare also Herrmann-Pillath (2008, p. 132 ff.).

one cluster people tend to explain general principles that evolutionary processes have in common – looking for universality – in the other cluster people want to explain the causal processes of co-evolutionary phenomena, asking how the products of past evolutionary processes influence ongoing processes in the economic domain – looking for particularity. It is clear where the two parties belong to. Therefore the Continuity Hypothesis, which will be discussed in details in the next subsection, does not undermine Generalized Darwinism, because they have different heuristic vehicles in mind. At this level we have to admit, as mentioned before, that Darwinism nevertheless may not fit as a heuristic vehicle at all, because of lacking a profound explanation for replicators and interactors in the socio-economic domain, hence the lack of units of selection. Conclusively we can say that the heuristic attempt of Generalized Darwinism is misplaced, although an argument for or against the attempt for ontology is still left.

Further it is argued that the project of Generalized Darwinism is at its stakes a rather algorithmic, differential approach to evolution. The Continuity Hypothesis however is rather looking for integration and therefore a more holistic approach. This may be underlined by the following quote:

While evolutionary generalists typically marvel at the usefulness if not indispensability of simple, tractable formal models, evolutionary particularists tend to stress the limits and shortcomings of such models in dealing with the richness and complexities in actual evolutionary processes. Vromen (2007, p. 8)

This is what we should have learned from the famous *Methodenstreit* of the last century. In addition Vromen (2007) also outlines by citing Boyd and Richerson (2005, p. 94-96), ‘*As such, simple abstract models and rich historical explanation are complementary, rather than competing.*’ The aim of Generalized Darwinism is to abstract from all biological content and reveal the universality of the trajectory. This is an appropriate attempt, nevertheless a Generalized Darwinian framework cannot provide an ontology, because for an ontology as such there are still too much innate assumptions resting in variation, selection and retention, such as replicators/interactors and consequently the units of selection. Insofar it is not reduced enough, what about matter and energy, time and space, intersubjection and connection; these are all topics of far more abstraction than the Darwinian trajectory. As long as the radical Darwinians cannot compete with these basic issues, they should not serve the Darwinian principles as ontology. Additionally Hodgson and Knudsen (2006) fade out that there is possible replication without replicators in the social domain, which does not fit within their

framework and contradicts their postulates. Next, Vromen (2007, p. 13 f.) explains that replication and interaction are two different processes leading to natural selection in biological evolution, as also supposed by Generalized Darwinism. Hence they have to defend this argument and have to illustrate representative processes of replication and interaction in the cultural domain, in order to stay consistent. But there is no prove at all, that there are such equivalences in the cultural domain, we may even say that replication and interaction cannot be separated in the cultural domain, as Vromen (2007, p. 14) follows by citing Wimsatt (1999, p. 290): ‘... *development and selection ... both impinge upon cultural heredity in a constitutive way.*’ This issue is about the purposeful acting human being. Human beings are still able to choose alternatives out of a specific set, it is not a blind process, but this is similar to assuming rational choice as ontology, but this is exactly what we want to falsify.

This implies that selection is an integral part of replication in cultural evolution and as such selection is inseparable from replication in cultural evolution. Vromen (2007, p. 15)

The Generalized Darwinian framework offers the most elementary principle of all evolutionary processes, nevertheless it cannot host as ontological or as heuristic device.

GENERIC NATURALISM

Continuity Hypothesis

Ulrich Witt postulated an assumption or a hypothesis which got very prominent in the discussion about a common naturalistic evolutionary ontology in recent years, it is called the *Continuity Hypothesis*. It got prominent, because it is of very basic importance to understand the embeddedness of economic systems in biological systems or even more general in physical or chemical systems, hence the role of evolution for economics and the role of economics for evolution. The hypothesis poses an ‘*ontological continuity of evolution*’ which means that we already know that the ‘*...human species is a product of evolution...*’, nevertheless ‘*...the modern economy is hardly explicable in terms of the theory of natural selection.*’ and ‘*...there is a point where the power of Darwinian evolutionary theory for explaining (economic) behaviour ends. But evolutionary change continues beyond that point – only with different means and in other forms.*’ Witt (2003, p. 3). In short terms, it means that evolutionary principles – determinants and properties of change – may change endogenously as well. Hence we may speculate that there is also an evolution of evolutionary principles going on. Human beings have endogenously developed new modes of cultural inheritance, for example individual and organisational learning or education. This was only possible because of the development of new cognitive capabilities like the human brain and the development of language in the first place, as we already discussed in the introductory chapter by quoting Hanappi (1994). Witt (2003) also postulates that evolution is primarily *generic change*; therefore he argues that evolution is abstractly driven by the *emergence of novelty* and its *dissemination* processes. The evolutionary economist should investigate the linkages and connections of the coevolution of biological as well as economic processes. This includes various research fields, like for example the evolution of cognitive human capabilities or the evolution of consumer and supplier behaviour, as well as their relationship towards macroeconomic processes.

The mechanisms by which the species have evolved in nature under natural selection pressure, and are still evolving, have shaped the ground for, and still influence the constraints of, man-made, cultural forms of evolution, including the evolution of the human economy. But the mechanisms of man-made evolution that have emerged *on* that ground differ substantially from those of natural selection and descent. Witt (2008, p. 550)

This quotation reveals exactly the spirit of the ontological continuity assumption. It is evolution as such sharing all reality, but evolution has manifold faces and cannot be described via natural selection alone, even on the most abstract level of interpretation. Witt (2008) comprehensively explains why this debate in economics depends tremendously on the conception of reality, on the ontological characteristics, the most basic epistemological items. Here, theory itself underlies path-dependent principles or causalities, if we start with some arbitrary or random ontology, there may emerge a point of no return on the heuristic or methodological level. We have to consider science as a tree of life as well; hence it is at utmost importance to put things straight on the ontological level. Mostly it is the case that researchers directly jump into some evolutionary heuristics and use them for their problems. Additionally they will confirm that their theory is evolutionary, though they have just borrowed some evolutionary concept to the social sciences. Witt (2008) wants to argue that any use of evolutionary concepts in the social sciences needs a naturalistic foundation, in order to stay consistent, these are logic preliminaries. The argument then is to avoid analogy constructions within evolutionary economics; this can be guaranteed by sticking to generic naturalism.

Consider something that evolves, be it a gene pool of a species, a language spoken in a human community, the technology and institutions of an economy, or the set of ideas produced by the human mind. Although such entities can change over time in response to exogenous, unexplained forces ('shocks'), their genuinely evolutionary feature is that they are capable of transforming themselves endogenously over time. The ultimate cause of their endogenous change is the capacity to create novelty. The way in which this happens varies greatly across different domains. Witt (2008, p. 551)

This is the idea of *generic* change, the *capacity to create novelty*, the immanent potential of *emergence*. Then *dissemination* or *diffusion* of the new acquired novelty is the next logic step in the queue; the specific kind of dissemination influences how the entity or the system will endogenously *transform* itself.

Evolution can thus be characterized generically – in a way that is not domain-specific – as a process of self-transformation whose basic elements are the endogenous generation of novelty and its contingent dissemination. The generic concepts of novelty emergence and dissemination provide an overarching heuristic for interpreting problems and inducing hypotheses in the evolutionary sciences. Witt (2008, p. 552)

This quotation shows a crucial point, it is the interplay, the cross-fertilization of ontology and heuristics. Now it should be clear why a Generalized Darwinism cannot share such ontological considerations, because the idea of the Darwinian principle is not abstract enough, in order to generally describe the idea of evolutionary change. Nevertheless the question

arises how this novelty can be generated? The specific conception of novelty plays an important role to better understand change at all, on an abstract ontological level of research.

Novelty

Novelty and its emergence are probably one of the toughest things to explain in any context. It is everywhere and it is always different, but living systems are able to recognize it, *ex post*. This is actually the point where Witt (2009) jumps in:

The distinctive epistemological feature of novelty is expressed by the difference it makes when the *ex ante* view of what is novel (i.e. the view at a time $t < \tau$) is compared to the view one can take *ex post* (i.e. at time $t \geq \tau$). Unlike in the *ex ante* case, *ex post* a (fictitious) observer is able, and typically is assumed, to know the relevant properties and meaning of what is emerged or is being created. Witt (2009, p. 312)

The problem is now, that time τ is not in – so-to-say – epistemological range, there are epistemological limits which bound our rationality. Further Witt (2009, p. 312) distinguishes between domain-specific novelty and universal novelty, which relates to the distinction of subjective and objective novelty. He makes clear that it is only possible to grasp the nature of the diffusion of subjective novelty towards other agents, whereas observation of objective novelty is epistemologically not possible and would even be irrelevant. Witt (2009, p. 312) additionally calls this the difference of *pre-revelation* analysis and *post-revelation* analysis, where only the latter can reveal scientific epistemes and the former is simple fiction.

So we may briefly conclude that analysing the emergence of novelty is only possible via its dissemination or diffusion, i.e. the dynamic change of something novel. This is a completely different ontological stand than it is proposed in neoclassical economics, where the observation of objective novelty is somehow possible and can be statically compared at different points in time.

Then Witt (2009, p.313) assumes that this emergent process needs at least two operations, a *generative* and an *interpretative* one. The first one produces new re-combinations of elements, the second one puts it in some context, which can be either ‘...a new emerging or a more general already existing concept.’ The crucial point may be that the two operations are logically distinct but are happening in the same instance of time. This can be seen as a procedural approach to novelty, where both operations are generic to the creation of mental novelty. In order to renounce himself from Generalized Darwinism Witt (2009) insists that the generative operation needs some pre-selection of elements which can be recombined. In particular this operation cannot be left to arbitrary or random choices. In consequence to the

Generalized Darwinian framework it does not impute some *blind* variation. Hence Witt (2009) introduces some similarity or conformity criterion for this pre-selection process, to confirm that this operation is a strongly *guided* process, instead of blind variation.

The second interpretative operation is not fully understood by cognitive scientists yet. Witt (2009) therefore proposes that this process of conceptual integration – of the new cognitive concept (idea, imagination) into some new emergent or already existing context – is done by *intuition*. Hence Witt (2009) states another hypothesis on the emergence of novelty:

While the generative operation can be automatized mechanically or electronically outside the human mind, for example, by numerical algorithms and programs, the carrying out of the interpretative operation is bound to the medium of the human mind and can therefore not be automatized. Witt (2009, p. 315)

Additionally the process of novelty creation may be one of iterated recursions. So there can be a third logically distinct *evaluative* operation as well, with feedback tasks. This operation may then influence *what* novelty will emerge. In biological terms, the equivalent procedure for the generative operation would be the recombination of selected genetic material; for the interpretative operation it would be the epigenetic expression of the varied gene code in the development of the phenotype; the evaluative operation would then happen indirectly, through competition of successful phenotypes.

Witt (2009) then follows that this emergent novelty is then *revealed* via inductive operations. Carrying out these operations requires time, and thus prevents the meaning of novelty being instantaneously accessible. These inductions are somehow simulations in the human mind, iterations of generative and evaluative operations, which can reveal the emergent property over time, nevertheless the interpretative function is ‘...*inaccessible to deductive reasoning on grounds of principle.*’ Witt (2009, p. 315). Finally we have to assume that ‘...*the emergence of novelty is not only a process that is iterated over and over again, but it is also a cumulative potentially autocatalytic process.*’ Witt (2009, p. 316). Therefore he follows:

By re-using newly created concepts in further iterations of the generative operation, an infinitely growing number of concepts can emerge from a finite number of initial elements, provided that the share of combinations to which a new meaning can be attributed is non-vanishing. Witt (2009, p. 316)

If we could verify that there is a finite number of initial elements we can then follow that there has to be some ultimate prior concepts in the cumulative evolution of human knowledge, which were not cognitively created, but by some innate concepts. This is called the *embodied*

knowledge hypothesis, elaborated by Hayek (1952). The hypothesis may rest eternal, since it will not be easy to understand and interpret the interpretative operations.

In his article Witt (2009, p. 317ff) further develops different degrees of novelty and its relation to uncertainty, which we do not discuss here. He then derives differences of novelty-induced uncertainty in comparison to uncertainty in the probabilistic sense.

For now, we have some ontological base how novelty may emerge out of the human mind and how it cumulates over time. Nevertheless we do not know how it disseminates in a social context yet. Here the protagonists of the *Continuity Hypothesis* stick to two different concepts, on the one hand it is group selection and the evolution of rules of conduct as in the late Hayekian tradition and on the other hand it is the principle of self-organisation, again comparable with Hayek's *spontaneous order*.¹⁵ The former will play a dominant role in the heuristics section of the thesis – in particular it hosts as a heuristic device for the theory of institutional change in a very profound manner. The latter will be discussed briefly as a core principle of evolutionary change now.

Self-Organisation

It is argued that the theory of self-organisation is a very basic evolutionary principle which can shed more light on economic theory at all. On the whole, self-organisation splits off in:

...self-regulating processes (negative feedback) which stabilize given structures and temporarily self-augmenting processes (positive feedback) which destabilize given structure and, thus, are instrumental in establishing new structures. ... The dynamic interaction between these two features of self-organization has turned out to be a powerful basis for generalizations. Witt (1997, p. 490)

All living dissipative systems share these processes, according to the findings of biophysics and biochemistry. Hence the idea of Witt (1997) is to extend self-organisation to the economic system as well. Georgescu-Roegen (1971) provided a similar framework in order to extend the notion of entropy towards the economic theory of production and growth. Other prominent authors like Foster (1997, 2005) do also claim that economic theory should be a theory of complex systems with self-organising forces, rather of simplistic ones. Concerning the significant role of self-organising and autocatalytic processes in evolution at all, we have to get a more detailed look into system theory and the science of complexity as well. Complex living systems share similar principles on an ontological basis. Insofar it is not the search for

¹⁵ Hayek's heuristic conception of *spontaneous order*, as well as the role of *rules of conduct* in cultural evolution, will be extensively discussed in chapter 3.3.

analogies which drive our interest in system science; it is the search for basic ontological properties of change at all. Hence the science of complexity probably cannot tell us how novelty emerges – as for instance the Darwinians try with insisting on the selection criterion – but it can tell us something about living systems in general, how they organise and behave over time and space, what properties they all share. Therefore we want to argue that neither self-organisation nor selection alone may host as an ontological basis for evolutionary economics, but both can help to understand how novelty disseminates in a complementary and very general way, within an ontological naturalistic foundation. Self-organisation and selection in evolution are extensively discussed in Kauffman (1993). Due to the immense significance of the interplay of those two concepts we will treat some of his thoughts in the following.¹⁶

Eighteenth-century science, following the Newtonian revolution, has been characterized as developing the sciences of organized simplicity, nineteenth-century science, via statistical mechanics, as focusing on disorganized complexity, and twentieth- and twenty-first century science as confronting organized complexity. Kauffmann (1993, p. 173)

Where neoclassical economics still finds itself in the eighteenth century, determining rigid *natural* laws for the economic behaviour of massively distinct people on earth, evolutionary economics moves with the times and is watching out for dynamics and order in complex adaptive systems. Generally we have to switch our concepts for systems from the idea of equilibrium towards the idea of disequilibrium in general. Complex systems are never in equilibrium, because they change and adapt continuously, albeit they may sometimes rest in stages on the edge of chaos and order, in stages of stable disequilibria or as Hayek once put it in flow-equilibria¹⁷. Such a state is according to Kauffmann (1993, p. 173): ‘... *a state which optimizes the complexity of tasks the systems can perform and simultaneously optimizes evolvability.*’ Furthermore, complex adaptive systems share following properties or characteristics:

- dynamical attractors: ‘*Dynamical attractors ‘box’ the behaviour of a system into small parts of its state space, or space of possibilities.*’ Kauffmann (1993, p. 173). Such attractors constitute the degree of self-organisation, they bound the possibilities. There

¹⁶ Please consider this as a necessary excursion at this point of the thesis. The idea of self-organization and of complex adaptive systems at all is not part of the *Continuity Hypothesis*; hence it is not consistent to place it in the same classified superset-header. Nevertheless it fits here at best, because it shares the idea of generic naturalism.

¹⁷ For a detailed description of the macroeconomic idea of flow-equilibria compare Witt and Brenner (2008).

can be several attractors in one system, where trajectories may lead from one to another. Insofar they are somehow comparable with the economic idea of *ordos* in Walter v. Eucken's¹⁸ work on ordoliberalism.

- three broad regimes of behaviour: *ordered*, *complex* and *chaotic*

Kauffman (1993) found out – by analysing random NK Boolean networks – that in ordered regimes the elements freeze very fast and form a bigger cluster which spans across the system. In the chaotic regime there is no frozen component, instead a connected cluster of unfrozen elements. Here small changes in the initial conditions may have strong and sensitive reactions to the whole system. Transitions from the ordered to the chaotic state are possible through phase transitions, where the transition region is called a complex regime. In this regime frozen and unfrozen elements are percolating simultaneously with very sensitive conditions. Further Kauffman (1993, p. 173) adds that:

...massively disordered systems can spontaneously 'crystallize' a very high degree of order. Much of the order we see in organisms may be the direct result not of natural selection but of the natural order selection was privileged to act on. Second, selection *achieves* complex systems capable of adaptation.

Here we may follow that self-organisation may be the driving force for *order* in a complex system, which can be achieved in a very spontaneous way as well; selection somehow drives the *adaptation* process pending or choosing between different dynamic attractors. These forces may complementary influence dynamic change or the dissemination of novelty and ongoing emergence on a very ontological level if the elements in the system may react autocatalytically¹⁹ in a *collective* way; hence they are in combination quite suitable for a generic naturalistic foundation of economics. This implicates a lot of new possibilities on sides of heuristics and methodologies. In methodological issues, institutional economics may swap towards design, implementation and analysis of complex adaptive systems as well, for example within more extensive use of agent-based computational models with endogenous network formation²⁰, which share all the components described above.

¹⁸ For an extensive analysis of the concept of *ordoliberalism* in Walter v. Eucken's work compare Goldschmidt and Rauchenschwandtner (2007).

¹⁹ A system may evolve *autocatalytically* if its elements reach some critical diversity, i.e. the variety of elements reaches a specific critical mass. Compare Kauffman (1995) for the theory of *autocatalysis* and Schelling (1978) for *critical mass* theories.

²⁰ These methodological issues of complexity, agent-based simulation and network formation and their role for the theory of institutional change will be extensively elaborated in chapter 4.

Evolutionary Realism

Evolutionary Realism represents another ontological stance for evolutionary economics, mainly developed by Dopfer (2005) and Dopfer and Potts (2004). Dopfer (2005) criticises the economic mainstream for its ignorance on questions for paradigmatic ontological foundations. He follows that these arrogant positions derive from the positivist foundations of neoclassical economics. Ontological issues raise the question how scientific reasoning works. Positivism claims on the one hand that all things are measurable and on the other hand that we can build coherent, consistent and complete axiomatic systems on empirical grounds. It is clear that science at all depends on generalizations of hypotheses about reality, as also Dopfer (2005) emphasises.

Any theory or coherent set of hypotheses (H) represents, in its bare bones, a generalization of a designated range of particular real phenomena (R). Dopfer (2005, p. 5)

We assume that there is a general need for inductive reasoning to get from individual cases to general statements. Dopfer (2005) follows further that the inductive procedure rests both in hypothesis generation and hypothesis testing; hence inductive inspection of reality has to be before and after the generalisation. Theory formation conclusively needs an iteration of R-H-R then. Therefore the famous *Methodenstreit* in the 20th century, as already discussed in chapter 2.3., can also be handled as a battle between R-H or H-R now, which involves a battle of verification – positivist adherents (R-H) – and falsification – realist adherents (H-R). Since Popper (2004) [1934] we can assume that a statement is scientific if and only if it is falsifiable, i.e. a discovering process of *ex post* induction (H-R). Nevertheless in this respect Dopfer goes along with Lakatos²¹ when he says that the formation of a whole new theory still needs an inductive procedure before stating some hypothesis (R-H-R), even when it is evolutionary founded. This is made clear when he refers to:

What are the procedures that allow us to arrive at a scientifically acceptable paradigmatic core? There are basically two methodological routes: the a priori and the a posteriori. The former belongs to metaphysics, but, *interestingly, scientists also take an a priori posture when it comes to the issue of paradigm or central research questions.* In his later writing, Karl Popper explicitly acknowledged the paradigmatic significance of the idea of evolution, but he argued that it was ultimately rooted in metaphysics. Science, by its own codex, cannot, however, rely on a priori stance; it is bound to take an a posteriori one. Dopfer (2005, p. 6)²²

This is a very crucial point in face of an evolutionary ontology. Is it possible to form an

²¹ In the sense that Lakatos assumes that there is some need for ad hoc assumptions as well when it comes to major scientific transitions.

²² Italics added

evolutionary ontology without stating ad hoc assumptions as well, where evolution intuitively seems *ad hoc*? This is the point Dopfer wants to bring us nearer, how can we combine a critical realist view of the world with an evolutionary one. The epistemology we need lies between them in a naturalistic foundation, evolutionary realism; since there are no uncaused causes, ad hoc assumptions will be falsified at all, when time comes. But in order to reject some dominant research regime and introduce something new, there is probably a need for intuitive a priori stances or deduction in some Austrian tradition.

Positivism presumes that scientists have an innate ability to practice their metier in an objective fashion, though these rules endogenously change over time. Additionally ontological beliefs and perceptions differ substantially between scientific communities. Due to the fact that there cannot be any objective a priori base for theory formation, we have to consider individual subjective a priori assumptions in scientific transitions. As already mentioned in the introductory chapter by quoting Hanappi (2003), Thomas Kuhn insisted on *paradigms* as unifying forces for scientific communities and Imre Lakatos referred to research *programs*. Regardless of whether we deal with paradigms or programs the set of *rules* of the hard core of any science changes over time in discursive manners. This is a necessary epistemological insight, which is completely ignored by positivists such as Milton Friedman. According to Friedman the set of rules – the scientific hard core of economics, its axioms – should stay constant over time and its influence on the inferential procedure can conclusively be neglected, because it involves a closed/complete view of science. Hence science may not change at all in this picture. Contrary to this, by recognizing the possibility of different rules and assuming an evolution of these rules as well, we have to consider the formative power of a deductive component in the inferential process, still contrary to the logic of Friedmanian positivism. Dopfer suggests a metatheoretical inference of paradigmatic induction with some deductive elements, in order to get to ontological statements of economic change. These statements should be statements about *all* reality – ‘...*the unity that all existences share.*’ Dopfer (2005, p. 6). Furthermore for him paradigmatic induction does not mean to inspect all statistically significant individual cases, it just means to open an intellectual discourse between philosophy and the sciences.

Laws do not change – rules do

In the chapter about self-organisation we introduced the notion that neoclassical economics mostly relies on Newtonian physics, i.e. mechanical thinking. Economists were always influenced by physicians, respectively because of their knowledge in creating laws of coordination and of motion. This was also the case within classical economics.

Economists like Smith, Ricardo, Malthus and Marx were extremely interdisciplinary scientists. Comparison between natural laws and economic laws was always a starting point, but not the only driving force for their research. This picture changed slightly with the rise of neoclassical economics. As already discussed, the marginalist revolution depicted the differential calculus as an ontological base for economic change. Dopfer raises the question why economists have chosen a mechanical/hydraulic system as their *mecca* instead of a biological one. Dopfer (2005) suggests by quoting Prigogine (2005) that this issue can be traced back to *Cartesian dualism*. Economists wanted to be attached to the *hard* side of science instead of the *soft* one, because ‘...only the ‘hard’ part of reality was considered to be amenable for scientific inquiry, empirical scrutiny and theory construction.’ Dopfer (2005, p. 9) Hence economics took over the calculus of Newtonian mechanics in order to describe economic activities in social contexts via non-changing laws. The Cartesian system wanted to mathematize science by looking for generalizations for objects and their behaviour. This is also an issue we already striped in the section of Generalized Darwinism, where we discussed the relation of universality and particularity. In this respect Dopfer goes back to Aristotle explaining that all things have an *essential* and an *accidental* property, which can also be interpreted as a *generic* and a *concrete/tangible* one. Social interactions as well as economic actions also have generic properties, but always with individual or concrete peculiarities. Hence economics is definitely on the wrong path when it applies neoclassical models which generally ignore the individual characteristics of economic phenomena and levels them to representative laws – which by definition *do not change*. ‘The model is universally deterministic.’ Dopfer (2005, p. 10) Laws do not change and they have to be proposed as universally valid, like the law of gravitation. On the opposite we could face *rules*, which are only particularly deterministic and dependent on concrete phenomena. Hence they *do change* – they have to. Rules represent certain regularities but with distinct individual and particular characteristics. Therefore economic change can be explained by the evolution of economic rules, which have strong interplays among themselves. We refer to an economic rule when we

find some regularity in economic activity either on certain markets or in policy environments. These rules develop over time, because the economic actors and their behaviour change from generation to generation, as well as their environment. Therefore it should be our basic attempt as economists to detect the emergence of new economic rules in society and to observe their behaviour/changes over time. Nevertheless we need some ontological stance to interpret or explain this emergence and its dissemination. In this case it is quite obvious to reject the idea of mechanical laws in order to prefer the concepts of biological findings. The main problem of mechanical systems is that they cannot treat endogenous change; there, change is only possible via exogenous forces or shocks, conclusively mechanical systems stay constant over time if there is no shock from outside. The idea that economic systems and their inner dynamics rest constant can be fully rejected nowadays, they change and transform continuously from within. Hence we have to look for endogenous concepts of systemic change, like self-organisation and evolutionary dynamics. Dopfer follows according to the findings of Prigogine (2005) and Haken (2005) that we can also gain a lot of new insights from non-classical thermodynamics, for example:

Probability distributions and statistical averages, used in classical thermodynamics for computational convenience, could serve the purpose for describing structural decay (entropy), but were bound to fail when it came to a theoretical statement about the *self-organization* of structure and its *evolutionary dynamics*. Non-classical thermodynamics, as pioneered by Prigogine and Haken, shows that, under certain thermodynamic conditions, macroscopic structures – for example, dissipative and synergetic structures – emerge and that the dynamic of an ensemble is characterized by order through fluctuations, phase transitions and cascades of bifurcations, leading to the continuity of evolution. Dopfer (2005, p. 11)

According to the role of Newtonian physics in classical thermodynamics there was a claim for universal physical laws. Now non-classical thermodynamics has shown that the Newtonian system is just a special case rather than a general one, when it comes to macroscopic emergence of structure through self-organisation and evolution. We may follow that a mechanical ontology would not fit at all and cannot compete with an evolutionary one, because it can be treated as a special case in a more general evolutionary framework. Hence the evolutionary idea of particular changing *rules* which may generate and destroy structure on a macro level reflects even better the idea of economic change than the idea of mechanic/hydraulic natural universal *laws*. Economic systems change via complex evolution of different generic and also particular rules.

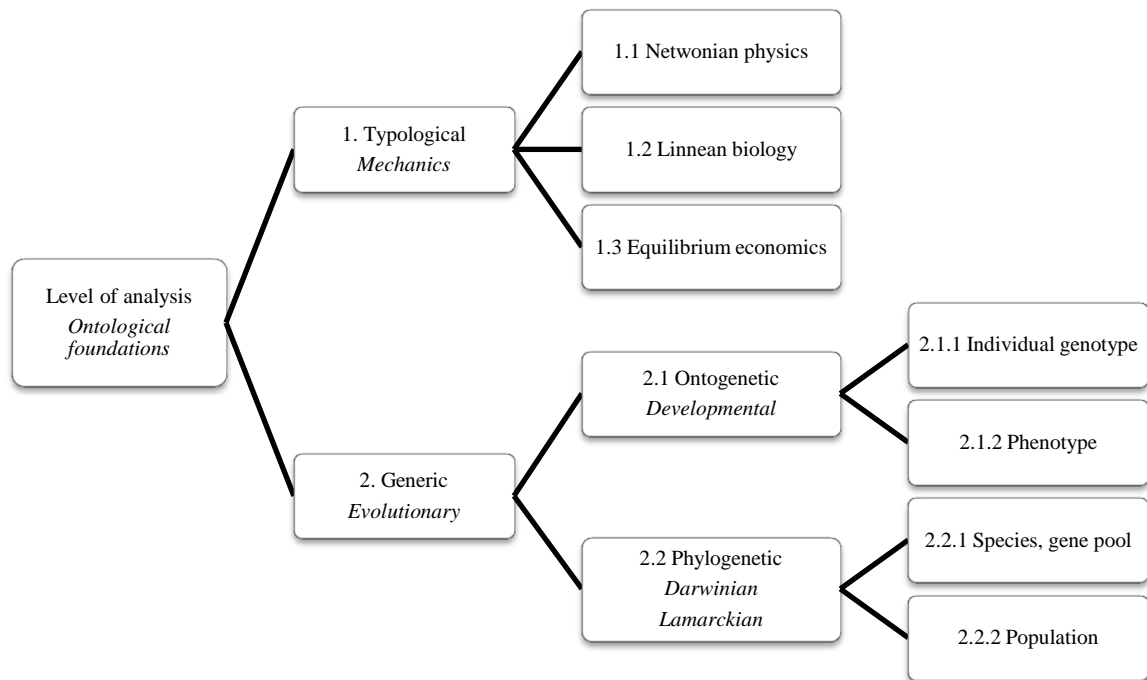
Empirical axioms of an evolutionary ontology

According to Dopfer the most difficult problem of an ontological investigation lies in the discipline's scientific language. If there is a need for ontological reorientation, as we face it in economics at the present time, there is also a need for de- and re-contextualisation of scientific terms. For these purposes Dopfer (2005, p.18ff) distinguishes between ontological, analytical and theoretical terms. Analytical terms represent terms independent of any scientific discipline, like evolution or population, hence they are of general purposes. Nevertheless they can be used as theoretical terms as well, for example like biological evolution or a population of economic agents. Then they have different meanings according to their discipline. We assume that evolution in biology is something different than evolution in economics, as we already discussed. Nevertheless they have the same naturalistic root, which is of ontological importance then. Evolution is domain-independent.

Let me emphasize again that nothing I have said is intrinsically a matter of biological analogy; it is a matter of evolutionary logic. Evolutionary theory is a manner of reasoning in its own right, quite independently of the use made of it by biologists. They simply got there first and, following Darwin's inspired lead, built arguments for dynamic change premised upon variety in behaviour in the natural world. What matter are variety, selection and development – not the natural world. ... Evolutionism is a distinct form of reasoning, of general applicability to problems of change and development. Metcalfe (2005, p. 420, p. 424)

Now if we want to use biological terms or terms of complexity studies in economics we have got to de-contextualise them towards a general, analytical meaning and then re-contextualise, embed them in the economic context. This process definitely needs some ontological effort in advance. Hence in order to get to well-formed axioms for an evolutionary ontology we got to categorise and abstract analytical terms again. Here Dopfer (2005, p. 20) provides a corresponding schema, the reader can find in figure 2.1. We can observe that the first distinction is made between *typological* and *generic* approaches. The typological approach is associated with a mechanistic paradigm; as already discussed above we may reject the mechanistic idea of change. On the contrary we can find a generic approach, which is associated with the evolutionary idea of endogenous change and self-transformation. Additionally it also offers an appropriate linguistic fit, '*...since it provides the linguistic genus for the terms 'ontogenetic' and 'phylogenetic'. The term gene may be seen as referring in its roots to both the biological term 'gene' and to 'genesis'. 'Ontogenetic' has to do with the one, 'phylogenetic' with the many.*' Dopfer (2005, p. 20)

Figure 2.1.: Analytical scheme of ontological foundations



Source: reconstructed from Dopfer (2005, p. 20)

Generally *ontogenetic* analysis refers to system thinking, because its main subject of investigation is the system as a whole. Dopfer (2005, p. 20) adds that it deals with the analysis of structure, the development of systems and their specific generic properties or mechanisms. In biology there is a next-level distinction between genotype and phenotype. The problem here is that on a more analytical base there is no common agreement on genotypes and phenotypes at all. On the economic theoretical level there are some first considerations, like Nelson's and Winter's (1982) introduction of organisational routines as phenotypes and firms as genotypes; as well as Hodgson's (2004b) introduction of habits as phenotypes or replicators and institutions as genotypes or interactors. As we already discussed in the previous sections there is no general analytical consensus on genotypes and phenotypes at all, just mere theoretical considerations in several disciplines. It is rather misleading to introduce these concepts too fast in economics, since there is no ontological and or analytical stand for them yet. Therefore it would be better to rest transitionally on the sub-level of systems, that of ontogenetic, developmental analysis or of phylogenetic analysis in this respect. This also fits quite well with the research agendas of Dopfer and Potts (2004) and Witt (2003) for example.

Phylogenetic analysis emphasises the research of the many of one kind. In biological terms there is a distinction between the gene pool and the population. Where the gene pool represents the genotype of one species, the population is a set of all phenotypes in a gene pool. So there is universally a gene pool and particularly a population of phenotypes. The comparison in economics relies on similar problems as in the ontogenetic analysis; nevertheless it involves more *population* thinking than system thinking in *ontogenetic* terms. Dopfer (2005) wants to analyse the dynamics of phylogeny via an evolutionary trajectory defined in terms of a succession of evolutionary regime phases. This includes his major attempt for *meso*-economics, because phylogeny can be neither micro nor macro. The idea of phylogeny can be best expressed via the formation of phylogenetic trees, where different species are part of different branches, according to their phenotypes. It is a study of evolutionary relatedness, i.e. investigation of variety and variation.

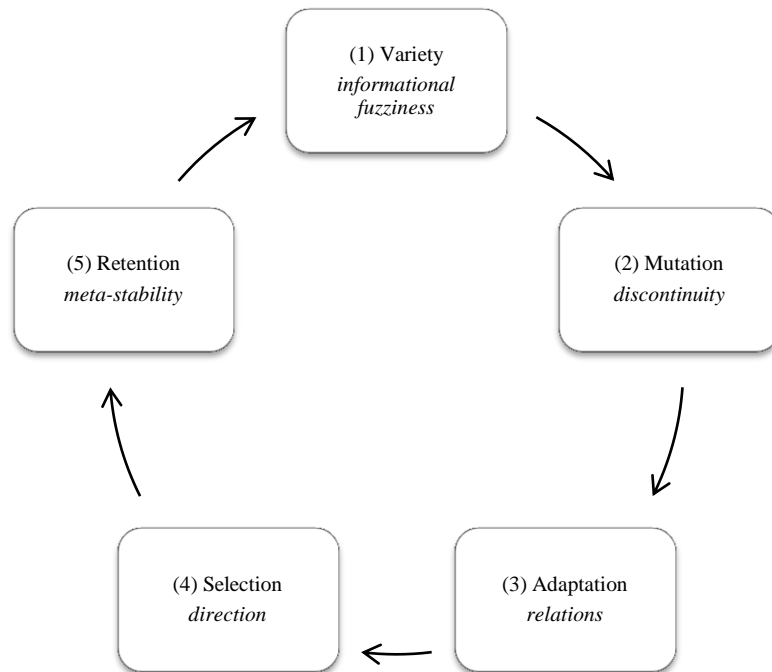
So how can such an axiomatic ontological foundation look like for generic evolutionary approaches within a naturalistic foundation?

As we have seen in Witt's (2003) analysis it has to deal with the dissemination of novelty on the one hand and with continuity or historicity on the other hand. Whereas the evolutionary idea of selection and competition may fit quite well for macro or global processes of evolutionary regimes, it may lack of potential explanation for micro or local processes in specific self-organising systems. Maybe the Darwinian trajectory is very helpful to explain major transitions in global contexts and concepts of complexity can help better in explaining the organisation and behaviour of specific local environments; that would be a sort of local-global connection of selection and self-organisation. Within this relationship we can also say that evolutionary selection has *universal* explanatory potential and self-organisation has *particular* explanatory potential, but not the other way around; nevertheless their interplay produces evolutionary regime transitions, i.e. endogenous change. This comparison may also fit for the old sociological problem, what comes first: structure or agency or methodological collectivism or individualism? Now we can say that neither of them is able to hold an ontological stand, because endogenous changes are strictly dependent on the interplay of universality and particularity. Apparently history matters and path-dependency plays a major role for our investigation. According to Dopfer (2005, p.15) an evolutionary regime has to consist of a transitional cycle of Darwinian processes, as shown in figure 2.2. Such a cycle may only represent major transitions in history.

The entire sequence from (1) to (5) can be conceived of as an evolutionary regime. Evolution occurs as one or more transitions from one regime to another. The analytical unit of change is a regime transition defined as a process that occurs from (5) to (2). The case of non-change or meta-stability is given by the link between (5) and (1). Change has as its starting point a meta-stable variety (1), and represents a transformation from this into a new variation pattern brought about by (2). This change works out along the phases of the evolutionary regime, and settles down in a new variation regime at (5). Dopfer (2005, p. 16)

This model of transitions is made in Darwin’s tradition, nevertheless on a very abstract level; it can only face major transitions in history; biological, cultural or economic. Dopfer refers to this scheme only for explanatory matters to give a decent picture of how evolution works, though its principles contain diverse mechanisms of change.

Figure 2.2.: Evolutionary regime



Source: reconstructed from Dopfer (2005, p. 14 ff)

In order to prove this transition cycle on validity and practicability Dopfer (2005, p. 17) suggests to go a level deeper in the analysis and watch out for more general axioms for the explanation of change. In short the axioms can be summarised as following

Axiom 1: *Bimodality axiom*

Existences are bimodal actualizations of matter-energy and information.

Axiom 2: *Association axiom*

Existences are structured in informational relations and matter-energy connections.

Axiom 3: *Process axiom*

Existences are processes in time, structured as knowledge.

Dopfer (2005, p. 18):

According to Dopfer and Potts (2004, p. 204ff) the axioms say something fundamental about the empirical foundations of evolutionary economic analysis and theory. Where the axioms are deductive for themselves, they refer to empirical findings from evolutionary economics and hence form an appreciative ontology out of empirical generalizations.

All existences are bimodal, interconnected and associative processes.

The *bimodality axiom* says that there are two coincident modes of existence in reality; an existence is a matter-energy actualisation of an idea. Where an idea has at least one actualisation and there is no actualisation without an idea. The point of bimodality is that any existence is never in pure form, which means it is neither pure matter-energy nor a mere idea. Dopfer (2005, p. 205) further explains that in an evolutionary ontology, the basic category is not energy and information, but ideas and actualisations. Conclusively axiom 1 tells us that bimodality means that existences are never arbitrary, ‘...in the sense of not being an actualisation of an idea. Bimodality says that there is one world, but with many rules, and in which each rule has potentially many actualisations.’ Dopfer (2005, p. 205) This implies a complete contrary picture in relation to the Cartesian system of thought. There is one world and it is modally complex. In this respect the ontological idea of evolutionary realism is essentially a naturalistic approach. The specific treatment of idea here is somehow the point of differentiation. Assume that we observe different existences actualised as matter-energy, but not distinguishable by matter-energy alone, then Dopfer and Potts (2004) refer to the ontological category of idea. They mean in particular that idea is the momentum of differentiation on an ontological level. The ontological category of *idea* can be further understood as *rule* in analytical terms. Hence they can say that any idea has a population of matter-energy actualisations on an ontological level; then they can jump to the analytical level by assuming a rule for an idea and a *meso*-unit for a population of matter-energy actualisations; which is quite tricky but consistent.

The bimodality axiom explains that ideas are non-arbitrary and have properties, Dopfer and Potts (2004, p. 206) add that these properties are never *a priori* evident; therefore they introduce the second axiom, an *association axiom*. Different properties of ideas are revealed through different associations, hence all existences associate. This axiom makes the

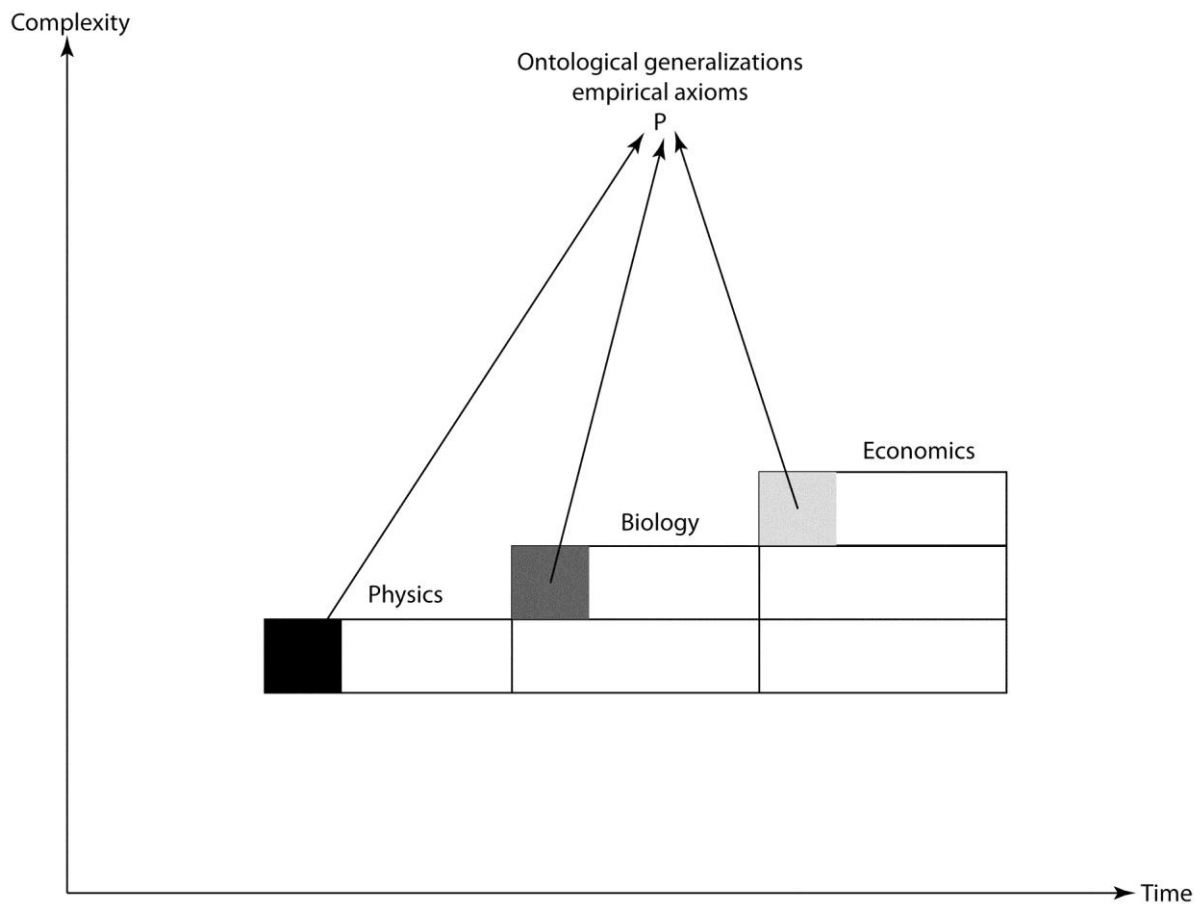
evolutionary ontology of evolutionary realism intersubjective, instead of objective (classical economics) and subjective (neoclassical economics).

When two ideas associate there is revealed information about these properties. Information is the revealed properties of ideas (or rules) by association. If two ideas cannot or do not associate, then there is no information. Similarly, the creation of an association is the creation of information, and hence novelty. Dopfer and Potts (2004, p. 206)

This axiom implies that information can only be revealed if we compare things and associate them. Consider a *price* for a good, it emerges out of comparison with another good, then only through the process of association we can determine the real *value* of the good; price or information becomes value or knowledge through association. Hence information is neither constant nor complete. Hence we can by the way rule out the neoclassical idea of rational expectations, which are bound to complete information. Dopfer and Potts (2004, p. 206) further follow that: '*In an evolutionary ontology, the geometry of associations is always incomplete.*' Axiom 2 additionally opens the way for complex theories of economic change, where information is revealed within networks; here the theory of networks can provide a lot of new insights through visualisation of dynamic change and how it affects structure and vice versa.

The *process axiom* gives existences a dynamic continuous character. Every actualisation is an unfolding process over time and space. This axiom goes hand in hand with Witt's concept of the Continuity Hypothesis. Therefore we can percept evolution as a continuous process between different layers with regime transitions, as already described. Figure 2.3 suggests such a layered continuity of evolution, nevertheless the transitions involve discontinuity as well; Dopfer (2005) refers to this global characteristic of evolution as an inferential process of ontological induction, as already described above. Here evolution is globally a layered, bottom-up, continuous process, where a physical level represents the ground floor, then a biological layer builds up on that and an economic, cultural or societal layer builds up on the biological one. The last layer visualises the rise of language, culture and more generally of the human species. The coloured squares indicate the scientific hard cores (paradigms or programs) of the different disciplines, which by definition has to rest on the different stages.

Figure 2.3: Ontological induction



Source: reconstructed from Dopfer (2005, p. 202)

These paradigmatic cores are the inductive base for their ontological generalizations then, because the set of all empirical generalizations (white rectangles) is obviously too large for such a base. Therefore the ontological axioms of evolutionary economics stem from several inductive cores of disciplines, for example physics, biology and economics. Finally figure 2.3 also shows that evolution is a process of ever growing complexity over the different layers and time.

On a more local level, evolution can be perceived via so-called *meso* regimes of rule processes in Dopfer's and Potts's (2004) framework. Generally spoken, this is about the connection of information and knowledge, where information in process is structured knowledge. Further Dopfer (2004) developed a theory of the economic agent as a rule-maker and rule-user, which fits as an approach to agency into our heuristic analysis of institutional

change. We will refer to this framework in more detail in section 2 of the thesis, where the heuristics play the major role of institutional change. But for now we will discuss naturalism explicitly in more detail.

CRITICAL NATURALISM

Naturalism has a very short history in economics. Early scholars who devoted their work to naturalistic approaches are for example Hayek (1973) with his analysis of cultural evolution through rules of conduct, Veblen (1898) with his emphasis to use evolutionary concepts in economics in general and Georgescu-Roegen (1971) with his analysis of the entropy law in economic processes. Nowadays more and more evolutionary economists discover the idea of naturalism as a consistent concept for socio-economic and cultural studies, as the last part showed. In short, naturalism is a conception of philosophy and social science which is socially situated but not socially determined. In this part we will dig a little bit deeper into naturalism and try to work out its properties, its epistemological claims and possible insights for a naturalistic foundation of evolutionary economics and more specifically of institutional change. It has to be addressed as *critical*, because a naturalistic ontological stand needs a continuous re-evaluating of its bounds and its limits between traditional natural and traditional social disciplines.

Naturalistic turn in economics

Herrmann-Pillath claims in various articles, compare for example Herrmann Pillath (2007a, 2007b, 2008), that a naturalistic turn in economics is coming and that it will shape the future of the discipline. How will it look like or where will be the difference towards a dualistic picture of the world economy, which is still observed via mechanistic economic methods? How will these new methods differ from the old mechanistic ones – are the former just Emperor's new clothes, biological systems instead of physics? What about the social element of a naturalistic foundation of economics? Herrmann-Pillath (2008) understands naturalism as consilience in the sense that knowledge mirrors the unity of the world.

Particularly, I argue that consilience means that some fundamental and general principles hold for the world in its entirety, and thus show up in any particular field of knowledge. These principles are ontological ones, and not scientific ones in the sense of originating in a particular branch of science. Herrmann-Pillath (2008, p. 130)

Herrmann-Pillath (2008) wants to make clear that naturalism must not be reductionism; because it shall transcend all the sciences, hence there should not be any reduction to physics or biology. The problem of reductionism is strictly connected with the epistemic subject itself, i.e. the scientific observer. The scientific observer's knowledge about the world manifests her observations; the observer is always situated in the experiment as well. Thus the difficulty lies in finding an *endogenous* naturalistic foundation. Such an ontological framework has to integrate obvious partial reductions, which includes the observer. Further evolution has to be the ontological category, to start upon, because it enables the possibility of novelty and emergence from within, which cannot be reduced, as Herrmann-Pillath (2008, p. 131) acknowledges. When talking about novelty he steps into the issue of regularity and singularity, where every singular event is a random event. Hence there cannot be a full-fledged theory about novelty, because something novel is always particular, unique and therefore random, otherwise it would be a regularity. This is strongly related to the topic we already discussed in the short part about self-organisation. The emergence of order is not something scientific in the first place, because the process is never the same; there is no overall regularity how order emerges. Correspondingly it is not easy to set it as an object of scientific discovery; nevertheless this is the challenge of naturalism. A naturalistic approach also means that we have to naturalise knowledge in an appropriate way. Consider evolution as evolution of natural knowledge, then emergence of different species increases nature's – our – knowledge and evolution becomes a huge learning process. Then we have to consider a continuity – as we already did in the previous parts – of nature's knowledge and human knowledge in the evolutionary process.

Herrmann-Pillath (2008, p. 132) follows Bhaskar (1989) in '*...defining naturalism as a specific epistemological stance where all social science explanations follow certain methodological principles of the sciences, yet simultaneously rejecting reductionism and scientism.*', which just offers a very vague idea of what naturalism is about. Nevertheless it refers to existence and causality in a first place and then is looking for explanations of relations between observed phenomena and its generating structures, offering the potential for emergence. Additionally there is no preconceived notion of a thing, i.e. there cannot be any *a priori* epistemes or any *a priori* objectivity, as already discussed by quoting Witt (2008). Herrmann-Pillath (2008) compares Bhaskar's notion of *existence*, where social entities are value-added, with the social ontology of Searle (1995, 2005), where institutions are the core

elements of change and mind is grounded on a naturalistic foundation within the concept of intentionality. It seems that in both interpretations of the world interconnectedness or networks play the most crucial role. Hence naturalism also tries to bridge between agency and structure or individualism and collectivism by analysing the natural role of knowledge through the eyes of an endogenous observer. Here knowledge has a physical substance, it is only real if it is incorporated or situated, and that means if it occurs in its *generic/tacit* function. Codified knowledge – like a collection of books in a library – is static and cannot trigger change in the first place. Therefore naturalism is also an antithesis of Cartesian dualism as well as European idealism. Dennett (1991) refers to the analysis of *real patterns* when speaking about naturalism. He opens this article with very interesting and stimulating questions; he asks for example whether *voices* or *centres of gravity* are in your ontology? Such questions, as trivial they sound, shall represent some scientific impotence which surrounds us. How could one prove to hear voices or how could one prove either centres of gravity are real or not? It raises the question of beliefs and conventions, because in that abstract respect ontology is still another social norm, a generic institution itself.

...more interested in the scientific path to realism: centres of gravity are real because they are (somehow) *good* abstract objects. They deserve to be taken seriously, learned about, used. If we go so far as to distinguish them as *real* (contrasting them, perhaps, with those abstract objects which are *bogus*), that is because we think they serve in perspicuous representations of real forces, ‘natural’ properties, and the like. This path brings us closer, in any case, to the issues running in the debates about the reality of beliefs. Dennett (1991, p. 28f)

Herrmann-Pillath (2008) is looking for isomorphism, he thinks if we gather new insights how our mind-brain connection works and if we have an entangled view of mind in the world, we may use our knowledge about mind as a source for knowledge of the world, in a realist tradition. This is again related to the Continuity Hypothesis, stated by Witt (2003), in tradition of an evolutionary epistemology. The way we percept the world and gain insights is evolutionary too, driven by trial and error. It posits unity of the biological and ideational world. Whereas Herrmann-Pillath rejects Witt’s hypothesis by assuming that human knowledge is not only a path-dependent result of biological evolution, but rather grows according to the principles of Darwinian evolution too, within variation-selection-retention. Conclusively Herrmann-Pillath follows a Darwinian tradition, but not explicitly a Generalized Darwinian one, which makes it a little complicated in the first place. For him evolutionary economics can build on the grounds of a naturalistic ontology, combined with an evolutionary epistemology, where the notion of a *detached* observer is *rejected*. Observer and observed

subject matter are neatly connected; they are an integral part of the world in the sense that without the assumption of an endogenous observer the notion of an event cannot be defined. Herrmann-Pillath (2008, p. 135) concludes that new insights from quantum theory show that *‘quantum events are not simply causes of other events, but are more close to being an ‘occasion’ for fixing a state or determining an event through the observer’s action.’* Such findings imply that events are like fix points in the face of observers, fix points which represent a subset of infinitely possible states of the world. Following this theory we can say that each event is unique in the eyes of the observer. Herrmann-Pillath (2008) further adds that the binding between observer and observed subject matter is itself an outcome of an evolutionary process, thus the interaction is fundamentally – in an ontological sense – paradoxical. This means that we already face paradoxes on a very ontological level of the world – reality as a paradox.

For the notion of economics it means that measurement is more random than expected and that a reduction of economic events towards physical systems would mean that prediction remains a superposition of an infinite set of possible states. Hence economics has to endogenise the observer in its models, which is possible via game theory. The world becomes a set of possible states which get spontaneously fixed by the very actions of the observer.

This latter action, however, cannot be explained endogenously, and hence appears as a random event in an ontological sense. Herrmann-Pillath (2008, p. 138)

This kind of randomness and impossibility to fully detect an event was already made clear by the famous Lucas critique in economics, as briefly discussed in the introductory chapter of ontological strands. Observation as such changes the world. A problem occurs when we believe that we are able to directly change the status of an economy via new policies. At the moment when we fully analyse a situation (which is of course only hypothetically possible), all information is diffused and the system gets closed – the observer creates a fixed point of reality via his analysing action. Hence there is no way to put the system onto the exactly same path created in the model of the scientist, because the scientist adds new information towards the system via his research and changes the initial fixed point into another possible state. Consequently predictions, recommendations or mere empirical analysis have non-linear consequences in reality, because of the asymmetry of an infinite set of possible states. Science

becomes arbitrary. The problem of science is a problem of infinite regress²³ in a naturalistic foundation. It is like game theory itself, the opponent may always react different than expected and if the opponent is a whole economy it becomes even more difficult to break the regress. The ability to break such infinite regresses emerges out of *creativity*, which is neatly attached to the notion of randomness and singularity. It is quite ironic that economists emphasised rationality for so long and never had the idea that creativity could be a complementary concept to rationality, with a few exceptions such as Schumpeter and Hayek. These two concepts need each other. They work out the interplay of regularities and singularities. The infinite regress of observer and observed subject matter is a self-referential/reflexive process, because observation is never without causation. This self-reflexivity needs creative moments to break the endless loops of infinite regress.

Any explanation of the world must include the observer and since we assumed a unity of material and ideational world we have to assume a monism of mind and brain as well. Hayek (1952) tried to find explanations for the brain-mind nexus in his only psychological writing *The Sensory Order*. This early work can still compete with the most modern findings of evolutionary psychology, such as the often cited Barkow, Cosmides and Tooby (1992). The central position deals with an algorithmic idea of the human brain, which is then explained as a rule system. In this framework the mind-brain nexus is not a general purpose machine anymore. It is rather a system of rules which works somehow in a heuristic way. That means in particular that the brain is not a single machine which can handle all incoming tasks. Different tasks are assigned towards different regions in the brain.

So what are the problems connected with a brain-mind monism and what did Hayek (1952) suggest to move on in theory?

Hayek states that there are fundamental limits to knowledge because any attempt at comprehensively explaining the world would presuppose to explain the relation between the observer and the observed, i.e. the relation between the brain and the world. However, a theory of the brain eventually is a creation of the brain. Herrmann-Pillath (2008, p. 139)

This problem of self-referentiality shows us that there will never be a complete explanation of how the brain works. It would need a cognitive apparatus which is even more complex as the brain itself, that apparatus would transcend the capabilities of the brain. This includes that the observer has to build a formal theory of self-referentiality which would obviously lead into

²³ Compare Harrington (2008).

foundational paradoxes, such as for example Gödel's *theorem of incompleteness*²⁴, which is in that sense a formal system's access to Hayek's point. Gödel's theorem shows us that there can be sentences in an arithmetic system, which are indecisive concerning their provability, but still true and consistent, therefore such a system would be denoted as incomplete. Now if we put both paradoxes together we can conclude that if the human brain is seen as an algorithmic system, which is a straightforward assumption at present time, all sorts of impossibility theorems, as well as Turing's theorem of undecidability for example, also apply for the brain. Herrmann-Pillath (2008, p. 139) calls this a naturalisation of Gödel's theorem. He then explains that the relation of impossibility theorems in formal systems has to do with Cantor's conception of set theory²⁵. The diagonal argument in Cantor's set theory represents self-referentiality as such²⁶ in an ontological sense.

If we envisage the brain as a system that operates formal systems, and that at the same time can be described by means of a formal system, the brain will manifest the same phenomena as described by the set of formalisms that can be deduced from the elaborations of the diagonal argument. This results into a naturalistic interpretation of self-referentiality. Herrmann-Pillath (2008, p. 140)

According to this quote we can only add that if the brain would just work as a formal system we would end up in endless loops, in an infinite regress. Nevertheless we are able to act creatively, as we already mentioned, creativity allows us to break self-referentiality, to end endless loops. Consequently we are able to posit propositions and *deduce* things out of our mind. Hence rationality needs to be cut or needs to be fragmented via creativity as Herrmann-Pillath (2008) puts it. According to him rationality must be fragmented by principle, the brain simply cannot be one unified cognitive calculator. This also reflects empirical findings of Nobel-Laureate Kahnemann (2003) or empirical work of Tooby and Cosmides (2005). Hence the brain has to work in a more modular way, where also non-cognitive mechanisms influence decision-making and observation in general. This modularity reflects the idea that the brain has different rule-systems for different tasks and is not a general purpose machine. On the

²⁴ Compare Hofstadter (1979).

²⁵ Hayek (1967, p. 61) wrote on supra-conscious mechanisms, concerning Cantor's set theorem, in a footnote: *'Twenty years ago I suggested (15, p. 48) that it would seem that any mechanism of classification would always have to possess a degree of complexity greater than any one of the objects it classifies, and if this is correct it would follow that it is impossible that our brain should ever be able to produce a complete explanation of the particular ways in which it classifies stimuli (as distinguished from a mere explanation of the principle); and ten years later I attempted to state the argument more fully (16, paras. 8.66-8.68). It now seems to me as if this would follow from what I understand to be Georg Cantor's theorem in the theory of sets according to which in any system of classification there are always more classes than things to be classified, which presumably implies that no system of classes can contain itself. But I do not feel competent to attempt such a proof.'*

²⁶ Compare for more detail Herrmann-Pillath (2008, p. 140).

other side it means that every brain is unique, particular and singular, consequently random. ‘*The very process of expectations includes a creative act of imagination, being kaleidic in nature. Those kaleidic phenomena are truly random in my sense.*’ so Herrmann-Pillath (2008, p. 144) referring to Shackle’s *Epistemics and Economics*. Randomness must then be described in an evolutionary theory of self-organised order, as we already sketched it by discussing the Continuity Hypothesis and Kauffmann’s point on complex systems.

Herrmann-Pillath (2008) then emphasises the notion of bimodality of the world which we already treated in the part of *Evolutionary Realism*. As the reader may follow, these different ontological claims have at least some fundamental points in common and they all may profit from complementary treatments of different perspectives instead of handling them as substitutes. It may be argued that naturalism works in the context of the mind-brain nexus and helps us to understand the role of the endogenous observer and the evolution of knowledge. This is the most crucial point for stating ontological considerations for economics, a naturalisation of situated knowledge. Herrmann-Pillath (2007a) also makes clear that a true naturalisation of the subject has to work within the concept of language, as also Dopfer (2005) followed in a similar way. Herrmann-Pillath (2007a) refers towards Searle’s (1995, 2005) *social ontology* in this issue. Searle tries to identify the institution as the ontological core of economic life, which is a network as well. His institutional analysis deals with language in general, for him it is the most crucial institution, as well as the preliminary condition for culture at all. Searle (1995) also offers a naturalistic conception of intentionality as a driving force for the emergence and maintenance of institutions such as language. As Dopfer (2005) said that if geometry is ontology for physics, language has to be ontology for economics. Here we can find a very deep and fundamental point concerning a naturalistic foundation. It deals with networks and holistic conceptions of the world, rather than atomistic interpretations.

Herrmann-Pillath (2007b) explains that there is still a lot of confusion concerning the debate of evolutionary ontological foundations in economics, because most economists transfer Neo-Darwinian concepts from biology towards economics, as for example Generalized Darwinism does. He instead wants to reveal findings from so-called Holistic-Darwinism and wants to clarify some fundamental misunderstandings which should convince sceptics of the Darwinian project in economics. Herrmann-Pillath (2007b) refers to Neo-Darwinism as an atomistic gene-centred approach, advocated by Dawkins (2006) [1976] for example. By that he means in particular that biological transfers towards evolutionary

economics are difficult, because there are several important problems which are even not settled in biology yet. Additionally there is a bunch of epistemological and methodological issues which are more or less neglected by such transfers. This raises the question how a research program like Generalized Darwinism tackles such problems or handles such biases. Herrmann-Pillath (2007b) argues that such an abstract universal program cannot base on an atomistic gene-centred view. Several biological concepts are not treated by the Neo-Darwinists, such as developmentalist topics which are also connected to a battle between population genetics and cladism²⁷. It seems that there is some divide between macroevolutionary and microevolutionary approaches in biology as well, where one can roughly connect the gene-centred idea of Neo-Darwinism to the microevolutionary strand and the more developmentalist idea to the macroevolutionary strand.

Evolution seems to be a simple and universal fact in an ontological constitution of the world; nevertheless it needs a more holistic/integral perspective on generic endogenous change as the Neo-Darwinists want to admit. Herrmann-Pillath (2007b, p. 4) wants to clear the ground for new discussion on the economic side as well; therefore he firstly presents the main ideas of the Neo-Darwinian project, which we can summarise to:

- replicator is the unit of *information*, it transfers information across generations through copying, it is the unit of variation.
- the unit of *evolution* is the population of replicators, it manifests changing population traits, the traits coalesce into the individual phenotypes, so that the unit of evolution is the population of individuals.
- the unit of *adaptation* is the interactor, which is constructed by the replicator, interface between information stored in the replicator and the environment in terms of selective forces, hence phenotypes are individual

Further Neo-Darwinian formulations include (Herrmann-Pillath (2007b), p. 5):

- There is no evolutionary relevant information transmission on the level of the interactor and from the interactor to the replicator (Weisman doctrine).
- Observed fitness in terms of the differential reproduction of traits of the interactor is directly correlated with expected fitness of replicators.
- This implies that the interactor has no specific function in the evolution of adaptation,

²⁷ Cladism or cladistics can be understood as phylogenetic systematics. In cladism biologists try to build an evolutionary tree of ancestors of organisms and species, i.e. a developmentalist approach towards evolution.

i.e. even if the interactive trait is irreducible to lower levels, the beneficiary remains the replicator. In particular, group selection is impossible.

As a result, the units of information and the units of adaptation emerge as the same, as has been most radically propagated by Richard Dawkins' gene-centred version of evolutionary theory. This is the atomistic approach in biology. Herrmann-Pillath (2007b, p. 5)

This is a very critical point Herrmann-Pillath (2007b) takes at stake, because genes as replicators get highest priority in the whole evolutionary story. They alone manage to transport information and they even get highest priority in processes of adaptation, because they construct the interactor. In this model the interactor, as well as the specific environment (the cell as we will see later), become less important. Conclusively there are two main biological controversies emerging:

- Are there higher-level replicators such as *memes*?
- Does the interactor carry information (possibility of Lamarckism)?

Where the latter is somehow neglected by the project of Generalized Darwinism, there is somehow a tendency to except the existence of cultural, higher level replicators such as *memes*. Dawkins himself introduced the term 1976, nevertheless he neglects the idea of an *extension* of replicator; it is rather supposed to be a parallelisation of the mere biological/genetic process and the cultural process of inheritance. This is also the case in Generalized Darwinism whereas Herrmann-Pillath (2007b) suggests a more holistic framework where both memes and genes are part of one and the same process. In order to take some distance to the atomistic perspective on Darwinism he raises three critical problems: the issue of the gene, the issue of development and the issue of macroevolution.

The issue of the gene

The gene is the one and only carrier of information in an atomistic picture of evolution, it is the ultimate replicator. According to Kauffman (1993) we can suppose so-called *epistasis* among genes, which means that genes are generally a part of complex interaction among themselves, i.e. epistatic behaviour. Hence we can suppose somehow that genes are part of complex networks as well and that such networks transfer the relevant information deliberately. Further it may be that the whole genome carries this relevant information, which would be announced as strong epistasis. At this point Herrmann-Pillath (2007b, p.6)

summarises akin observations to the following:

- the degree of additive genetic similarity across species and taxons is much higher than the degree of phenotypic similarity, which points to the crucial role of interactions among genes as the differential feature
- there is a pronounced division of labour and hierarchy between genes, in particular regarding the regulation of the activity of genes
- phenotypic traits can be determined by variable combinations of genes, i.e. the genome is highly degenerate and potentially multifunctional on the level of the subunits

Here we can indicate that the role of interaction among genes has higher priority than expected and consequently can rule out reductionism such as the gene-centred perspective of Dawkins (1976). The phenotypic expression of the genome is the individual whereas genes are seen to correlate with individual traits. Herrmann-Pillath (2007, p. 6) follows that this must consequently apply for memes as well, there has to be something like a *memone*, where memes cooperate in a kind of network. Herrmann-Pillath heads up for a holistic picture, where genes and memes somehow underlie group-selection processes instead of solo selection. He then admits that the transfer of Darwinian concepts towards economics strictly depends on the initial perspectives of evolution. Some other contrary starting position concerning the role of the gene as a replicator for evolutionary economics could be the idea of *epigenesis*. Epigenesis stands for the idea that genes are just recipes or instructions how to transfer information. Consequently they play the role of a sender and need a receiver in order to decode or implement those messages. This raises the question where the boundaries of a replicator end, because genes do not replicate themselves, they just give replication orders or host recipes. Then the receiver must be the cell in this context, hence gene and cell are interdependent parts of a whole, the replicator. Biological or genetic information is just stored in genes, like in a library, but as Herrmann-Pillath (200b) puts it, a library still needs competent readers. Additionally this perspective fundamentally changes interpretations of the cell, because it is not an interactor anymore, it becomes a part of the replicator. This is something what Lynn Margulis (2002) would call *symbiogenesis*, i.e. overall and briefly a network theory which brings its synergetic properties to the front, applied to biological reproduction. In this respect complexity increases for its conceptual equivalents as well. Most current economic interpretations of routines as replicators and firms as interactors, or habits as

replicators and institutions as interactors would be fundamentally misleading. In a holistic view of evolution firms would be replicators as well, playing the receiver part of information transmission. New insights from biology additionally show that biological information transmission goes beyond the gene. Such results indicate that some biological information must be inherited independent from genes, although being indirectly encoded by them. Then Herrmann-Pillath (2007b, p. 7) follows:

If the genotype determines the phenotype of the replicator, interactor and replicator fuse, and the interactor becomes an integral part of the inheritance mechanism. ... All these phenomena can be summarized as ‘epigenetic systems of inheritance’, which differs from epigenetic reductionism in that the latter just takes genes on a longer leash, whereas the former accepts an autonomous role of epigenetic processes in the reproduction of biological information. Herrmann-Pillath (2007b, p. 8)

Implications from such considerations follow up into a view where the unit of selection is no more the individual or the gene, but the *lineage*. Following Gould (2002, Chapter 8) this may also result in an interpretation where the ultimate unit of selection is the *species*, which is then a biological *unit* for itself. Such new insights may change a lot and has to deepen the discussion for biological transfers towards other disciplines fundamentally; because it stands in complete contradiction to the mainstream biological view.

Another point which would additionally change such basic concerns is the issue of development.

The issue of development

According to Herrmann-Pillath (2007, p. 8) the dualism between replicator and interactor may break down, because biologically relevant information is said to emerge from the interaction between the two with neither having a dominant status. Such a thesis stays in tradition of the *developmental systems approach* in evolutionary theory, compare Oyama (2000). This approach shifts towards a more developmental, generic perspective of evolution, an idea which Schumpeter probably would have preferred. In Neo-Darwinism the following problem occurs, due to its more or less history-free concept of evolution it downplays the role of structural constraints. The biological mainstream tends to view adaptation as the main force for change, where Herrmann-Pillath (2007b) adds that such a pure adaptionist perspective would be ergodic, since time is secondary. Heterodox approaches to economics seem to attack neoclassical economics simply for such reasons; they have to be aware that such views are also present in mainstream evolutionary theory. Hence if we want to build up economics in a

new organic way we have to look out for evolutionary approaches which are non-ergodic in the first place and consequently introduce the notion of development into evolution, which is surprisingly not self-evident. Herrmann-Pillath (2007b, p. 9) explains the role of the adaptationist as implementing testing procedures to understand engineering efficiency of certain observed phenotypical features of living systems, whereas the developmentalist would emphasise the linkages between phylogeny and observed constraints on development. It means that within a developmental systems approach scientists would try to find explanations via observing the roots of specific characteristics or traits in a tree of life (by looking through lineages) within different timelines. The adaptationist system works with efficiency and fitness, the argumentation works the other way around. System specific characteristic or traits prevailed, because they have simply adapted at best. This indicates again the difference of atomistic reductionism and holistic interpretations of evolutionary processes. Conclusively Herrmann-Pillath (2007b, p. 9f) argues that this point changes the concept of information in biology dramatically. From the developmentalist perspective information is contained in historically emerging constraints on development, which is *not* connected to the inheritance mechanism, in the sense of simultaneously adaptive forces. This perspective of information interestingly reflects the notion of knowledge in Hayek (1945), where he admits that knowledge is bound to its environment; this is also the notion of tacit knowledge.

Secondly, this information is activated via continuous interaction with the environment in which development is realized, so that finally the historically contingent system of interactions between structure and environment emerges as the fundamental evolving unit in biology. ... If this were true, there would be no way to separate environment, interactor and replicator in an analytically neat fashion, as even the environment itself would attain a function in the process of replicating biological information. Herrmann-Pillath (2007b, p. 10)

This proposition has fantastic consequences for endogenous change. First of all it is primarily *generic* in a developmental fashion, secondly all common models of cultural inheritance via replicator and interactor are simply *proprietary* theories of something which is even more complex than expected and thirdly *history* matters more than it was expected. The idea that one cannot analytically separate environment, replicator and interactor is congenial in favour of network and complex systems approaches to change at all.

The issue of macroevolution

Herrmann-Pillath (2007b) additionally argues that it is misleading to purely concentrate on the genetic part of evolution, i.e. the genotype. This would reflect the micro perspective on

evolution, whereas observation of phenotypes over time would enable macroevolutionary analysis. In order to link micro- and macroevolution there is a need for a new observational language. In this respect evolutionary economists should care more and more on the dimension of their research. They should begin to ask themselves if their specific research question is a case for microevolutionary tools, i.e. adaptation, selection models, population genetics, quantitative models; or if it is a case for macroevolutionary tools, i.e. developmental system approach, phylogenetic linkages, cladism. Additionally it is even not clear in biology how gradual changes may proceed, according to Gould (2002, chapter 9) such changes can proceed at different speeds. Gould's theory of punctuated equilibria also plays a dominant role in this respect; evolution is still a random process.

At the moment we can briefly summarise that Neo-Darwinian theories build upon the notion of adaptation, casted in quantitative models of population genetics, whereas the developmental and morphological school is based on specific methods to identify and classify phylogenetic linkages and patterns, as in cladism.

It is quite interesting that this comparison also reflects the struggle between orthodox and heterodox approaches in economics. The standard economic assumption is that all information is concentrated in the individual and its conclusion is to create a representative agent, i.e. methodological individualism; '*...whereas other maintain that, for example, institutions are intrinsic carriers of information that is even not known to the individuals, proposed by Hayek and others.*' Herrmann-Pillath (2007b, p. 11)

Hence a fruitful ontological foundation has to base on a marriage of both micro- and macroevolutionary approaches, namely a holistic paradigm of holistic information, according to Herrmann-Pillath (2007b). A possible solution for him rests in a so-called *teleosemantic* theory of the mind, built upon the foundations of Hayek's *Sensory Order*:

- thinking is based on neural selectionism in the brain
- the linkage between mental processes and the 'external' world operates via a selectionist process in turn

Therefore Herrmann-Pillath (2007b) suggests linking the theory of the mind, which is now connected to cognitivism and neuroscience, with a Generalized Darwinism. Then meanings are simply reduced to functions. The particular human mind is the outcome of an evolutionary process on different levels; every brain/mind is singular and therefore random.

As we have seen in this chapter, biology as a science has multiple fundamental problems

concerning its most basic idea of evolution; therefore we have got to be more careful in transferring concepts to fast, even in face of ontological considerations. Correspondingly Generalized Darwinism does not even include developmental ideas for now, so how can we even think of it as a foundation, where it is strictly following short-time evolutionary ideas, such as mere selection, quantitative adaptation and population genetics? This project needs a lot more time. Nevertheless there are certain ideas which already follow a more holistic – that is a more generic – perspective on evolution in ontological matters, such as Corning (2005).

Naturalism as dialectics of micro and macro

Bhaskar (1989) defends a critical realist view of science, which can be interpreted as a combination of *transcendental realism* and *critical naturalism*. Now we can imagine what is somehow meant with naturalism in an evolutionary perspective as Herrmann-Pillath (2008) explains. Nevertheless Bhaskar's conception is more general according to the entities and components of a modern realist approach towards philosophy of science, understood as unified science.

Following concern drives the argument: Economics and the social sciences in general tend to look for quantitative solutions in the natural sciences for their socio-economic qualitative problems. Of course it is interesting to discuss how ontogeny and phylogeny work and what epistasis means; nevertheless we have to be clear that these concerns possibly will *not* solve our problems. By reading Gould (2002, p. 595ff) it turns out that evolutionary theory faces the same problems as we do in economics. Economists usually debate how sole micro-individual actions accumulate or aggregate to macroeconomic phenomena, such as inflation, depreciation of currencies or unemployment. Now heterodox economists are aware that such phenomena have got to deal with institutional change. These institutions represent Smith's famous invisible hand; sometimes the hand becomes visible after all, in case of laws, property rights or governments and sometimes it rests invisible, in case of language, money or habitus. Despite the fact that we know that these institutions frame socio-economic life, we do not know the mere existence of it, we cannot proof it. Gould (2002, p. 595ff) discusses a similar problem in biology, namely the problem of the individual in an evolutionary context. We already got in touch with this issue in the last section when we talked about species as one single entity, but this problem is from far more importance and difficulty that it needs some more attention. New institutional modelling, in an evolutionary generic way, has to treat

institutions differently. Institutional analysis will always have to challenge the notion of agency versus structure. Maybe in order to overcome such fundamental problems, it will be necessary to reconceptualise the notion of the individual again, in an ontological manner. This special attempt of integration may be a first milestone towards bridging micro and macro approaches across the sciences, which definitely is a major concern of naturalism as well. In this case we may follow evolutionary biologists such as Ghiselin (1974) and Gould (2002) who have stressed to use the term *individual* as a generalisation, contrary to the mainstream gene-centred perspective, advocated by Dawkins (1976) for example. That means in particular that an individual may be a unique *organism*, but can additionally stand for a species as well. Hence organisms refer to unique bodies, such as a human-being or a cow and individuals refer to a more general term of organised structures, such as species, lineages or organisms. Corning (2005, p. 187ff) took over the same idea but with different terminology, he uses *super-organisms* for higher level entities, as also Sober E. and Wilson D.S. (1999), Hölldobler B. and Wilson E.O. (2008) do. Gould (2002, p. 601) refers to this terminological discussion as too confusing and refers to Hull.

From the point of view of human perception, organisms are paradigm individuals. In fact biologists tend to use the terms ‘organism’ and ‘individual’ interchangeably. Thus biologists who wish to indicate the individualistic character of species are reduced to terming them ‘superorganisms’. The same claim can be expressed less misleadingly by stating that both organisms and species are individuals. Hull (1976, p. 175)

Thus, we will refer to individuals as the general term as well. Why is this terminological discussion even important? In the modern synthesis of population genetics the idea came up that selection and adaptation is only working on micro-units, i.e. organisms. The more macro-evolutionary side of the discipline is nevertheless convinced that there is something like hierarchical selection going on. That means selection also works on lineages and species. These insights relax the mere gene-centred perspective of so-called Neo-Darwinism. Bringing this discussion back to evolutionary economics it would on the one hand completely change the idea of a Generalized Darwinism, because its advocates trust on the gene-centred perspective of population genetics for now, and on the other hand it opens new perspectives on institutions as holistic individuals.

A holistic concept of agency is necessary to understand the role of institutions in economics. Holism means that institutions can be neither reduced to mere contracts nor to its organismic agents, as the famous quote from Aristotle subsumes: ‘The whole is more than the sum of its parts.’ Another crucial issue of holistic institutionalism is that an institution cannot

be treated within a setup of methodological individualism, because it cannot be reduced to a unique *organism*. An organism can be simply defined via a certain discrete place and time of birth and death. Corning (2005) brings up the idea of synergy in order to ontologically state the assumption, that institutions are individuals. He refers to an individual²⁸ if it is a synergy-producing entity. In Corning's view human society faces a so-called *collective survival enterprise*. This notion is extremely important in the light of the Darwinian point of struggle for existence. Such holistic interpretations of evolution show that selection and adaptation work on various layers and that an evolutionary theory does not imply survival of the fittest *organism*, but rather of the fittest *individual*. In that respect it solely lies in human hands to treat planet earth as one integral individual, since everything in nature is connected, as again Aristotle showed via the metaphor of the *Great Chain of Being*.

This point additionally implies the possibility of group selection in cultural, socio-economic contexts, which was a major concern of Hayek (1979)²⁹. Cultural group selection roughly means that cultural traits, which are on the one hand to the benefit of the whole group and on the other hand not assignable to a specific organism/human being alone, are inherited via selection among groups of individuals. Group selection or hierarchical selection on the whole can help to explain specific developments of institutions. It can tell us why specific institutions emerge due to cultural constraints in different regions in the world. Here culture can host as an institutional basin of attraction. Additionally we may use group selection as a heuristic device for the formation of specific institutional networks. It can be helpful in explaining historical processes of institutional development as well. Further we want to comment on two, for us important characteristics of group selection. First, Zywicki (2000) wisely argues, among others, that the possibility of group selection truly is a semantic question, hence the argument against group selection cannot be done in an *a priori* matter; it is rather a question of empirical provability. It is a semantic question, because if we look through holistic lenses we can always tackle the problem on two sides; on a higher macro level of one entity – the group – or on a lower micro level of several individuals. This game can be played infinitely. It rests as a question of empirical cover then, what fits better as an explanation, at which levels we should start our analysis. This point totally invites the notion

²⁸ Corning (2005, p. 201) uses superorganism instead of individual, it should be made clear via Gould's (2002, p. 595ff) argumentation why individual suits better.

²⁹ Hayekian group selection will be discussed in more detail in section 3.3.

of *scalefreeness*³⁰ and *nestedness*³¹ as methodological vehicles in tradition of complex systems' studies.

The current revival of group selection theory may perhaps be attributed, in considerable measure, to the growing recognition that it can also entail 'win-win' processes. Co-operating groups might provide mutual advantaged for their members, so that the net benefits to all participants outweigh the costs. In other words, co-operation is not equivalent to altruism and does not by definition require sacrifices, or genes of altruism. ... This, in essence, is what game theory models of co-operation tacitly postulate, (...) which is why game theory formulations are largely indifferent to the degree of relatedness, if any, between the co-operators. ... Moreover, game theory provides a window into a vastly larger galaxy of cooperative phenomena that, I submit, reduces the group selection controversy to a sideshow. Corning (2005, p.20)

This point stresses the notion that the discussion on altruistic or egoistic economic behaviour is probably of lower priority than the discussion on cooperation. Game theory as a theory observing cooperation opens a lot of opportunities. It is one thing to accept that institutions construct social realities, that they may stand alone as holistic individuals and probably have to build up networks on evolutionary graphs in a group selection manner in order to challenge global problems, but it still needs the notion of internal model building and strategy formation on the observer side. A game theoretic setting offers a formal model of a social situation, where two or more observers or players have to decide on their strategies. The point of game theory is that the outcome of the game may change endogenously if actors choose freely. If such games are played iteratively then cooperation gains influence; in the long run cooperation may beat out free-riding, as a strategy. Hence methodological implications of a generic, naturalised institutionalism are anticipated, which will be discussed in detail in section 3. Game theory and the theory of networks are powerful tools or devices to model generic change in various settings. They additionally fit the required ontological base we made at this point. This debate on the limits of *individuality* reflects troubles of economic theory in a very similar way. Economists are still not able to bridge micro- and macroeconomic theory in an adequate manner, maybe because of misleading concepts such as a closed-systems-approach, homogeneity of individuals, rational choice and so on, nevertheless that cannot be a sufficient excuse for it. Due to the fact that even biologists do not have a clue how to make such an effort we may follow that this problem is based on even more fundamental grounds. Therefore it is suggested to leave the discussion on an evolutionary ontology for now and abstract a little bit more within the philosophical cornerstones.

³⁰ Compare Csermely, P. (2009, Chapter 2.2)

³¹ Compare Csermely, P. (2009, Chapter 2.3)

Transcendental realism and the problem of naturalism

To what extent can society be studied in the same way as nature? Bhaskar (1989, p. 1)

This opens the cunning prologue of Bhaskar's postulates on naturalism. It is a question about the possibility of having same methods for the social and the natural sciences, which is the current problem of evolutionary economics. The point is that this question is on the other side a question of holism or reductionism. It is about the starting points you take in your scientific analysis. What is the individual level of nature and society? These are questions we already raised in the previous section, but have not found an answer yet. A central motive in Bhaskar's writing is to offer a philosophical stance between the lines. Bhaskar (1989, p. 15 ff) admits that there are two dominant but different ontological positions in philosophy of science, i.e. *hermeneutics* and *positivism*. Hermeneutics was majorly inspired by Heidegger and his pupil Gadamer, it implies a strong ontological notion of interpretation and understanding. It is a philosophical strand of understanding the understanding and the interpretation of experience. Hence experience gains the central attention in finding truth. Consequently it has to be naturalistically founded, because understanding will somehow lead to the physical existence of being as such. We have already considered the idea of hermeneutics and simple *Dasein* in context of Schumpeterian economics and his central idea of a unified social science. We concluded that Schumpeter has envisaged a generic picture of institutional change, but never admitted this could be evolutionary, hence naturalistic. Bhaskar criticises the idea of hermeneutics, because social science is conceived as a science of just understanding experience. In his words, Bhaskar (1989, p. 17): '*... that social science is (or should be) concerned with the elucidation of meaning and the tracing of conceptual connections – activities clearly lacking the inanimate world of nature.*' This very basic claim stresses the point that reality is more than experience and consciousness, which are modalities only incorporated by animals and human beings. Since the animated world is only a fraction of let's say earth, a realist naturalistic theory has to be even more basic than hermeneutics suggests.

The second dominant ontological position is held by positivism. Positivism is a non-naturalistic strand which shapes orthodox social science at hands today. Especially economics is methodologically embraced or shackled by positivist thinking. The Friedmanian notion of *as-if* is a typical argumentation style of neoclassical economics. The idea of *as-if* can be

rendered very easily. Madden, B. (2006): ‘*Friedman’s main point was that a theory’s validity should not be judged by the realism of its underlying assumptions but rather by the accuracy of its predictions. In effect, theories should be viewed ‘as if’ their assumptions were true.*’ First of all the economist derives an idea, after that she establishes an assumption and deductively concludes implications for the society as a whole. At last she has to test it against empirical observations, nevertheless for testing it is just necessary to prove it via aggregates. The point is that this vehicle works without testing ones assumptions; it is testing the theoretical predictions the model is producing and then re-concluding that reality works *as-if* it were like the stated assumptions. So the idea of rational expectations for example is an assumption which cannot be proven in reality, nevertheless positivist theory tells us it has to be alright, because aggregated results are empirically proven. Another point of positivism is that social reality is far too complex to test assumptions about it. Hence it is more conflict-averse to state an obscure and naive model of reality and just empirically test its aggregate behaviour. This makes science much easier, but it loses focus on reality.

In response to this, positivists tend to argue that the social world is much more complex than the natural world (‘interactionism’, already prefigured by Mill) or that the regularities that govern it can only be identified at a more basic level (‘reductionism’, prefigured by Comte), and that, in any event, concepts (or meanings), to the extent that they are explanatorily relevant at all, can only be identified, or hypotheses about them tested, empirically (i.e. behaviourally). Neither party doubts for a moment that empirical invariances are necessary for laws, or that the conceptual and the empirical jointly exhaust the real. Bhaskar (1989, p. 17)

Surely it is difficult to say either the social world is more complex than the natural world, but this notion will disappear when we start to accept that there is only one world, for which we have to take care of. Bhaskar additionally says that most actual problems in social science stem from the two fetishes of *empiricism* and *individualism*, where the former one arises out of positivism and the latter one out of hermeneutics. Yes, it is a problem that hermeneutics somehow reduces experience to the individual level and gazes through this lens. Experience represents a holistic modality, you are never alone when you experience something, and you are always connected.

Conclusively Bhaskar (1989) suggests trusting on a critical naturalism or transcendental realism. One can find three fundamental principles in Bhaskar’s critical realism:

- ontological intransitivity (reality exists independently of knowledge)
- epistemic relativity (all knowledge is socially constructed)
- judgmental rationality (there are rational reasons of preferring some beliefs over others)

Further, according to Bhaskar, reality is stratified, and it consists of three levels:

- the empirical level (the level of experiences)
- the actual level (the level of events and states of affairs)
- the real level (the level of underlying structures, causal laws, and 'generative mechanisms'—for Bhaskar, all true knowledge is knowledge of this underlying level)

Within these two blocks we can identify some fundamental associations. There is a divide between ontology and epistemology, where the former is intransitive and the latter is transitive. There is no possible separation of subject and object. Additionally it is not surprising that the idea of *Evolutionary Realism* is somehow related to the idea of critical realism. Dopfer follows a similar separation of the *empirical*, the *actual* and the *real* in his writings as well. In order to get a denser picture of Bhaskar's (1989) idea of naturalism we will refer to two chapters in his book and excerpt the critical issues; *society* and *agency* again. At last we will focus on the biology-culture divide and possible exit-strategies for an integrated concept of naturalism, called here simply *Culturology*, along the lines of developmentalist approaches in evolutionary theory, for example Oyama (2000).

Society

Bhaskar's naturalism builds on a very simple ontological notion of society. Society is pre-existent, society is a social fact. By that he means in particular that the way we percept nature is much more radical than perceiving society. Criticism about facts (either natural or social ones) increases tremendously when we swap from debates on the existence of nature to debates on the existence of society.³² On a first look, Bhaskar has no answer for this question. Nevertheless he gives exemplary models how we could percept society more realistically, within a similar or within the same ontology. He therefore asks, what are the properties of society or what can even be properties of society? First it is an ontological question what properties societies posses and secondly it is an epistemological question of how these properties are made possible objects of knowledge for us. Following Bhaskar (1989, p. 25), in transcendental realism it is the nature of objects that determines their cognitive possibilities for us. So what is the nature of society?

- Societies are primarily irreducible to mere people.
- Social forms constitute the necessary condition for any intentional act.

³² This assumption may also deal with the fact that we are equipped with special or explicit organs (f.e. eyes, ears, ...) for perceiving nature, but we do not have any special or explicit organs for perceiving society (except language of course); which makes us more worry about the existence of society.

- their pre-existence establishes their autonomy
- their causal power establishes their reality

Society is made upon social relations, it is definitely not made upon mere people or groups, and these are two fallacies Bhaskar wants to show us. Such considerations want to stem against methodological individualism. We got to move from a theory of society as *experienced* by its agents to a theory of *essential* social relations which necessitate them. Hence agents may not even be aware of them. Society is really there, it is not just a model we have in our thoughts. Then Bhaskar (1989, p. 26) raises the question, ‘*why do we have different theories about inanimate things?*’ He finds the main problems of an inadequate theory of society in the lack of relation-based components and contrary to it in an overemphasis on absolute components, like an individual. Individualism is atomistic; it is compound of a Newtonian mechanistic picture of society. Societies have to be considered as complex irreducible real objects. In individualism there is no social fact, there are just individual facts, which are just interpreted in social terms. He criticises Popper, because he insisted on a theory which deals with ‘*all social phenomena, especially social institutions should be understood as resulting from human agency.*’ Bhaskar (1989, p. 27) Popper had reasons for insisting on agency, because the only alternative was the collectivist structural theory of Durkheim. We will see that Bhaskar tries to find something different. Margrate Thatcher once said that there is no such thing as society; her politics was nurtured by individualism. But how can we even think of an individual in a non-social way. Another problem emerges because individualists mostly think that the *social* is the same as the *group*. This is not the case, because sociology is concerned with *persistent* relations between individuals and groups. Hence the investigation of mass behaviour is interesting for example, but it cannot be main subject-matter of any social science. Bhaskar summarises the conception of the neoclassical model, that its reason is an efficient slave of passion (utility maximizing) and social behaviour is the outcome of simple maximisation; it is treated as a by-product. On the one hand relations play *no* role in this model and reason is *only* applied to desire and passion. Obviously this model cannot have any explanatory potential for society; it can only provide normative issues. Additionally the Durkheim collectivist model cannot provide a full-fledged model of society as well. In this conception society determines human agency, and surely not the other way around. Hence it is not concerned with groups and even not with habits or rules of conduct.

If Durkheim combined a collectivist conception of sociology with a positivist methodology, Weber combined a neo-Kantian methodology with a still essentially individualist conception of sociology. Bhaskar (1989, p. 31)

Table 2.3: Four tendencies in social thought

	<i>Method</i>	<i>Object</i>
Utilitarianism	empiricist	individualist
Weber	neo-Kantian	Individualist
Durkheim	empiricist	collectivist
Marx	realist	relational

Source: Bhaskar (1989, p. 31)

In Durkheim's as well as in Weber's conception a residual empiricism holds back and ultimately annuls a real scientific approach. Such a Bhaskarian formulation reflects again a critique on empiricism and on mere agency, because both are not able to reveal the social relations, which should be the primary real objects. Hence it is a simple question of categorisation, if we accept the fact that the real components of society are its relations and not its mere nodes; then we can swap to new models. Such models have to be in tradition to the Marxian conception of real relations in society, which create *value*. It is not the individuals who create value or evaluate something; such valuations emerge out of persistent social relations – *institutions*.

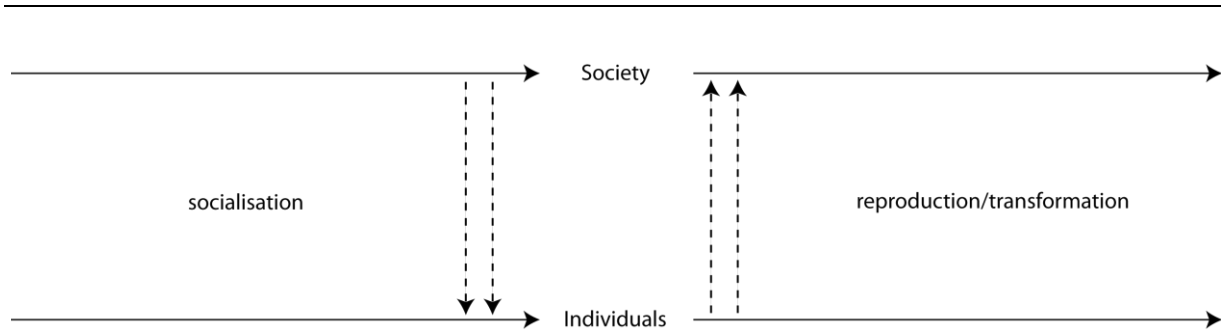
Bhaskar's model of society is a transformational one. It starts with a pre-existing society, with social facts where individuals are born into, they then may learn what these facts are made of and start to get involved. By that individuals transform society in a very simple way. It is a model of *continuous* dialectics, society forms individuals creating society. This model wants to express *reification* in contrast to *objectivation*; which can be understood as the ...

... moment in the process of objectivation in which man establishes distance from his producing and its product, such that he can take cognizance of it and make of it an object of his consciousness; and is regarded as necessary to any conceivable social life. Bhaskar (1989, p. 32)

This is also something Marx (2001) [1890] had in mind with a combination of a realist ontology and a relational sociology. In figure 2.4 we can see Bhaskar's (1989, p. 36) transformational model of society. In his model people do not create society, it pre-exists them and is a necessary condition for human action. Further, society does not exist independently of human action, but it is not the mere product of it; hence individuals and

groups transform it. Reproduction and transformation still leads to achievement, either it happens directly or indirectly/emergent. Then, society provides necessary conditions for human agency/action and *intentionality* is a necessary condition for it.

Figure 2.4: Transformational model of society/person connection.



Source: reconstructed from Bhaskar (1989, p. 36)

Bhaskar's (1989) ideas do not end at this point, but they leave our major interests at this point. The idea of intentionality is a very crucial issue of institutional development at all. Intentionality presupposes the concept or process of language and is neatly connected to it. Language is according to Searle (2005) the most basic human institution ever developed, it allows *culture*.

But the conceptual aspect of the subject-matter of the social sciences circumscribes the possibility of measurement in an even more fundamental way. For meanings cannot be measured, only understood. Hypotheses about them must be expressed in language, and confirmed in dialogue. Language here stands to the conceptual aspect of social science as geometry stands to physics. Bhaskar (1989, p. 46)

This releases the inner heart of a naturalistic foundation of social sciences. Naturalism gets unfolded via discourse, via linguistic process. A discursive world leads us into the idea of reality/society as a process. It entails power and related building blocks of social existence and of institutions at all. The idea of language as an intentional act and of power as a constructive force in the evolution of institutions will come back in later sections of this thesis. By looking into Bhaskar (1989) we can identify society as real, like nature, due to the idea of pre-existing persistent social relations – institutions. Nevertheless, facing scientific monism, it is one point to treat society in a realist fashion, but it is even more important to analyse the relations and interdependences of nature and culture, both understood as real processes. We have seen in the previous chapters that this is not an easy project, but the

project has just started.

To conclude the debate on naturalism, it is argued within the developmental system's framework of Oyama (2000). It serves as an appropriate realm to treat the biology/culture debate/divide. The term *culturology* is introduced to cover the issue adequately. It is used in Russian academia as an equivalent for the European cultural studies, but with a slight affinity to systemic thinking. Either or not the Russians discuss the biology/culture divide within these terms. It is majorly understood as a more systemic anthropology.

Culturology

Culturology shall work as a co-evolutionary approach to naturalism that means that biological and cultural processes interdependently transform reality. Bhaskar's notion of realism was more on the relation between a person and society. He opens the way to treat society as a real fact, as a fact of persistent pre-existent social relations; majorly transformed by persons.

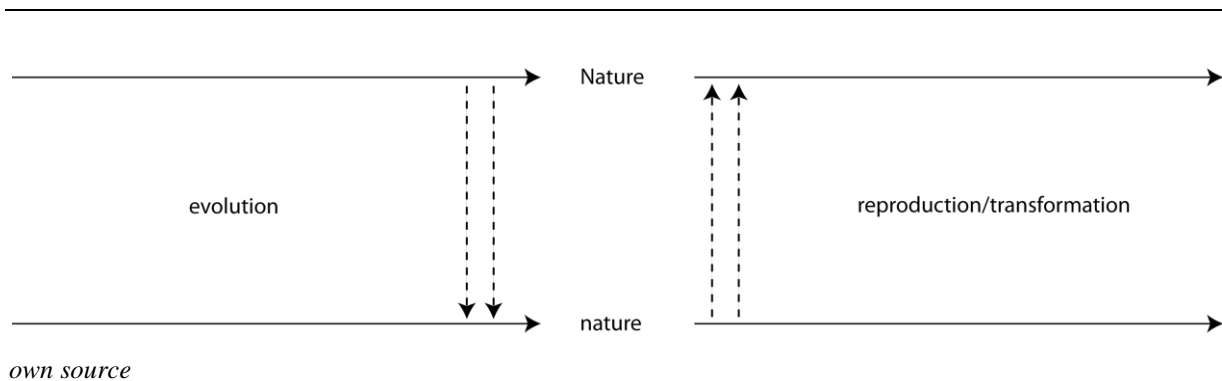
Oyama (2000, p. 142) makes clear that neither mind nor language are thought to be things we either possess or not, consequently we cannot locate them. *'Where is my mind?'* is a great title of a rock-song from the Pixies in the 90ies, which fascinated the first internet generation of young hackers and wannabes. So, is it in the internet, the mind? The question seems simple and boring, but it indicates a very basic, maybe the one and only ontological, problem. There is no special location for the mind, there is no special location for language, there is only a location for speech and so on, but language is more fundamental than its corresponding organs.

Next question: Where are cultural traits? A whole generation of Neo-Darwinian biologists lectured that cultural traits are encoded in our genes. Now, we start to regain confidence that this solution may be far too easy. How could it even be, that for example trading/bargaining/speculating is codified in the genes alone, that there is no room for nurture? The debate between nature and nurture stems from asking the wrong questions. That is what Oyama (2000) wants to tell us. It is not about where is mind or where are traits located, it is about what does it mean to have a mind or what does it mean to rely on cultural traits in society and how do they evolve. Mind and traits are facts, they are natural and real existences, but without any special location. They are emergent realities and rely on complex networks or systems; their mere existence probably depends on infinite factors. Nevertheless they have got to be treated as important as realities with a special location, like the brain or

the eye. They also depend on infinite factors and are somehow also emergent, but with a slight difference: they can be physically located.

These ideas or considerations are dealing with a crucial insight. If we always ask about specific locations of emergent phenomena, we will not stop believing in ‘*isolated individuals whose properties (possessions!) can be enumerated without paying attention to activities and surroundings.*’ Oyama (2000, p. 142) She wants us to turn outwards instead of too much inwardness. It is the interaction of environment and organism which manifests change and generates novelties. The genes alone will not do it. In Oyama’s view external *Nature* and internal *nature* co-construct over time, through intimate engagement with the world.³³ In that respect we can sketch a co-evolutionary transformational model of *Nature* in comparison to Bhaskar (1989). *Nature/biology* pre-exists and influences *nature/culture/society*, which continuously transforms *Nature/biology*. In such a model *Nature* is a necessary condition for *nature*; but it is not the product of it. Further, *Nature* does not exist independently of *nature*.³⁴ Then, identically to Bhaskar, reproduction and transformation still lead to achievement, either it happens directly or indirectly/emergent. Then, *Nature* provides necessary conditions for *nature* and *culture* (or at least language) is a necessary condition for *organic Nature*.

Figure 2.5: Transformational model of Nature/nature connection.



Insofar we are able to sketch a co-evolutionary transformational model of the relationship between organic biology and culture – the so-called nature–nurture debate, as illustrated in

³³ She uses a Big *N* for *external Nature* (Nature out there - biology) and a small *n* for *internal nature* (human nature - culture).

³⁴ Here, we need to restrict *Nature* to *organic Nature*, because we have to assume that there could exist an *anorganic Nature* independently/without any culture. This leads us to an additional assumption, namely that organic life needs something comparable to culture (or at least language), in order to exist. It must be clear that we cannot prove this assumption within this context.

figure 2.5. This can be treated as one possible ontological foundation of naturalism, where *Nature* is multiple and not arbitrary.

A further question is related to the concept of design in evolution, which can be treated in two different ways. First, design can be an intentional act of creating a finished product; second, design can refer to a pre-existing external model, then designing is interpreted as imitating or copying. The above figure 2.5. incorporates both concepts in a co-evolutionary way. There is a pre-existent biology out there, where some culture depends on and may emerge through replicas; nevertheless culture produces feedbacks to this biology within purposeful design. This interplay is called evolution. The model may also reflect multiple perspectives, which also Oyama (2000, p. 145) mentions. She concludes that maybe it is not a good idea to believe in straight-forward solutions in science, ‘...*I realized that getting the facts straight once and for all was not the point.*’ It is an incorporated property of complex systems that they will always produce new, often unexpected, outcomes. Hence we, as scientists, should focus more on relations and relations of relations, rather than on solutions.

Traditional science and religion are all involved in legitimating only certain kinds of knowledge, in sanctioning only certain kinds of knowers and ways of knowing. In scientific knowledge the knower paradoxically disappears. Oyama (2000, p. 146)

By that Oyama (2000) means in particular that the exaggerated search for objectivity annuls the observer. In addition it supports the myth of autonomy and separateness of the world. This is also the case within neoclassical economics, where we are now confronted with models (for example endogenous growth theory) which are far away from any linkage to reality and propagate a somehow autonomous ‘world’.

Such considerations, from design to objectivity and knowledge, lead us to the most prominent concept of the modern world – information. Oyama (2000, p. 147) points out that information is somehow the modern-technological incarnation of design. As we already discussed at hands of Hanappi (2003) and Herrmann-Pillath (2007b), information is a manifold concept, there is information in us and out there. The information in us reveals the biological basis and defines the *instinctive* core of being; it is prescribed inner reality. This type of information is mostly regarded as genetic information that is translated into bodies and minds. Additionally the information out there is not just some mysterious stuff, no, it is real, it is about real persistent relations, whether it refers to society or to biology. It seems, on a first glance, that information moves from outside inwards, via perception. Now, knowledge, understood as processed or

structured information, is mediated as objective and technocratic in a scientific way. Nevertheless it should be democratic, according to Bhaskar's (1989) analysis of social relations creating real existences, i.e. information and in a second instance knowledge. Oyama (2000, p. 148) adds that if we do not recognize '*...our active role in knowing, it may lessen the chances that we will be reductively stuck in one perspective, or at one level of analysis.*' This reveals the potential of active democratic research, instead of passive elite thinking; it is a way we also should consider evolution as such. Oyama (2000, p. 148 ff.) insists of taking fortune in our hands, by envisaging another kind of biology, a kind that is less tied to the search for the one timeless truth, that will structure our life. Her mantra would be to do evolutionary science in favour of understanding reality and not for fetish.

Another point made by Oyama (2000, p. 153ff), referring to the nature/nurture debate, is that there will always be some acquired nurture without a localisable biological base. In this respect naturalism should be treated as a project of co-evolution. She mentions this critical issue, because within the project of socio-biology it was not always clear how this integration shall work. People often tried to ground the mind or cultural traits biologically and reduced it to natural science, which is obviously not in favour of naturalism, as we try to develop. Therefore naturalism shall embrace strict transformational co-evolution of organisms and their environment in a nested way; even in a holistic picture of evolution, which is not the case in Corning (2005) or Herrmann-Pillath (2007a) for example. Nature is not static at all, neither *Nature* nor *nature*, even if it fixes some points in the environment or in behaviour over time.

3. Institution – Generic Heuristics

3.1. What are institutions?

Institutional economics has a very long and old tradition, which first of all can be traced back to the American institutionalists: Thorstein Veblen (1857-1929), Wesley Clair Mitchell (1847-1948) and John Rogers Commons (1862-1945). They were prior influenced by the American pragmatists: Charles Sanders Peirce (1839-1914), who can be considered as the founder of pragmatism, William James (1842-1910) and John Dewey (1859-1952). In particular we identify this approach as the *Old Institutional Economics* (OIE), which today stands on the opposite to the *New Institutional Economics* (NIE). The latter mostly originated in the work of Coase (1937, 1960, 1998) and Williamson (1975, 1979). The former OIE approach got a renaissance within heterodox strands of economics, e.g. in evolutionary economics. Another categorisation can be drawn from a political science perspective. Hall and Taylor (1996) suggest thinking in three different institutionalisms, namely *historical institutionalism*, *rational choice institutionalism* and *sociological institutionalism*. The authors explain that historical institutionalism has its roots in structural functionalism – that the emphasis was on the structural component of the emergence of an institution and not so on the functional outcome as a response to the system's needs – and in group conflict theory, which we will also discuss briefly in the end of section 3.4. Additionally historical institutionalists always had a close relation to Marx and this was also part of a major debate on the directions the theory should go, either away from Marx or closer to him. As a consequence the institutional process is illustrated as a path-dependent process which creates or determines power relations in society to some certain extent. In contrary rational choice institutionalism conceives institutions as instruments to sustain specific human behaviour, institutions are the mere means to an end then. The emphasis is on agency, a society's institutions are justified through minimizing transaction costs. This approach stands very

close to the NIE approach, because rational-choice institutionalists in political science borrowed a lot of ideas from the *new economics of organisation* literature, especially the concept of transaction costs. All common neoclassical assumptions on the individual agent and its representative model are included into this kind of institutionalism, but primary there is a fixed set of preferences and an optimising agent acting on rational choice. Sociological institutionalism has developed in the sociological domain of organisation theory and as the authors claim gets more and more interesting for political scientists as well. This third approach, perceived from political science, stresses the issue of culture. In particular followers of this school argue that

...institutional forms or procedures used by modern organizations were not adopted simply because they were most efficient for the tasks at hand, in line with some transcendent rationalism. Instead, they argued that many of these forms and procedures should be seen as culturally specific practices, akin to the myth and ceremonies devised by many societies, and assimilated into organizations, not necessarily to enhance their formal means-ends efficiency, but as a result of the kind of processes associated with the transmission of cultural practices more generally. Hall and Taylor (1996, p. 14)

We can easily conclude that the type of institutionalism depends on the one hand on the use of a *calculus* or *cultural* approach in general and on the other hand on the use of a specific calculus or cultural approach. The calculus approach does neglect that ideologies and social/cultural practices do determine human agency even if it is not rational or irrational. The cultural approach does neglect that human agency may also be of strict strategic or tactic nature, that means that it grounds on rationality. The role of institutions emerges out of this contradiction. Both categories influence institutional change and consequently human behaviour in an integrated way; this can be seen as a realistic picture of institutionalism. Of course the degree of calculus and culture is completely situation-dependent, but it will always be a mix.

Returning to the economic domain, we may say that we have the same problems and the same categorical issues, but we found something which may overcome these to-be dichotomies, i.e. *evolutionary or generic institutionalism*. The idea of generic change and evolutionary variety influencing the structure of institutions and the agency of human individual beings in a bimodal way, builds upon the grand visions of the godfathers of evolutionary economics: Thorstein Veblen, Friedrich August von Hayek and Joseph Alois Schumpeter. In the following section we will try to elaborate a picture of institutional change that hopefully can be called generic. Therefore it is suggested to look into the work of the announced scholars and additionally into the work of Pierre Bourdieu. His ideas and concepts

are far more close to the idea of evolutionary, generic change than one would immediately guess. Hence we will learn a lot of essential things to better understand *generic change*. All four scholars work with theoretical concepts that integrate structure and agency in a very archetypical way. Veblen used the idea of *habits* and habits of thought to explain the *cumulative causation of institutions*, Hayek built upon the idea of *rules of conduct* and tried to develop *spontaneous orders* with them, Schumpeter got popular with his view of the *entrepreneur*, as a risk-taking, active, *innovative* economic agent who is able to initialize *creative destruction*. Bourdieu convincingly showed in several books and articles that human beings follow cultural and social practices within a specific *habitus* and so creating certain *fields* of social existence, conditional on *cultural dispositions*. You see that all these concepts have to deal with *calculating* as well as *cultural approaches*. The program of generic institutionalism tries to tell stories of institutional change and finally suggests certain models, capable of reproducing the stories' generic characteristics. The most difficult thing for institutional analysis is defining and categorising institutions. Searle (2005, p. 18) writes: '*I do not much care if my account of institutional reality and institutional facts matches that ordinary usage. I'm much more interested in getting at the underlying glue that holds human societies together.*' Hodgson (2006, p. 1) otherwise argues: '*This paper proposes that those that give up³⁵ are acting in haste; potentially consensual definitions of these terms are possible, once we overcome a few obstacles and difficulties in the way.*' We have to deal with this issue in a very serious way, because institutions may be the most basic things human beings are mutually engaged with, independent from their way of creation, which may be emergent or designed. Once we recognize the entire theoretical as well as practical importance of institutions, we may also recognize that they occur in a fractal way in society, multi-faceted, self-similar and everywhere. Hence it is a difficult task to define them, distinguish them, categorise them and order them. Searle (2005) emphasises that language is the first and most important institution in human evolution, without language human beings will not be able to form different institutions and evolve within culture and technology. He strengthens the argument that there is no space, no situation, no nothing in human culture without institutions, hence we cannot imagine something like a *natural* or *institution-less* state. We have to anticipate institutions when we talk about institutions, or to put it in other words: we need institutions to explain institutions and their development. But what are the

³⁵ By the means of *giving up* to define institutions and their properties.

most common distinctions for institutional objects?

First of all, we may consider Ostrom's (2005, p. 137 ff.) analysis of *institutional statements*, which incorporates a grammar of institutions involving three components, every institutional statement may be a *rule*, a *norm* or a *shared strategy*. This concept of institutional statements can be compared with Searle's (2005, p. 6 ff.) idea of institutional facts, evolving out of social facts, because both share the idea of *deontic*³⁶ logic, moral and power. Institutions shape power relations, they create, destroy and maintain moral systems, they define property rights, they enforce social life. Ostrom's grammar of institutions is an evolutionary story with a strong emphasis on strategic human behaviour. According to her, human strategies may evolve to social norms and finally to rules. She distinguishes them with a strict syntax and modal operators³⁷. It is important for now that institutions evolve over time, from simple strategies to complex institutional regulative structures, as e.g. the European Union. This emphasis includes a path-dependent argument of institutional change.

But are all rules the same? How can we distinguish language from a constitutive body as e.g. the parliament of the European Union? According to Hodgson (2006) some misunderstandings within institutional economics on the proper meaning of institution arose with North's (1990) contribution to institutional change.

North (1990) defined institutions as *the rules of the game*, whereas the rules have to be interpreted as institutions and the players as organisations. Hence an organisation, according to Hodgson (2005, p. 9 f.), is not an institution in North's framework, because it is treated as a single agent, due to North's ambitions in investigating the macroeconomic consequences of institutional change. Nevertheless an organisation has to be considered as an institution as well, because it is also involved in a continuous process of deliberation and rule-design. Organisational routines may reflect the institutions of an organisation.

Organizations are special institutions that involve (a) criteria to establish their boundaries and to distinguish their members from non-members, (b) principles of sovereignty concerning who is in charge, and (c) chains of command delineating responsibilities within the organization. Hodgson (2005, p. 18)

Further there are some huge misunderstandings concerning the terms *formal* and *informal* or *legal* and *nonlegal*, codified and tacit. It is difficult to say whether an institution is formal or

³⁶ Ostrom (2005, p. 140): '*DEONTIC is a holder for the three modal verbs analysed by von Wright. These are 'may' (permitted), 'must' (obliged), and 'must not' (forbidden).*'

³⁷ For a detailed analysis see Ostrom (2005, p. 139 ff.)

informal, because it strictly depends on the heuristic device³⁸ one uses in order to imagine or envisage it, in thought experiments. Hodgson proposes that these distinctions are very ambiguous and arbitrary, thus they should be either handled with intensive care or should be simply left out. The definition of organisations as special institutions is a very good and common distinction, good enough to work with it on institutional change. This definition is a very important and deep one, because it concerns different heuristic patterns of thought. Hence an organisation is a special institution because it has a strong aspect on human agency, organisational behaviour and routines; whereas the rules can still be generic, such as language or money for example. Organisations are always institutions too, but it does not work the other way around.

Hodgson (2006, p. 2 f.) defines institutions like this: ‘*Without doing too much violence to the relevant literature, we may define institutions as systems of established and prevalent social rules that structure social interactions.*’ Further concerning rules, he writes: ‘*The term rule is broadly understood as a socially transmitted and customary normative injunction or immanently normative disposition, that in circumstances X do Y. ...*’ (ibid., p. 6): ‘*Institutional economists in the Veblenian tradition, and modern and original pragmatist philosophers, argue that institutions work only because the rules involved are embedded in shared habits of thought and behaviour.*’ This emphasis is still consistent with Ostrom’s (2005) and Searle’s (2005) contribution, nevertheless they have different *heuristic devices* in mind, how this embeddedness of shared beliefs or imaginations may work. Hodgson and Knudsen (2004) identify habits as the most important units for institutional change; in tradition of Veblen these habits shall drive the process of cumulative causation. For the two authors habits represent something more, together with routines³⁹ they shall act as *replicators* and firms or institutions as *interactors* in a kind of replicator-interactor dynamics. Besides the fact that there is no social equivalent of genes – biological units of selection – in the cultural sphere, it is a very instructive and didactic concept, but may not work for certain as well as generic socio-economic purposes. Ostrom (2005a) deals with a more *strategic, game-theoretic* heuristic. There the agents have different strategies and form institutional statements in a somehow dialectic process. Searle (2005) works with *collective intentionality* as his major driving force for institutional change.

³⁸ Heuristic device is here understood in the manner of Witt’s (2008a, p. 10 ff.) distinction between heuristics and ontology.

³⁹ Routines understood in tradition of Nelson and Winter (1982).

These vehicles are all modern, still evolutionary variants, we can find as well in the history of economic thought, e.g. pragmatist approaches or Austrian approaches. Hayek's (1973, 1976, 1979) late contributions on social philosophy and legislation have a strong emphasis on *self-organisation* as the major force for institutional change. He considers the evolution of institutions in *taxis* and *cosmos*, where he ascribes to the former institutions like constitutions, which are majorly designed; and to the latter institutions emerging out of spontaneous order, that are systems of rules of conduct for example. Hayek was a strong opponent of socialism and worked his whole life against socialist and over-regulative ideas; hence it is easy to understand why he favoured self-organised forms. Another Austrian major contributor to institutional development clearly is Schumpeter, with e.g. his work on economic development (1911). According to Shionoya (2009) Schumpeter had a *unified social science* in mind, with an emphasis on historical institutional development as well as on prospective entrepreneurial agency. His economic analysis of the entrepreneur did not exclude institutional concerns; he made the supporting role of banks and the state an important feature of his heuristic frame. They should provide and guarantee risk-minimising institutional infrastructure for entrepreneurial activity.

Furthermore, Dopfer et. al (2004) used the Schumpeterian concept of innovation to describe institutional change within a *meso* sphere. Generic rules establish institutional activity on a meso level of the economy, where innovation, either economic or social, happens. Dopfer emphasises in his works that mere aggregation from micro- to macroeconomics cuts off the most important processes of socioeconomic life. Rules are generated during this aggregation process. On the other side Elsner (2009) shows that there has to be a kind of *meso*-size of groups or of social structures necessary for the evolution of institutions, hence size does matter a lot.

The evolution of human institutions is additionally dependent on the development of human capabilities, such as cognitive processes, social learning and as already mentioned above intentionality. Cordes (2004) brilliantly shows how cultural evolution distinguishes from biological evolution, that human evolution continued on the grounds of biological evolution. The development of cognitive as well as intentional human capabilities shapes human interaction and therefore the evolution of institutions, such as markets, states, firms, families, friendships, laws, language, money and culture as such.

Still institutions shape conflicts between social groups, because they lead to specific

economic and political distributions in society. This is a topic where Bourdieu comes in, who shows that human beings are involved in a manifold capital process, so that there are *varieties of capital*. These forms of capital do always emerge in light of certain dispositions, which are acquired and incorporated in a *habitus*. The so-to-say Cartesian product of economic and social capital versus cultural dispositions creates a specific *field* in a dialectic way. These fields are the flourishing grounds for institutional change; they are shaped by internal and external conflicts. Further, habitus is not just a pattern of behaviour acquired over years from parents and school friends, it is much more. Habitus has to be considered as path-dependent culture, it forms the way of life in manifold facets.

These different heuristic devices show the immense complexity of institutional change at all. Additionally they show how change can be interpreted. Hence in this section we will try to introspect this whole spectrum of institutional heuristics. We will discuss different heuristic devices for institutional development, as ascribed above, along their influential founding scholars: Veblen, Hayek, Schumpeter and Bourdieu. We will see that each representative had special institutional concerns in mind when talking on institutions generally. These special concerns then reveal different abstract and *generic* aspects of institutional change, like *circular-cumulative causation*, *spontaneous order*, *group selection*, *creative destruction* and *habitus*. Finally we will see how these different heuristics fit together in the broader ontological setup of evolutionary change.

3.2. Veblen's heritage

Precisely wherein the social and political sciences, including economics, fall short of being evolutionary sciences, is not so plain. At least, it has not been satisfactorily pointed out by their critics. Their successful rivals in this matter – the sciences that deal with human nature among the rest – claim as their substantial distinction that they are realistic: they deal with facts. But economics, too, is realistic in this sense: it deals with facts, often in the most painstaking way, and latterly with an increasingly strenuous insistence on the sole efficacy of data. But this 'realism' does not make economic an evolutionary science. The insistence on data could scarcely be carried to a higher pitch than it was carried by the first generation of the Historical School; ... an evolutionary science, on the other hand, is close knit body of theory. It is a theory of a process, of an unfolding sequence. But here, again, economics seems to meet the test in a fair measure, without satisfying its critics that its credentials are good. ... The difference between the evolutionary and the pre-evolutionary sciences lies not in the insistence on facts. There was a great and fruitful activity in the natural sciences in collecting collating facts before these sciences took on the character which marks them as evolutionary. Nor does the difference lie in the absence of efforts to formulate and explain schemes of process, sequence, growth and development in the pre-evolutionary days. ... There is no abrupt transition from the pre-evolutionary to the post evolutionary standpoint. Even in those natural sciences which deal with the processes of life and the evolutionary sequence of events the concept of dispassionate cumulative causation has often and effectively been helped out by the notion that there is in all this some sort of a meliorative trend that exercises a constraining guidance over the course of cause and effects. ... Economic action must be subject matter of the science if the science is to fall into line as an evolutionary science. ... The hedonistic conception of man is that of a lightning calculator of pleasures and pains who oscillates like a homogeneous globule of desire of happiness under the impulse of stimuli that shift him about the area, but leave him intact. ... The later psychology, re-enforced by modern anthropological research, gives a different conception of human nature. According to this conception, it is the characteristic of man to do something, not simply to suffer pleasures and pains through the impact of suitable forces. He is not simply a bundle of desires that are to be saturated by being placed in the path of the forces of the environment, but rather a coherent structure of propensities and habits which seeks realisation and expression in an unfolding activity. ... The economic life history of the individual is a cumulative process of adaptation of means to ends that cumulatively change as the process goes on, both the agent and his environment being at any point the outcome of the last process. ... What is true of the individual in this respect is true of the group in which he lives. All economic change is a change in the economic community, – a change in the community's methods of turning material things to account. The change is always in the last resort a change in habits of thought. This is true even of changes in the mechanical processes of industry. A given contrivance for effecting certain material ends becomes a circumstance which affects the further growth of habits of thought – habitual methods of procedure – and so becomes a point of departure for further development of the methods of compassing the ends sought and for the further variation of ends that are sought to be compassed. ... It may or not be a teleological process in the sense that it tends or should tend to any end that is conceived to be worthy or adequate by the inquirer or by the consensus of inquirers. ... The question of a tendency in events can evidently not come up except on the ground of some preconception or prepossession on the part of the person looking for the tendency.

Veblen, Th. (1898)

Thorstein Veblen (1857-1929) definitely was an extraordinary and outstanding economist. In his article in the *Quarterly Journal of Economics* 'Why economics is not an evolutionary science?', Veblen (1898) he showed that economics can be something different than deductive logic on the one hand and mere data collecting on the other hand. For him economics has to be a science about cumulative causation of human intentions and habits, seen as a heuristic device rather than a mere method. These habits should be considered as situated and emerging out of the past. As an early evolutionist he also considered that evolution does not have to be a teleological process, in contrast to contemporary opinions and Social-Darwinist positions. Veblen stands in tradition of American institutionalism; his economic focus was primarily on technology and cultural evolution within an institutional concept of cumulative causation. Therefore, in this chapter, we will try to locate Veblen's thoughts on institutions among the American institutionalists like Commons and Mitchell. For these purposes it is referred to Reuter's (1996) book on institutionalism as such. Then we will focus on Veblen's emphasis on technology, habits and the machine process as an institutional anchor for economic growth and its link to labour, via Hodgson's (2004) outstanding book on the evolution of institutional economics. Concerning his thesis on conspicuous consumption some cross-reference is given to Bourdieu's theory of culture and taste via the concept of habitus. In the end we may be able to sketch more contemporary and abstract models out of Veblen's legacy, for example Elsner's (Berger and Elsner (2008)) approach of OSA and CCC. We will see if these concerns and abstract heuristics are prolific for further generic approaches to institutional change and whether they can be applied to environmental institutional economics, by referring to van den Bergh (2007) for example.

Finally we have to admit that Veblen's framework is completely consistent with our ontological framework, as we have developed in the first part. The idea of developmental system's approaches as well as the idea of critical naturalism fits with Veblen's agenda and with the American Institutionalism as such. Additionally his ideas of institutional change follow a generic logic of particular changes in rules instead of universal changes within laws, as we proposed.

AMERICAN INSTITUTIONALISM

Three major developments shaped the evolution of American Institutionalism, which can be identified via the philosophy of *American pragmatism*, the development of the institutional method as *critique of the neoclassical method* and institutionalism as *critique of capitalism*.

American pragmatism

The era of American pragmatism is mostly associated with the philosophy of Charles Sanders Peirce (1839-1914), who can be considered as the founder of pragmatism, William James (1842-1910) and John Dewey (1859-1952). Pragmatism introduces a rather odd picture of philosophy, compared to the European tradition. Continental philosophy in the 19th century was still shaped by the idea of ideal truth and ideal humanity. The American pragmatist position offered a problem-focused approach to truth and human development. Pragmatism is a philosophical school which is about the effects or consequences of things, instead of the pure identity of them. This is also true for the *pragmatist maxim* formulated by Peirce in ‘*How to make our ideas clear*’:

Consider what effects, which might conceivably have practical bearings, we conceive the object of our conception to have. Then, our conception of those effects is the whole of our conception of the object.
Hookway (2008)

The maxim is about practical consequences of things. Nevertheless we have to consider that consequences are manifold, hence it says nothing about the kind of consequences. But the maxim shall act as a rule, for clarifying concepts and hypotheses. It is so-to-say a more practical approach to philosophy. Peirce engaged pragmatism as a philosophy of acting instead of realizing, recognizing or perceiving. Therefore his new school released big attacks on scholasticism, metaphysics as well as idealism on the whole. Peirce was definitely against the idea of *final* or *ideal* truths as cornerstones for the sciences. Nevertheless Peirce also wanted to advance scientific method as such. In his writings on logic and on scientific method he presented his perspective on induction, deduction and abduction. Induction stands for an argument from a random sample towards a population and deduction stands for the other way around. Then abduction resembles the area of an *educated guess* or of a *conjecture*, which can be understood as a kind of probable argument from sample to population or vice versa, but the crucial point of a conjecture is about probability. Abduction means more specifically stating a

hypothesis. Now Peirce's scientific methodology builds upon these three basic principles of logic as phases. Scientific method begins with abduction – stating a conjecture or hypothesis – then follows deduction – conclusions are drawn considering the hypothesis as true – and at last comes induction – where the hypothesis is tested. Therefore pragmatism should not work as a philosophical system, but as a general ‘... *technique to respond on questions, solve problems and clarify terms.*’ Reuter (1996, p.75) Hence pragmatism shall prove terms and theories on validity concerning different life styles or life practices. It is a *praxiologic* draft of philosophy. In short, Peirce's pragmatism declares the possibility of timeless truth and epistemes as not worthy. Additionally, Peirce was a supporter of a more sophisticated theory unification of the evolving unity of mind and body.

William James's scientific domains dealt with psychology and physiology, in contrast to Peirce. Reuter (1996, p. 75 ff.) makes clear that the pragmatists not only have focused on concreteness, but also on a relativistic picture of truth, which was more elaborated by Peirce's followers, like James and Dewey. Truth in the sense of James is something which practically fits, in sense of the best adapted truth, in an evolutionary view. Hence truth is something which has to be constructed or is already constructed, instead of something which has to be discovered. This process of social construction of truth is similar to Searle's (2005) understanding of collective intentionality, in the sense of mutual creation of conventions or norms. Further, the construction of reality or truth has to be a process of trial and error, an evolutionary process; this point was made clear by Dewey. He advanced pragmatism towards a more instrumentalist perspective. In his studies on education and democracy, Dewey referred to the necessity to solve societal problems via trial and error. His study was about democracy as the most basic evolutionary process we can face. Instrumentalism is here seen as the art of participatory democracy. Necessarily, thinking has to be an instrument for action in this picture, as Reuter (1996, p. 79) points out. Hence Dewey's picture of pragmatism can be seen as the dominant philosophical foundation/tradition of institutional economics. Society may only evolve in a holistic way, if education and democracy is fostered. Therefore Dewey imagines democracy as a principle of life and not as just another type of legislation, which is somehow similar to Habermas' conception of democracy in Habermas (1981), the theory of *communicative action* and *practice*. At last we may summarise some points for the definitive significance of pragmatism for institutionalism, according to Reuter (1996, p. 80/81):

- Pragmatism denies historical processes as necessities, hence it believes in a free will of human beings. Then human beings are able to shape society and economy via their own criteria.
- The question of *truth* does not have any practical value for pragmatists. It is reduced to a question of practical consequences; either things or processes prove. The major aim is to analyse and explain possible solutions for real-world phenomena in society and economy. Therefore it is necessary to focus on empirically ascertainable realities.
- Expressions about reality are *true*, if they solve problems in society and economy; else they have to be revised. A pragmatist theory has to coevolve with reality. Hence a pragmatist theory has experimental properties and is open to new problems, experiences and insights. Science is therefore an instrument for action.
- The possibility of better and more founded insights increases via the capabilities and willingness of society to participate in the epistemological process. Therefore democratic discourse, participatory responsibility and participative management are in the centre of the theory.

Development of institutional method

The question of what is the institutional method or what is institutional methodology is floating like a ghost ship through academic circles. The new institutional economists still deny that the old institutionalism worked along scientific method, in contrast they are considered as anti-theoretical and worthless to promote. Reuter (1996) quotes Ronald Coase, Noble-Laureate for his theory of the firm–institutionalism and his works on externalities in 1991, according to his view of the American institutionalism.

The American institutionalists were not theoretical but antitheoretical ... Without a theory they had nothing to pass on except a mass descriptive material waiting for a theory, or a fire. Reuter (1996, p. 99)

Old institutionalism was understood as something unscientific and unsuccessful in the eyes of the neoclassical dogma. Consequently it is not surprising that somebody like Coase completely missed the point. Somewhere else Ronald Coase writes:

The phrase, 'the new institutional economics,' was coined by Oliver Williamson. It was intended to differentiate the subject from the 'old institutional economics.' John R. Commons, Wesley Mitchell, and those associated with them were men of great intellectual stature, but they were anti-theoretical, and without a theory to bind together their collection of facts, they had very little that they were able to pass on. Coase (1998)

This quote shows on its own how narrow this kind of thinking was and still is. It is this kind of thinking which still dominates economic academia and it is also this kind of thinking which has not gained any insight from the past *Methodenstreit*. As already discussed in the first part of the thesis, the *Methodenstreit* was majorly a battle between Schmoller and Menger, where the former represented the German historical school and the latter the Austrian school. One possible insight from the *Methodenstreit* is that one better not purely separate induction from deduction, hence avoiding engagement within dichotomies. This was also shown by pragmatists like Peirce who insisted on scientific phases, where a main component is represented by abduction, understood as a hybrid. Drawing conjectures, stating hypotheses or having a vision in the Schumpeterian sense is always on the edge between inductive and deductive techniques. Further we may argue that neoclassical economists tend to think that even institutional settings have to be explained within the narrow (purely and poorly) deductive corset of individually utility-maximising representative agents, without any social context. If the modeller insists on transaction costs as the one and only social context, the modeller will lose a very major component of the system, namely the environment – the society. The transaction cost approach is misleading, because it is compound of mere agency, neglecting the status and the development of the economic environment. Additionally it is Coase's theorem which tries to make us clear that economic relations, such as externalities, are all *solvable* by mere market allocation, if transaction costs are minimised. But even if transaction costs run directly towards zero, there will still be human boundaries, like cognitive capabilities or personal animosities, making transactions *naturally* costly; although such costs may also be interpreted as investments. The question of transaction costs is simply misleading. Two issues have to be raised according to the transaction-cost-approach. At first there is the issue of *solution*. Neoclassical economists think in problems which necessarily command analytical solutions. Considering the applied methodology, every problem must have a concrete and foremost explicit solution. Institutional economics cannot be a science which offers clear-cut technical solutions for society or for the economy, it can only provide heuristic hints for regulation. Institutional problems are complex, they evolve, they do not stay constant over time and they change from within, because agents as well as the environment changes too. Hence it is reckless to talk about explicit technical solutions in institutional contexts. The second issue deals with *the public* and *the common*. Mostly it sounds fancy when technocrats have elegant, tidy and prosperous solutions for societal,

institutional concerns. It sounds even more impressive when these solutions do not need any third party authority, when the problems are solved by the participants of the specific market on its own. The major problem is that social, political or economic problems need some third party, at least for legislative and executive issues of power. Hardin's (1968) '*Tragedy of the Commons*' represents the problem in a short and easy-to-read article, although it shows the extreme naivety of mankind regarding their belief in solving social problems with brutal mechanistic concepts.

In our day (though not in earlier times) technical solutions are always welcome. Because of previous failures in prophecy, it takes courage to assert that a desired technical solution is not possible. Wiesner and York⁴⁰ exhibited this courage; publishing in a science journal, they insisted that the solution to the problem was not to be found in the natural sciences. They cautiously qualified their statement with the phrase, 'It is our considered professional judgment. . . .' Whether they were right or not is not the concern of the present article. Rather, the concern here is with the important concept of a class of human problems which can be called 'no technical solution problems,' and, more specifically, with the identification and discussion of one of these. Hardin, G. (1968, p. 1243)

Hardin raises the most critical issue of social, economic or political problems. There is a class of human problems, which can be identified as *no-technical-solution problems*. Such problems involve public or common goods and they are simply not treatable by market allocation; they have to be tackled via the state or via some community – a third party. In his article he refers to population growth as a specific member of this class of problems. Sure it is, by remembering the Malthusian trap that population grows geometrically/exponentially. Additionally it is for sure that people will lack food and resources in a finite world sometime, if population growth rates do not change. Now such a problem cannot face any technical solution, without changing the premises. The major idea is that old-school scientists still think that problems have to be solved by holding factors constant, considered as *ceteris paribus*. Obviously the greater amount of human problems will not be technically solvable without changing the factors, the preliminaries or the circumstances. Therefore we may only solve problems by changing them, by stating them in a new way or by reconsidering the initial conditions as well as desired outcomes, instead of looking for brutal solutions, which may look elegant at a first glance.

⁴⁰ Commenting the arms race (prisoner's dilemma) in the cold war, in *Scientific American* 211:4, 27 (1964): 'Both sides in the arms race are ... confronted by the dilemma of steadily increasing military power and steadily decreasing national security. *It is our considered professional judgment that this dilemma has no technical solution.* If the great powers continue to look for solutions in the area of science and technology only, the result will be to worsen the situation.' (italics added)

Only a criterion of judgment and a system of weighting are needed. In nature the criterion is survival. Is it better for a species to be small and hideable, or large and powerful? Natural selection commensurates the incommensurables. The compromise achieved depends on a natural weighting of the values of the variables. Man must imitate this process. There is no doubt that in fact he already does, but unconsciously. It is when the hidden decisions are made explicit that the arguments begin. The problem for the years ahead is to work out an acceptable theory of weighting. Synergistic effects, nonlinear variation, and difficulties in discounting the future make the intellectual problem difficult, but not (in principle) insoluble. Hardin (1968, p. 1244)

This whole issue is about heuristics, it is not about specific formal models or about a specific analytical method to solve a problem; which Coase denotes as *theoretical*. No, it is about the *style* of thinking about problems/issues within a praxiological perspective. Hardin's hint on a natural theory of weighting appears to be a familiar idea of what we elaborated here. The old institutionalists – Veblen, Commons, Mitchell – have established a well-defined framework in this tradition, in order to capture the characteristics of institutional problems. In favour of solving a problem you may have to understand its nature and its development, just before you start solving it analytically, because maybe the problem does not have any solution; which brings us back to a *tragedy*. Anyway we should take tragedies serious in a realistic way, instead of whitewashing them with pseudo-solutions as the mainstream of new institutional economics is doing. Hardin (1968) refers to a tragedy by citing Whitehead's (1948) *Science and the Modern World*:

'The essence of dramatic tragedy is not unhappiness. It resides in the solemnity of the remorseless working of things.' He then goes on to say, *'This inevitableness of destiny can only be illustrated in terms of human life by incidents which in fact involve unhappiness. For it is only by them that the futility of escape can be made evident in the drama.'* Hardin (1968, p. 1244)

The petty scientist will always take it personal, if he cannot find a neat solution for a well-defined and well-behaving problem, instead of admitting boundaries. Escape, as Whitehead says, will be the logical consequence of a narrow-minded person. Getting back to our American institutionalists and Coase's critique on them we may conclude that Coase is a man who is escaping such a tragedy, he – as many others in the neoclassical paradigm – underestimates real-world processes in the two ways mentioned above: the concept of *solution* in the social sciences and the problem of *public* and *common* goods in economics. His new institutional program for economics still works with a deductive timeless model of transactions and allocations. Therefore it is nothing more than impudence, arrogance and snobbism to denote the old institutional economics as anti-theoretical, where the new ones live the life of easy short-run escape solutions for real world phenomena, such as climate change. If climate change will be treated as a pure market allocation thing, which shall be

solved via a pareto-optimum of minimised transactions, we will get flooded faster than we may solve the optimisation problem. Realism does not necessary mean pessimism. It is sometimes important to admit fallacies and boundaries of our human capabilities in face of institutional problems, but this does not necessitate giving them up in resignation. Within such a pragmatist perspective we may manage to better understand the full nature of institutional problems, which may lead us to more workable, practical solutions, instead of technical and tidy ones.

The core concept of the old institutional method is clearly *situative embeddedness*. Hence it is in the institutionalist's interest to analyse specific societal situations and dominant historic paths leading to these situations and moving away. The institutional context of a situation is the outcome of a cumulative process of causation, it is therefore necessary to investigate the milestones of this cumulative causation, in order to understand the emergence of an institution for example. On the other side it will be unavoidable to understand this cumulative process as an evolutionary one. As we have sufficiently discussed in the previous part of the thesis, it means a major switch in the social sciences from mechanistic models towards evolutionary ones. This is also true for the American institutionalists, they swapped along the ideas of the pragmatists from analysis of static situations towards analysis of dynamic processes. Therefore we can also argue that Coase defines this process-oriented organic thinking as antitheoretic, which fits into the picture of the dominant neoclassical paradigm. The old institutionalism focuses on empiric material and tries to understand its underlying dynamics, societal and agency's forces shaping institutional contexts along cultural, social, economic and political needs and wants. Veblen's (1899) *Theory of the Leisure Class* introduced a new methodological perspective into economics which turns around holism and evolution. According to Reuter (1996, p. 105), Veblen focuses on the *why and how* questions of changes in the economy, instead of asking about *what* premises lead to the perfect outcomes.

By formulating hypothetical historical reconstructions based on his principles of *social action* and *institutional transformation*, Veblen creates an heuristic construction that serves as a formula for observation and analysis of what he finds to be the essential meaning of existing *behaviour*. This gives to his work a critical style, but also a depth of analysis that is a degree of predictive validity. Weed (1981)

Weed (1981), as well as Reuter (1996), constitutes the major success of Veblen's method in his style of *hypothetical historical reconstructions*. Veblen (1899) reconstructs the evolution of the modern industrial society by starting with hunter-gatherer societies who behaved in a

very instinctive way. These instincts got culturally inherited over time and do still influence contemporary consumption patterns, as can be shown empirically via conspicuous consumption for example.

The formulation of theories of social institutions have often employed some sort of heuristic device that plays the role in the theory of pointing, by analytical comparison, to the underlying properties of social change. These heuristic devices represent abstract analytical descriptions where certain processes or principles of social relations can be represented in an unambiguous way. Some of the best known of these devices are the *ideal type* and the *cybernetic model*. The purpose of these devices is not so much to account for the relationships found in a particular body of data, but rather to provide us with analogies and metaphors which serve as a framework for comparative description and analysis. Thorstein Veblen uses one of these formulations, the hypothetical historical reconstruction, in his evolutionary theory. Weed (1981)

When Weed (1981) refers to heuristic devices as analogies and metaphors, he was not sure that it will be possible to think of heuristic devices, like generic evolution, in an ontological way as well, in a socially and naturally unified organic world. Nevertheless he shows that this core example of hypothetical historical reconstruction is a part of an evolutionary methodology. Additionally Weed (1981) emphasises the importance of using heuristic devices as abstractly guiding models or scientific strategies. He shows that especially institutional theory needs such heuristic devices as anchor points for their models. Hence this position somehow additionally vindicates the concept of introducing different institutional theories along their heuristic devices, within this part of the thesis.

Where Veblen's approach is holistic, evolutionary and even sometimes genetic – therefore analytic – Mitchell is more on the policy side at home. His expectations in economics are functional rather than descriptive. Wesley Mitchell insists that economists should participate in economic policies.

... we shall at least be helping on that long process of trial and error by which mankind is striving towards control over its own behaviour. Reuter (1996, p. 109) citing Mitchell (1937)

Mitchell also imagines the economic system as a continuous process of trial and error, hence with an evolutionary perspective. Albeit he treats economics as an evolutionary science, he does not try to build an evolutionary model for real economic processes. His emphasis on evolution differs from Veblen in a very important notion. Veblen concentrates on the long-run cumulative processes in society, from a system-theoretic position. Instead Mitchell focuses on political potential in the evolutionary idea, the potential of try and error in contrast to the religious idea of pure truth and absolute policy. This perspective enables the possibility that human beings are able to interfere with the system, that we can shape it along our own

interests. It is even more than that, Mitchell recommends to give your own policy, so-to-say, a try. Mitchell refers to Veblen as an economist who is in search of real, actual economic behaviour, instead of trying to project behaviour on what people would do if the orthodox premises are reached.

Veblen (...) chose to reason out human behaviour. (...) he sought to explain actual behaviour, not what men will 'normally' do; his conclusions are supposed to conform to 'facts' and to be open to testing by observation in a directer fashion than are most expositions of 'economic laws'. Reuter (1996, p. 110) citing Mitchell (1937)

Nevertheless Mitchell also criticised that Veblen's world is admittedly stimulating but on the other side also speculative. His universe of thoughts waits for validation, as Mitchell outlines. Hence he felt responsible, as Veblen's student and friend, to fulfil this validation via a huge empirical basis.

He [*Mitchell*] wanted to swim and not to wade, to explore and not to turn round and round on a small piece of arid land. Reuter (1996, p. 111) citing Schumpeter (1950)

Mitchell claimed more realism in economics. He was frustrated by the orthodox deductive and speculative system of thought. Therefore his destiny seemed to refer to Veblen's legacy, in order to change the dominant orthodoxy towards more empirics, which also means to introduce more and more statistical testing towards economics. Empiricism was something completely new in economics in this period. Concerning this issue, Mitchell refused the idea of one *rationality*, working in all human beings, and tried to avoid introspective studies of a one-dimensional economic agent, according to Reuter (1996, p. 113). He stresses the idea of institutional factors shaping real economic behaviour in a diametric way, shaping manifold rationalities.

... to find the basis of economic rationality in the development of a social institution directs our attention away from the dark subjective realm, where so many economists have groped, to an objective realm, where behaviour can be studied in the light of common day. Reuter (1996, p. 113) citing Mitchell (1937)

Emphasis is taken on the importance to relax assumptions on strict subjectivism in economics. Otherwise objectivism of economic behaviour will not lead the way as well. Although, as contemporary studies from anthropology show, we are able to model the socioeconomic world in an *inter-subjective* picture, which may introduce more realistic assumptions about economic processes.

Economic theory of the speculative kind is as cheap and easy to produce as higher mathematics or poetry – provided one has the gift. And it has the same problematical relation to reality as do these products of imagination. Reuter (1996, p. 115) citing Mitchell (1937)

Imagination is real. Although it is suggested to try to weight our economic, social and political policies/decisions on empirical facts, rather than on imaginations. Imagination helps us to create new theories, to develop something special and unique, but in a second process they have to be tested and validated in practice and data, especially for practical policy reasons.

Mitchell's life as an economist began with his dissertation on the so-called 'greenback studies'. The greenbacks were paper notes, functioning as a non-convertible currency during the American civil war. Mitchell's emphasis on empirics launched his interest in business-cycle theory, his mistrust in the quantitative theory of money and his interest in a central institution providing knowledge/information/data about economic processes. He was a founding member and year-long director of the *National Bureau of Economic Research*, still one of the most important economic institutions worldwide. Mitchell's work on business cycles is still a master piece in economic history and can compete with the greatest economic works in the last 150 years. Wesley Mitchell's practical, pragmatic institutionalism is not another declaration of war of the *historical school* towards the so-called *pure theory*. No, it has to be understood as an attempt to overcome this dichotomy and to better talk about a *dialectic process* instead. Nevertheless he insisted on *hypotheses* rather than on *theories*, because they can and should be tested in a process of continuous trial and error, contrary to closed theories.

(...) in the social sciences (...) investigators get forward by expounding hypotheses that seem at a given time to be plausible, working them out, seeing to what consequences they lead and then modifying their hypotheses. That is to say, they go forward by the method of trial and error. The more things that they try that are at all plausible, the harder they try them, the more thoroughly they work them out, the faster they get through with their series of blunders and the more advanced lies the stage in which they are making their current blunders. Reuter (1996, p. 123) citing Mitchell. (1937)

Mitchell's economic paradigm stands for synchronicity of the quantitative and the qualitative, the empiric and the theoretic, the inductive and the deductive research. This dialectic thinking is connected to a more abstract holism then. '*The more economists learned, the deeper grew their conviction that they must know the whole economy in order to understand any part.*' Reuter (1996, p. 124/125) citing Mitchell (1937).

Contrary to Mitchell's rather broad empiric conception of economics John R. Commons developed a different but familiar perspective of institutional methodology. Commons was intensively politically involved in negotiating with different societal groups, like workers, unions, etc. He was convinced that new insights from practical political life should be immediately introduced into theory. Commons theory of so-called 'formulas' was a contrary program to Weber's *Idealtypen*, instead they were something like *Realtypen*.

Instead, therefore, of a fixed ideal type which Weber names an utopia and which, indeed, becomes more utopian if it remains fixed as we proceed with our investigation, we have a changing hypothesis, taking in new factors or retiring old ones, always seeking to make less utopian the utopias which our minds construct. Thus theory becomes, not only a mental process for investigation of facts, but becomes also an interpretation, correlation, expectation of facts. In short, theory becomes a different meaning of Weber's 'understanding' – not the pedagogic meaning of fellow feeling, but the pragmatic meaning of insight on which we predict and act. Reuter (1996, p. 127) citing Commons (1936)

Commons persists on his formulation of theory, a holistic perspective as well. The real types change over time according to the whole, but the whole itself is just a configuration of developing *patterns*, as Commons (1936) addresses. Nevertheless it is often argued that his thoughts are muddled and difficult to decipher, because they mostly refer to general holistic issues, rather than concrete sub-systems of society, like politics or culture, as it is considered in complexity. Hence his institutionalism is very close to the pragmatists' foundations of Dewey. It is designed as a process-oriented, problem-solving theoretical tool-kit, which shall adapt to the environment continuously. Commons generally defends a position between them both, it would be inappropriate for the pragmatic institutionalist to act only on one side of the medal.

In the previous part of the thesis we have establish a detailed analysis of a possible new generic, naturalistic and evolutionary ontology, in contrast to a dual, closed and mechanistic perspective of economic systems. Veblen's critique on neoclassical concepts was majorly directed against the mechanistic Newtonian picture of economics. He often mentioned that economics is a backward science, celebrating a hedonistic manifesto within divine/natural order, in a pre-Darwinian way. The way of using the word *nature* or *natural* was something completely different 100 years ago. In the orthodoxy nature is something unchangeable, it is divine, constant, static and original, but it never moves, jumps or sleeps; in fact nature never *acts* in such a picture. But there is no natural law or order, there is only a naturally, endogenously changing pattern of rules. This was also the way Veblen considered institutional economics to be. The advantage of an evolutionary institutional methodology lies

in its capability to adapt and change in dependence on specific situations and contexts, but still with some universal toolkit in mind. Nevertheless institutionalism also emancipated with its critique of capitalism as such, which we will briefly highlight in the next section.

Critique of capitalism

Veblen, Commons and Mitchell, as institutional pioneers, have known too well that the neoclassical paradigm in economics had nothing in petto to seriously fight economic crisis. More than this, they were all aware that crisis is a natural fact of any capitalist system. According to this premise, the institutionalists had something similar in mind like Marx' theory of the evolution of capitalist societies, along their systems of production. But the institutionalists, with exception on Veblen, had different consequences in their mind sets. For Marx any capitalist production system has to break endogenously and has to be removed via a communist authority within a revolution of the proletariat. The old institutionalism has different exit-strategies for crisis. Crisis as an innate phenomenon of capitalist economic production systems just shows that there is a need for well-functioning institutions capable of stabilizing market-driven overshooting. Veblen explains his criticism of capitalism along the historic development of mankind, somehow familiar to Marx. This theory of human development can be reread in Veblen's (1899) *Theory of the Leisure Class*, where he shows that in early phases of mankind people lived in original, peaceful and small societies. Then everything has changed with the rise of private equity, a phase of Barbary, as he called it. In fact, private equity initialised competition among people. The production of goods and services let societies compete for surpluses, the owners of these surpluses could escape from the production processes; they do not need to work anymore, Veblen (1899, p. 49 ff). Such development led to leisured or idle classes in a first instance and secondly towards conspicuous and wasteful consumption (ibid., p. 79ff). It is quite obvious that such consumption patterns wanted to demonstrate, establish and maintain wealth and prosperity of a few people against the mass of the working class. This development can be traced back thousands of years before the first industrial revolution; this kind of behaviour was born before the machine economy. According to Veblen (1899) – compare also Reuter (1996, p. 159f) – capitalism evolved along following phases:

- primal phase of peaceful social life: no private equity, weak competition, group solidarity

- Barbary: private equity, competition and egoism
 - predatory-martial: open fighting, ‘man vs. man’
 - seemingly-peaceful: more subtle forms of fighting -> demonstrative waste and conspicuous consumption
 - époque of craftsmanship
 - modern machine époque, i.e. modern capitalism

As we can immediately identify, Veblen does not percept capitalism as something prosperous or inviting, on the contrary capitalism reflects Barbary for him. Hence *conflict* and *crisis* have to be the dominant terms concerning the analysis of capitalism and its development. The problem of capitalism, indicated by Veblen (1899), manifests in its one-way characteristic of different modes of consumption behaviour or different modes of taste. Veblen wants to show that good will, sympathy, a sense for fairness or other socially positive characteristics of human-beings are not helpful in such a system; he insists that it is rather the opposite case, namely that socially positive, or as it is contemporarily called *pro-social* or *altruistic* behaviour, is misleading in a capitalist economic system. For Veblen, there are simply two classes of people in capitalism, somehow similar to Marx. There is *business* – people who want to gain surplus profit within command and order actions – and *industry* – people who have to produce something in order to survive. In contrary to Marx, Veblen insisted on defining the two classes along different patterns of habits and actions, instead of property relations. Reuter (1996, p. 165) cites Veblen (1904, p. 348) in a very deep and thoughtful quote in this respect:

It is a question not so much of possessions as of employments; not of relative wealth, but of work. It is a question of work because it is a question of habits of thought, and work shapes the habits of thought.

Hence the Veblenian class system has to be interpreted as complementary to the Marxian, instead of supplementary. Those who gain financial profits receive power and can cumulatively influence crucial political as well as economic decisions, which will not be advantageous for the industry, obviously. Veblen’s critique on capitalism works with cumulative causation of habits of thought in continuous time. Capitalism is not just a phenomenon in some period; it is more a universal struggle of hunters and gatherers with ever new faces, which has manifold cultural outcomes in manifold cultural environments. Modern capitalism is modern slavery of modern machines and workers servicing them. Hence the role

of institutions is to shape the conditions of *social value*. In Veblen's theory, human-beings have an intrinsic instinct of workmanship. This instinct emphasises the creative potential of productivity.⁴¹ Production, work and labour are very old measures for value and price in human evolution. In times, when there still was no private equity, there was also no such competition among people, because production was for the best of the group. If something was produced in a novel way by an individual, the status of the group increased and profited, because of an increasing individual status. Hence individual benefits melted in benefits of the group. Products had a specific societal function, they were not meant to reflect something like status in the first place. They were built to produce something else, in comparison to private equity which stands for consumption. Property rights changed social life tremendously as well as the economy. Along the new role of property the instinct of workmanship changed and exaggerated in individual and foremost competitive races for status. Mere property evolved cumulatively, independent from actual *physical* production/work. Sooner or later the institution of property got something like a natural right.

The ultimate ground of validity for the thinking of the business classes is the natural-rights ground of property, – a conventional, anthropomorphic fact having an institutional validity, rather than a matter-of-fact validity such as can be formulated in terms of material cause and effect; ... Reuter (1996, p. 163) citing Veblen (1904)

Veblen emphasises, that people started to compare each other on different grounds than on mere produced or crafted matter; such a notion reflects one-sided rise of wealth and prosperity as a typical institutional property of capitalism. Along the rise of modern industrial productive forces, as for example the steam machine or the railroad, this institution completely changed the modern world. Private property is about everlasting competition for status via conspicuous consumption to show individual mastery.

The institutional method investigates and explores different patterns of economic behaviour: consumption, investment, production and saving in order to visualise the cumulative evolution of patterns in socioeconomic life, which may be called institutions. Veblen showed that private property rights in combination with industrial production enabled wastefulness as a specific characteristic of capitalism. Hence institutionalism has to be critique of capitalism, at least in the old tradition. By remembering the thoughts of the pragmatists, it does not mean to be pessimistic at all, because a modern human democratic

⁴¹ This is also very close to Marx. Marx defined the *value* via the social *relations* of labour and labour intensity.

society is able to create and explore institutions which are able to regulate this waste as problem-solving vehicles; still depending on the willingness of the people. Nevertheless the picture of institutionalism is contrary to the Marxian, insofar that institutionalists did not imagine capitalism as something which will simply vanish or destroy itself within a revolution, because capitalism rests too deep in the bones of human evolution. The instinct of workmanship tempts members of the industry class (workers) to imitate members of the business/leisure class (capitalists), in contrary to the Marxian picture, where the proletariat endogenously raises its swords against capitalists. This imitating process is Veblen's model of cultural inheritance of habits of thought. Lower classes tend to consume the same wasteful things as the higher classes with some lag. It is a *trickle-down* process of tastes and preferences, contrary to Bourdieu's *trickle-around* model of habitus⁴², as we will see in section 3.5. Veblen's trickle-down model of consumption patterns is also called the *Veblen-effect* in standard economic literature nowadays: Lower class members consume products and services which the higher/leisure class members consumed some certain periods before, because they want to feel a part of them. Obviously this has to happen with some lag in time. This model can also explain why there has never been a big class movement/conflict in the United States.

Veblen surely was the most pessimistic institutionalists among Commons and Mitchell considering capitalism. His business-cycle theory majorly focuses on depression and crisis, which is initialised via supply-side effects.⁴³ Even if his business-cycle theory was not that prominent, he anticipated the important role of expectations, money and credit, as the dominating (e.g. Keynesian, Hayekian or Schumpeterian business-cycle theory) theories still do today. The profit-seeking interests of the business class lead to crisis, as his dualistic (business-industry) perspective of society suggests. Economic expansion is driven by productivity and increases variety in certain economic sectors. This leads to increasing prices and consequently to increasing investments in production in other sectors, because overall demand increases and expectations for higher profits increase. These expectations play the crucial role in a business-cycle. We now know that such optimistic expectations may outplay high risk on the macro level and can invoke bubbles. Bubbles rise with an increase in investment goods which leads to further increases in prices on the whole macro level. Then,

⁴² Trigg (2001) offers a detailed comparison of Veblen's and Bourdieu's model of the cultural inheritance of tastes, preferences and habits.

⁴³ Compare also Reuter (1996, p. 168ff)

according to Veblen as well as Mitchell, these expected payoffs get to highly calculated. Extensive orders are set and mostly an enormous number of credits is set with a good hope in future that interests may not rise. Due to the fact that prices rise faster than wages, rents and interests, the business class receives high payoffs (inflation payoffs) in the short run. Consequently with rising wages, rents and interests these payoffs decrease thereafter and expected long-run profits are overestimated. Then economic depression comes in when costs cannot be covered anymore, because of a too optimistic picture in the first place. Along a cumulatively increasing pessimism recession is starting. Veblen then follows that depression is chronic in capitalism.

... depression is normal to the industrial situation under the consummate regime of the machine, so long as competition is unchecked and no *deus ex machina* interposes. Reuter (1996, p. 170) citing Veblen (1904)

According to Reuter (1996) we may follow that Veblen's interpretation of crisis and of chronic depression can be assigned to the set of overproduction theories; whereby Veblen conceives overproduction as a monetary phenomenon: It is due to increasing prices that suppliers cannot sell anymore. His overinvestment theory is conclusively comparable to Hayek's treat on business-cycles, albeit the rise in investments has other causes there; compare Hayek (1931). Here the key lies in the savings of households. However Veblen's only exit-strategy for chronic economic depression lies in the benevolence of a planning, strong and efficient expert leadership of economists, technicians and engineers.⁴⁴ This notion represents a rather devastating point in Veblen's work. Hence his followers like Commons and Mitchell either ignored Veblen's technocratic/totalitarian position or offered a democratic solution instead of it. Capitalism cannot get reformed for Veblen, not with the state and not within the rule of law.⁴⁵ Therefore, considering his political perspectives, he was a true Marxist.

In contrary Commons has a more optimistic picture of capitalism in mind. Commons emphasises that society runs in the wrong direction if the individual is more important than a social structure. He also finds the reasons for crisis in this relationship. Further Commons argues, according to Reuter (1966, p. 177ff), that market participants do not necessarily have the same rights. This is a very crucial notion, where contemporary political dialogue is still

⁴⁴ Here we can see Veblen's strong connection towards technology, which will be a central issue in the next chapter.

⁴⁵ Compare Reuter (1996, p. 176)

involved. The opinion that the market is a democratic institution is simply wrong, because the idea of *freedom* and *property* have changed tremendously after the industrial revolution. Commons argues that especially workers are discriminated due to changing institutional factors of the law and of property. In fact these factors still change a lot; insofar his critique is quite contemporary. Commons argues within an evolutionary system, nevertheless he did not support upcoming thoughts of social-Darwinism. In his view the market does not create a fair distribution of wealth; hence there is a need for democratic balancing institutions. This leads to a *conflict-centred* perspective of economics, instead of a *harmonic* one, which was propagated by the market fundamentalists. In the neoclassical paradigm the market should distribute interests in a harmonic way, creating compromises, rather the opposite is fact: it creates conflict between different fields, classes or groups of society. Nevertheless these conflicts are all solvable via negotiations and compromises, in contrary to the visions of Veblen and Marx. In his eyes institutionalism should save capitalism for the benefit of all.

Commons was especially concerned with the development of property and freedom as constituent factors for individual action. Therefore he continuously studied American property law and its gradual changes. Property evolved from physical (*tangible*) to *intangible* property; everything with exchange value can be possessed. Commons has shown, according to Reuter (1996, p. 180f.), that the most significant change in property rights came along the growth of big industries, where owners have the right to *withhold* instead of just *hold*. It was the initial possibility to withhold necessary goods for certain social groups, which changed the conditions. These new circumstances at American courts led to tremendous *lagged* disequilibria in power relations among negotiating parties. This lag emerged due to fast economic changes, enterprises changed from small and middle size to big industries; workers and their unions were left behind with their rights. Commons concludes that such changing power relations drive economic crisis. American government was therefore endeavoured to compensate these differences with occupational health and safety. Commons was sure that property as well as freedom rights should change due to new circumstances, contrary to the idea of natural right and natural law. Property and freedom are both social innovations and not something metaphysical. Conclusively there is no such thing as nomological institutionalism. In contrary property and freedom are socially emerging properties of human interaction. This notion is quite close to Hayek's analysis on the evolution of conductive rules as emerging law, as we will discuss in more detail in section 3.3. Commons also refers to the difference of

liberty and freedom in this respect.

Liberty, as such, is only the negative of duty, the absence of restraint or compulsion. But 'freedom' is positive. (...) Freedom is power. It belongs to the 'freeman' (...). It is power to call on the officials to make one's will effective (...). Reuter (1996, p. 184) citing Commons (1924)

Therefore we need well-functioning institutions, which on the one hand allow individual freedom and restrict property rights on the other hand, in order to get at least similar pre-conditions for all people. Such circumstances can only be achieved through democratic collective efforts for the benefit of the whole people. In Commons' perspective capitalism does not solve socioeconomic problems on its own; additionally it does not 'naturally' produce fair order. Hence in a capitalistic system it is necessary to permanently fight for *fair* order within continuous collective interference with the law and with the economy. Capitalism can only prosper if all participants are somehow emancipated, without any exceptions. This can also be seen as some *Leitmotiv* of institutional thought.

Mitchell's institutional critique of capitalism represents the prototype of the institutional method, which is grounded in his business-cycle theory. It is somehow surprising that Mitchell's analysis is massively influenced by Veblen's institutional investigations on the one hand and on the other hand Mitchell's analysis has influenced Schumpeter's business-cycle theory as vice versa. These circumstances gain even more importance if one considers that Schumpeter expresses himself very clearly on Mitchell's business-cycle theory. This can be seen especially in two articles, in *Mitchell's Business Cycles*, Schumpeter (1930) and *Wesley Clair Mitchell (1874-1948)*, Schumpeter (1950), by introducing it as seminal observations on business-cycles.

Mitchell was one of the first institutionalists looking for recurring patterns in the business-cycles. Therefore he observed the most dominant contemporary theories and tried to categorise them according to prevailing economic factors driving crisis and expansion. This endeavour let him conclude that economic events in cycles come and go in very complex manners at a first glance, according to the huge amount of different and conflicting theories on business-cycles. Mitchell made following categorisation, as represented in table 3.1.

Table 3.1.: Mitchell's overview of contemporary business-cycles

physical	emotional	institutional	
		caused by endogenous changes in institutions	caused by normal functions of institutions
<i>Jevons</i>	<i>Pigou</i>	<i>Schumpeter</i>	<i>Veblen, Lederer, Spiethoff, Hansen</i>

Source: table drawn according to Reuter (1996, p.188)

Mitchell made clear that a good business-cycle theory will need to incorporate all three factors; physical, emotional and institutional as causes for boom and bust by connecting *theory, statistics* and *history*. Additionally he was assured that the real causes for cycles lie in the monetary sector, as also Veblen insisted. This assumption stems from the idea that money is not just a tradable good – as it was originally anticipated – instead money is something which can be actively produced. Hence there is always a trade-off between making money or making goods; which is still a problem today, considering the boom in the 1990ies and the crisis in 2000 and 2008. According to Reuter (1996, p. 190) we can summarise Mitchell's main hypothesis on business-cycles as following: The economy gets subjected to fluctuations of expansion and crisis as more and more people get involved with either mere *money business* or *profit-seeking*.

Mitchell was interested in the influence of organisations and institutions of the money economy onto entrepreneurs' expectations and behaviour. In this respect Mitchell also refers to Simmel's (1900) *Philosophy of Money*. Further Mitchell conceives the problem of economic crisis according to Veblen's criterion of usefulness of goods. Both criticized the ongoing production of goods for the simple reason of making money. These insights lead to the recurring issue that it may be microeconomically justified to seek profits, but such behaviour can cumulatively make a lot of damage on the macro side of the economy. Mitchell then brings in that the classic economic assumption that the economy will be in equilibrium if all follow their own interests is fairly wrong. Further Mitchell's – central for his business-cycle theory – investigations of price fluctuations due to cycles showed that prices do not change in the same manner. Changes occur in response to institutional factors, which then represent incentives for higher or lower profit expectations for the entrepreneur in the money or goods economy. Cycles are tremendously dependent on different behaviour and

organisation of trade-unions in wage negotiations of diverse sectors. Mitchell more or less accounts swapping from pessimistic to optimistic general behaviour and vice versa as the main reasons for boom and bust. It is due to the cumulative character of such systemic emotional changes in the economy, that it comes to crisis or expansion. It is *epidemic* in his words; what is called *herding* behaviour 100 years later. Such herding may systemically change major directions of the economy.

The world of business is a system comprising numberless independent enterprises, bound together by industrial, commercial, and financial ties. For the continuance of prosperity it is indispensable that a certain balance be maintained among the fundamental processes that constitute the activity of this system. Reuter (1996, p. 194) cites Mitchell (1913)

Along these imbalances in the economic system expansions may always be very short ending in depression. Such conditions led Mitchell to the idea that there is a need for some economic planning elements, in order to minimise uncertainties and increase general societal trust. More transparency of economic processes on the macro level can also minimise the risk for epidemic outbreaks. Further it is important to say that cycles are not necessarily caused by economic factors; there can also be environmental as well as social or political reasons. At last it has to be derived that Mitchell's results of his business-cycle theory confirm Veblen's considerations that a capitalistic economy necessarily drives into crisis, if it is not regulated enough. Hence we may conclude that the institutional method is a heuristic device to identify economic elements which can moderate capitalism preventing it from driving against the wall. This is represented in Veblen's, Commons' as well in Mitchell's work.

INSTINCT, HABIT AND TECHNOLOGY

The following section deals with Veblen's most crucial associations according to cultural evolution as a heuristic device enabling institutional change. These works include '*The Instinct of Workmanship*', Veblen (1914) and '*The Theory of Business Enterprise*', Veblen (1904). Veblen (1914) refers to a naturally selected instinct of human beings which drives creativity and productivity, this instinct influences significantly technological change and economic growth on the macro level, due to cumulative effects. Otherwise Veblen thought that technological progress will tremendously shape our habits and our culture by using

machines as productive slaves. Both issues, but especially the role of the machine process, which is elaborated by Veblen (1904), have to be observed very critically.

Hodgson (2004) remarks that the issue of instincts to work is very closely related to ‘... *the alleged dichotomy of pecuniary and industrial motives.*’ Hodgson (2004, p. 195 ff.). Veblen’s concern regarding the instinct of workmanship stems from another neoclassical assumption. Orthodox economists usually assume that economic agents are *labour-averse* or *averse to useful efforts*, i.e. *hedonistic*. Veblen was suspicious whether this assumption may fit into the greater picture of human evolution at all. Here, Hodgson (2004, p. 195) adds that the notion of disutility of labour is somehow inconsistent within human evolution.

If such an aversion to useful effort is an integral part of human nature, then the trail of the Edenic serpent should be plain to all men, for this is a unique distinction of the human species. A consistent aversion to whatever activity goes to maintain the life of the species is assuredly found in no other species of animal. Under the selective process through which species are held to have emerged and gained their stability there is no chance for the survival of a species gifted with such an aversion to the furtherance of its own life process. If man alone is an exception from the selective norm, then the alien propensity in question must have been intruded into his make-up by some malevolent *deus ex machina*. Veblen’s (1898-99, p. 187)

Veblen argues that it is misleading to believe that an activity, like working, can represent an intrinsic aversion, due to following reasons. On the one hand the instinct of workmanship initialized the emergence of human beings out of primates⁴⁶ and generated stable and growing populations of the human species through the development of culture and language over thousands of years on the other hand. Working is a necessary condition for the survival of mankind, hence why should human beings build a consistent aversion towards it. Veblen’s argument works rather contrary.

In contrast, hundreds of thousands of years of human evolution must have led to the selection of some propensity to engage in work that was useful for survival. This is the basis of his idea of an ‘instinct of workmanship’. Hodgson (2004, p. 196)

Neoclassical scholars may argue that such aversion originated in modern capitalism, in the course of industrial revolution, where capitalism subsumed to money economy. But even in a capitalist system with *pecuniary* interests something has to be produced physically in order to survive, something *industrial*. This is the point where the machines come. Otherwise the money economy generated new habits and new cultural environments as well, but always contrary to the ‘instinct of workmanship’. Further this Veblenian dichotomy reflects his strict

⁴⁶ Remember that it was the creation and usage of artefacts such as *tools* that enabled the emergence of higher-primates, not at least because it *forced* the primates to *upright carriage*.

societal separation in business and industry, making money and making goods. It may be followed that grabbing money and seeking profits dominates industrial production. This resembles Veblen's strong pessimism towards capitalism, affected by cumulated re-constitutive downward causation.⁴⁷ He anticipated certain cultural traits as major threats for the prosperity of mankind, because they potentially harm institutional structures. On the other hand pecuniary incentives, emerging out of a selective process of capitalism, somehow undermine its own capitalist foundations – industrial production.

As well as the obvious parallel here with Marx's position, note also the similarity with Schumpeter's (1942) claim that a contractarian system undermines its necessary culture of devoted service, and K. Polanyi's (1944) similar proposition that markets are corrosive of the social fabric. What is distinctive about Veblen's argument, however, is its Darwinian framework of evolutionary selection. Hodgson (2004, p. 197)

Veblen emphasised that capitalism leads to the selection of pecuniary attributes rather than productive ones. Now after the 2008 economic crash, the question is open how to regain a domination of the *real/goods* economy over the *virtual/money* economy. Nevertheless Veblen made some categorical mistakes as well.

... any species could evolve a 'consistent aversion' to energetic activity, as long as a compensating productive activity was triggered when survival was at risk. Veblen overlooked both compensating inducements to work, and consequently a possible reason for an aversion to labour to evolve. Hodgson (2004, p. 199)

Insofar we have to consider Veblen's analysis as incomplete regarding the evolution of the instinct of workmanship as a main propensity of economic behaviour, shaping institutions. Veblen simply ignored potentially compensation for productive forces. Hodgson (2004) further criticizes that Veblen also underestimated the role of social institutions as a driving force for workmanship. It may be followed, that socially coercive power represents a better interpretation of workmanship as the instinct thesis. Then, in an evolutionary context, the selection criterion would rather work on a social whole – understood as an emerged institution – than on an individual instinct, which is of high importance for an evolutionary theory of cultural change. Hodgson therefore suggests replacing Veblen's *instinct of workmanship* with the concept of an *institutionalised propensity to provision for human needs*. The latter propensity is far more general and is able to explain the origins of human survival via productive efforts in a more comprehensive way. *Institutionalised* can still imply that there

⁴⁷ *Re-constitutive downward causation* is a technical term, used by Hodgson (2004), for Veblen's concept of trickle-down inheritance of habits from the business class to the industry class, then resulting into a new modus operandi in the business class again.

were instincts in the beginning, but then cultural innovations compensated them in special ways, like division of labour and so on. Therefore we may conclude that such an argument may only work on cultural species⁴⁸, where instincts can be compensated via social structures, such as institutions. Veblen's concerns on pecuniary interests in the economy went far enough, he even thought about political consequences due to new institutional settings.

Modern (civilised) institutions rest, in great part, on business principles. This is the meaning, as applied to the modern situation, of the current phrases about the Economic Interpretation of History, or the Materialistic Theory of History. Because of this settled habit of seeing all the conjunctures of life from the business point of view, in terms of profit and loss, the management of the affairs of the community at large falls by common consent into the hands of business men and is guided by business considerations. Hence modern politics is business politics, even apart from the sinister application of the phrase to what is invidiously called corrupt politics. Veblen (1904, p. 153)

Today the business sector can be compared more than less with the financial sector. Financial institutions dominate political issues, even in times of crisis. Veblen's story is about crashes initialized by new habits of thought in different communities – like wasteful habits and conspicuous consumption. New institutions create new financial/business products and demand stems from new behaviour and new habits; such a financial architecture may cumulate into bubbles of expectations for ever increasing profits as we have seen in historic crises in the 1990s in Mexico (1994), in Asia (1997/1998) and in Russia (1998), as well as the Dot-Com crash in 2000. These crises have already shown that institutional setups built on mere market-liberalization may lead to tremendous credit crunches and currency fluctuations, if central banks play their role as lenders of last-resort. The habits of thought as well as social practices need a counterpart to virtual, pecuniary interests, focusing on real, social interests. Institutions may change accordingly to regulate chronic financial over-shooting. If we can learn something from American Institutionalism, it is the fact that it needs on the one hand regulating fiscal and monetary policy and on the other hand a change towards moderate consumption behaviour. The lesson of the institutionalists is that institutions need changes from within the society, boosting or enforcing economic policies. The old IS-LM macro-flag that exogenous policy shocks will do the job alone, does not work in complex economies. Additionally it is not an issue of duality, not of mere pecuniary or mere productive interests. The pecuniary interests enable innovations as well, which is the Schumpeterian story. We need innovations, we also need technological growth to certain degrees; we need new and better technology to fight our health and climate problems, as well as issues of over-

⁴⁸ i.e. organic life-forms.

population. Conclusively we need innovations to increase or at least maintain our human evolutionary *fitness*. This all has to be an institutional issue of balancing evolutionary criteria in the economy; neither individual, pecuniary motives nor collective, industrial motives may solve mankind's problems, but an essential and balanced mix of them, packed into a modern institutional agenda may do. Such a setup still has to build upon a capitalist market economy, framed by a self-confident, authentic, anti-corrupt and regulating state. Veblen's analysis of the machine process went too far. In short he attested that industrial production with machines invoked the capitalist habits of thought. He makes it clear in the beginning of *The Theory of Business Enterprise*.

The scope and method of modern industry are given by the machine. Veblen (1904, p. 1)

The scope of the process is larger than the machine. In those branches of industry in which machine methods have been introduced, many agencies which are not to be classed as mechanical appliances, simply, have been drawn into the process, and have become integral factors in it. Veblen (1904, p. 1, p. 3)

Machines determine the cornerstones of modern industrialized life; they even *infected* other non-industrial parts of economic processes with their logic. Veblen's interpretation of the machine process grounds in one of his philosophical problems, according to Hodgson (2004). As a Kantian he believed that everything in life has causes and moreover that this can be empirically proven. Nevertheless these causes cannot be solely interpreted with scientific methods. Universal causation cannot be directly derived from experience, it needs presuppositions. The Kantian says that causation does not have any objective reality, causation rests in our minds. Hence also Veblen thinks that a principle of causation needs a metaphysical postulate, because causation itself is not provable. Here the machines come in. It is the machine which creates a new ontology, a capitalistic ontology. The machine gives us new presuppositions, namely that everything is *matter of fact* – empirically provable. This new machinist ontology leads to positivism; it tells us that we do not need metaphysical assumptions anymore. Although a problem emerges, because there cannot be any science without any presupposition about the object, which has to be investigated. Veblen builds up another dialectic, between *matter-of-fact validity* and *institutional validity*. This antithesis creates a doomed picture of capitalism, as also Marx and Schumpeter anticipated; a self-destructing property of capitalism. Veblen even called his last chapter of the *Theory of Business Enterprise*: Chapter 10 – *The Natural Decay of Business Enterprise*.

Broadly, the machine discipline acts to disintegrate the institutional heritage, of all degrees of antiquity and authenticity – whether it be the institutions that embody the principles of natural liberty or those that comprise

the residue of more archaic principles of conduct still current in civilized life. It thereby cuts away that ground of law and order on which business enterprise is founded. ... But the future of business enterprise is bound up with the future of civilization, since the cultural scheme is, after all, a single one, comprising many interlocking elements, no one of which can be greatly disturbed without disturbing the working of all the rest. In its bearing on the question in hand, the 'social problem' at large presents the singular situation. The growth of business enterprise rests on the machine technology as its material foundation. ... The institutional basis of business enterprise the system of natural rights – appears to be a peculiarly instable affair. Veblen (1904, p. 215)

Machines destroy institutions by standardizing all, metaphorically spoken – a machinistic ontology creates matter-of-fact validity in comparison to a social/naturalistic ontology creating institutional validity. Hodgson argues (2004, p. 215):

Veblen attempted to establish his presuppositions of universal causation and Darwinian evolution on the basis that they themselves were a historically contingent product of the machine age. His implicit metatheory included the proposition that such preconceptions are historically specific. But Veblen's metatheory is itself universal and hence does not fit into Veblen's own historically contingent scheme. An internal contradiction appears.

So, Veblen misconceived the role of the machines. Clearly technology involves our lives and creates new socioeconomic circumstances, but it does not create or impute ontological presuppositions of how we may perceive the world and consequently reason. Here we can offer critical realism and naturalism nowadays, as robust ontological positions, instead of technological determinism.⁴⁹ Hodgson (2004, p. 215):

Within this broad, modern realist tradition, it has been demonstrated that it is possible to establish key ontological presuppositions that are consistent with the possibility of scientific enquiry. Within the more prominent versions of modern realism, the choice of presuppositions is not merely a matter of individual imputation, as Kant would have it, but disciplined by the recognition of a world beyond our senses, in which events are subject to causes and laws.

Veblen wanted to show that the machine process undermines our understanding of causality, by doing so it changes society's habits of thought. Nevertheless, as also Hodgson (2004) explains, working with or on a machine cannot influence the worker's kind of reasoning, her idea of causality. The worker may only learn the specific mechanisms of the machine by operating it. There is another example Hodgson (2004) raises that contradicts Veblen's materialistic explanation of the machine process. According to Veblen (1904) the machine process engages a strong material determinism in society concerning explanations for and of causality. The US as one of the greatest industrial nations worldwide is also a very religious nation. If we take Veblen's story of the machine process for serious, the US citizens should be

⁴⁹ Compare the strong emphasis on naturalism in section 2 of the thesis.

more secular as they are in fact. The same issue counts for the scientific process in the US. The US' universities and research institutions have the best standings worldwide, so science is not just another dutiful job in the US, it is a significant pillar of the whole economy.

Science involves the relentless and unbounded pursuit of integrated and consistent causal explanations. However, the machine does not itself engender such a pursuit. ... There is nothing inherent in mechanization per se that leads to a specific behavioural or ideational outcome. We observe machines, but our understanding of them depends on our preconceptions. Mechanical action cannot itself bequeath ideas of ontology or logic. Hodgson (2004, p. 220f)

However, Veblen additionally missed that industry and business is not strictly separable. There will not be any factory or productive plant without any management plan or money calculus, this is simply not possible; except in a technocratic social planner economy. Industrial interests have to be served by organisational matters as well, which are assumed to be only a part of the business enterprise

Contrary to Veblen, industry is not merely a matter of '*mechanical, tangible, material values*'. It is also a matter of social organization and human psychological motivation. The calculus of '*money value*' may have some inhibiting, distorting or other effects on productivity. But the removal of this monetary calculus would bring industry to a halt, unless it was replaced by some other feasible system of entrepreneurial, managerial and workforce motivation. Veblen offered us no practicable alternative. He saw the negative effects of the monetary calculus, but, largely blind to the central questions of industrial organization and motivation, he failed to acknowledge that the monetary calculus nevertheless provides powerful incentives, as well as distorting priorities. Hodgson (2004, p. 222)

Hence Veblen was right by explaining the influence of technology, especially the machine process, on our culture, but he made a significant mistake. A mistake dealing with universality and particularity or regularity and singularity. Veblen's explanations on cumulative cultural change as a heuristic device for institutions are outstanding, but as he moved to the example of industrial organisation, he overestimated the effects of technology on our own habits of thought. The machine process may involve our behaviour and our culture in several ways, but these influences remain particularly. In the end, the business enterprise, as well as the machine process, is too insignificant for radical changes of our epistemology. Institutions shape our culture and vice versa but they do not determine the way we think. This leads us back to the idea of language as our first native institution. Language cumulatively influenced our ontological conceptions of the world, but is there something prior to language? Institutions emerge on the ontological level and work or unfold within a specific heuristic. The machines may influence this heuristic drive, but they cannot interfere with our ontology, the way we conceive reality.

INSTINCT, COGNITION AND LEARNING

Cordes (2005) sheds light on the cognitive issues and their relations to instincts, habits and institutional change. He presents an analysis of the cognitive foundations of the instinct of workmanship, which is backed up with new insights from the growing neurosciences. Major importance is given to the differentiation between the biological aspect of innate instincts, the neurological aspect of cognition and the socio-economic aspect of habits of thought, along the lines of the instinct of workmanship. Human agency is the main factor driving cumulative causation and shaping institutional and cultural dynamics. Cordes (2005, p. 3) explains that human behaviour is influenced by ‘...*the impulse of instinctive factors and the drive to conform habits.*’ Whereas Hodgson’s (2004) analysis showed that Veblen ultimately wanted to find a universal connection between instincts, habits and technology. So that institutional and technological change is even capable of changing human beings’ perception of reality, i.e. epistemology and ontology. It shows that Veblen additionally wanted to find an explanation how *causality really* works. Now we have to admit that causality is for itself too complex, that obviously neither institutions nor technology cannot offer universal explananda for the mechanisms of causality. Institutional change remains just a factor among thousands on the ontological level. Cordes (2005) swaps to the heuristic level and focuses on the cognitive foundations of Veblen’s institutional change, which is nevertheless imputed by the very same technology. Therefore we regard institutional change invoked by the machine process as a *particular* phenomenon in this section, which influences our *behaviour* instead of our *logic*. The logic of causation remains on the ontological level and cannot be influenced by institutions and technology, as shown by Hodgson (2004).

The development and introduction of new technology may eventually, cumulatively and unintendedly, entail a change in the basic pattern of life and economic environment, ultimately leading to the development of new habits of thought that possibly come to replace the established habits and institutions. Cordes (2005, p. 3)

Two basic ideas are raised: first, it is the notion of development and technology that matters. It is emphasised that the introduction or emergence of new technology may lead to changes in the institutional setting, but also the further development of an existing technology. Second, these changes influence cumulatively and unintendedly new habits of thought. Cordes (2005) follows from Veblen that human instincts can invoke innovations, because they work as well as habits along conscious reasoning. Hence ‘... *in Veblen’s theory, the evolution of institutions*

is conditioned by the material circumstances and by the innate propensities of human nature.' Cordes (2005, p. 4). Veblen's major concern was to understand why *workmanship* vanished after the rise of the machines, i.e. industrial revolution. This is a question of how the instinct of workmanship continuously influences economic culture and economic institutions over centuries. Veblen's answer grounds in production as a social activity according to Cordes (2005). The expression of workmanship in a production process is determined by two factors: firstly, it is the pecuniary interest of the business running the industry – degree of profit – secondly, it is the amount of machines used in the production process. This expression also influences the degree of cooperativeness during a production process, because it controls the division of labour. It is somehow evident that production processes change over decades, now Veblen argues that these changes imply changes in the degree of workmanship. Further the degree of workmanship – expression of the instinct – in an economic culture produces regularities over time, i.e. cultural or economic evolution. Hence Veblen wanted to provide an evolutionary theory of cognition, in a very broad sense. This was impossible to do concerning the status of cognitive and psychological theory in his time. Cordes (2005) tries to rethink his concepts according to new insights from the cognitive, neurological and psychological sciences. There is profound evidence that the human brain has specialized circuits for reasoning and learning instincts; which represent the most archaic regions of the brain. These different modules work autonomously and were separated due to evolutionary pressures, according to new findings in neurogenetics and cognitive neuroscience; here Cordes (2005) quotes Pat Levitt and Alfonso Caramazza. Additionally these basic modules, for reasoning and instincts, are somehow genetically influenced. Caramazza suggests that knowledge is organised according to evolutionary adaptations; certain pressures were dedicated to special brain mechanisms. This research also investigates the origins of mankind, concerning the use of tools, or in Veblen's terms the instinct of workmanship. Researchers can more or less show that the innovation of tool-using created a special domain in the brain, responsible for technical intelligence. It is argued that *general* or so-to-say *common* learning capabilities of biological life-forms could not host such cognitive complexity of *reflectively*⁵⁰ using an

⁵⁰ Here, the literature also suggests distinguishing between *responsive* tool-use and *reflective* tool-use. Responsive usage of tools and artefacts let animals, like intelligent apes, use tools for their means. This can be done via imitation for example. Reflective usage of tools and artefacts enables a different layer; human beings could engage in reflecting the idea of the tool as a mechanism. Therefore they could reproduce tools or artefacts according to stored ideas or imaginations, like using geometry as a production template. This idea is connected to the notion of tacit knowledge.

artefact or a tool. For that reason: '*Specialized cognitive processes and capabilities were required for creating mental templates, planning sequences, and mental rotations of artefacts.*' Cordes (2005, p. 7) He further explains that researchers already found experimental evidence for such special brain domains or categories of specificity. Correspondingly we can find information structures near to the primary sensory and motor areas of the brain, which get activated when an object is acquired. Evidence has shown that especially these areas – information structures – are accessed when a *manipulative* object is identified by a test person. It is even more astonishing in this context that researches in the field of neuroscience found regions in the brain and also decoded the mechanisms which are exceptionally responsible for learning from other individuals. Cordes (2005, p. 8) allocates in these areas and mechanisms the capability of cultural transmission of knowledge; a major origin of cultural evolution is learning by imitating. Further Cordes (2005) argues that such learned habits operate as filters of experience. In an evolutionary selective way these adapted filters select the perceived information, according to current significance. These neuroscientific investigations can be regarded as cognitive foundations for the motivational importance of instincts and habits driving economic action. Nevertheless the story expands when intelligence comes into play, a notion also emphasised by Veblen.

In his terms, the natural selection of instincts during human phylogeny has provided man with a set of basic dispositions. In addition, the cultural heritage of habits and institutions, which has also evolved through time, is acquired by an individual during his process of socialization. In the course of habituation, habits of thought and behaviour are passed over from one generation to the next via various forms of cultural learning. Cordes (2005, p. 10)

The instinct of workmanship is a disposition *guiding* an act of deliberate choice or shaping expectations, whether rational or not. Cordes (2005) follows that an individual's acquired culture is a product of socialized learning or social transmission that is constrained by evolved domain-specific properties. That is a notion which was made very prominent by Boyd and Richerson (1980). They observed that the process of cultural transmission is not neutral towards the behaviour being transmitted, in contrary to genetic evolution. This can be regarded as a very major and basic insight in the theory of cultural evolution. Social learning is strictly dependent on the individual's dispositions or expressions of innate instincts and habits of thought and is therefore conditional on *heterogeneous* prerequisites. Especially the instinct of workmanship falls into a category where human beings have strong domain-specific mechanisms in the brain, i.e. heterogeneity within the brain, all involved in governing knowledge in their own ways. This bunch of filters and selective properties of the brain

initialize creativity and engage in novelty. Albeit there is a huge set of heterogeneous mechanisms involved in economic action, the instinct of workmanship will rest as a never-to-be-underestimated bias, propensity or disposition influencing economic regularities in the long run; in an evolutionary transformational way.

FROM CIRCULAR CUMULATIVE CAUSATION TO EVOLUTIONARY ENVIRONMENTAL POLICY

This section refers briefly to the conception of *circular cumulative causation* introduced by European institutionalists, like Gunnar Myrdal, William Kapp and Nicolas Georgescu-Roegen. This shall be done by looking into the work of Berger and Elsner (2008). The authors raise the issue that the idea of institutional economic change, shaped by cumulative causation of habits of thought, was not a mere American phenomenon. Further the article especially tries to elaborate the *circular* notion of cumulative causation, developed by Myrdal, compare for instance, Myrdal (1944, Appendix 3). Myrdal starts his methodological considerations with a critique of the equilibrium concept.

The notion of equilibrium, for instance, has been in all our reasoning for centuries. Actually it is present in most research of the present day, even when it is not formally introduced. In most social research we have restricted our utilization of the equilibrium notion to that simple and static variant of it, the *stable equilibrium*. ... We propose the utilization of *other equilibrium notions* besides the simplest one. For dynamic analysis of the process of change in social relations, it is highly desirable that we disengage our minds from the stable equilibrium scheme of thinking. ... The most important need is to give place in our hypothetical explanatory scheme to a rational recognition of the cumulation of forces. Myrdal (1944, p. 1065)

Myrdal emphasises that the notion of a stable equilibrium is totally misleading in the social sciences. Contrary to that, he promotes the idea of cumulative forces. The major difference between Veblen's conception of cumulative causation and Myrdal's conception of circular cumulative causation lies in the order of events. Veblen's institutional change builds upon a cumulative *sequence* of economic institutions, invoked by habits of thought. Whereas Myrdal introduces *feedback* loops into the analysis, hence he fostered the circular aspect of cumulative institutional change. The circular expression of cumulative causation can be neatly connected with the *open system approach* in economics as well, more or less advocated by Kapp and Georgescu-Roegen, as Berger and Elsner (2008) argue. If a system, whether economic, ecological or whatever is perceived as open, it is on the one hand automatically

connected with other systems and on the other hand it is also driven by self-enforcing mechanisms, so-called feedback loops. Now, Myrdal's heuristic device, circular cumulative causation, can be carefully regarded as a more general and more abstract concept of increasing returns to scale, in economics. The returns-to-scale mechanism is one of the most prominent mechanisms in the economic literature of production. This mechanism also involves a feedback loop of input factors, such as labour or technology, to the output. Dependent on the composition of input factors, the returns can either be constant, decreasing or increasing. Now more generally spoken such mechanisms exist everywhere in *naturalistic* systems, but they are far more complex (discontinuous and non-linear) than the usual economic anticipation of returns to scale. Nevertheless the cumulative effects of institutional change via habits of thought also bring back returns at specific scales to the economy, the system as a whole. But the feedback process can hardly be causally decoded.

Myrdal analysed, for instance, the role of institutions in traditional societies and showed that the 'economic factor', e.g. foreign investment, does not necessarily gain dominance over the 'institutional factor' and does not necessarily lead to better development. Thus, as a real type and applicable research hypothesis, CCC captures central characteristics of socio-economic processes. Berger and Elsner (2008, p. 83)

Cumulative causal causation gets a deeper significance, if it is especially considered as an open-system-approach. OSA generally means that systems import low entropy and export high entropy, hence everything is connected via a huge and tremendously complex trade network of energy; this is the thermodynamic explanation. The classic role of the economy is to reallocate resources and redistribute social costs of productive processes and moreover to feed mankind. Nevertheless contemporary economies produce a lot of waste and dirt, compared to what people really consume. If we keep considering growth and its status as perceived in the neoclassical closed-system approach, this waste will not become less. Ecological as well as social consequences have increased a lot since the first industrial revolution; this should give people a lot of reasons to rethink the role of the economy and the mechanisms of it. The entropy law says that entropy has to grow continuously in the universe (closed, isolated system), till it reaches a maximum threshold, where matter gets disordered and complexity runs zero. In the contrary, open, biological systems work different; there complexity steadily increases instead of decreases. Nevertheless complexity may still increase in biological systems, like organisms or evolution on the whole, despite entropy grows. The explanation for growing-complexity in the biological realm lies in its open-system character. The biological ability to balance the entropy level via a self-regulating mechanism of

consumption and production is compatible with the entropy law. Georgescu-Roegen (1971) followed that biological life speeds up the entropic degradation of the whole system, because it is fed by low entropy. Institutions let us steer in the opposite direction, if we consider economic production as an entropic process, emitting a lot of irrecoverable waste – high entropy. Now imagine the following: The more high entropy we emit the faster the world collapses, just a simple rule. Hence as a consequence environmental and ecological economics needs more attention as well as better integration into a bigger picture of evolutionary economics. Berger and Elsner (2008) also make a critical note on weaknesses of the path-dependence concept in contrary to an open-system approach. In particular they say that we may lose the big picture or the long perspective if we concentrate too much on path-dependency.

Many approaches [in evolutionary economics] focus on phenomena only *within* the logic of the 'market' economy, such as the evolution of markets and market structures, the evolution of firms and their strategies, or the diffusion and adaption of technology. Phenomena like systemic social costs, asymmetric power distribution, vested interests, and socio-ecological degradation fall outside the attention of many approaches. The conception of path-dependence tends to divert interest in causal relations towards focussing just on short-run random events. ... For instance, OSA and CCC consider that it is an institutionalized practice to hold prices low mainly by shifting costs on the socio-ecological subsystems in conjunction with manipulative advertising, generating systemic wasteful consumption patterns that make for pathdependent sales and 'growth'. Berger and Elsner (2008, p. 89)

The authors emphasise the importance of open systems. If we ship our short-run business benefits on long-run socio-ecological costs, we will end up within poverty traps mixed with climate catastrophes. This may not happen in a few years, but centuries are the units to think in. The point is that evolutionary institutional economics can definitely help out in such policy aspects, if long-run consequences are taken for serious. Some excellent examples are offered, how to successfully integrate economic, ecological and social issues within an evolutionary institutional setup; i.e. Steppacher (2008) and Steppacher and Griethuysen (2008); van den Bergh (2007), van den Bergh and Gowdy (2000) and van den Bergh, Faber, Idenburg and Oosterhuis (2006).

Institutions and sustainable development

Steppacher (2008) generally follows the ideas of Georgescu-Roegen and Veblen, by highlighting *sustainable* development of economic systems. His approach centres the concept of property: property as the '*...core institution of capitalism.*' Steppacher (2008, p. 336f.) argues that it is the difference between property and possession which is not treated or not

respected in mainstream economic literature. Property enables legal creditability. It gets institutionalised in the economic system via legal rules and the law; i.e. the Veblenian story of a property-based economy. This specific feature of property drives economic *growth*, because it provides individual (think of mortgages) as well as social (think of natural monopolies, e.g. money, energy, electricity,...) security for transactions. In contrary, possession just points to the physical/material component of property, i.e. the entropic story of Georgescu-Roegen (1971). Lending a bike to a friend, let the borrower *occupy* it materially, but the lender will still *own* it as a legal property. Steppacher (2008) investigates the issue whether property also drives or affects economic *development* in a social and ecological aspect. One characteristic condition for a developed economy is a stable currency, though a nation's currency is extremely dependent on the system of property rights. Money is, as Steppacher (2008) rightly argues, a derivate of property and not of possession. The accumulation of money and its stabilisation needs a well-functioning legal system, which should at least secure properties. This is so-to-say the first institutional rule which has to be learned, it gives security. Although as economists we still have to envisage the consequences of introducing legal property systems into possession-based regimes. Every property system works on grounds of a nation's culture, because the cultural environment teaches how to practice or live the rules. Steppacher (2008) brings in John Stuart Mill's story of the introduction of a legal property system in India by the British Empire in the 19th century. The Indian economy went out of control. People could not fulfil the regulations ad hoc, that the British had in mind. A specific problem was that Indian peasants could not understand the quite modern institution of credit relations, because they were confronted with huge cultural gaps.

Nevertheless the question of sustainability, with respect to social and ecological costs, remains an institutional question, hosted by the legal system. The sustainable future is dependent on the political willingness to internalize social and ecological costs via an adequate legal framework. Concerning this issue, Hayek (1973) once said that we made a big mistake during capitalist development and the corresponding globalisation: we simply lacked to reform our international system of law or we simply have not introduced any convenient international system of law. Instead, the OECD countries were keen on introducing hundreds of different international fancy organisations, all living in parallel worlds, without any real legal potential to scrutinize recurring problems. They were all governed by profits. Contrary to this, we need to introduce new legal standards for the globalised world.

Relative resource prices say nothing about ecological scarcity: they only represent actual supply and demand situations of economic agents, with, at best, some short-term anticipation of changing relative scarcities and their economic meaning. The same is true for costs involved in politically imposed pollution control. These costs say nothing about the severity of ecological conditions. Steppacher (2008, p. 338)

Further, in order to engage sustainable development, we may need to reconsider our economic priorities. Following Georgescu-Roegen's (1971) issue of entropy, we need to realize that mineral resources are able to produce a lot of energy at costs of high entropy. On the contrary, biotic or renewable resources cannot produce that much energy, but are not increasing entropy as their mineral counterpart; they do not produce that much waste. Hence if we want to maintain exponential economic growth we got to bet on mineral resources, renewable ones will not help out in that case. Steppacher (2008) says that it is the property imperative of exponential growth which requires minerals and which consequently empowers ecological degradation. Additionally renewable resources are exposed to the *rhythm* of the biosphere; they are not always available on demand. These issues should be taken care of in a sustainable conception of ecology. Another important lesson we have to learn from Georgescu-Roegen (1971) is again related to the entropic aspect of the economy and its ecological footprints. The economic process is an irreversible process; it is involved with irreversible transformation of energy into work. Hence ecological consequences made on behalf of capitalistic interests cannot be undone in the future. The economy is also part of the thermodynamics of matter and energy. This notion shows us how possession aspects of property are actualised, they are material actualisations of legal or operant rules.

Survival of the greenest

Environmental economics and evolutionary economics developed more or less parallel, argues van den Bergh (2007) within his article on *Survival of the greenest*. Both disciplines pulled a lot of ideas from biology, the former looked more into ecology and the latter more into evolution as such. Van den Bergh showed in several articles that they also share on a common characteristic of all biological systems: diversity. It is not surprising that the economic mainstream is blind concerning this issue. The orthodoxy focuses on efficiency instead of diversity, which is incorporated in the old mechanistic-industrial doctrine. There are also two related dichotomies which come up in these respects, i.e. growth and development – efficiency and diversity. In the last sub-section we have seen that growth, at least exponential growth, will not be possible without mineral resources, therefore mankind

has to focus on economic development in a more systemic manner. Now in this sub-section we will reveal some hidden taboos between the trade-off of diversity and efficiency in economics. This will be done by briefly presenting some approaches and applications made by van den Bergh and his colleagues' articles, involving environmental policy, technological diversity, ecosystem management, energy innovation, resilience and sustainability.

A second level is that of natural resources and ecosystems which are subject to biological evolution – notably mechanisms like selection and sorting (Vbra and Gould 1986) – should be considered seriously in as far as they affect the structure, morphology and functions of resources exploited by human beings, as well as life-support systems upon which environmental stability and human life depend. van den Bergh and Gowdy (2000, p. 37)

Van den Bergh and Gowdy (2000) bring in evolution to environmental economics, by focusing on evolutionary dynamics of resources. They argue that environmental economics was shaped too long just by the analysis of sustainable development or by defining sustainability. It can be considered as a fact, that from an evolutionary perspective, human beings critically raise selection pressures on the biosphere. Now in order to study the co-evolution of economic and natural systems, the authors invoke following definition of evolution.

Evolution can be characterized as disequilibrium and qualitative (structural) change that is irreversible and unpredictable, can be gradual and radical, and is based on micro-level diversity (variation) and selection, as well as macro-level trends and shocks ('large-scale accidents'). van den Bergh and Gowdy (2000, p. 38)

Following this trend the authors are also looking for a greater picture of evolution – understood as a real phenomenon –, integrating in a sequential as well as co-evolving way physical, chemical, biological, cultural and economic phenomena. Van den Bergh and Gowdy (2000) highlight the importance of the theory of *punctuated equilibria*, the advantage of *sorting* compared to selection as well as *co-evolution*. These concepts do all belong to the universe of macroevolution and of developmental-system approaches, as we also elaborated in chapter 2.4, along the works of Gould (2002) and Oyama (2000) for example. Additionally it is unavoidable to accept that there is no optimal state of the economy in environmental economics. Furthermore we have to rethink our economic priorities – as also Steppacher (2008) argued – concerning on the one hand the irreversibility of damages we are dealing to nature and on the other hand concerning technological lock-ins of industries dependent on mineral resources. This has to be done more or less within an institutional agenda. A possible approach to could be to create models of long-run historical change and environmental

degradation, as van den Bergh and Gowdy (2000) suggest. Such a model would more work with *threshold* values than with traditional neoclassical *marginal* values, because marginality does not fit in the realm of biodiversity. Another useful area for evolutionary institutional models could be climate research. Researchers in climatology also have to deal with long-run studies and long-run effects of certain consumption patterns in the economy. But for most, it is the issue of technological change which worries environmental economics at similar levels as evolutionary economists, as e.g. in the Neo-Schumpeterian field.

The lock-in of non-optimal technologies creates environmental and other social costs. Examples are car-based transport and fossil-fuel based energy generation. Stringent environmental regulation may have positive innovative effects on environmental performance of firms through technological inventions and innovations. van den Bergh and Gowdy (2000, p. 48)

In this respect the authors also refer to possible first-mover advantages of firms introducing new *green* technology to the markets, due to new stringent environmental regulations. Institutional guidelines could enhance new ecological trends reducing environmental degradation in the long-run. This technological issue has to be regarded as a must for the European Union. Environmental regulations can give a lot of potential to European industries, known as export-tigers, if they swap on ecological products e.g. in the automobile sector. Then they can really use a Schumpeterian first-mover advantage for the European export profile. Diffusing their knowledge of new technologies may be a second advantage to compete in R&D. As van den Bergh and Gowdy (2000, p. 48) wisely argue the whole ecological project is dependent on economic policy to ‘... *unlock non-optimal technologies.*’ In order to get to adequate policy solutions, we need to do some research first. It will be necessary to understand the long-run evolution of socio-economic systems, as it was the agenda of the American institutionalists. Here the authors highlight the concepts of resilience, understood as a specific type of ecological stability, equivalent to sustainability and of biodiversity; as a necessary focus for ecosystem management as well as ecological consequences of technological change. Hence policies should watch out to regard biological, social as well as geographical diversity in same categories, because ‘*Evolution implies a focus on complementarity rather than substitution.*’ van den Bergh and Gowdy (2000, p. 52 f.)

The new-institutional economic solution for environmental problems is based on the introduction of eco-certificates to the market to internalize environmental costs. This concept led high-income firms to buy a lot of these certificates, so that they get *green-washed*. Independent of this rather naive idea, this neoclassical solution has not tackled the main

problem. Obviously big multinational firms will not have any problem to buy themselves out. The certificates will punish small and middle enterprises, which cannot afford to buy certificates. The whole market internalisation solution fails on every level. Policy has to look different, first of all it has to be of global character. Environmental issues need global institutional networks, as it is also argued in Hanappi et al. (2009), in order to introduce appropriate policies. Global governance is the way to go, nevertheless first steps as in Kyoto 1997 as well as in Copenhagen 2009 show that there is still a lot of work to do to. These conferences reflect a first awakening of global governance structures, which have to be regarded as political-economic necessities for our future. Van den Bergh et al. (2006) take a similar step according to evolutionary policy design. First of all they argue that public policy from an evolutionary perspective needs to influence the selection environment and the effectiveness of specific innovations. Since climate change is a global phenomenon, the selective environment is global as well. Now global institutions need to come up and evaluate specific technological advances on their *adaptiveness*, regarding ecological consequences as well as economic *effectiveness* in contrary to efficiency. An evolutionary-inspired policy additionally needs to imply and promote diversity at all ranges.

It is crucial for evolutionary policy-makers to balance between diversity and selection, so as to prevent a system ending up in either deadlock or inefficiency. Here it is important to balance the cost of diversity in the short term against the benefits of diversity in the longer term. This trade-off can never be made on the basis of full information, but relies on expert estimation of chances, barriers and opportunities. van den Bergh et al. (2006)

In this context we have to highlight two important things. First, an evolutionary theory, packed in a policy environment⁵¹ will not produce or even does not claim to aim an optimal solution. Evolutionary policy has to build on a try-and-error logic, a logic similar to the ideas of the American pragmatists. Pragmatism is an inevitable way to go for environmental policy. Second, selection has to be considered as a local search path, that is also why we should use *sorting* instead. Selection produces at most *local optima*, which can be related within a hierarchical context. Evolutionary selection, understood in a generic naturalistic way, as offered in section 2, has to be regarded as a differential measure. van den Bergh (2007) compares this specific evolutionary characteristic with *survival of the fitter or relatively fit*,

⁵¹ For a detailed analysis of an evolutionary assessment of energy technologies, such as *fuel cells*, *nuclear fusion* and *photovoltaic cells* take a look into van den Bergh (2006, p. 67 ff.).

instead of *the fittest*. This notion is extremely important as well as essential for conducting evolutionary policy, either in environmental issues or somewhere else.

3.3. Hayek's heritage

It is, perhaps, worth stressing that economic problems arise always and only in consequence of change. So long as things continue as before, or at least as they were expected to, there arise no new problems requiring a decision, no need to form a new plan. The belief that changes, or at least day-to-day adjustments, have become less important in modern times implies the contention that economic problems also have become less important. This belief in the decreasing importance of change is, for that reason, usually held by the same people who argue that the importance of economic considerations has been driven into the background by the growing importance of technological knowledge. ... One reason why economists are increasingly apt to forget about the constant small changes which make up the whole economic picture is probably their growing preoccupation with statistical aggregates, which show a very much greater stability than the movements in detail. ... The continuous flow of goods and services is maintained by constant deliberate adjustments, by new dispositions made every day in the light of circumstances not known the day before, by *B* stepping in at once when *A* fails to deliver. ... The problem which we meet here is by no means peculiar to economics but arises in connection with nearly all truly social phenomena, with language and most of our cultural inheritance, and constitutes really the central theoretical problem of all social science. As Alfred Whitehead has said in another connection, 'It is a profoundly erroneous truism, repeated by all copy-books and by eminent people when they are making speeches, that we should cultivate the habit of thinking what we are doing. The precise opposite is the case. Civilization advances by extending the number of important operations which we can perform without thinking about them.' This is of profound significance in the social field. We make constant use of formulas, symbols and rules whose meaning we do not understand and through the use of which we avail ourselves of the assistance of knowledge which individually we do not possess. We have developed these practices and institutions by building upon habits and institutions which have proved successful in their own sphere and which have in turn become the foundation of the civilization we have built up.

Hayek (1945, p. 523-528)

F.A. von Hayek (1899-1992) was a splendidly diverse economist. His writings range from the economic analysis of capital and money as well as methodological subjectivism in his early years, to psychological analysis of knowledge ('*Sensory Order*') in the 50ies of the 20th century, to his socio-philosophical writings in the 60ies and 70ies. This section on Hayek's legacy will more or less deal with his latest works, at most his '*Studies in philosophy, politics and economics*' and his writings on '*Law, legislation and order*'. Hayek was a rather exact writer, able to think and argue very deeply, his style of writing was always concerned and certain, but it hardly got authoritative or mandatory. In the end of the 20th century with the rise of neoliberal politics he got mystified. Many people regard him as the one and only godfather of *Neoliberalism*. Of course, Hayek was very much influenced by his Austrian colleagues and teachers, like Carl Menger (1840-1921), Eugen von Böhm-Bawerk (1851-1914) or Ludwig von Mises (1881-1973). Hence he started his intellectual career with a more subjectivist picture of society and the economy; which was implicitly a more *hermeneutical* idea of social life and human action. Additionally one can classify his business cycle theory into this same tradition. Hayek wrote his first major works after the Great Depression, hence

he was up to develop a business-cycle theory which was able to explain crisis. According to him, depressions are invoked by over-investment or erroneous investment, by creating bubbles. In short, his ideas of the origins of economic dynamics and reasons for crisis were totally contrary to Keynes' conception. Keynes (1883-1946) developed his *General theory of employment, interest and money* in 1936. For him, the origins of the crisis lie in decline of aggregate demand, which he introduced as a new macro concept into economics. In order to overcome a recession and regain economic growth, aggregate demand has to be increased along fiscal intervention as well as money expansion. Hence we can follow that Keynes introduced more objectivist ideas into economics, as for example aggregates, and Hayek remained on more subjectivist positions, as it was supposed by the Austrians. The subjectivist position induces a supply-side theory of boom and bust where agency plays a major role in economic activity, whereas the more objectivist position reclaims a demand side theory of the business cycle where aggregate behaviour sets the agenda. The difference between Hayek and Keynes was tremendously influenced by economic policy in the 20th century. We can definitely admit that most of economic policies or instruments on the fiscal as well as on the monetary part of the economy have their origin in the ideas of these two extraordinary scholars. Furthermore, from an institutional perspective we may regard both of them as institutional patrons of the 20th century. They were totally aware that institutions matter in economic life, that they shape economic conditions and activities. Keynes built upon the strength of the state as a formal economic institutional framework governing policies and regulating market behaviour. He believed in the willingness and benevolence of trained economists leading the state's institutional pillars. But Hayek tried to develop a full-fledged theory of how institutions emerge and retain in society. How institutions live, grow and sustain from informal ones to formal governed ones and vice versa. In his later works his emphasis was especially on the concepts of spontaneous order, cultural inheritance, rules of conduct and group selection. Maybe there lies the significant difference of their approaches to economics, in their perception of economic institutions. We may assume that Keynes envisaged governed, formal social structures where political willingness plays the major role, whereas Hayek's work focused on their emergence and their life-cycles.

MONEY, HAYEK, KEYNES AND BANKING

Why were these two extraordinary economists rivals? What do they have in common? This sort of questions must have bothered Steele (2001) in his book on *Keynes and Hayek: The money economy*. Both authors were heavily influenced by the economic massacre of the interwar-period and the political massacre of World War II. It was their challenge to rethink the political economy of Europe, where just a huge pile of shards was left. Obviously they introduced distinct concepts, but with similar aims and common origins. Keynes wanted a strong state, regulating market behaviour as good as possible. Fiscal interventions should increase consumption and consequently aggregate demand. Monetary policies should expand the money supply and guarantee substantial investment. His theory aimed at the prerequisites of full employment, stable prices and low interest rates. Hayek wanted a weak state; he wanted to rethink liberalism. Households should save money and make thoughtful investments, also possible via stable prices. Hayek's monetary vision was accompanied by highly restrictive interest rates. In short, Keynes had expansive policies in mind and Hayek restrictive ones. Truth is that both scholars envisaged a theoretical marriage of the theory of value with a full-fledged monetary theory. In the shadow of the Great Depression there was no other economic escape than to develop a monetary theory preventing further economic meltdowns, leading into political turmoils. Steele's (2001) gateway for a comparative analysis of their intellectual lives deals with their *visions*. Here we may understand vision, as we already did in the Schumpeterian context, as a *pre-analytical cognitive act*. Their vision truly was to integrate time and money into general economic analysis. Hayek and Keynes were aware that there will never be something like complete information and consequently perfect foresight. Hence both dealt with *uncertainty* during their studies, as an indicator for incomplete information. Uncertainty and risk are institutionalised in the economy via the monetary system; currencies and their interest rates indicate the factor of uncertainty as well as risk; whether to save or to invest. In the after-war period investing still remained as economic action on the real side of the economy, like for example investments into industrial relations. Hence it seems that uncertainty and risk could actually be calculated, at least more than nowadays. In fact this is not true; in the second half of the 20th century economies were still coined by huge fluctuations of currencies due to high inflation rates; that means in particular that prices were quite unstable. Consequently their political-economic agenda was

shaped by giving stability to the price-system. This was certainly a greater concern for Hayek as for Keynes. The early Hayek anticipated that it is the introduction of money (understood as money expansion) into the economic system which disturbs the *Trade Cycle* and produces price instability between demand and supply. The crucial point for our analysis will be that even the *early* Hayek was aware of regular disturbances of equilibrium, i.e. disequilibrium.⁵²

It arises from the circumstance that the automatic adjustment of supply and demand can only be disturbed when money is introduced into the economic system. ... Every explanation of the Trade Cycle which uses the methods of economic theory – which of course is only possible through systematic co-ordination of the former with the fundamental propositions of the latter – must, therefore, start by considering the influences which emanate from the use of money. ... This must be the aim of all theories which set out to explain disturbances in equilibrium which, by their very nature, cannot be regarded as immediate consequences of changes in data, but only as arising out of the development of the economic system itself. Hayek (1933, p. 101f.)

Within this quote we can extract two important issues, also relevant for Hayek's future research. First it is the introduction of money which produces regular disturbances – the monetary system raises fluctuations in interest and capital goods; second these disturbances have to be regarded as system-immanent – the monetary system has to be regarded as an integrated part of the real economic system and its trade cycle, which brings in the notion of endogenous change and disequilibrium. Some years later Hayek analyses the structure and function of national monetary systems. Hayek (1937) more or less argues that central banks, understood as independent and autonomous institutions, have to act for the interest of the country, although in responsibility for the international economic system. Additionally the fate of the monetary system lies in the hands of the central bank. Money has internationalized over the years and the system got even more diffuse since the release of the gold standard; which was majorly a reason to finance the war machines. Now Hayek raises the importance of responsibility of central banks, governing national monetary systems for the sake of international price stability. In his eyes central banks have to restrict the circulation of cash and different media to a certain extent. This shall be necessary to guarantee a degree of homogeneity in the international money system. Just to make it clear, a national bank has a huge responsibility considering the international economic system; hence it has to govern the circularity in a more restrictive way in the first place. In Hayek's words:

This complex structure, which is often described as the one-reserve system, but which I should prefer to call the system of national reserves, is now taken so much for granted that we have almost forgotten to think about

⁵² For a more detailed picture of Hayek's concept of float equilibria compare Witt and Brenner (2008).

its consequences. ... In the first place I would emphasize that bank deposits could never have assumed their present predominant role among the different media of circulation, that the balances held on current account by banks could never have grown to ten times and more of their cash reserves, unless some organ, be it a privileged central bank or be it a number of or all the banks, had been put in a position, to create in case of need a sufficient number of additional bank notes to satisfy any desire on the part of the public to convert a considerable part of their balances into hand-to-hand money. It is in this sense and in this sense only that the existence of a national reserve system involves the question of the regulation of the note issue alone. The second point is that nearly all the questions with which a central banker is daily concerned, arise out of the co-existence of these different sorts of money within the national monetary system. Theoretical economists frequently argue as if the quantity of money in the country were a perfectly homogeneous magnitude and entirely subject to deliberate control by the central monetary authority. This assumption has been the source of much mutual misunderstanding on both sides. And it has had the effect that the fundamental dilemma of all central banking policy has hardly ever been really faced: the only effective means by which a central bank can control an expansion of the generally used media of circulation is by making it clear in advance that it will not provide the cash (in the narrower sense) which will be required in consequence of such expansion, but at the same time it is recognised as the paramount duty of a central bank to provide that cash once the expansion of bank deposits has actually occurred and the public begins to demand that they should be converted into notes or gold. ... I shall try to show that the existence of national reserve systems alters the mechanism of the international money flows from what it would be with a homogenous international currency to a much greater degree than is commonly realized. Hayek (1937, p. 12f.)

Hayek had serious concerns about money expansion and central bank policy on the one hand and favoured an international monetary system on the other hand. Some 40 years later he was still aware that only the gold standard⁵³ or fixed exchange rates could compete with international currency fluctuations⁵⁴. In Hayek's early writings it is not clear whether he wanted an international or a global currency, but the lesson to learn starts with expansive monetary policies. Such policies are actually no problem if the expansion just concerns bank deposits, but as Hayek argues if these deposits have to be converted into cash or gold. That happens during so-called bank runs (compare the 2008 liquidity trap) where the commercial banks will always have problems to provide *immediately* such amounts of cash. Such situations will force central banks to print new money or to offer new satisfying tenders for the commercial ones, guaranteeing short-run liquidity. The interbank market will be frozen, banks will not provide credits among them. Additionally also primary and secondary market will be affected. This monetary vicious circle may trigger huge international problems in the monetary system; i.e. currency fluctuations with high inflation rates in the long-run, then also penetrating the real economic sector. In order to prevent such consequences in advance it will

⁵³ 'So long as money is managed by government, a gold standard, despite its imperfections, is the only tolerably safe system; but it is better to take money completely out of government control.' Hayek (1976a)

⁵⁴ 'Readers who know my consistent support over more than 40 years of fixed rates of exchange between national currencies, and of my critique of a system of flexible rates of foreign exchange, even after most of my fellow defenders of a free market had become converts to this system, will probably feel at first that my present position is in conflict with, or even represents a complete reversal of, my former views. This is not so. In two respects my present proposal is a result of the further development of the considerations which determined my former positions.' Hayek (1976a, p. 81)

be necessary to introduce an international system of legal financial institutions. Here Hayek and Keynes go different ways. The later Hayek (1976a) argues that there is no need for a central bank anymore, or any governing structure monitoring and controlling money flows. Money has to be *spontaneous* and *denationalised*, free of trade and will emerge wherever it is needed. Keynes' agenda heads up for an international or global central bank system with just one global currency. Undoubtedly this concern was on Keynes' agenda by introducing the *Bancor*, his original idea for the Bretton Woods conference. Where Hayek wants to get rid of all monopolies and likewise promotes the decentralised governing capacity of informal institutions (rules of conduct) as well as the necessity of a strong formal institutional system of international law, Keynes emphasises the technical and analytical abilities of well-trained *macro*-economists paving the way for concerted fiscal and monetary management, but as well on global scale. Nevertheless Keynes, as an English scholar, also followed the liberal tradition of the enlightenment. Additionally it has to be said by now, that neither Keynes was a socialist nor Hayek was a neoliberalist. Both accusations involve mere populism. Even some random expressions show their serious, reasonable and realistic concerns regarding political economy. Hence it is more than pathetic to ride superficial policy campaigns on their backs indicated as neoliberalist or socialist nowadays. For example Keynes once wrote on capitalism,

... the decadent international but individualistic capitalism ... is not a success. It is not intelligent, it is not beautiful, it is not just, it is not virtuous – and it does not deliver the goods. In short we are beginning to despise it. But when we wonder what to put in its place, we are extremely perplexed. Steele (2001, p. 27) cites Keynes (1933, p. 239) – *National Self-Sufficiency*.

and on liberalism:

It is the best safeguard of the variety of life, which emerges precisely from this extended field of personal choice. ... For this variety preserves the traditions which embody the most secure and successful choices of former generations; it colours the present with the diversification of its fancy; and, being the handmaid of experience as well as of tradition and of fancy, it is the most powerful instrument to better future. Keynes (1936, p. 380)

Hayek wrote on *laissez-faire*:

...while the presumption must favour the free market, *laissez-faire* is not the ultimate and only conclusion. Steele (2001, p. 26) citing Hayek (1933), 'The trend of economic thinking', *Economica*.

...probably nothing has done so much harm to the liberal cause as the wooden insistence of some liberals on certain rules of thumb, above all the principle of *laissez-faire*. Steele (2001, p. 26) citing Hayek (1944), *The road to serfdom*, Chicago.

We have no longer even a generally understood name for what the term 'free system' only vaguely describes.

Certainly neither ‘capitalism’ nor *laissez-faire* properly describe it; and both terms are understandably more popular with the enemies than with the defenders of a free system. ... *Laissez-faire* was never more than rule of thumb. It indeed expressed protest against abuses of governmental power, but never provided a criterion by which one could decide what were the proper functions of government. Much the same applies to the terms ‘free enterprise’ or ‘market economy’ which, without a definition of the free sphere of the individual, say little. Hayek (1973, p. 61f.)

Additional similarities in their perception of economic reality and economic change arise from their recognition of the essentiality of the knowledge problem. Both scholars treat this problem in dedicated volumes, Hayek observes the phenomenon of limited, but evolving knowledge in his *Sensory Order* and Keynes treats the problem in his *Treatise on Probability*. Further common visions about economics include for example their aversion of utilitarian concepts.

This brief observation about their policy agendas and their visions gains more and more importance today, regarding the 2008 economic crisis and its consequences for example. At this moment we still sit in front, to a great extent, of the same economic instruments, policies and perspectives as Hayek and Keynes worried after the Great Depression and World War II. Overall the most important economic pillars and insights have not changed, even if neoclassical forerunners want to make us believe something different. It should be rather clear now that these two intellectual elephants have more in common than superficial comments want to brain-wash today. Steele (2001) emphasises the difference between *hermeneutics* and *realism* as the main source of their differences. Still these two ontologies shape rivalries between *Austrians* and *post-Keynesians*. Even if their heuristic conception of economic progress and limited knowledge is highly connected, their prejudices of the world are more than distinct:

The ontological divide between Austrians and post-Keynesians underpins an age-old controversy over man’s place in nature and the rival notions of human free will and determinism. Where Austrians emphasise the capacity of individuals to change the course of events, post-Keynesians emphasise the organic structure of an economic system whose parameters constrain individual action. Since post-Keynesians argue that those societal parameters can be changed through the exercise of a *political* will, the debate turns on the manner in which an individual may affect the destiny of himself and others. Steele (2001, p. 168)

The aim of an evolutionary institutional program for economics builds upon the modest idea of presenting a path in between. Weizsäcker’s (2005) article on Hayek and Keynes gives a perfect account for a proper synthesis. He highlights that Hayek and Keynes have indeed fundamental differences in their philosophical tradition, but he wants to give an appeal to dismantle prejudices of Keynesians as well as Hayekians. Weizsäcker (2005) refers to the

philosophical strengths of Hayek and the analytical or technical improvements that Keynes introduced to economics. In his short essay he stresses the notion of *change* as a major fact in economic systems. Hayek introduced the idea of spontaneous order as a heuristic device capable of dealing with complex change. The market is here understood as an information provider of prices; hence the price system's only function rests on dealing with inconsistent circumstances of economic action. It does not coordinate something, but it provides information. The process of coordination is done by the economic agents alone; the market is just an information structure, always signalling like traffic lights. Weizsäcker (2005) concludes that it is the idea of permanently changing circumstances – economic dynamics – which necessitates the price system and consequently Hayek's concept of spontaneous order. On the contrary we can note empirically that prices do not adapt that fast. It is the economic phenomenon of *sticky prices*, that they do adapt slower than the quantities. The price system works slower and more incomplete than expected from a mere theoretical perspective. Nevertheless Hayek (1945) also remarked that the price system has to be regarded as incomplete. Additionally Weizsäcker (2005) attacks by defending Hayek the two main *streams* of thinking in perfect markets and complete information, i.e. the Walrasian *general equilibrium framework* and the Friedmanian methodology of the *as-if* argument. First, it is the *constructivist* attitude of both which contradicts them in the end. Within constructivist logic all prices (all information) are revealed through the construction of the market. Additionally it is assumed that there has to be something like private knowledge separated from public knowledge. These ideas reflect a centralised perspective of the market. In a perfect competition environment the market is the centre of all information; it stores public knowledge and distributes information like a machine. Weizsäcker (2005) argues that in both conceptions the price signals are simultaneously available for all economic actors through the hub. Hence there is no such thing as individual knowledge, although the Hayekian idea suggests that especially the private knowledge is related to the price system itself. Furthermore Hayek (1945) explains that the market coordinates individual knowledge via the price system but nothing else, which is consistent with the idea of an information provider managing individual information transfers. The Walrasian interpretation would be to argue that individual knowledge and public knowledge are separated and only the price system as a collective, constructed, knowing unit is able to efficiently coordinate and distribute the individual knowledge. This conjecture is caught in a mechanistic and constructivist cage,

where the market acts as an all-knowing machine. Hence we may follow that Hayekian competition is a dynamic process of transferring information from states of lower knowledge in society to states of higher knowledge. Then a better coordination is also more likely, according to this aspect competition is a discovering procedure.⁵⁵ Consequently it is rather misleading to regard a market as a mere allocation phenomenon of complete information, because on the one hand the market is signalling information via its institutionalised structure and it is dealing with incomplete information on the other hand. This is the point where research of markets with incomplete information begins. The signalling process also includes the idea of a trademark as a market institution, carrying knowledge about goods. The price system just acts as a knowledge carrier, transporting it from one location to another.

Weizsäcker (2005) begins his synthesis between Hayek and Keynes at hands of Adam Smith's division of labour. The author establishes an unintended notion of the division of labour; it is so-to-say a necessary by-product of economic action and not a construct. This division of labour produces asymmetry on the goods-markets, resulting in a distribution of more demanders than suppliers. Additional asymmetry arises through transaction costs. Weizsäcker (2005) considers transaction-saturated demand and transaction-interested (he calls it *hungry*) supply. Now transaction costs differ in dependence on, for example availability of products, on diversity of products and on the kind of product corresponding to its means as an intermediate good or a final good. Furthermore there will be higher transaction costs on higher regulated markets like net-service markets: railway, electricity and so on. Then the argument follows the stickiness of prices, higher transaction costs leading to more lag. According to Weizsäcker (2005) in such situations the participating parties may negotiate on tariffs instead of prices then, because asymmetry is too high. The stickiness of prices tells us that prices will increase very slowly when demand increases, contrary to the program of perfect competition. This is also Hayek's story, because individual knowledge is highly skewed and scattered in the price system, creating lags and uncertainty. Weizsäcker (2005) brings in a rather tricky argument: We have assumed transaction-hungry suppliers. They will produce on stock, just to guarantee availability via reserve capacities, the Keynesian point in his *General Theory*. These suppliers will create the spontaneous order. Customers are usually spoiled via the *real-time* availability of goods, which is certainly anything else than self-

⁵⁵ Weizsäcker (2005) here refers to Hayek's writings on *Individualism and economic order* and his *Freiburger studies*.

evident. If suppliers would not produce on stock and build up capacities, our (demanders') expectations would clash with reality. Hayek follows reality in saying that we, as demanders, might always get what we want in modern capitalism. So the expectations get true in most of the cases, this is made possible via spontaneous order of the market; this phenomenon cannot be planned.

The bridge to Keynes follows this logic on the macro side of the economy. If aggregate demand increases then the reserve capacities play their respected role and production increases as well. On the other side if aggregate demand decreases then aggregate capacities go down primarily. Otherwise it is not sure how the common business woman will change prices or if she even will change them, because of scattered knowledge. Weizsäcker (2005) suggests that supply should ignore a just temporary change in demand, for reasons of price *reliability*. He wants to tell us that if demand increases or decreases the prices do not have to react principally as anticipated by the orthodox theory. The author claims that in most cases it will be better to keep the original prices in the first place, because the situation will be too uncertain. This phenomenon of high reserve capacities and sticky prices reflects the Keynesian notion of underutilisation on the supply side. Additionally the assumption of a surplus in goods and factors on the supply side corresponds with an economic system where the prices are distributed through individual knowledge and carried/institutionalised knowledge (trademarks, ...); in contrary to the Walrasian system of constructed, centralised knowledge. Weizsäcker (2005) then follows, by considering a lagged real price system, that the whole economic system of trade would not be able to guarantee the demanded flexibility without that much reserve capacities; which result from spontaneous order.

At last it is the idea of denationalised money, as raised some rows above, which should bring Hayekians and Keynesians more together. The central banks are to a great extent autonomous nowadays and that is for good reason. Weizsäcker (2005) argues that if there would not be any reserve capacities – the Keynesian story – then money expansion would directly and unchecked lead into inflation, instead of higher production. The Hayekian argument to refuse money control from the state – to denationalise money for reasons of political abuse – is implicitly Keynesian, because it is implicitly assumed that there are reserve capacities on the supply side of the economy. The capacities guarantee product expansion in the first place and a slowly price expansion, according to Weizsäcker (2005). Hence moderate money expansions can lead to a better workload for the whole economy in

the medium run, better employment, and so on. Nevertheless inflation will come in the long-run, due to increasing factor prices and consequently increasing production costs. Weizsäcker (2005) then concludes that the Hayekian idea of independent money was maybe the most important economic innovation in the 20th century. Ambiguities about political abuse of money expansion arise from the fact that reserve capacities – introduced in the Keynesian *General Theory* – are an empirical economic fact now.

SPONTANEOUS ORDER

Hayek's most crucial concerns in defending and promoting a theory of spontaneous order are grounded on a pronounced aversion against constructivist theories of human life. Hayek (1967) majorly distinguishes between human action and human design. In this respect he takes very radical positions, in order to dissociate himself from constructivist schools. He argues that social institutions are not the result of human design, but rather emerge along complex human action, as a by-product. Hayek (1978) stretches the notion that it is not about criticising social or political potential to create or design something deliberately, but rather to deal with the origins of this realm of human enlightenment. The argument concentrates on the strict separation of *natural* and *artificial*, hence his critique goes beyond an attack on political will.

Descartes had taught that we should only believe what we can prove. Applied to the field of morals and values generally, his doctrine meant that we should only accept as binding what we could recognise as a rational design for a recognisable purpose. Hayek (1978, p. 5)

This emphasis on purposeful rational design – understood as absolute truth – involves a narrow perspective of human agency. Perceivable truth embraces more than mere rational purpose. Here, *trust* sneaks into the game in an indirect way. Hayek implicitly argues that trustworthiness is not only a matter of formal, hard-coded institutions, which are purposely constructed. Trust is rather intrinsically dependent on informal institutions, such as rules of conduct. These innate rules build the foundations of any truth and they evolve cumulatively over generations and generations by human actions. The Cartesian legacy additionally binds people as slaves to authority if it is politically interpreted; i.e. anti-liberal. Hayek (1978) argues that this kind of rational constructivism – involved in a strict dichotomy of the *natural*

and the *artificial* – produces devoted political creeps, always looking for higher authoritative instances justifying or proving their actions. Hayek finds very critical words regarding Rousseau's⁵⁶ *social contract*.

The belief in the unlimited power of a supreme authority as necessary, especially for a representative assembly, and therefore the belief that democracy necessarily means the unlimited power of the majority, are ominous consequences of this constructivism. Hayek (1978, p. 6)

further:

What I want to show is that men are in their conduct never guided exclusively by their understanding of the causal connections between particular known means and certain desired ends, but always also by rules of conduct of which they are rarely aware, which they certainly have not consciously invented, and that to discern the function and significance of this is a difficult and only partially achieved task of scientific effort. Hayek (1978, p. 6-7)

Hayek refers again to the innate properties of human action, which guide behaviour. These innate characteristics have culturally evolved, they frame human behaviour and they constrain human will and choice. These rules give people the ability to act within a social *order*, or even to anticipate some kind of order. Our cultural heritage equips us with these innate rules – partially genetically and culturally inherited – which at the end of the day are able to establish something like order in a spontaneous way. Hayek (1978) here clearly refers to these rules as result of a selection process, in particular group selection. This postulate stands logically in contradiction to the constructivist hypothesis of deliberate design of the social environment; i.e. individual selection. Obviously we cannot design our institutional framework by mere purpose, nevertheless we are able to give them some drift or spin on rational grounds or political willingness. This is a notion which is especially ignored by Hayek. His real aims were different. Hayek wanted to settle up with all theological foundations of constructivism, i.e. intelligent design. Therefore he became a passionate promoter of evolutionary theory, because it is the only paradigm able to explain the complexity of life. Hayek also supported the evolutionary epistemology of his Viennese colleague Karl Popper. Their common evolutionary explanation of social order builds upon trial and error of such innate rules, because these human rules create knowledge which is culturally transmitted from generation to generation. A cultural selection process detects rules which create a more efficient order and these best-practice rules prevail. It is a complex process of knowledge transmission via cultural institutional carrier systems. The story is kind of similar to Hayek's (1945) story of

⁵⁶ Hayek (1978, p. 6) adds that Rousseau was a passionate student of Descartes.

knowledge transmission in the price system. There, compare some rows above, individual knowledge is transferred to locations where it is needed, from lower states of knowledge to higher states of knowledge. That is the task of the price system, understood as a knowledge carrier. Social order can be interpreted in a similar way. Prevailed rules of conduct are transmitted through cultural inheritance within society. Thereby it is important to note that prevailing does neither mean optimal nor natural. They are just well adapted to the specific cultural environment, in a non-designed way. By this we may follow that Hayek headed up for the difference between purposeful design and intentional or social learning. He claims that order emerges spontaneously in context of learned, transmitted or innate culture. This order cannot be the product of any constructivist rational design; hence it cannot be fully decomposed theoretically. In this respect we have to agree. Hayek's liberalism mostly builds upon David Hume's moral philosophy, in his belief in human action instead of human design; as it is stated in Hayek (1967, chapter six and chapter seven). This specific tradition sheds more light on his specific conception of agency and methodological individualism. In contrary to the dominant opinion that there is just one methodological individualism, we have to propose a more distinguished perspective regarding this issue. Contemporary orthodox economics highlights the rational competencies of the human being as a utility-maximising individual. This concept is the basis for the representative agent. Hayek attacked both assumptions during his whole academic life; the rationality issue as well as the utilitarian notion of behaviour. Therefore it is rather unrewarding to confuse these different approaches. Here, the real differences between human action and human design get visible. The neoclassical conception of the economic agent suggests a purposeful rationality, i.e. constructivist human design. Additionally the new institutional economics, as envisaged by Coase for example, regards institutions as *just* deliberately designed contracts with transaction costs. In this respect we can anticipate the huge gaps between the new school and evolutionary institutional approaches. Hayek never defended such a methodological individualism, as provided by scholars like Becker, Arrow or Samuelson. On the contrary he attacked such constructivist approaches to economic theory.

The counter draft simply builds upon an evolutionary interpretation of economic action. Here human action is the result of cognitive as well as innate characteristics of a person, instead of human design as a result of mere cognitive rational reasoning; such characteristics also include subconscious properties, which culturally evolved over time. In chapter one, we

discussed a critically naturalistic ontology where society is transformed in a co-evolutionary way by institutions as well as its agents, by nature as well by nurture. Such a concept includes the cognitive potential of human beings to deliberately create formal institutions, but the main difference of a naturalistic perspective is shaped by the history of these human beings. The *bauplan* of a specific formal institution will be made on rational grounds, by cognitive, purposeful acts, but the looking or the aesthetics will be culturally evolved. Every formal institution has informal historical roots and is therefore a cumulative result of the history of human agency; not in an immediate manner (snap shot) but in the big picture. This is considered in Hayek (1973, p. 8 ff.), writing on construction and evolution. The Hayekian evolutionary picture still offers enough space for choice, reason and liberalism. Choice and reason is always considered in relation to its specific history of events; it is always bounded, framed and embedded in its evolution. Individual knowledge is factually and permanently limited by the nature of the human body, but it can be transferred by institutional carriers from one location to another, spatially as well as temporary.

What is order and why is it spontaneous?

Hayek's massive critique on constructivism was necessary to establish a differentiated picture of order. For Hayek (1973, p. 35), there are two kinds of order: made order or *taxis* and grown order or *cosmos*. *Law, legislation and liberty* was considered as a new theory of law and legislation. For this purpose it was necessary to discuss the emergence of *order* as the most important foundational pillar of *law*.

By 'order' we shall throughout describe *a state of affairs in which a multiplicity of elements of various kinds are so related to each other that we may learn from our acquaintance with some spatial or temporal part of the whole to form correct expectations concerning the rest, or at least expectations which have a good chance of proving correct.* Hayek (1973, p. 36)

Hayek's order is about constancy and consistency of social processes, granting common expectations. Hence he criticises that academia has focused more on a deliberate concept of order, founded on human design. This constructivist access to order repelled a lot of advocates from classical liberalism. Hayek was always in fear of an anti-emergentist concept of order, the catastrophe of World War II showed the fatal potential of constructivist order. He instantly associates the *taxis* with command and obedience. Hayek wanted to break with the dogma that order can be just understood as forced from outside of a system, building upon a closed-system perspective. Then he concludes that a spontaneous order framework thus offers different and additional properties of consistency and constancy; properties which emerge

endogenously during the formation process of an ordered state. Hence advantages and disadvantages cannot be considered in advance, but need time to unfold or reveal as social patterns, then they can be accessed. Societal change is therefore in flux. Hayek (1973, p. 37) notes that cybernetics, as the regulatory study of systems with feedback, was also an upcoming scientific branch focusing on emergent phenomena on a structural layer. The idea of circular causality and open-systems was also already discussed in 3.2. These insights also indicate connections between Veblenian institutional dynamics and Hayekian ones.

The potential constructive power of a social environment gives rise to *organisations*, as a form of willingly established order. Hayek's distinction between *cosmos* and *taxis* reveals his categorisation of institution and organisation. In this respect Hayek also switched from 'purpose' to 'function'. By that he means in particular that an order does not necessitate specific purposeful action of all the agents, nevertheless the order may establish some purpose endogenously; as a kind of function. The way and kind of organising is then similar to the concept of self-organisation and evolution as we described in chapter 2.4. Hayek also adds that it is not necessary to design an institution as a plot, but it is possible to arrange the conditions where order can evolve spontaneously. In this respect he can be compared with his ordoliberal colleague from Freiburg, Walter v. Eucken. Ordoliberalism is a kind of governmentality, understood in Foucault's interpretation of a specific rule to govern⁵⁷, where competition is forced by a well-established legal system of legal rules (*ordos*) to undermine monopolies within the state. The proposed order shall act as a legal limiter to liberal action and shall guarantee order from within, an *eidetic*⁵⁸ order. Hence, such a *cosmos* must always strive after a status on the edge between chaos and order. Legal rules have to be established in a very sensitive way. Additionally in such a framework it will not be easy to discuss the role and treatment of natural monopolies. Hayek (1973, p. 41 ff.) refers to the complexity of

⁵⁷ Compare Foucault's (1978, p. 173ff) explanation of *governmentality*.

⁵⁸ Compare Goldschmidt and Rauchenschwandtner (2007) on the relationship between Husserl's *eidos* and von Eucken's *ordos*, as well as Foucault's interpretation of ordoliberalism. In this respect the market economy represents an organic order as well. The Foucaultian (1978) interpretation of ordoliberalism suggests, according to Goldschmidt and Rauchenschwandtner (2007, p. 22-23), '*Yet ordoliberalism is not a frame within which the market is supposed to operate, it does not set limits around the market. Instead, it is the expression of a (fundamental) principle of order as well as an imperative, namely that all obstacles to competition, except the most vital political cushions, are, from a social policy point of view, undesirable. With regard to the eidetic order of the market, this means that, not only should the endeavours of competition be given free rein, but more importantly, competition should be created and produced. ... Following the ordoliberal logic, Foucault positions the solution of the problem of monopoly on the institutional level, to maintain competition operational. Arriving at a monopoly position is not a phenomenon that is inherent to the market; rather, it is caused by external effects. ... The legal-constitutional framework then enables competition to be really effective.*'

cosmos. Spontaneous order cannot be universally understood, but we can pick out particular rules of conduct of the elements and analyse them. We do not need to understand the universal character of order, it is auxiliary enough to understand certain proxies or rules which condition the status of *cosmos*.

The market order in particular will regularly secure only a certain probability that the expected relations will prevail, but it is, nevertheless, the only way in which so many activities depending on dispersed knowledge can be effectively integrated into a single order. Hayek (1973, p. 42)

Here, Hayek admits that a spontaneous order will only produce common expectations to a certain degree, by that he means that the predictability is dependent on the degree of orderliness. Therefore order can only be understood as a multitude within society. Nobody will have access to the complete information set of this order in an overall way; hence *cosmos* and *taxis* will always coexist. Hayek (1973) also admits that organisation as designed order is probably the most powerful social technology that human beings have achieved; when he refers to government as the organisation of the state and not the other way around for example. Further, Hayek argues that both systems of order are conditioned to different sets and natures of rules. Therefore the next step in Hayek's analysis focuses on the characteristics of rules which are able to establish such orders. This issue also concerns the different usage of commands versus rules within an organisation, where the latter may achieve '*...use of knowledge which nobody possesses as a whole.*' Hayek (1973, p. 48). Whereas commands just demand specific functions of organisational members, in a more linear way. If we would consider human coexistence, the state or the market just as an organisation with mere functions, the world would look very primitive and backward. Therefore general rules of law, which create spontaneous order, may head up for abstract or universal order, otherwise command and rules of organisation head up for specific particular purposes; for sure an organisation needs to have clear-cut objectives. Hayek's argument points at the possibility of human will to purposefully establish spontaneous order; which is generally misleading in his eyes. Hence it is impossible to replace spontaneous order with organisation and the other way around. Hayek is majorly concerned with law and liberty considered in a co-existing and maybe co-evolving way. Legal positivism always tried to separate them and thought law just as restricting freedom. Hayek (1973) invites law in favour of granting liberal action. A major classification of spontaneous order is made by him along the following quote, comparing organism (as well as its miss-interpretations) and organisation.

This relatively concrete character of the order of organisms shows itself in the fact that their existence as distinct wholes can be perceived intuitively by the senses, while the abstract spontaneous order of social structures usually can only be reconstructed by the mind. Hayek (1973, p. 53)

This distinction shows quite obviously what human mind is capable of and what somehow transcends its capabilities. Both structures reflect organic self-organising forces, mechanisms and functions, nevertheless only one is considered as truly organic. Within this comment we can also anticipate some ignorance of the economic academia regarding biological explanations of social processes; which otherwise do not stand for *biologisms*.

About conventions and social orders

Robert Sugden (1989) brings in the issue of game theory, regarding spontaneous order. On the other side he still defends the liberal tradition of Hayek, in believing in a higher potential of self-enforcing rules than of formal deliberate design. By looking into Sugden's attempt on order and rules we come back to an issue already discussed in the Veblenian section, namely property. Sugden argues for an archetypical role of property in institutional theory. These archetypes emerge through conventions. If we consider common-pool resource problems, also the original topic of Noble laureate Elinor Ostrom, they need fast as well as practical solutions coordinating property rights. In a spontaneous order a convention becomes a rule, '*... the institution of property itself may ultimately be a form of order.*' Sugden (1989, p. 86). A convention is just one possible solution of a game, hence agents following conventions (most people to a greater extent) cannot be regarded as fully informed and consequently not as rational. At last Sugden refers to normative issues in economics. He claims that welfare economics regards moral judgements just as overall judged constructions of welfare. Such welfare functions work according to simple rational principles, which are for the sake of policy insufficiently differentiated.

The conventions which create order in a free society are supported by moral beliefs: people believe that they ought to keep to these conventions. But there is no independent principle of justice that provides a rational basis for these beliefs. Sugden (1989, p. 87)

Sugden impressively shows how to explain a convention as a self-enforcing rule. For that purpose he refers to a *Hawk-Dove* game in a certain *property* dilemma. The dilemma is about who takes a common good into her custody. The Hawk strategy is an aggressive one and the Dove strategy is a conciliatory one. This has to be considered as an intersubjective or interactive approach to moral judgements or welfare, in the name of game theory. In pure

strategies, the game, as established by Sugden (1989, p. 87), looks as follows, see Table 3.2.

If both choose *Dove*, then the two players divide the common good equally. Now the trick is to bring in heterogeneity. There will only be stable equilibria, if the two players behave differently. Sugden introduces a signal as a pivotal element, this element decides who will be *A* and *B*. The player who is *A*, plays *Hawk* and *B* plays *Dove*; the other pure strategy would be that *B* plays *Hawk* and *A* plays *Dove*. These possible outcomes are pure-strategy equilibria, which Sugden describes as conventions on common property.⁵⁹ The signal-rule takes over the real coordination task, because it is self-sustaining.

Table 3.2.: Hawk-Dove - normal form in pure strategies

		Player B	
		Hawk	Dove
Player A	Hawk	(-1, -1)	(1,0)
	Dove	(0,1)	(0.5,0.5)

Indeed, it is arbitrary that the players should use this particular signal to coordinate their behaviour: any signal that gave one label and a different label to the other would serve equally well. Any such convention may be understood as a *de facto* rule of property. Sugden (1989, p. 88)

Hence receiving the signal is sufficient enough for both players to coordinate the real strategies, because they just need to be informed about the assignment rule; i.e. the convention. Insofar the game mutated to a top-level game with rational expectations. Both players benefit from applying to the convention, therefore the rule is self-enforcing, in a Hayekian sense. Nevertheless the next question rests on rationality, either it is rational to follow conventions or not. The crucial point about rationality in classical, i.e. one-shot, games is that rationality gets circular, because it has to be argued *as if there were* uniquely rational strategies for both of them. Sugden further explains, that this does not imply that a found Nash-equilibrium has to be uniquely rational. Hawk-Dove or Chicken-games do not have a unique equilibrium, they have multiple ones. Therefore the argument has to follow the characteristics of the specified convention, which is in our case: '*A plays Hawk and B plays dove.*' Sugden (1987, p. 89). A convention is *consistent with* rationality but not *prescribed by*

⁵⁹ Sugden ascribes, that this mode of introducing signals corresponds to Robert Aumann's (1987) concept of coordinated equilibrium, with a Bayesian notion.

it. The full-body of rational choice could not suggest a specific strategy within the constraints of classical game theory in this special game, because these players are totally inexperienced, though super-rational. Sugden argues, that '*... ordinary people with limited rationality but some degree of experience and imagination might have no difficulty in coordinating their behaviour.*' Sugden (1987, p. 90). Hence games with multiple equilibria or repeated-games, which also do not have equilibria in pure strategies, need a pivotal top-level of the game, especially in coordination questions; because otherwise players get trapped in *infinite regress*, as it is the case in classical game theory.⁶⁰ Participants in a common-pool resource problem or in a simple coordination game have to rely on internal models, transcending rationality, because rationality may be a purely individual or private characteristic of human beings. These internal models build upon conventions or as Sugden (1987, p. 90) calls them common experiences; i.e. a *social history* heading to Hayek's *rules of conduct*, discussed in the next section. Therefore we may conclude that a spontaneous order can only show up in the light of a common or social history, prerequisite for the evolution of institutions. Additionally this social history or convention may be also understood as an *evolutionary stable strategy* (ESS). The notion of evolution in this context brings in a population argument. Additionally ESS does *not imply* that it provides *Pareto-efficiency*. It will definitely need some *critical mass* to evolve as a favourite rule, of property in our example. What Sugden wanted to show is that such rules or conventions are not the product of human reason, rather of human action, in respect of Hume and Hayek. Hayek (1976b) once explained that economics may not be the best term to explain the processes involved in an economy.

For a proper understanding of the character of this order [meant spontaneous] it is essential that we free ourselves of the misleading associations suggested by its usual description as an 'economy'. An economy, in the strict sense of the word in which a household, a farm, or an enterprise can be called economies, consists of a complex of activities by which a given set of means is allocated in accordance with a unitary plan among the competing ends according to their relative importance. The market order serves no such single order of ends. ... The term 'catallactics' was derived from the Greek verb *katallatein* (or *katallasein*) which meant, significantly, not only 'to exchange' but also 'to admit into the community' and 'to change from enemy into friend'. ... From this we can form an English term *catallaxy* which we shall use to describe the order brought about by the mutual adjustment of many individual economies in a market. A catallaxy is thus the special kind of spontaneous order produced by the market through people acting within the rules of the law of property, tort and contract. Hayek (1976b, p. 108-109)

Building on this terminology, Klein (1997) investigates the two different concepts of social order, referring to the *economy* as activities within the firm, the state and the household, as an

⁶⁰ Compare Schelling's (1960) prominent exemplary situation where 2 people need to arrange a meeting in New York, without communicating.

order of conscious planning and referring to the *catallaxy* as an order without central planning or just called spontaneous dedicated to a free society. By that he refers to Schelling (1978) who intensively studied the emergence of higher order dependent on micro-motives. Under such dependency macro-patterns may come up without any macro-planning. Klein (1997) argues that Schelling indeed writes in tradition of Smith and Hayek, but with different terminology. He then adds that evolutionary economics and complexity literature is working with terms like path-dependency, network effects, lock-in and so on. These similarities emerged by discussing the evolution of technological systems, like the discussion on VHS vs. Beta or Blue-Ray vs. HD-DVD. Klein (1997) announces several scientific debates which deal with undesigned or emergent social orders, from a macro perspective. He focuses on a distinction between two types of coordination, on the one hand he discusses emergent conventions associated with Menger, Schelling and the path-dependency literature and he discusses spontaneous order as a *distinct* concept associated with Smith, Hayek and Polanyi on the other hand. Hence Klein (1997) locates the will for synthesis in Hayek's work concerning the debate on social order, because he followed and admired both scholars, Smith as well as Menger, in an even-tempered way. Where Smith was more concerned with spontaneous order, Menger focused more on emergent conventions and left out the complex of order. In this respect Klein (1997) also criticises that the work of Sugden (1987) as well as Arthur's (1989) conception of path-dependency and lock-in do not reflect a nexus with Hayek's focus on spontaneous order, for several reasons.⁶¹ Sugden's example of a

⁶¹ This critique involves a multitude of work among the *New Institutional Economics* program, compare for instance Greif (1994), Greif and Laitin (2004), as well as Young (1996) which will still be discussed in this section. Generally, the *New Institutional Economics* approach heads up to synthesize historical or comparative institutional analysis with a game-theory approach. In fact this is a challenging and very prosperous task. Nevertheless new institutional economics mostly treats institutions as mere conventions (later also treated as Schelling coordination) which may become legally formal in some time. The problem is that they Hayekian or Smithian idea of institutions is something completely different, i.e. a social order but still emerging spontaneously. This kind of order transcends the investigated subject of the *NIE* and is consequently not treated in its studies; mostly because classical game theory is not an appropriate tool to deal with it. I give you an example out of Greif's (1994) article. There he wants to discuss major institutional trajectories, as an example he focuses on the comparative difference between Maghribis and Genoese. Greif (1994) proposes that they have different underlying cultural beliefs dealing with individualism and collectivism. He also argues that developing countries mostly ascribe to collectivist patterns of social life and developed countries to individualist patterns of social life, which is en passant simply not true. Apart from that assumption the two different cultural fields developed different institutional trajectories. The crucial point is that Greif (1994) did not analyse a specific evolution of social orders of the two geographical areas, but rather two different game-theoretic strategies, namely individualism and collectivism; then these two strategies have equilibria, i.e. the observed cultural conventions influencing their specific social organization, still far away from order. In fact this article remains as a very vague proof that individualist interests or cultural beliefs foster institutional development and consequently economic growth. The argument represents just another *black and white* picture of our society,

coordination game involves a focal point, which is required to establish the coordination, because it is not possible to achieve a stable equilibrium within mere strategies, as already elaborated. Now, Hayek's interpretation of spontaneous order goes beyond such a scenario. He highlights that individuals just have local and limited knowledge, so that they cannot know all of the participant's conventions in a so-called *catallaxy* game. A two player's game can just *point* to the real complexity of spontaneous order. For the one shoe-maker it does not look like he is playing with thousands of other players in a market economy, still he can rely on cultural focal points, or conventions. Nevertheless the shoe-maker will have competitors, trying to exhaust specific conventions. This notion involves that real market processes are something more than coordination games, they are just simplified didactic models. Hence there are two explanations for coordination, the former more Schelling like coordination indicates phenomena where people coordinate themselves in a *reflexive* manner, which has to be understood as a mutual process; coordinating *our behaviour*. The second understanding would imply an *arrangement* concerning an object for example. The objects do not coordinate themselves, it is the participants arranging something.

In the Hayek meaning, the concatenation of affairs in cases like the catallaxy is not actually coordinated by a Great Arranger, but, as Smith's famous metaphor demonstrates, their idea of coordination is clarified by an allegory of the affairs being 'led by an invisible hand'. Klein (1997, p. 326)

This is why Klein insists on *meta-coordination* as the right term in the understanding of Smith and Hayek. The crucial point lies in the *reflexivity* of the participants and the involved objects. Reflexivity opens a spectrum between those two ideas of coordination. The convention hints at behavioural regularity in a social coordination problem, where the regularity represents just one possible equilibrium of the stated problem.

The economic significance of conventions is that they reduce transactions costs. Imagine the inconvenience if, whenever two vehicles approached one another, the drivers had to get out and negotiate which side of the road to take. ... Conventions are also a notable feature of legal contracts. People rely on standard leases, wills, purchasing agreements, construction contracts and the like, because it is less costly to fill in the blanks of a standard contract than to create one from scratch. Young (1996, p. 105)

building upon the idea of linear historical development; instead of non-linear complex societal evolution, i.e. the Hayekian and Smithian concern. In a later paper Greif (2004) turns to a different issue, more related to our concerns. He proposes that institutions do not change that often, as originally assumed by historical institutional analysis. On the contrary they change according to punctuated equilibria. Greif (2004, p. 18): '*Hence, institutional change should have a quality of punctuated equilibria (Krasner 1984), where change is in actuality evolutionary but apparently abrupt, typically associated with a 'crisis' revealing that the previous behaviour is no longer an equilibrium.*' This aspect reflects a great turn in the *New Institutional Economics* program, because it is getting closer to the real deal, i.e. spontaneous character, shortly after or in a crisis, of a social order – meta-coordination or punctuated equilibrium.

Young (1996) emphasises the feedback-loop characteristic of conventions, actually becoming rules then. We may conclude that conventions play an important role in creating institutions in a spontaneous way. '*Conventions are a manifestation of coordination, and, by providing a precedent, they are an aid to coordinate.*' Klein (1997, p. 328)

Nevertheless the issue of social order is even more complex, social orders subsume conventions. Hence it is necessary to distinguish between coordination and meta-coordination. Here Klein (1997, p. 331) helps out with a very comprehending table (see table 3.3). First of all, Klein clarifies that mostly Hayekians are misunderstood when they speak about spontaneous order and conventions. They mean in particular that coordination can only be achieved by competition, but they mean metacoordination. The more Schelling type coordination, where people head up for a common goal, is something categorically different, hence people need also different methods. It will not be satisfactory to artificially establish competition in a Schelling coordination, because it will have negative effects. The organisational body of a firm cannot be the result of a spontaneous order as well, it needs a certain hierarchy with a certain role allocation or division of labour, to coordinate its productive means for reasonable goals.

Therefore we do not declare a firm as a kind of spontaneous order, it is only an institution in a more abstract sense. The firm needs specific coordination too, apart from that it will crash; i.e. coordination in a more conventional way than social order within an explicit taxonomic rule setting and not an implicit one. Respectively, also along Klein (1997, p. 330), we may say that the Hayekian emphasis on competition was mostly misunderstood, because it was anticipated in a different context, namely in a too diffuse treatment of coordination. When Hayek speaks about *cosmos* he means a *metacoordination* problem, which deals more with rules of conduct than with conventions, as we will see in the next section. Klein's (1997) typology of conventions and social orders additionally focuses on the separation of undesigned and designed coordination.

For conventions, there is the further issue of whether the standard (or rule) was designed, such as the QWERTY keyboard, and whether *its adoption or emergence* as a convention was designed. My focus here is the emergence. Thus we say the QWERTY is an undesigned, or emergent, convention, even though it is a designed standard. ... The distinction between good and bad. For a convention, the issue is whether it is good or bad *for* achieving metacoordination. The assessment is based on comparison with *other* plausible or relevant conventions, not with the state of affairs where there is no convention at all. For a social order, the issue is whether it is good or bad in achieving metacoordination. Klein (1997, p. 332)

Table 3.3.: Typology of conventions and social orders:

	<i>Undesigned</i>		<i>Designed</i>	
	<i>Emergent conventions</i>		<i>Designed Conventions</i>	
	Good for MC	Bad for MC	Good for MC	Bad for MC
<i>Conventions (Coordination)</i>	(1) Common Law Gold standard	(2) British/American system of weights and measures Chinese writing	(3) Metric system	(4) American winter clock setting
	<i>Spontaneous order (cosmos)</i>		<i>Planned order (taxis)</i>	
	Good in MC	Bad in MC	Good in MC	Bad in MC
<i>Social Orders (Metacoordination)</i>	(5) Catallaxy Roller skating [in group] Common law <i>creation</i>	(6) Tragedy of the commons	(7) Activities within the firm and other organisations	(8) Centrally planned economy

Source: reconstructed from Klein (1997, p. 331)

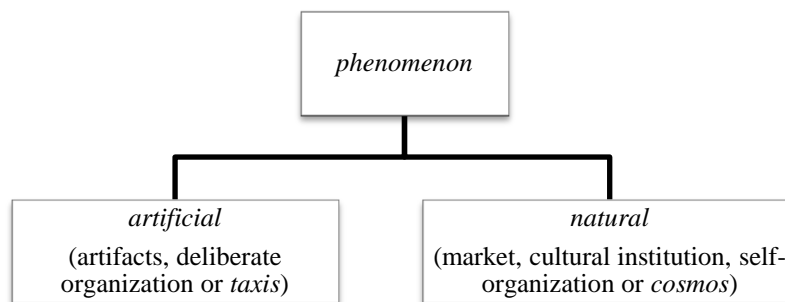
Note: MC stands for metacoordination; cells (7) and (8) represent organisations in Hayek's sense of *taxis*. The other cells do all represent institutions, but cells (5) and (6) are the only ones representing Hayek's sense of *cosmos*.

The original complexity of conventions and social orders, their different interpretations and categorisations open up a mere infinite map of possible social patterns, where Klein focused just on two of them. What is a strategy, what is a norm, what is a field, all these topics invite more and more conundrums of social change. Nevertheless Klein shows what seriously can be done by looking a bit more deeper into the issue. His critical perspective gives new insights into the treatment of coordination and the role of conventions in comparison to social orders.

Hayek focused on the major distinction of natural and artificial, as we already analysed. Albeit he extensively criticised a tradition of wrong usage of these terms, himself used them very misleadingly. For him an organisation, which can be a firm or a state for example, is an *artificial* construction of deliberate human design. On the one hand a firm obviously is made on human purpose and design to follow certain goals, like profit, on the other hand a firm is

still a *natural* thing. Even a socialist central planned economy has to be something natural, it does not and cannot have an exact *bauplan* like a watch, an example used by Khalil (1997, p. 309). Therefore *artificial* simply does not fit for something *socially* designed. Additionally, in case of an organisation, the design focuses on hierarchical constraints and maybe some *modus operandi*, but it cannot cover all actions of such a social structure. Still people have to develop and take use of some tacit knowledge, which is not involved in a so-called *bauplan*. This notion reflects at most the inappropriateness of the word artificial in this context, because *tacitness* implies natural knowledge, also a big issue of Hayek, as already discussed. Insofar we can conclude that maybe Hayek contradicted himself in some instances. Khalil therefore suggests an alternative categorisation for institutions, as figure 3.1 and figure 3.2 shows.

Figure 3.2.: Hayek's categorisation between artificial and natural

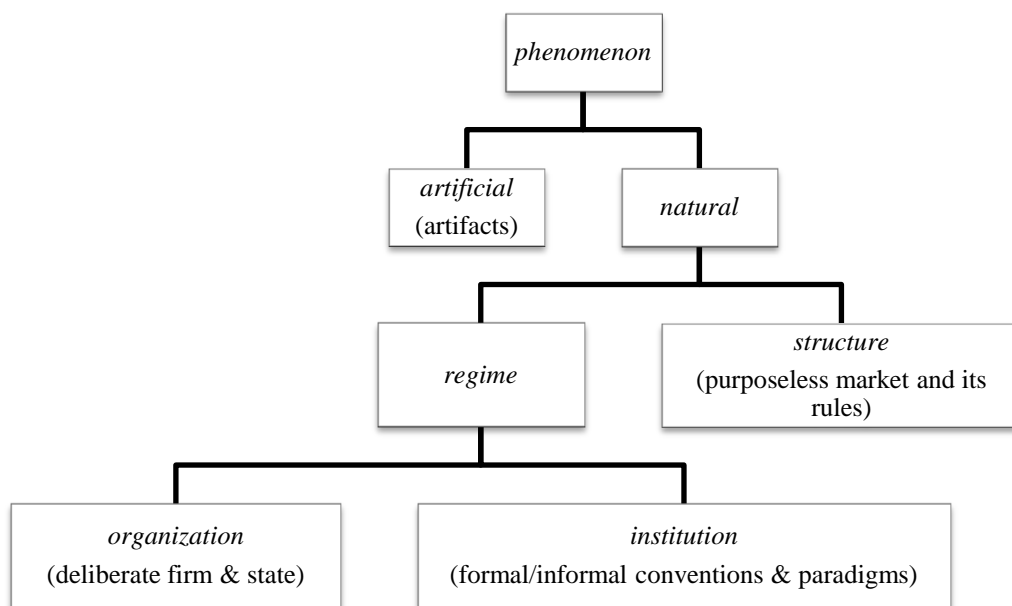


Source: reconstructed from Khalil (1997, p. 310, Table 2)

Khalil (1997) heads up for something deeper. For him the categorisation in *cosmos* and *taxis* is of a different dimension than the proposed Hayekian dichotomy of *natural* and *artificial*, for the following reason. Hayek explains that the two types of order, either organisation or self-organisation are at the top level of this issue – i.e. natural or artificial – but Khalil (1997) explains that Hayek used this topology just for different types of institutions – i.e. *nomos* and *thesis*. Hayek distinguished *nomos* – *law of liberty* – and *thesis* – *law of legislation*, where he obviously favours the former. Law of liberty reflects something generic, that means in particular that there are rules and conventions which may generate laws of liberty, without any purpose or deliberate design, in a spontaneous way, i.e. *cosmos*. Whereas the law of legislation ascribes to a positivist or constructivist perspective of rules; they are positively

constructed to purposely constrain liberal actions, which is a deliberate order – the *taxis* or the *thesis*. To summarise the issue at stake, the former conception of *nomos/cosmos* invites a legal/political/economic framework of institutions enabling liberty; the latter conception of *thesis/taxis* invites a legal/political/economic framework of institutions constraining liberty. Of course these two approaches to *law and liberty* need each other in a complementary way to establish something like social justice.

Figure 3.3.: Khalil's extended categorisation

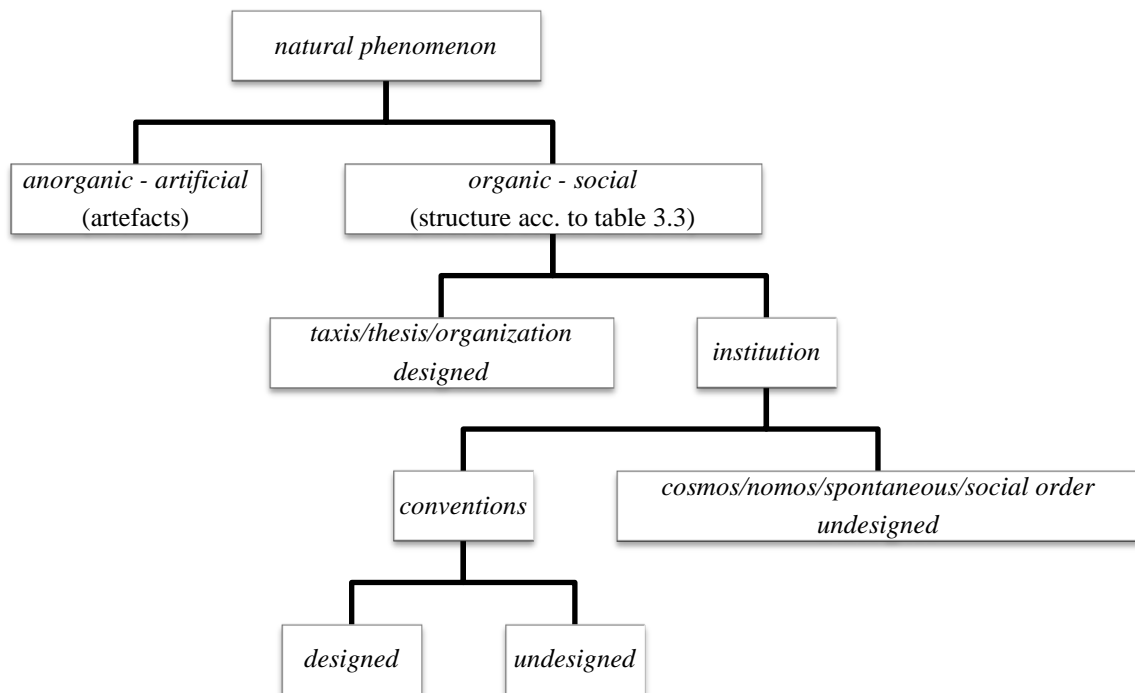


Source: reconstructed from Khalil (1997, p. 310, Table 2)

Hence the Hayekian taxonomy of *cosmos* and *taxis* just fits for the two different coordination sets of institutions and organisations, because they are *social* orders, therefore *natural* orders, at least in a critical naturalistic ontology as approached in chapter one. Two issues seem to be problematic within Khalil's taxonomy. First, his separation of regime and structure, this is really vague and inappropriate. Why should a market be a structure and not an institution, why should an institution be a regime? Probably it would be better to introduce another alternative schema, compare figure 3.3. The second issue depends on insights from section one, regarding critical naturalism: Phenomena have to be natural, they cannot be artificial in an evolutionary framework. There can be an artificial composition of anorganic parts, i.e. an

artefact, which is nevertheless still natural.⁶² We have to admit that Hayek jumped between the dimensions. Taking the categorisation in figure 3.3. for serious, then Khalil is right by arguing that Hayek's distinction between *comsos* and *taxis* is not located in the same category. At the end of the day *comsos* and *taxis* just represent two of eight possible cells in the category of table 3.2, namely the two different metacoordination states. Institutions can be more than social orders, there is still the realm of conventions and norms. Otherwise we have to talk about institutions only in the strict context of specific social orders, i.e. metacoordination. This is what Hayek did in his most prominent writings, without exception. For him, rules and conventions are not institutions, but they enable potential emergence and evolution of institutions. Hence *rules of conduct* are prerequisites for institutions in the Hayekian sense.

Figure 3.3.: Extended categorisation



Source: own source

⁶² This issue was extensively discussed in section one, especially in the subsection on critical naturalism.

RULES OF CONDUCT AND HAYEK'S CULTURAL EVOLUTION

Imitation and rules of conduct

Human action is guided by rules of conduct. It is the individual which follows the rules and the society which evolves on their grounds. It is very significant to acknowledge, as Hayek (1967, p. 44 ff.) does, that these rules of conduct just *implicitly* reflect the know-how of doing something. Of course it would be nice to find out how the rules work explicitly, but at the end of the day it is not necessary. Hence we need to take advantage of models simulating these rules as scientists. The argument for modelling nevertheless does not necessitate that we follow Friedman's and Savage's (1948, p. 298) postulate of *as if* the people knew the formulas to do their actions. Actually they do not know the models scientists assume for them. A specific human action, simple or complex, is always different, because time and space is always different, therefore people do not act according to scientific models. They even do not act *as if* they knew them. Consequently it is also wrong to assume, as a scientist, that agents in a model do act *as if* they were real people; it is just a model, useful in some cases, but not able to represent real actions as 1:1 maps. This specific assumption about human actions and rules of conduct had had tremendous methodological implications of economics as a scientific discipline. It involves a huge debate on the questions of how realistic assumptions of human actors *can* be and of how realistic assumptions of human actors *must* be. The latter, normative question can be rather easily answered: assumptions should be as realistic as possible. The former, more positive question is a very difficult one and cannot be answered here in this context. Of course, complexity of models increases if we put in more realistic assumptions and the corresponding results may be not that workable, but that does not imply to rely on *absurd* assumptions, just because results *seem* nice. Hayek (1967, p. 44) has not anticipated these methodological consequences of Friedman's and Savage's argument, he just mentions the example of the billiard player.

(A being endowed with intellectual powers of a higher order would probably describe this by saying that the billiard player acted as if he could think.) Hayek (1967, p. 44)

This short note indicates the circular and therefore sideshow character of the whole example – there is too much conjunctive mood in it. Then in a footnote he explains the real core of the problem, which just deals with explicitness. Hayek calls two statements in German, we translate

them into English⁶³. First, 'I know how to play tennis.' Second, 'I can play [*am capable of playing*] tennis.' The first character knows the rules of the game and probably learned something about the technique literally, but possibly cannot even hit a ball. The second one just knows how to play; she is capable of hitting the ball and playing the game. This example also involves the difference of *codified* and *tacit* knowledge, which we already discussed a bit in chapter one. Now, getting back to Friedman and Savage (1948), it is simply not sufficient enough to model economic agents *as if* they follow a certain formula. Human actions and rules of conduct will always be shaped by some implicitness which transcends the postulate of *as if*. Therefore, for the scientist, it is always necessary to reconsider her assumptions about reality, instead of just focusing on aggregate results and the elegance of the used formal apparatus. For these concerns Hayek also speaks about the sense of something, language or justice for example. People have some sense or instinct to follow a rule, which we will never be capable of stating it explicitly. The next step forward in the argument therefore has to be the individual perception of rules. Hayek brings in the notion of perception, because he wants to explain that even if they cannot be stated explicitly, rules can still be learned and transmitted. This kind of learning or transmission necessitates perception or identification of a rule and brings in the social or cultural character of rules of conduct, i.e. imitation. The most crucial aspect of imitation may be that imitation itself represents a rule of conduct and can only be understood situated in action or practice. Therefore, imitation has to be dependent on specific situational context; that means in particular that there cannot be any blue-print of how to imitate something or someone.

Now, the real transfer process is not just any transmission of information in a kind of receiver-sender system. Hayek describes it as a mechanism where patterns, abstract orders or arrangements are transferred from one field to another. Additionally there is no need for a dedicated specific sender in this process; the receiver is rather downloading from a source she prefers without necessary conscious knowledge of the source. Hayek (1967, p. 49) calls it a '*...mechanism of sensory pattern transfer*'. Specific focus has to be made on the recognition, identification or insight of a certain abstract order or pattern which shall be imitated. Imitation is about recognizing something, integrating it and doing it then as well. This implies a difference to copying as well as the creation of an epistemology, because the imitator will build a memory of certain epistemes for the process of imitation. Additionally, as Hayek

⁶³ He uses German for the difference of '*können*' and '*wissen*', because in English you have to paraphrase them.

explains, imitating does mean that there will be a lot of different sensations involved. He notes that these different sensations allow a common complex imitation, because they are mostly synchronised over time and space. Relevant sensations for an imitation process – transferring a *Gestalt* phenomenon – are of course visual, tactile, kinaesthetic and auditory ones. We have to exclude smell and taste sensations, because they are of a different phenomenal category, i.e. they cannot be part of the same phenomenal situation. Hence only visual and tactile sensations may foster imitation. Auditory senses can only be in the same timing, but not in same space. This list of possible sensations for imitation may also establish or shape the ground for so-called collective intentionality, as propagated by Searle (1995, 2005). We may assume that not only our own different sensations sometimes may be *on-beat*, but also the sensations of different people may be *on-beat* for some time. Of course such improvable but still possible circumstances or conditions would make it easier to imitate others or learn from others. Timing and locating makes the culture. Hayek then explains that the human brain or the neural apparatus of different people has to have common features, in order to be capable of even forming same or similar abstract patterns. *'It is the classification of the structure of relationships between these abstract attributes which constitutes the recognition of the patterns as the same or different.'* Hayek (1967, p. 50). He was concerned with these issues for a long time, especially with the distinct generation of patterns through behaviour, perception, sensation and nerves in his book on *The Sensory Order* Hayek (1952), which we already discussed a bit in chapter one regarding the issue of self-referentiality and knowledge. Konrad Lorenz was a dedicated observer of different behavioural patterns, especially in case of geese. He also tried to connect these findings with epistemological questions. It seems that imitation strictly depends on a probably even composition of behavioural and perception patterns. Hayek insists that the behavioural aspect may serve as a template for higher order pattern recognition: *'What at first may have originated with an innate and fairly specific movement pattern may thus become a learnt and abstract mould for classifying perceived events.'* Hayek (1967, p. 51). This short note shows again the complementary character of phylogeny and ontogeny, the one necessitates the other and vice versa. It also indicates that phenomenology may crucially assist in explaining imitation processes and cultural evolution at all. Our senses do often recognise patterns or conducts which cannot be described explicitly. There are somehow concrete instances for our sensation, although they are not accessible to our brain, to articulate them or codify them for

explicit reuse. This is a matter of specificity, according to Hayek. The major problem of this issue is that we as human beings do often act guided by such specific *non-specifiable* perceptions, which are not subject to scientific explanation. Hayek (1967, p. 54) notes that these perceptions and foremost their stimuli '*... cannot be defined in 'physical' terms...*' and are therefore ignored by behaviourists; though they reflect intuitively perceptible wholes with potential for imitation and consequently cultural evolution. Additionally these perceptions may also be the most cunning ones for explaining human relations and social learning. Hence in conclusion, imitation does not depend that much on movement or behavioural patterns, they just serve some archetypical templates, but the real imitating processes come from moods, dispositions or attitudes, which are all *non-physical/non-behavioural* elements of cultural evolution; all elements sharing non-specifiable perception. Hayek (1967, p. 55) argues: '*It is from such perceptions that we derive most of the information which makes the conduct of others intelligible to us.*' Intelligibility offers a crucial point in the evaluation process of rules to imitate or not. This is a proposed unconscious cognitive evaluation, the value of intelligibility is indeed a value of practicability. Here we may compare Hayek's multitude of chains of rules, complex composition of perception and action rules, with Bourdieu's concept of habitus. This point of Hayek's analysis is actually the closest to Bourdieu's idea of habitus, which will be discussed extensively in section 3.5.

Every perception of a rule in the external events as well as every single perceived event, or any need arising out of the internal processes of the organism, thus adds to or modifies the set of rules governing the further responses to new stimuli. It is the total of such activated rules (or conditions imposed upon further action) which constitutes what is called the 'set' (disposition) of the organism at any particular moment, and the significance of newly received signals consists in the manner in which they modify this complex of rules. ... Indeed, in view of the inter-connections between the sensory and the motor elements on all levels, it becomes impossible clearly to distinguish between an ascending (sensory) and descending (motor) branch of the process; we should conceive of the whole rather as one continuous stream in which the connection between any group of stimuli and any group of responses is effected by many arcs of different length, with the longer ones not only controlling the results of the shorter ones but in turn being controlled by the ongoing processes in the higher centres through which they pass. ...what we have to deal with is a set of relations between two systems of rules. Hayek (1967, p. 57)

Hayek says that the set of rules governs further responses to stimuli. In this respect they shape and foremost constrain certain possibilities or potentials of the further so-called ontogenetic development of a certain human being. This is what habitus claims as well, it is a governing set for evolving dispositions.

Hayek (1967) moves to the hermeneutical⁶⁴, in this respect epistemological, core of the presented problem. Sensational patterns have to be regarded under the header of *Verstehen* (understanding) and the recognition process of this understanding procedure has its social epistemological meaning in *Einfühlung* (empathy). Smith (1984) dignified a whole book for extensive discussion of what sympathy can be and how it influences the most cunning pillars of society, like property, corruption, prosperity, benevolence, approbation and merit for example. This shows again the neat connection between Hayek and the 18th century moral philosophers. Nevertheless it will be sufficient enough to consider the meaning of human action in terms of intelligibility than to really understand it. For such intelligible interpretation mental structures of human beings need to have at least some partial similarities in their mental structure. We have to admit that conscious processing of phenomena and its explanation in explicit statements does not represent the highest level of our mental capabilities. Even if sub-conscious processes are at lower levels in a psychological classification, they may deal with the most important mental functions at all, like pattern recognition for instance. The imitative process of rules of conduct among human beings represents an interwoven system of pattern recognition on several layers.

Hayek (1967, p. 62) on Kurt Gödel:

To those familiar with the celebrated theorem due to Kurt Gödel it will probably be obvious that these conclusions are closely related to those Gödel has shown to prevail in formalized arithmetical systems. It would thus appear that Gödel's theorem is but a special case of a more general principle applying to all conscious and particularly all rational processes, namely the principle that among their determinants there must always be some rules which cannot be stated or even be conscious. At least all we can talk about and probably all we can consciously think about presupposes the existence of a framework which determines its meaning, i.e., a system of rules which operate us but which we can neither state nor form an image of and which we can merely evoke in others in so far as they already possess them. Hayek (1967, p. 62)

⁶⁴ For a discussion on *Hermeneutic Economics* compare for instance Perrin (2005). Traditional *Austrian Economics* was always considered in a methodological dualism perspective, where the human subject rules out anything else. Now especially Hayek and foremost Popper showed that it is possible to overcome this dualism by means of evolutionary epistemology and psychology, on a more practical level of science. Vanberg (2004) showed that Hayek transcended the problem at hands; he introduced a naturalistic approach to subjectivism, which is able to treat the economy as an evolutionary system with certain history. Hence deductive and inductive methods gain equal importance in such a picture, as we also discussed in the section on naturalism in chapter one. There we tried to involve this idea in a dialectics along the lines of Bhaskar (1989), who was originally at home in the more realist camp.

Systems of rules of conduct and social orders

In this special respect Hayek (1967, p. 66ff.) distinguishes between systems of rules of conduct, which govern the behaviour of the members of a group and the social order resulting from the group as a whole. We may immediately follow that this may be regarded as a proposed analytical try to overcome a methodological dualism by means of naturalism or evolutionary epistemology. An important aspect is that a system of rules of conduct does not necessarily produce or create some social order or patterns of action, so that system and order are distinct categories. It is quite interesting that Hayek mentions the second law of thermodynamics, i.e. the entropy principle, concerning the issue of regularities in the elements and systemic patterns, as Georgescu-Roegen or Kapp (discussed in the previous section) did. An intuitive assumption of Hayek is that a group is associated with disorder or chaos. Nevertheless a group of living entities will always need a specific order of actions for certain costs of energy (remember that order is quite cost-intense); which does not imply that all rules of conduct do create orders, they may also engage in chaos.

Nine notes from regarding the difference of *social order* and a *system of rules of conduct*.

1. A particular order of actions can be observed and described without knowledge of the rules of conduct of the individuals which bring it about: and it is at least conceivable that the same overall order of actions may be produced by different sets of rules of individual conduct.
2. The same set of rules of individual conduct may in some circumstances bring about a certain order of actions, but not do so in different external circumstances.
3. It is the resulting overall order of actions but not the regularity of the actions of the separate individuals as such which is important for the preservation of the group; and a certain kind of overall order may in the same manner contribute to the survival of the members of the group whatever the particular rules of individual conduct bring it about.
4. The evolutionary selection of different rules of individual conduct operates through the viability of the order it will produce, and any given rules of individual conduct may prove beneficial as part of one set of such rules, or in one set of external circumstances, and harmful as part of another set of rules or in another set of external circumstances.
5. Although the overall order of actions arises in appropriate circumstances as the joint product of the actions of many individuals who are governed by certain rules, the production of the overall order is of course not the conscious aim of individual action since the individual will not have any knowledge of the overall order, so that it will not be an awareness of what is needed to preserve or restore the overall order at a particular moment but an abstract rule which will guide the actions of the individual.
6. The concrete individual action will always be the joint effect of internal impulses, such as hunger, the particular external events acting upon the individual (including the actions of other members of the group), and the rules applicable to the situation thus determined. The rules upon which different individual members of a group will at any moment act may therefore be different either because the drives or external circumstances acting upon them make different rules applicable, or because different rules apply to different individuals according to age, sex, status, or some particular state in which each individual finds itself at the moment.
7. It is important always to remember that a rule of conduct will never by itself be a sufficient cause of action but that the impulse for actions of a certain kind will always come either from a particular external stimulus or from an internal drive (and usually from a combination of both), and that the rules of conduct

will always act only as a restraint on actions induced by other causes.

8. The orderliness of the system of actions will in general show itself in the fact that actions of the different individuals will be so co-ordinated, or mutually adjusted to each other, that the result of their actions will remove the initial stimulus or make inoperative the drive which has been the cause of activity.
9. The difference between the orderliness of the whole and the regularity of the actions of any of its individual parts is also shown by the fact that a whole may be orderly without the action of any particular individual element showing any regularity. This might be the case, for instance, if the order of the whole were brought about by an authority commanding all particular actions and choosing the individuals who have to perform any one action at a given moment at random, say by drawing lots. There might in such a group well exist a recognizable order in the sense that certain roles were always filled by somebody; but no rules guiding the actions of any one individual (other than perhaps the commanding authority) could be formulated. The actions taken there by any one individual would not be derived by means of a rule from any of its properties or any of the circumstances acting on it (other than the commands of the organizer). Hayek (1967, p. 68-69)

Social order differs from the set of rules of conduct in consideration of its emergence. Orderliness arises from within a group of people and cannot be causally reconstructed from the individual rules of conduct. As such the order is relevant for the preservation of the group and not the specific individual regularities. Emerging orders do somehow regulate the further evolution of the set of rules of conduct; they can operate on selection, mutation as well as variation. This property can be regarded as a feedback mechanism from social orders back to individual rules of conduct. Then we have to add that Hayek's cultural evolution, via group selection, stands on the shoulders of individual conducts, but operates on a social emerging layer. This kind of dynamics can be understood at best along social simulation, especially via agent-based modelling. In an agent-based model artificial societies evolve according to the notes above. Agents have individual rules of thumb, but the emerging social/artificial order sets the agenda for overall development; i.e. endogenous change. Hayek (1967, p. 69) also adds that the most visible and also simplest examples for development via an established overall order are *spatial patterns* of living groups, like *swarms*. He mentions the arrow formation of migrating wild geese or a defensive ring of a buffalo herd. Swarms do reflect specific social orders, where individual entities just have to follow a few rules, like for instance parallel movement, and greater patterns emerge. Research of swarm behaviour also led to great developments in movies with graphical computer simulation, with a feedback to zoological research areas as well. A good example for a more abstract social order, still among animals, is the division of labour in insect states, as mentioned by Hayek. Socio-biology made a good effort in understanding and explaining the nature of such systems. Nevertheless swarms, as well as insect states, lack certain capabilities, in order to compare them with institutions. Institutions have two great advantages in favour of these low level

complexities. First, they are able to store knowledge over generations of people in an intuitively, accessible way. Second, they are able to endogenously transform this knowledge in a cumulative process. This specific tacit knowledge needs a much higher degree of abstractness and complexity among a group.

The individual may have no idea what this overall order is that results from his observing such rules as those concerning kinship and intermarriage, or the succession to poverty, or which function this overall order serves. Yet all the individuals of the species which exist will behave in that manner because groups of individuals which have thus behaved have displaced those which did not do so. Hayek (1967, p. 70)

The dominant advantage of group selection in comparison to individual selection rests in the flexibility of a group to change itself as a whole in response to certain environmental changes. Without such a capability, individuals would be lost; if not the steady structure itself would lead the way for change. Even changes in the individual rules of conduct will not automatically lead to changes in the whole, because the whole is an emergent social property, where evolution operates. Hayek shows that social theory has to deal intrinsically with emergent patterns and properties – as well as their structuration potential and the cumulative change of them – as overall orders. Although we may never perfectly reconstruct the emergence of an order in analytic terms out of individual rules of conduct, it is our task to decompose and analyse this process as good as it gets in socioeconomic theory. But the most important thing, announced by Hayek, is that we as economists, on the one hand should not get trapped in misleading discussions about the degree of human rationality, and on the other hand that it is rather misleading to observe conducts without taking care about their collaborative outcomes in social groups; this is what he ascribes to behaviourists. If we consider these properties of social phenomena as serious and valuable, the next step towards useful legislation and policy is not far away. There are possible modern governmentalities around, mostly indicated as social market economies, where maybe even Hayek would have agreed. It is exactly this co-evolutionary process of the *regularity* ‘...between the conduct of the elements and the regularity of the resulting structure.’ Hayek (1967, p. 77), but as well the co-evolution of the *singularity* between the conduct of the elements and the singularity of the resulting structure, what makes complex phenomena that exciting. ‘Norms are thus an adaptation to a factual regularity on which we depend but which we know only partially and on which we can count only if we observe these norms.’ Hayek (1967, p. 80). The comparison with norms as adaptations to factual regularities, which can only be factual if we rely on a

critical realism/naturalism, is rather interesting. It implies, as Hayek adds, that people have to observe them firstly, in order to adapt to them, hence norms are activating people to do something; they are social enforcers. Processes of group selection are neatly connected to this enforcing mechanism of norms. Group selection is related to acceptance, sanctions and punishment. Norms give orientation for this process; they are cultural as well as ethical markers. In the long-run these norms, also understood as moral activators, shape the formation of institutions. Sanctions, disciplinary methods or dispositives of power as Foucault⁶⁵ called them, are also shaping governmentalities and yes, governmentalities are institutions, evolved cumulatively over hundreds of years.⁶⁶

The factual belief that such and such is the only way in which a certain result can be brought about, and the normative belief that this is the only way in which it ought to be pursued, are thus closely associated. ... The world is fairly predictable only so long as one adheres to the established procedures, but it becomes frightening when one deviates from them. ... the ‘Thou shalt not’ kind of rule may after all not be so evry different from the rules giving us information about what is. [Hayek adds in a footnote]: The possibility contemplated here is not that all normative rules can be interpreted as descriptive or explanatory rules, but that the latter may be meaningful only within a framework of a system of normative rules. Hayek (1967, p. 80-81)

This attempt shows at last that Hayek was never a deputy of *laissez-faire*, but he always warned to install normative settings or laws from above without any connection to or any entanglement in culturally transmitted *lived* rules and norms. Hayek’s views on cultural evolution are not very pronounced or developed at all, but he made a major step forward in promoting cultural evolution by saying what it is not and by indicating the major features. Hayek (1967) made a huge attack on constructivism which appraises in reasonable thought and human design. On the contrary Hayek ascribes greater potential to imitation and human action. These are for him the greatest achievements of our long instinctual development, of our genetic heritage. What may result from imitation? It is social learning which gives potential to something *between instinct and reason* and that is the *extended order*.

That is, I am chiefly concerned with cultural and moral evolution, evolution of the extended order, which is, on the one hand (as we have just seen), beyond instinct and often opposed to it, and which is, on the other hand (as we shall see later), incapable of being created or designed. ... Learning how to behave is more the *source* than the *result* of insight, reason, and understanding. ... It is not our intellect that created our morals; rather, human interactions governed by our morals make possible the growth of reason and those capabilities associated with it. Man became intelligent because there was *tradition* – that which lies between instinct and

⁶⁵ Foucault has shown in several texts that the concept of *power* transformed in the 17th and 18th century with the rise of classical liberalism. Power evolved from authoritative central disciplinary power to disciplinary, endogenous methods in society. The modern phenomenon of neighbourhood watch can also be regarded as a part of such disciplinary methods, as well as the evolution of altruistic punishment, social norms and contingent cooperation.

⁶⁶ Compare Foucault’s (1978, p. 49ff) analysis of the evolution of liberal governmentality.

reason – for him to learn. Hayek (1988, p. 21)

Hence, it is *custom and tradition* which stands *between instinct and reason*. These customs and traditions shape as well the difference between cultural and Darwinian evolution. Darwinian evolution works along identifiable real objects, so-called genes, even if scientists do not know yet exactly if solo genes transmit or networks of genes and cells; i.e. *epigenesis*. Our cultural evolution continued genetic evolution, as also Karl Popper emphasised, but their mechanisms are somehow different, though similar.

To refer to terms now used in biological discussion, cultural evolution *simulates* Lamarckism (Popper, 1972). *Moreover*, cultural evolution is brought about through transmission of habits and information not merely from the individual's physical parents, but from an indefinite number of 'ancestors'. The processes furthering the transmission and spreading of cultural properties by learning also, as already noted, make cultural evolution incomparably faster than biological evolution. Finally, cultural evolution operates largely through group selection; whether group selection also operates in biological evolution remains an open question – one on which my argument does not depend (Edelman, 1987; Ghiselin, 1969: 57-9, 132-3; Hardy, 1965: 153ff, 206; Mayr, 1970: 114; Medawar, 1983: 134-5; Ruse, 1982: 190-5, 206-6, 235-6).⁶⁷ Hayek (1988, p. 25)

In this respect we have to add that mere historicist interpretations of cultural evolution are not sufficient to explain the long-run development and the complex diversity of institutional structures. Historicist interpretations mostly lack in explaining evolution as ontogenetic *and* phylogenetic. Historicism tends to describe the evolution of economic culture via ontogenetic arguments.

FROM GROUP SELECTION TO NESTED BANKING

Hayek's cultural evolution builds massively upon the idea of group selection. He has often repeated, that it is not quite clear whether group selection may work in a genetic context or not, as works of Gould or Ghiselin indicate. Otherwise he has also emphasised that we do not have to care about this issue too much, since group selection may be the only explanation for cultural transmission of information and in a wider aspect, of knowledge transmission. In this respect it is possible that selection, variation and retention work on cultural fields, but in a non-memetic, non-atomistic way; which would represent an individual counterpart to the genetic selection argument. Hayek's work on group selection was not that well established

⁶⁷ The issue on possible group selection even in biological phylogeny was also tried to elaborate in chapter 2.4., in the part on critical naturalism.

and it clearly has a lot of gaps still to fill. Nevertheless there are several authors also favouring the concept of group selection. Some may try to fulfil Hayek's legacy and some others may have taken a completely different path. The following section concludes the discussion on Hayek along group selection, liberalism and banking. At a first glance these topics may have nothing in common, but they all represent a great piece of Hayek's work.

We will see that the linkages are more solid than one would expect. Group selection reveals Hayek's naturalistic interpretation of how liberalism works – liberalism clears the way for his opinion and outlook for international law and legislation, for Hayek there is only one law, i.e. the *law of liberty* – this rather denationalised concept of law may favour the idea of global governance, even or especially in the context of banking finally. This conclusion may then feed back to the opening sub-section on Hayek, Keynes and money.

Buzzing around group selection

Fracchia and Lewontin (1999) make reference to the mine field between *culture, evolution and history* and describe it as a hundred year long struggle among cultural anthropologists talking about an *evolving* culture.

That struggle has, in part, been a philosophical consequence of a diversity in the understanding of what distinguishes an evolutionary from a 'merely' historical process. In greater part, however, it can only be understood as a confrontation between the drive to scientize the study of culture and the political consequences that seemed to flow from an evolutionary understanding of cultural history. Fracchia and Lewontin (1994)

It is difficult to separate evolution from history, but only at the first glance. Where may we find differences, nuances between history and evolution? The idea to breathe life into these two terms starts with a comparison of *genetic, generative and generic*.⁶⁸ Evolution has all three of these characteristics in common. Generic presupposes genetic and generative. History does not have any elements that mutate or change in a continuous way; all elements in history are fixed, discrete and eternal events. The term genetic is always connected to elements in change, like genes or whole individuals. Generative otherwise indicates a mechanism producing or destroying something. In phylogeny there is sex between two living entities producing a fertilized ovum with a specific inherited genetic code. Then in ontogeny we may consider the growth of an individual as generative, as well as its decay. When we combine

⁶⁸ Fracchia and Lewontin (1999, p. 57): '*It might be asserted that for theories to qualify as evolutionary they must consist of more than mere constraints and prohibitions; rather they must be characterized by generative laws or mechanisms whose operations produce the actual histories.*'

genetic and generative we may get a template for change; i.e. generic. History does not have such a template of change. Cultural anthropologists and institutionalists have shown that culture shares such templates, that it implies generic change. It generates new forms of living, producing, destroying and consuming in dependence of elements of change, which are traits, customs, norms or institutions. Of course, these elements are not explicitly identifiable, but they are influencing our lives every day. Even in biological evolution we will never locate them exactly, as we have shown in section 2.4. Hence it is assumed here that culture does evolve. Fracchia and Lewontin (1999, p. 57) argue: '*Human culture has had a history, but to say that culture is a consequence of a historical process is not the same as saying that it evolves.*' The two authors explain that a theory of cultural evolution has to insist on a transformational approach of change. They argue that there are two possible approaches to evolutionary change, i.e. transformational and variational. Nevertheless the authors unfortunately miss that evolution on the whole stands in between; even on the biological side scientists are not quite sure whether all change is just variational, without any direction. Of course we have to claim some compromise, where developmental ideas like path-dependence and unfolding are involved as well as random variation. This compromise should influence developments in the cultural sphere as well. We have seen in 2.4. that mere variational claims like the Neo-Darwinian synthesis, sociobiology or Universal Darwinism are not capable at all to explain evolution. In section 2.4. we assumed to understand a species, a lineage or a group as an *individual*. Fracchia and Lewontin (1999) argue against a *population* approach to culture and against the idea of society as if it was an *organism*. We want to defend the idea of society as an *individual* in this respect, instead of a population, as originally elaborated by Gould (2002). Populations are as such totally rigid objects without any differentiation. It is really dangerous to treat society or culture under such conditions, because it allows extreme generalisation of things which should not be generalized for ethical reasons. Maybe biologists can speak of populations of bacteria or viruses, but even to speak of populations of fish or buffalos is somehow reckless; they represent cultural societies as well. The next critique regards the notion of an organism. Well, an organism cannot represent a group, in this respect the authors are right. An organism is too vague, it can be anything or nothing, conscious, unconscious, self-reflecting or not, who knows. Therefore it is suggested to come back to the terminology of an individual, even for a group. An individual does have a specific consciousness, it can dream, it can play, it can fail, it can regret and so on. An individual is

also highly differentiated, comparable to society. The authors ascribe one specific property to society and culture, which is related to Marx' and Engels' thesis⁶⁹. Societies need to be dissolved from their unity sometimes, in order to understand differential processes, like power games or political conflicts on the whole. This dissolution is necessary to reveal the relatedness of classes or sub-groups within the complex. The argument builds upon this point; an individual can be dissolved as well, as various kinds of psychological traditions have shown. *Integrity* may play a crucial role in this respect. Changes within this individual and between such individuals can be explained via a group selection framework, using an intermediate way between transformational and variational approaches of evolutionary change, if and only if these individuals are not treated as irreducible atoms but rather as distinctive individuals. Hence in this respect complexity gets enormously important. Real group selection processes will not work within a population-*only* or replicator-interactor-*only* framework. Fracchia's and Lewontin's (1999) are concerned that most of the modelling work on cultural evolution heads up in a wrong direction.

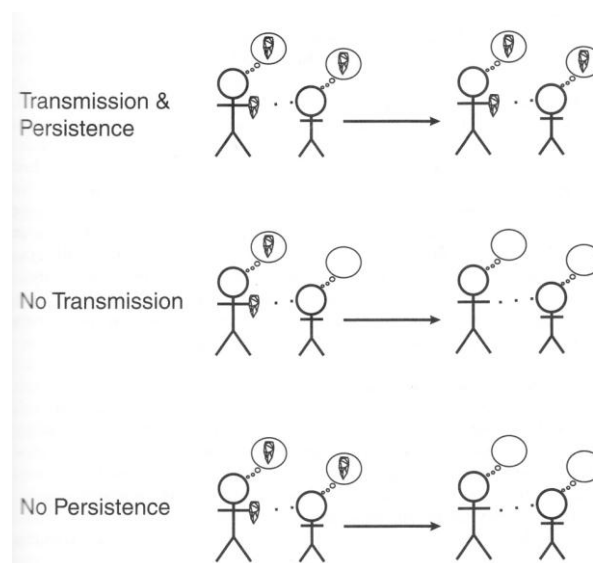
Boyd's and Richerson's (2005) work on cultural evolution presents a more detailed insight into the generic template of group selection. Their work treats two different concepts of cultural evolution in a co-existing manner, *persistence* and *transmission*. Culture is able to transmit information and mental representations to inexperienced people via imitation for example, as we have already explained. Thus such internal models do not have to persist over generations in a strict sense. They will persist only if they are used and articulated, or captured in some institutional context. Figure 3.4. provides an idea of how transmission and persistence interact and shows the specific roles of them. Individuals need to acquire information to do something or to manufacture something, which represents the transmission part of cultural evolution. Boyd and Richerson (2005, p. 56) give the example of *using a tool*. Transmitting information is done via social learning, people need to observe other in using or manufacturing a tool and store this information in their brains. We can compare this process with the third sketch in figure 3.4. Useful information about a specific tool is transmitted from an experienced individual towards an inexperienced individual, for example from mother to child. It is rather obvious that such a process needs bidirectional information transmission, so that it transcends a simple act of sending a post card. The second process involves persistence in *doing* it. Cultural variation does only occur if the mental models which are transmitted are

⁶⁹ Compare Bhaskars's (1989) notion of relatedness, discussed in 2.4.

also fulfilled in an active, practical way; in case of fabricating a tool for example or really using it in a similar way as it was conceived in the model.

Such *persistence* may fail to occur for two different reasons: individuals may forget how to make or use the tool, or they may, as a result of interacting with the environment, modify the information stored in their brains so that they make or use the tool in a significantly different way. Without both transmission and persistence, there can be no culturally transmitted variation. Boyd and Richerson (2005, p. 57)

Figure 3.4.: *Transmission and persistence in cultural evolution*



Source: Boyd and Richerson (2005, p. 57)

Indeed, cultural inheritance or transmission-persistence (however one wants to project the wording) is manifold, but at least twofold. The first sketch in figure 3.4 shows that the transmitted knowledge is actually used and a specific cultural or socioeconomic practice is reproduced and definitely not copied. It is very important to note that these two processes are not genetically determined, though they may be rooted or entangled in a biological code. Even the knowledge about imitation, observation, overall about social learning is not genetically determined; it emerges out of cultural, just in practice. A corresponding question regarding the issue of transmission of behaviour arises in context of natural selection. The authors dedicated their work to the question, to what extent does the transmission process depend on the evolution of genes, i.e. the degree of nature in cultural evolution. The authors conclude that natural selection may favour persistence, which represents a logic assumption. The

crucial thing is to identify traits, conducts or behaviours which cannot be acquired by mere individual learning or where individual learning is too costly. This emphasis was made clear very well by Hayek, the rules of conduct imply such models which cannot be learned individually. Consider a person who is willing to learn everything on her own, equipped with a hypothetical ultra-egoism. The point is, also elaborated by Boyd and Richerson (2005)⁷⁰, that such totally egoistic behaviour would not converge in an evolutionary stable strategy, because the person's capacities, skills and conducts would be worse adapted to the environment than some person counting on a social learning strategy. Otherwise a totally altruistic concept will not be evolutionary stable as well, because a changing environment would handicap the imitators. They would cease in lack of inventions and innovations, made by individual learners. Assuming that appropriate adaptation implies an evolutionary advantage, then it is crucial whether and how often the environment changes. *'Learning entails an evolutionary trade-off.'* Boyd and Richerson (2005, p. 19). Obviously a frequently changing environment promotes learners instead of imitators who start with first guesses and adapt their behaviour on their own. In such a case imitators get a disadvantage because they initially fail in the new environment. Learners will only prevail if they find imitators maintaining their individual improvements; otherwise they need to start from scratch each period, which implies very high costs. The whole issue carries a huge trade-off and needs a mixed evolutionary strategy. Another comment from the authors expresses the problem quite neat:

Capacities that increase the chance that individuals will learn behaviours that they could learn on their own will be favoured as long as they are relatively cheap. On the other hand, even though the benefits of cumulative cultural evolution are potentially substantial, selection cannot favour a capacity for observational learning when rare. Thus, unless observational learning substantially reduces the cost of individual learning, it will not increase because there is an 'adaptive valley' that must be crossed before benefits of cumulative cultural change are realized. ... A theory of mind may have initially evolved to allow individuals to better predict the behaviour of other members of their social group. Boyd and Richerson (2005, p. 61)

Such a capacity, or *theory of mind*, builds the main difference between human and animal cultures and substantially weakens the position of sociobiology. The clue is that such an evolved theory of mind implies something like *shared imagination* or common internal sub-models working as a common social or cultural rhythm. The next step is to think about who we imitate, observe and learn from by doing. This agenda sets group selection on top of the

⁷⁰ *'The average fitness of a population at the evolutionary equilibrium is greater than the average fitness of individuals who do not imitate as long as the probability of the environment changes is less than half.'* Boyd and Richerson (2005, p. 42)

list, because in a cultural environment we are able to choose or deny transmitters of cultural heritage to a great extent on our own; despite the fact that we are not able to choose our family background.

Human populations are richly subdivided into groups marked by seemingly arbitrary symbolic traits, including distinctive styles of dress, cuisine, or dialect. Such symbolically marked groups often have distinctive moral codes and norms of behaviour, and sometimes exhibit economic specialization. Ethnic groups provide the most obvious example of such groups, but the phenomenon includes groups based on class, region, religion, gender, and profession. ... The evidence is fairly clear that the symbolic marking is not simply a by-product of a common cultural heritage. ... Moreover, since groups are typically fairly large, such processes likely produce symbolic marking as an unintended by-product of human choices made for some other reason. Boyd and Richerson (2005, p. 99)

On the one hand symbolic markers identify ourselves as in-group members and on the other hand they distinguish ourselves from out-group individuals or different groups. Such a symbolic marking procedure pulls the trigger for cultural evolution, it enables heterogeneity which can be considered as the greatest wealth of human beings. Group selection, understood as symbolic marking, involves several sub-issues, like for instance selective imitation, rapid cultural adaptation, ethnocentrism and group cooperation; which are elaborated by the authors and shall be discussed now. Boyd and Richerson (2005, p. 105) define culture as information capable of affecting individuals' behaviour, this information then includes skills, attitudes, beliefs and values. This information can be acquired from others by teaching, imitation or generally social learning mechanisms. The authors argue that some information, drawn out of this possible set, represents a cultural variant. Several evolutionary biologists, like Wright, Fisher, Haldane or contemporary scholars like John-Maynard Smith, Hamilton, Cavalli-Sforza, Feldman or even Boyd and Richerson have shown, how to use neat mathematical models – mostly building upon population dynamics like replicator models, evolutionary games, group or kin selection – for cultural inheritance. They want to stress within- and between-group conflicts on behalf of different selection keys.

Another interesting group of problems in this realm deals with coordination of such symbolic markers in correspondence to behavioural traits among groups. We treated this issue already in this chapter by looking into the emergence of conventions, hence compare the models from Young or Sugden. Boyd and Richerson (2005, p. 118ff.) together with Richard McElreath used the idea of a coordination game to model the subdividing process of cultural groups along symbolic or ethnic markers. The game in normal-form is given in table 3.4.

Table 3.4.: Evolution of markers

		Player 2's behaviour	
		1	0
Player 1's behaviour	1	$1 + \delta$	1
	0	1	$1 + \delta$

Source: Boyd and Richerson (2005, p. 119)

In the model markers work as coordinators, they allow people to interact with each other along a specific codex. The model shall meet three assumptions. First of all, interactions among people with shared beliefs are promoted with higher pay-offs than interactions among people with discordant beliefs. Second, people favour interactions with people of common culture or common observable traits. Third, people imitate successful people and behaviour with higher payoff spreads in the population. As the authors argue, these assumptions meet common empirical findings. Given two instances of traits; the behavioural trait is either 1 or 0 according to the specific strategy of the players, compare table 3.4. The marker trait is assigned randomly – again either 1 or 0 – according to e ; if $e = 1$ individuals interact at random else $e = 0$ individuals interact only with individuals carrying the same marker. Basically the model wants to explain the difficulty of migrating into a group; that it is not easy to check out the right markers at a first glance; hence people who do not know the common marker traits or symbols (inherited codex) get a disadvantage. The next part is about imitation, people who are successful get imitated; this concern is implemented in the assumption: W_{ij}/\bar{W} . Where i denotes the behaviour and j the marker trait; W is the specific payoff and \bar{W} represents the average pay-off in the group. Combinations of behaviour and marker with a higher pay-off than average get imitated. Then the authors derive an expression capable of changing the frequency of behaviour and marker in each group, along imitation and social interaction.

$$\Delta p_1 = \delta U \{ (p_1 - p_0) (1 - (1 - e)) R^2 \} \quad (1)$$

Where $R = \frac{D}{\sqrt{UV}}$ is the correlation of behaviour and marker; U and V are the variances of behaviour and marker, D is the covariance of them. If $R = 1$ then everybody in the group with behaviour 1 also has marker 1, with $R = -1$ everybody with behaviour 1 does have marker

0. In case of $R = 0$ there is random action. (1) says that if more people do 1 than 0, then the change in the fraction of group one, Δp_1 increases, otherwise it decreases. So the R^2 gives information about the correlating marker, if it is near 1 people are highly correlated with the same marker at given behaviour. Additionally if e is rather small at the same time, they almost always interact with individuals with the same behaviour and gain low advantage from common behaviour. If R^2 is near 0, most interactions occur at random and people get advantage with common behaviour. Now, frequency of marker 1, i.e. q_1 changes along equation (2):

$$\Delta q_1 \approx 2\delta D(p_1 - p_0)\left(1 - \frac{e}{2}\right) \quad (2)$$

The validity of (2) depends on the covariance of behaviour and marker, if it is small then (2) is quite valid; i.e. when the individual's marker predicts little about the behaviour. An increase in D leads to a decrease in the dependency of marker towards behaviour; originally if marker 1 is associated with behaviour 1 and if behaviour 1 increases in group, so does marker 1 as well. So this effect decreases by increasing D . The last part of the model introduces migration:

$$\Delta D = m\{\bar{D} - D + (p_1 - \bar{p}_1)(q_1 - \bar{q}_1)\} \quad (3)$$

This effect is about group mixing, m denotes the amount of individuals moving from one group to another, but consider this effect as an exchange; so people get exchanged from two groups. Mixing will reduce the differences in frequencies of behaviour and marker between neighbouring groups. Further migration increases the covariance (D) between marker and behaviour within the group. \bar{p}_1, \bar{q}_1 and \bar{D} denote the average values for the frequencies in behaviour and marker as well as in the covariance, in neighbouring groups providing immigrants. A last effect is supposed to be recombination; i.e. individuals sometimes acquire marker and behaviour traits from different individuals, leading in randomization of behaviour and marker. This parameter will be called r . The authors have run numerical simulations with this model with two interacting groups and a parameter space of e (chance of interacting at random), m (migration), δ (effects of social behaviour on individual welfare – coordination game pay-off parameter) and r (recombination rate). Counted 4 degrees of freedom obviously enable some complex dynamics. These runs have shown the following results, in brief⁷¹,

⁷¹ For a detailed discussion of the results as well as a visual presentation of simulation runs and model graphs, please have a look in the text Boyd and Richerson (2005, p. 128)

1. Stable behavioural differences between groups usually become ethnically marked.
 2. Spatial structure is needed to generate ethnic markers but not to maintain them.
 3. Increasing the number of populations increases the range of initial conditions that give rise to ethnic markers.
 4. Group differences are strongest at boundaries.
 5. A more general model of social interaction leads to similar results.’
- Boyd and Richerson (2005, p. 122ff.)

The parameters m and δ create ecological circumstances, they influence environmental conditions for people migrating or social overall conditions. By contrast the parameters e and r shape the psychological conditions of the agents. The authors argue and runs have shown, that social interactions in which common behaviours have a high pay-off are leading to the establishment or evolution of markers. This result shows that the model is quite reasonable within its assumptions. As an overall result, we may conclude that in the coordination setting, groups benefit at best, when their behaviours are honestly signalled by markers, then both markers and behaviours prevail, because of successful imitation. Migrating people need accessible and true markers to orientate, in order to imitate and select the successful ones. This kind of marking process is compared with the concept of cooperation in the works of Axtell, Epstein and Young. The authors argue, that intuitively the idea of evolution of symbolic or ethnic markers as meta-coordinating elements can give orientation for individuals how they should cooperate and moreover with whom to cooperate. In a more extended framework with markers, cooperation and punishment are able to transform the cooperation problem of a Prisoner Dilemma into a coordination structure. The benefits of such a model would be great to further advance the theory of group selection.

The next model is motivated by a crucial question: What in human history forced large-scale cooperation? In our early cultures, we lived in small kin-based societies, then at some point in time we have developed higher forms of culture, grounded on large-scale cooperation, leaving the horizon of a mere family network. Therefore Boyd and Richerson (2005, p. 134ff.) and their co-authors wanted to show how cultural group selection and contingent cooperation, i.e. reciprocity, work together, that they are evolutionary stable in large-scale groups. Unfortunately a major problem occurs. In a repeated game, such as an iterated Prisoner Dilemma, any pattern of behaviour can be sustained by mutual self-interest. Game theorists called this the *folk theorem*. If you repeat a specific strategy that long in a game, it will sustain, hence cooperation and reciprocity are not able to explain the puzzle of large-scale cooperation among non-relatives in human societies, which represents a systemic

social psychological advantage towards other species. Nevertheless, simulations in various labs have shown that reciprocity is a very likely evolutionary outcome, as also Axelrod and Hamilton (1981) have shown. It is rather simple, reciprocators like to interact with other reciprocators, than with defectors. As several real-life examples show, contingent cooperation, as in a sports team or in a committee, works. The main question remains: Is it evolutionary stable even in larger groups? For this reason research focused on n -person Prisoner Dilemma, instead of pairwise sequential gaming, like in Axelrod and Hamilton (1981). The grand difference in a n -person Prisoner Dilemma is that all n agents choose simultaneously either to cooperate or to defect. Otherwise in an agent-based simulation for example, all n agents do also act simultaneously, but they are only affected by their specific *neighbourhood*. Hence the n -person simultaneous game builds upon a global decision approach of all agents in the population, is therefore a *global (macro) population* investigation. The agent-based simulation investigates more the global (macro) emergent properties evolving out of *local (micro) neighbouring* gaming, but both still observing global effects in the end. However, experiments have shown that in the n -person game contingent cooperation is not stable in large groups, because reciprocity becomes a less likely evolutionary outcome. The reciprocity effect *inflates*, it can only overcome this inflation if defection is not tolerated via punishment. The authors argue that with growing groups defectors prosper geometrically, hence in order to explain the puzzle of large-scale cooperation in human societies we need punishment, because defectors cannot be selectively excluded in any other way from gains of free-riding. Somebody needs to play the police; Trivers (1971) introduced the idea of *moralistic punishment*. In a second-order game a cooperator punishes a defector. Of course the cooperator has costs for punishing, but the whole group benefits, because defectors are induced to change behaviour to cooperation. Why should selection favour moralistic punishment? In such a game there are two strategies, either moralistic punishers (cooperate and punish defectors) or reluctant cooperators (defect until they are punished). The essence of punishment or sanctioning is that it can stabilize any kind of behaviour, if there are enough punishers left. Now remember the folk theorem, in the end it is not about a specific strategy, like mere cooperation, defection, *tit-for-tat* or *Pavlov*, no, it is about how to sustainably enforce such a strategy within and between groups, in the long-run. This insight is also consistent with the evolution of symbolic markers, they are the enforcers of real-acting behavioural traits.

Otherwise history has shown that human beings are usually not that moralistic, in order to punish defectors. It is more common that people ignore defecting as *second-order free-riders*. A second-order free-rider is an agent relying on somebody else to punish the first-order free-riders (defectors), so that the whole group can still evolve to cooperation. Hence, individual selection does not have any good reason to promote moralistic punishment as a likely evolutionary strategy. It will be too tempting to cooperate without punishing anybody; nobody wants to make his hands dirty. Boyd and Richerson (2005, p. 241ff) have shown that group selection can stabilize moralistic punishment by stemming out second-order free-riders. In their model group selection occurs via inter-group conflict, so groups may extinct as well. The model proceeds in a two-stage game, where at the first stage agents either cooperate or not and in the second stage cooperators punish defectors or not. A further part of the model includes migration and imitation in a similar manner as we discussed in the previous model. During an *interwar* period between pairwise groups, groups can be conquered by each other; which is modelled as a replacement. The higher the rate of defectors in a group, the more likely a group gets conquered and defeated, this enables moralistic punishment to get stable.⁷² Results (on an overall perspective) have shown that on the one hand group selection can maintain moralistic/altruistic punishment and on the other hand this punishment can assure altruistic cooperation in large-scale groups in the long-run.

It is important to see that punishment leads to increased cooperation only to the extent that the costs associated with being a punisher decline as defectors become rare. ... Group selection is more effective in this model than in standard models for two reasons: first, in groups in which defectors are rare, punishers suffer only a small payoff disadvantage compared with contributors, and, as a result, variation in the frequency of punishers is eroded slowly. Second, payoff-biased imitation maintains variation among groups in the frequency of cooperation, because in groups in which punishers are common, defectors achieve a low payoff and are unlikely to be imitated. Boyd and Richerson (2005, p. 246-247)

We can follow that long-run evolutionary outcomes somehow look like equilibrium selection problems in game theory and that selection between groups generates group-beneficial outcomes. Intergroup competition always works on a population structure where multiple equilibria are quite common. The authors have additionally shown that such intergroup competition in populations leads to evolution of group-beneficial traits on 500-1000 year scales, compare (Boyd and Richerson, p. 204ff). Overall the authors note that *'These models show that the evolution of cooperative norms is a side effect of rapid, cumulative cultural*

⁷² Please compare Boyd and Richerson (2005, p. 241) for more details on the model as well as exemplary simulation runs and graphs of the evolution of the group selecting process with in-group moralistic punishment.

adaptation.' and that '*...group selection is a much more important force in human cultural evolution than it is in genetic evolution.*' Boyd and Richerson (2005, p. 143)

In order to bridge the point to liberalism again, we may connect these insights with the work of Bowles and Gintis (2005), where they discussed the role of group selection with in-group moralistic punishment on social capital and community governance. This notion brings us back again to an appropriate idea or governmentality of liberalism. In Bowles and Gintis (2005, p. 379), the authors claim that good governance also needs essential moral sentiments in society to build upon. These sentiments include on the one hand social capital understood as trust and incorporated in a concern for associates and on the other hand '*...a willingness to live by the norms of one's community and to punish those who do not.*' Hence the focus of what governance needs and what determines society has shifted from the concept of homo oeconomicus to an institutional context – the rules of the game. Generally, the idea of social capital implies solidarity in group-like social structures, like communities or institutions. Hence social capital is still considered as an endogenous or emergent governance property of groups. The interesting point of social capital, in the setting of political economy, is that both advocates, left-wing and right-wing, favour this concept, because it can either help out in market as well as in state failures. For this reason Bowles and Gintis (2005) bring in the idea of community governance, as a self-organising, governing characteristic of communities, which is able to help out when market or states fail to coordinate, allocate and distribute resources and income. Nevertheless we have to consider the upcoming question about the power of such community governance in different scales and sizes of groups. Social capital is also culturally transmitted, hence in different regions the economic and political potential of it to cover market and/or state failures from bottom-up will diverge tremendously, this is also what Putnam (1993) and (2000) extensively discussed. Discussions of this kind initialized political movement between a fully planned economy and a laissez-faire economy. Bowles and Gintis (2005, p. 381): '*All recognized the bankruptcy of the ideologically charged planning-versus-markets debate.*' The authors raise a critical point regarding the popularity of social capital. They conclude that *capital* is something people own, but social capital cannot be owned, it can just emerge out of ongoing interactions. This is why they fostered the aspect of *community* instead of social capital regarding the issue of governance, because it reflects what people do and where they do it, rather than what they are and own. Concerning this debate we may have to consider multiple outcomes. Bourdieu (1989) would argue that people

gain something from ongoing repeated interactions, which may create networks or something similar; these gains can then be associated with a single person in form of social capital. It may be useful for now to conclude that the emergent gains from mutual cooperation in groups shall be treated as community governance in light of a social policy debate, whereas they shall be treated as social capital in a socio-psychological or –philosophical context. The former considers the emergent property as a group-only (untouchable for single individuals) thing and the latter may also associate it with a capital terminology (touchable for single individuals). In Bowles's and Gintis' (2005) framework communities play the third role in policy triangle of markets, states and communities, which is also defended by Ostrom (2005b). Further the authors argue that community governance cannot rely on the self-interested model of homo oeconomicus, instead they propose.

Rather, it is predicated on *strong reciprocity*, which is a predisposition to cooperate in a collective enterprise, and a predisposition to punish those who violate cooperative norms, both of which are individually costly but conducive to strong social capital. Bowles and Gintis (2005, p. 382)

In short they want to show that community governance addresses market and state failures; that well-designed institutions make markets, states, communities mutual reinforcing and that poorly designed institutions may induce the opposite – by crowding out community governance (this insight is provided by Ostrom (2005b)); property rights heavily influence the evolution of community governance; importance of community governance will increase when their treated economic problems get impact on larger scales – exceeding their small-scale environment. Most examples of community governance show that people create a solitary community in order to solve a common-good problem, where all members get out with a Win-Win situation. Examples have also shown that the size of the group is very critical for a well-working environment. If a community gets too big their governance potential may also get corrupt in face of state authorities.⁷³ Additional common gains emerge from social learning. The elders of the communities mostly transmit their knowledge of a specific problem to the younger part of the community. The point is that this observational or social learning mechanism is much cheaper than individual learning and the community benefits on the whole in conserving their cultural heritage. This conservation also gives comparative advantage towards other communities and possible trade options.

⁷³ Consider the emergence of organizational criminality (mafia) as a possible development of community governance. In such a case either the size was too big for a community or legal matters were violated by third party.

Communities thus make an important contribution to governance where market contracts and government fiat fail because the necessary information to design and enforce beneficial exchanges and directives cannot effectively be used by judges, government officials, and other outsiders. Bowles and Gintis (2005, p.384)

This quite brief observation of the potential benefits from community governance for governance at all, shows a very crucial point. The members of communities are knowledge insiders and they all share a kind of tacit knowledge which is simply inaccessible for outsiders. The information problem is the most natural problem inducing market and state failures. This implies a mostly underestimated advantage of communities, also covering norm formation and norm maintenance. A community's norms shape its individual framework of cultural transmission, this is mostly the community's biggest secret; it can be compared with a code which has to be deciphered. Conclusively communities are able to sustain norms and moreover they play an important role in comparative institutional analysis. Within modern global economic and political problem it is more important than ever to consider mixed policy solutions. Markets, states and communities are at home in different domains and are capable of solving political dilemma with different initial conditions. This is the task for institutional economics, to assign and identify the right problems for the right institutions, which also involves appropriate knowledge of the diverse heuristic devices which explain their emergence and development.

A community can only sustain along effective monitoring and punishment, it needs moralistic interventions to protect the benefit of the whole against individual incentives. These moralistic enforcers may also create decisive problems of communities, regarding the issue of insider-outsider distinction. If a community gets rather powerful or wealthy, it will try to sharpen the borders for *immigrants*. Outsiders may get exploited; hence the problem of communities rests endemic. Such failures have to be covered by either the state or the market consequently. Community governance evolves from bottom-up along group-selection processes, so there can never be a perfect template for its governance structure. Therefore the possible spectrum of rules, norms and organisation patterns enforcing and enhancing the working of a community is very broad. But we may definitely add that mutual cooperation, monitoring and punishment are fruitful moral ingredients. Future development of community governance will get more and more important in modern information economies, but as the authors finally conclude their preservation heavily depends on fair, socially justified policies shaping equal income distributions:

If we are right that communities work well relatively to markets and states where the tasks are qualitative and hard to capture in explicit contracts, and where the conflicts of interest among the members are limited, it seems likely that extremely unequal societies will be competitively disadvantaged in the future because their structures of privilege and material reward limit the capacity of community governance to facilitate the qualitative interactions that underpin the modern economy. Bowles and Gintis (2005, p.395)

A short note on liberalism

We face two different kinds of liberalism, the one proposed by Hayek in tradition of the Scottish moral philosophers, like Hume, Ferguson or Smith. The second one in a French tradition, majorly founded by Voltaire, Rousseau and Condorcet; then overtaken by the English utilitarianism, like Bentham for instance. Where the latter is founded on a *rational, constructivist* perspective of the world, the former builds upon a *naturalistic, evolutionary* framework. This is what Hayek wanted to show – the philosophical foundations of liberalism are of different nature. Now, for our modern economic concerns it may be useful to develop an approach lying between them, in this thesis it is proposed that the specific governmentality of *ordoliberalism* can play such a respective role. Ordoliberalism may also benefit from community governance on the small-scale level; as an endogenous solitary property. Vanberg (1994) explains Hayek's legacy once again and tries to discover his dialectic treatment of liberalism. In his conclusion he adds the notion of *Ordnungspolitik* or *ordoliberalism* as a possible solution for Hayek's liberal dilemma. We will briefly reflect Vanberg's (1994) findings, in order to conclude the liberalism topic with an outlook for a solitary governmentality of ordoliberalism, building on a triangle of the market, the state and the community – compared with Foucault's (1978) investigations about German ordoliberalism versus Anglo-American neoliberalism.

Vanberg (1994) argues that Hayek's conception of liberalism hints in two counteracted directions and moreover that these different positions form some necessary dialectics for the establishment of liberal order, which is also consistent with his overall work. The author calls these two positions *rational liberalism* and *evolutionary agnosticism*. The former position deals with Hayek's rational arguments for the establishment of a liberal order, mostly considered in his earlier writings and in *Law, Legislation and Liberty*. The latter position focuses on Hayek's argument that we should favour cultural evolutionary processes in comparison to deliberate institutional design. The rational or positivist theoretical part can be considered as a work on the *science of legislation*. We noted in the beginning of the chapter on Hayek, that he was far-away from the idea of laissez-faire liberalism and always insisted in

a positive way that there has to be a ‘...*framework of legal rules and institutions that allow a liberal order to flourish.*’ Vanberg (1994, p.2). In this respect Hayek also referred to such a framework in two possible ways, where the first one *represents the construction of a rational system of law, under the rule of which people are free to follow their own preferences and a systemic framework of specific orders and prohibition.* The latter clearly describes a social planned order and the former a framework for a liberal order. Vanberg (1994) also repeats an important phrase from Hayek’s article on *Free Enterprise and Competitive Order* (1947).

...suggests there that it is more adequate to interpret ‘the fundamental principle of liberalism’ not as an absence of state activity, but ‘as a policy which deliberately adopts competition, the market, and prices as its ordering principle and uses the legal framework enforced by the state in order to make competition as effective and beneficial as possible.’ Vanberg (1994, p. 3)

Hayek never clearly explained how the positive effort of formalizing a liberal legislation should look like, though, as also Vanberg argues, it perfectly fits with the *ordoliberal* approach of Walter v. Eucken or Franz Boehm of the Freiburg school. All of them, including Hayek, can be regarded as *constitutional* and *order*⁷⁴ economists. Concerning Hayek’s discourse on cultural evolution Vanberg (1994, p. 4f) states that it is necessary to distinguish between his *factual* and his *normative* claims.

Namely, on the one hand, the factual claim that cultural evolution will tend to select in favour of institutions with certain predictable properties, and, on the other hand, the normative claim that institutions with these kinds of characteristics are beneficial. More briefly, in order to have the noted implications, Hayek’s evolutionary argument would have to have empirical and normative content. It would need to have empirical content in the sense that it tells us what kinds of rules and institutions can be expected to prevail in evolutionary competition. And it would need to have normative content in the sense that it would tell us why the kinds of rules and institutions that tend to survive in evolutionary competition are desirable. We therefore need to examine the question what empirical and what normative content Hayek’s theory can be said to actually possess. Vanberg (1994, p. 4)

He argues that evolutionary outcomes will always be successful ones and that knowledge about the rules will not tell us anything about the normative content of successful institutions. Nonetheless these rules shape or constrain the evolutionary process. In terms of political economy we are able to rationally design them; hence we are able to build the legal framework, where liberal action and possible prospective institutions may flourish. Although he criticizes Hayekian arguments like ‘*guided not by reason but by success*’ as tautologies, he also emphasises that such phrases may only guide as *conditional conjectures*. In short, Hayek mostly concentrated on evolution as such, how it works in culture, and not on the constraints

⁷⁴ In German: ‘*Ordnungsökonomie*’

that are shaping it. Hayek's normative criterion relies on individual benefits, also in face of his group selection argument; there the benefit of the whole group, by selecting a specific trait, is for the benefit of every individual. Hence Vanberg (1994) argues that the desirability for individualistic constituents makes the rules and institutions beneficial. Rule-guided individual actions or conducts mutually create beneficial social orders in an emergent way, which are only beneficial on the social level, because the individual aims followed. Cultural evolution favours institutions desirable to the persons involved. This conditional claim tells us again the advantage of competition as a discovery process, where the greatest discovery always includes new problem-solving knowledge. The discovery process still needs a strict legal framework, in order to protect civil rights and property against corruption and criminality. This discovery process, also looking for better institutional settings, is best ascribed as an evolutionary dialectics, where we may never find an optimal solution; it remains an ongoing challenge.

In this sense the concept of the market process as a spontaneous, evolutionary process and the notion of deliberate institutional design are not only compatible with each other; they are necessarily linked with each other. The liberal understanding of institutional requirements for a well-working market implies that there is a role for what the German Ordo-liberals called *Ordnungspolitik*, a policy specifically aimed at providing and maintaining a suitable legal framework for the market order. The Ordo-liberals distinguished clearly between the spontaneous internal workings of the market and the question of how the institutional framework that conditions the market's operation is created and maintained. Vanberg (1994, p.7)

The task of providing such a legal framework relies on political grounds, hence economics and politics are always necessarily interwoven. Regarding Hayek's immense critique on rational constructivism or constructivist rationalism, Vanberg (1994, p. 9) adds: '*His argument against constructivist rationalism in the realm of rules and institutions is not meant as an objection against institutional design per se but against excessive claims that ignore the limits of our knowledge and reason.*' This critique involves his fear of total authoritarian redesign of specific evolved social orders. So, in conclusion we have to regard his work as a conditional claim about evolutionary competition, supporting a liberal philosophy. The remaining interpretation of Hayek's liberal legislation constitutes, as also Vanberg (1994) argues, as *Ordnungspolitik of cultural evolution* in contrast to interventionism. In this respect we are able to guide the cultural evolutionary process by framing it by desirable rules. The Hayekian heuristic legacy for institutional economics lies in the dialectics of evolutionary competitive processes as cultural discovery procedures and the positive policy tasks regarding liberal legislation. The significance of *ordo-liberal* thought was recognized and cherished by

Foucault (1978, p. 49ff) in his lectures on *governmentality*. He also emphasised, Foucault (1978, p. 112ff), as already mentioned, that the German *ordo-liberal* movement was something completely different in comparison to the Anglo-American laissez-faire project of *neoliberalism*. This phenomenon was made very clear by Goldschmidt and Rauchenschwandtner (2007). The two authors interpret the work of v. Eucken in a *phenomenological* way, along Foucault's interpretation of *ordo-liberalism*. Additionally they compare Eucken's *ordos* with Husserl's *eidos*. The authors understand the social and liberal legislation of a social market economy as a specific *eidetic governmentality* and show its huge potential for economic theory and policy. *Ordoliberalism* may find a scientific as well as a policy related renaissance in Europe. Recent debates about the future of economic theory and policy in times of global financial crisis in the German press, like FAZ⁷⁵, also emphasise such a possible revival. Institutional economics may profit a lot from upcoming research in constitutional and *ordo-liberal* economics in tradition of scholars like von Eucken or Hayek.

Nested banking

A globalised economy will produce global problems which will be of such complexity that mere markets will not manage to handle them in a fair and balanced way. Hence we have to imagine institutions differently. Recent developments on planet earth, like climate change, everlasting poverty, energy crisis and financial fall-down, have shown that markets are not general purpose machines, optimally allocating resources. Indeed markets are the most proper institutions that have emerged with the rise of mankind. Markets are rule systems which change over time in the need of improvements due to new circumstances. The mainstream economic view treats economic phenomena as a mechanistic closed system and gives policy suggestions in a similar manner. Globalisation has made the world more interconnected and smaller, but complexity has grown very fast as well. We face an epoch where global governance will get more and more important, due to the simple fact that mere nations do not have the power to solve the big global problems, they even cannot estimate the consequences of their own policies on a global layer. Modern institutional settings need to be self-organised and self-regulating, though they are also in need of intellectual redesign and of adaptations to vast cultural changes. Facing such a double chimera needs a more complex concept of

⁷⁵ Compare Frankfurter Allgemeine Zeitung 06/18/09: *Wissenschaftsdebatte: Was ist und was kann Ordnungsökonomik?*

institutional development. First of all, institutions cannot be treated as mere contracts, because actors are engaged in institutional evolution. Additionally institutions do not work as mechanic laws; they rather represent organic characteristics as individuals do. Hence in a naturalistic foundation of economics, institutions would represent a whole lineage or a species in an evolutionary interpretation and not just a single organism. Modern evolutionary theory faces a struggle between micro- and macroevolutionary concepts, whereas the former usually works within the idea of population genetics and the latter with more developmentalist approaches.⁷⁶ This struggle can be compared with debates between orthodox and heterodox approaches in economics as well. The idea is rather simple; it is about history and adaptation. Sole micro approaches, independent from any scientific discipline, mostly argue that functional adaptation to the environment is the one and only justification for existence. Macro approaches argue that existence is a matter of development and history; hence structure and its constraints matter. We face an old dialectics between functionalism and structuralism. Are they just adaptive vehicles in a diverse struggle for existence or are they the cumulative outcomes of long historical processes?

Consider banks as a prototype example for institutions as socioeconomic carriers in society. Banks, and their corresponding power of lending money, have shaped social relations probably more than any other institution in human history. Though their essential socioeconomic task has not changed over hundreds of years, they still evolve tremendously, regarding the ever increasing diversity of products and banking methods. Credit is the most essential good for investments in future projects; it is the most essential good in a social and liberal political economy. Companies, private as well as public households have to rely on creditability. Every economic step means a great trade of trust versus money. Various but still similar manifestations of banks, money and credits have evolved in economic history.

Today's financial world is the result of four millennia of economic evolution. Money – the crystallized relationship between debtor and creditor – begat banks, clearing houses for ever larger aggregations of borrowing and lending. From the thirteenth century onwards, government bonds introduced the securitization of streams of interest payments; while bond markets revealed the benefits of regulated public markets for trading and pricing securities. From the seventeenth century, equity in corporations could be bought and sold in similar ways. From the eighteenth century, insurance funds and then pension funds exploited economies of scale and the laws of averages to provide financial protection against calculable risk. From the nineteenth century, futures and options offered more specialized and sophisticated instruments: the first derivatives. And, from the twentieth, households were encouraged, for political reasons, to increase leverage and skew their portfolios in favour of real estate. Ferguson (2009, p. 342)

⁷⁶ Compare Gould (2002, p. 595ff).

The growth of financial institutions in the economy got accelerated with the rise of the Medici in Northern Italy in the end of the 14th century. The Medici understood banking in an unprecedented way; in fact they were involved in a prototype of foreign exchange. They started in the streets dealing with coins in front of benches, whereas nowadays we face banks as highly prestigious buildings in the hearts of our biggest metropolis. The deals got more and more sophisticated. Financial instruments and methods reach from ordinary private mortgages, to mortgage backed securities (MBS), to credit default swaps (CDS), collateralised debt obligations (CDO), and short selling. Time still plays the most important role in financial business. Huge investment traders, like Goldman Sachs or Morgan Stanley, are able to deal along high frequency trading (HFT); i.e. huge computer clusters get parked in the cellars of important stock exchanges (Frankfurt, London, New York) in order to accomplish trades in milliseconds, just to be faster than anyone else. All this was made possible along three major institutional innovations, according to Ferguson (2009, p. 49f). The successes of the Medici were transferred to the North of Europe, primarily to England, Sweden and the Netherlands. The first prototypes of central banks emerged there. In the 17th century in Amsterdam the exchange bank introduced deposits for merchants and other banks, so they could make transfers without carrying the coins from A to B anymore. In Stockholm the bank also lent money to customers in first forms of credit. Since then the banks no longer have held back the same amount of physical money as reserve; Ferguson (2009, p. 50) notes that they introduced fractional reserve banking. And the last innovation, still in the 17th century, was made possible by the English. The Bank of England counts as the first central bank worldwide. It was majorly founded to finance British warfare. Since the second half of the 18th century they also have had a monopoly on issuing notes. These main turnarounds in the history of finance let the European economies grow and grow. Together with the industrial revolution, economic growth was perceived as a never-ending story of success, of course on behalf of the bourgeoisie and on the back of workers and other exploited groups. Conclusively changes and turnarounds in the real and in the money sector are heavily interwoven and strictly dependent. Ferguson (2009) adds that these processes in the goods and in the money market have an evolutionary structure and create similar patterns.

It seems perfectly plausible that the two processes were interdependent and self-reinforcing. Both processes also exhibited a distinctly evolutionary character, with recurrent mutation (technical innovation), speciation (the creation of new kinds of firm) and punctuated equilibrium (crises that would determine which firms would survive and which do not). Ferguson (2009, p. 54)

Let us assume that banking underlies an evolutionary speciation process, where different lineages have evolved over the years. These lineages got selected in certain periods of economic evolution; like for example the introduction of banknotes, the innovation of credits, the establishment of central banks, but also on the one hand the rather new development of micro-credits for farmers in developing countries and on the other hand macro-credits for indebted economies, organised by the international monetary fund (IMF). These lineages can be considered as economic traits; their corresponding executing organs – banks – are equipped with certain fitness. By assuming such an evolutionary scheme for banking we may also follow a group selection argument. Group selection processes can be best described – in analytical form – along the Price equation.

Price showed that selection can be thought of as a series of nested levels: among genes within an individual, among individuals within groups, and among groups. He discovered a very powerful mathematical formalism, now called the ‘Price covariance equation’; for describing these processes. Boyd and Richerson (2005, p. 141)

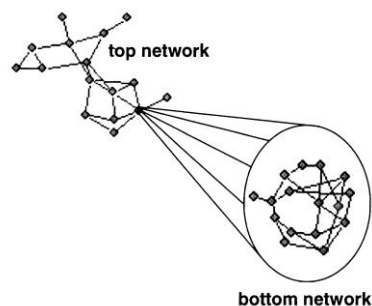
The importance of the argument lies in the nested character of this formalism. It allows to analyse the relative development of traits, measured with the fitness of, for example, a group and their offspring (kin selection), or the fitness between groups or the development of different individuals in a group. We could use this equation in several forms for the banking issue; e.g. relative comparison of specific banking traits in current time and relative comparison of banking traits and their ‘offspring’ in a kin selection manner. Generally the equation may look as following:

$$\Delta b = \frac{\text{cov}(\$_i, b_i)}{\$} + \frac{E(\$_i, \Delta b)}{\$}$$

In this form we have the relative development of banking traits or characteristics Δb (average of traits among the groups) described by the covariance of the corresponding fitness for trait i , i.e. $\$_i$ and the i^{th} expression of the banking trait b_i per average fitness of groups, i.e. $\$$ plus the expected value for the very same expression. By that, we could analyse the specific benefit of a trait for a whole group of banks in relation to the individual benefit of a trait for a single specific kind of bank. In other terms, it would be possible to look into the relative importance for e.g. micro-credits for farmers for all kinds of financial products and the benefit of micro-credits just for their specific executive organs. The first term of the formalism expresses the change due to selection between groups (population level) and the second term reveals the change in frequency due to changes within groups (in-group or individual level).

Of course, this specific usage of the Price equation for the evolution of banking traits remains a hypothetical consideration for now, regarding the relative fitness of financial instruments. Nevertheless it could hint at a balanced usage of banking traits, where the whole diverse population of financial possibilities may benefit and not just a single group, like for instance investment banks. Such a comparative analysis could engage in stabilising the various institutional traits and networks of banks. Where the Price equation is future talk in this respect, we already have working instruments also capable of comparative group analysis in networks. Remember the above statement of Boyd and Richerson (2005, p. 141) '*...selection can be thought of as a series of nested levels...*'. Nestedness is a concept borrowed from network theory and the science of complexity; it therefore comes from the other side of scientific branches compared to evolutionary theory. Nestedness is usually considered as an additional structuring device to make the handling of a complicated large network easier. A nested network is decentralised, that means in particular that there is no room for a centrally planning monopoly. A top level network consists of nodes which themselves, at closer inspection, again are networks called bottom level networks, compare figure 3.5.. Handling of the top level with fewer nodes is easier than the handling of a network consisting of all nodes of all bottom level networks, in theory as well as in practice. Moreover bottom levels again may have even lower levels constituting each of their nodes; the idea can be generalised to many levels.

Figure 3.5.: Nested networks



Source: Csermely (2009, p. 33)

Though the intuition behind nestedness looks trivial and immediately reminds on the institutional structures (horizontal versus vertical) of institutional frameworks, the real crux is

how the network summarised at the node of the next higher level translates its working into the relationships to the other nodes at the higher level. A formal enhancement to tackle these problems has been the introduction of so-called modules⁷⁷. Here the relationships between modules of a top level network can be made more explicit by using direct links between bottom nodes. It is even possible to blur the distinction between top level nodes by assuming overlaps. But though matters are now made more explicit this advantage comes at a price: It is more difficult to determine for a given set of low level nodes what can count as a module in the first place. Again a concise definition must be chosen, a particularly common one requires nodes within a common module to have at least as many links within the module than links to nodes outside the module. Coming back to the evolution of banking traits, we may follow that banks represent such complex networks, where top-level networks are formed endogenously, like e.g. the formation of the European Central Bank (ECB) system or the Federal Reserve (FED). Additionally the IMF represents such a development towards a top-level network. On the other side private financial instruments have evolved along globalisation; consider CDS, CDO or HFT for example; as well as currencies. Today we face a bidirectional development of currencies. On the one hand there are new currency unions, like the Euro area, which can compete with other *global* (top-level) currencies; on the other hand we also face developments in direction of *regional* (bottom-level) currencies, capable of supporting communities. All these developments have multiple correlations, some of them are on the same layer, but others produce systemic feedbacks towards lower or higher levels of networks. This is what nestedness is about; it is about horizontal and vertical fragility and stability of networks. Hence it can structurally show which traits secure other ones within a group selection argument. The highest layer in our fractal banking network will be represented by global institutions; which link together the various other top-level networks of banks, states and financial markets. Global governance becomes a huge complex human project. Consider the vast bureaucratic efforts to establish a global currency or even the idea of central banking as global governance⁷⁸. Such projects cannot be treated by a single central global authority/monopoly. Insofar we have to consider the idea of institutional networks as decentralised structures capable to handle ubiquitous banking problems on several system layers.

⁷⁷ Compare Csermely (2009, p. 36) for a detailed explanation of modules.

⁷⁸ Compare Hall (2008).

Central banking is a very trustworthy process, as governance is on the whole. The only way to legitimate governance is by establishment and maintenance of social contracts. Now let us raise a simple question: Does the European currency union (Euro) represent a loss in trust in its national predecessors? In other words: Was the European decentralized financial system that bad that we needed a new currency and consequently a new central bank on a higher level? Or was there a need for a greater unification in order to compete with other financial global players, such as the US or China? These questions do all head up to a very essential notion: What does group selection and nestedness mean in a concrete political economic environment? Why do we want to build up bigger entities over time and what traits are selected? Are we afraid of losing competitiveness or is it a natural process, such as globalisation? In case of banking we may be better up with nested networks of banks, for reasons of *trust* and *size*. They can simultaneously support developments in several directions, because they enable system-relevant diversity and variation in case of banks, currencies, financial instruments and derivatives. Such networks have to redistribute trust where it is needed at most in certain periods of time. Banking is probably the most authentic trust indicator a society can face, hence the stability⁷⁹ of a political economy will heavily depend on the governmentality of banking and its creditability. The second argument on size involves globalisation processes such as internationalisation of corporations and interconnectedness on the production/real side of economics, such as wage competition or tax competition among countries, as well as interconnectedness on the financial side of economics. It shall be argued that the private sector got bigger and bigger in case of certain global players, i.e. huge multinational corporations, usually the winners of globalisation. Therefore there is also some need for counter weight on the public sector, which then has to be incorporated in political unions, such as the European Union or the Euro zone with the ECB etc.. Banking has some additional characteristics compared to governmental issues. There is no democratic legitimisation of central banking at all, but there is some hidden/invisible social contract between creditors and debtors. Creditors and debtors are manifold in society, there are business banks, investment banks, private households, public households, central banks and many others, but there is probably no unit which exclusively lends or borrows money; it is always represented by both sides of the coin. This somehow independent special social

⁷⁹ By stable we mean the stability of macroeconomic fundamentals such as inflation, unemployment and so on, as well as societal factors such as trust, criminality, corruption and so on.

contract on central banking plays a very crucial role in global political economy.

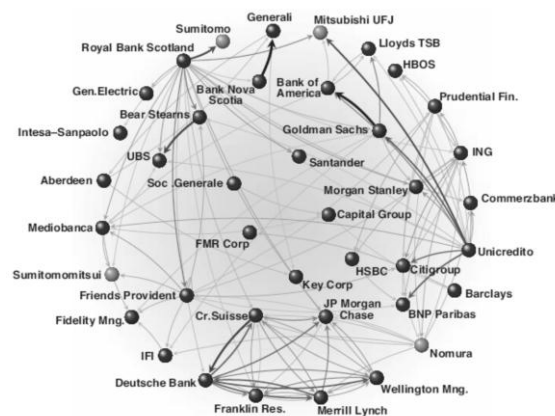
Global financial governance – and particularly monetary governance – is argued in this book to be a system of rule based on systems of distributed authority networks among both public and private actors that are strongly dependent upon intersubjectively shared meanings. As it is a system with multiple sites of authority, it is a decentralized system of multilevel governance. Hall (2008, p. 5)

As Hall (2008) wisely argues, banking is primarily a social process. It has to redistribute debts and capital in a political economy; hence it is theoretically perfectly negotiable. If a bank takes such concerns for serious, then it will earn trust in return. A bank has to establish social balancing functions in an archetypical way. This argument will be developed more precisely in a specific network model in section 4.3. For now it is sufficient enough to explain the core modalities of the model. The concrete idea is to model the functions of banking in a socio-economic way, by that using the concept of group selection via nested networks. In a research project on the evolution of the Austrian Central Bank in the shadow of the development of the ECB, we conduct a socio-economic model of banking within a network approach. In this model we use banks as balancing units for power relations in society. We consider an abstract network between creditors (*hawks*) and debtors (*doves*), where we assume that creditors are well equipped with economic capital and debtors have to rely on social capital. The idea is that there has to be a process of capital redistribution in two ways: Creditors gain trust from debtors, in case of social capital, in return for economic capital – credits. This approach may lead us to a more contemporary concept of capital, where the social component gains more influence. The persistent economic crisis shows us that banks may only survive if society trusts in its redistributive role, this assumption will hold in the long run. The central bank has to play the role of a meta player and coordinate or balance power relations between creditors and debtors, comparable to the state. The concept of nestedness allows us to start on an archetypical level of analysis. Once we establish the basic model we are able to scale/zoom it in both directions, towards a global layer or top level network – in case of central banks or even world banks – and towards a regional layer or bottom-level network – in case of communal banks working in a more micro environment. The next step is to consider these networks as modules for themselves, this allows us to analyse the evolution of them. Time plays the most important role in a process of global banking. The current crisis can be interpreted as a sudden *phase transition*⁸⁰ of network modularization, in the words of

⁸⁰ Also comparable with the notion of a *punctuated equilibrium*.

Csermely (2008, p. 35 ff.). Imagine a network of different bank-environment modules, then these modules are linked, but not just only on a horizontal level, as well as in a vertical dimension. Such links are also called *weak links* in the sense of Granovetter (1983), because they establish connections over broad ranges and are mostly unique. These weak links are system-retentive, but may also induce endogenous system-destructive shocks, if they break. If such weak links break or disconnect, then the whole system may collapse due to immense spontaneous stress. This was the case as the credit links on the interbank sector got frozen in the still persistent global economic crisis, because of tremendous and moreover spontaneous loss of trust. After this specific phase transition, the whole system changed, because the structure of network modules between banks dissipated. Structural change was induced in an evolutionary way and the cards got mixed again. The idea of weak links between groups as system retainers has a lot of potential in comparative institutional network analysis. It is therefore a concept which shall be considered more and more in modern economic thought, because it can easily show and indicate systemic risks in a network and can reveal critical bottle-necks, which can then be guarded by appropriate policy strategies. Schweitzer et al. (2009) show how to use the idea of networks and their evolution to analyse the origin of economic crisis.

Figure 3.6.: Sample of the international network of financial institutions



Source: Schweitzer et al. (2009, p. 424)

Figure 3.6 Schweitzer et al. (2009, p. 424) visualises financial data in a network structure. This specific network shows the interconnection of financial institutions as nodes and the

strongest existing relations among them as weighted and directed links. The saturation of links stands for the weight between two nodes, the thicker a link the more important it is. Obviously the network can only reveal a reduced form of the real-world financial interconnectedness; nevertheless it shows the big picture. The authors argue and can prove along the data that the global banking sector is highly interdependent, which makes the structure quite vulnerable for breakdowns of important nodes and weak links. This can be regarded as a best-practice example of how to deal with institutional networks in future research.

The argument on nested banking shall have shown that banking has to be viewed as a globally nested governance project. In connection to the here elaborated work on Hayek and his perspectives on cultural evolution, legislation and liberalism. Banking and its corresponding rule sets can never be socially planned, because the interdependencies are too high and too complex for a straightforward plan. In this respect we have to introduce a decentralised nested governmentality in the financial sector. In the last thirty years we could observe nearly anarchic actions on the global financial markets, due to the introduction of new instruments and techniques. This development produced a lot of economic growth and wealth, but not for all people. The gap in incomes increased tremendously, because the *ordos* or frame for financial actions has not been introduced. Insofar the markets produced an extremely dangerous situation which reached a systemic breakdown in the year 2008, from which we will suffer the next decades. Liberalism without any *ordos* is doomed to failure, as the neoliberal American project shows. Continental Europeans have to rely on their ordoliberal governing roots and should spread the word across the world. The crisis gives enough opportunity to establish an overall taxed order for financial transactions; this frame obviously needs new transactions taxes to redistribute profits and losses in society. Such taxes have to be implemented along global institutional networks, in order to execute them where they are needed at most. For instance it cannot be the goal to tax micro-credits with the same rate as short-selling, different banking traits need different control to maintain a liberal order on all levels of social living. In times of new currency unions, central banks distribute their responsibility in a new way. National institutions do not offer open-market operations anymore; instead they have to deal with financial control and need to focus on research on more specific financial problems. Hence global banking institutions will rise; have to indicate systemic risks and have to redistribute tasks to the appropriate network level. In this respect

banking will evolve to a more nested decentralised governance system of financial transactions. Looking back to Hayek and Keynes such a concept offers a synthesis for their monetary claims; a global financial nested order will need to rely on the governing power of communities, markets and states in a cooperative way, in order to be protected against systemic risks.

3.4. Schumpeter's heritage

This sub-section on Schumpeter and his legacy shall develop the ideas, stated in section 2.3, further by focusing on Schumpeter's heuristic conceptions of economic change and the role of institutions within it. The discussion in 2.3. tried to elaborate Schumpeter's ontological position towards economics and economic change. We concluded along the lines of Shionoya (2009) that Schumpeter had a *universal social science* in mind. He stood between the lines of the *Methodenstreit* in his epoch along his notion of the *entrepreneur*. Secondly Witt's (2008a) analysis has shown that the Schumpeterian system of thought rests on a *dualistic ontology* and on *generic heuristics*. This idea of Schumpeterian generic heuristics will shape the following discussion. *Heuristics* deal with ideas of how things *change*, whereas *ontology* deals with ideas of how things *are* and *methodology* is about the devices to *model* this change. The issue at stake is institutional change, though we still lack clear-cut definitions of institutions. It is important to explain what *generic* means in more detail. A dialectic approach would suggest describing what it is not firstly. Dopfer (2010, p. 6) explains that classical science was aimed to reveal the universality of change, to find a *nomological law* of change. Schumpeter tried to work out rules of change in a similar manner as we already conceived along Veblen and Hayek; he was looking for *generic* rules as well. Dopfer (2010, p. 6) further notes that these generic rules denote the body of theories based on non-classical ideas of change, which became popular in the 19th and 20th century.

The approach has been challenged by the advent of evolutionary biology in the first half of the 19th century. The ontological premise of an immutable universe broke down in the face of the theoretical proposition that the observed variety could not be reduced to any typical average but was itself a consequence of continuous change. The classical assumptions were replaced by those of heterogeneity and mutability or, in the parlance of evolutionary biology, by extant variety and continual variation. Dopfer (2010, p. 6)

Hence the *generic* character of change invites multiple outcomes or actualisations. It includes the principle of particularity, but still entails specific rule-guided production or destruction *patterns*, with similar characteristics. Generic pattern may have common origins, but on an operant level the actualisations look different. The crucial point is, that these different actualisations may generate new generic rules then in certain time and space. Regarding the issue of generic change in particular, we look into Schumpeter's own treatment of evolution and development. In this respect it is referred to Schumpeter's (1954) *History of Economic Analysis*, where he dedicated some passages on evolution. The book was edited by his wife

and it was published posthumously. It entails an astonishingly detailed analysis of what ever happened in economics, with focus on the analytic tradition of economic thought. The *History of Economic Analysis* can be regarded as an economic encyclopaedia. Additionally it tells a lot about the character of J.A. Schumpeter. He seemed to be a vital but also arrogant person, as also biographies like in Catephores (1994) demonstrate. Nevertheless the *History of Economic Analysis* shows his admiration and respect towards economics as a profound and serious science as well as his meticulous way of explaining and combining economic positions. Mark Perlman notes in the introductory chapter, that Schumpeter wanted to clarify that there is a huge difference between the economic science and the policy part of economics; the difference between *theory and policy*. This is a point which is also very dominant in Schumpeter (2005) [1942]. Schumpeter explains that policy, in a Weberian bureaucratic tradition, should be left to experts. Schumpeter was a technocratic economist at the end of the day, he always insisted on the dominance of high theory in comparison to policy evaluation. Insofar one has to consider Schumpeter's (1954) *History of Economic Analysis* as a eulogy for high theory. In this respect, thoughts on the issue of economic laws and change at all will be elaborated. Afterwards some more concrete sub-sections are presented covering the issue of the *entrepreneur and business cycles – credit, capital and institutions – innovation, technology and creative destruction*. The section will be concluded by an interpretation of the concept of *meso*, understood as a consistent Schumpeterian legacy. Hence we will discuss the ideas of Elsner (2007) and Dopfer et. al (2004) in this respect. At last, the concept of meso trajectories shall be applied in the field of democracy design and regional innovation.

Schumpeter (1954, p. 34ff) shows in his chapter on the *sociology of economics* that economic laws are something very special.

The historical or 'evolutionary' nature of the economic process unquestionably limits the scope of general concepts and of general relations between them ('economic laws') that economists may be able to formulate. There is indeed no sense in denying, a priori, as has been done sometimes, that any such concepts or relations can be formulated at all. ... But it is true that 'economic laws' are much less stable than are the 'laws' of any physical science, that they work out differently in different institutional conditions, and that neglect of this fact has been responsible for many an aberration. Schumpeter (1954, p. 34)

Here Schumpeter considers a very critical point, that generality is problematic within the concept of a law in the social and economic sciences. Generality limits variational development in economic processes. The one and only possibility for consistently analysing

economic processes is by looking into the institutional setup of the processes. Schumpeter notes that institutional conditions enrich the economy with variety. Hence different institutional environments and cultural circumstances influence and shape the economic processes as well as economics as a science. The observer is always biased by the nature of her living, by her socioeconomic and cultural origin. This insight reflects an important message for Schumpeter's starting point for his analysis of the history of economics. He says that ideologies condition the economic observer, and additionally the political and consequently the economic process itself. This feedback circle between economic observer, politician and economic agent is formed by the institutional environment, as also Marx and Engels pointed out several times. Marx called a system of ideas an *ideology* and he assumed that ideological biases create economic realities. Schumpeter adds that Marx felt much alike to state that at his time the ideological bias formed the economics of the industrial and commercial bourgeoisie. Today we go further by observing the process primarily shaping institutions and then secondly shaping economic realities and biases again and again. Nevertheless it has to be said that scientific investigation needs to be biased, unfortunately we are not able to determine our own bias or even escape from it, since we are symbiotic part of it. So ideological biases may be only detected by someone different. Ideologies influence the institutional environment, as culture does, but are as well re-influenced by institutions and their corresponding economic realities, like e.g. production regimes (car industry, semiconductor, bio-technology...).

Social location undoubtedly is a powerful factor in shaping our *minds*. But this does not amount to saying that our minds are exclusively shaped by the economic elements in our class position or that, even so far as this is the case, they are exclusively shaped by a well-defined class or group *interest*. Schumpeter (1954, p. 36)

This notion is quite interesting in context of the previous analysis of group selection in section 3.3, because such a group interest clearly emerges by a mix of in-group and between-group competition as well as within contingent cooperation. Such ideologies are formed by the composition of moral sentiments and material interests of group behaviour. Additionally this short note brings in the issue of path-dependence once again, in contrast to social class-determination. Ideologies carry institutional innovations, but they cannot offer normative scientific criteria about truth. Logic strikes out ideology in scientific terms, but it does not mean that ideology strikes out reason. Unfortunately the rise of totalitarian systems proved this assumption several times in history. Therefore 'economic laws' are on the one hand of

very complex recursive character and always in motion for themselves on the other hand. The search for a general 'economic law' is futile.

A highly significant, but often ignored or misunderstood domain in economics is represented by the *History of Economic Thought*. Schumpeter insisted on writing a *History of Economic Analysis*. Why did he insisted on *Analysis* instead of *Thought* so much, since *History of Economic Thought* was already an established sub-discipline? Maybe the crucial point for his focus on *analysis* lies in his belief in economics as a true science, integrated in a whole body of analytical tools. Instead the idea of *thought* carries ideologies with it, which he criticised as economic prejudices a lot as we have seen above.

The same applies to what we define as Economic Thought, that is, the sum total of all the opinions and desires concerning economic subjects, especially concerning public policy bearing upon these subjects that, at any given time and place, float in the public mind. ... We shall, of course, never neglect the general environment of economic thought in which, at various times, analysts did their work. But these environments and their historical changes are never our main object of interest. ... The development of analytic work, however much disturbed it may have been by the interests and attitudes of the market place, displays a characteristic property which is completely absent from the historical development of economic thought in our sense and also from the historical succession of systems of political economy. Schumpeter (1954, p. 38-39)

Schumpeter speaks of disturbance of analytic work. For him ideologies are bad noise for the real deal. It seems interesting that Schumpeter did not care that much on the real applicability of analytic work in his studies. He was interested in the mere scientific process in analytic terms, besides major real economic developments. In respect of scientific progress, Schumpeter speaks of threats to the analytic enterprise, which are composed of biological biases and political doctrines or systems of thought. Moreover Schumpeter tries to investigate possible conditions and procedures of how a young scientist could start from a scratch. This is the point where his popular argument of scientific *vision* sneaks in.

In other words, analytic effort is of necessity preceded by a preanalytic cognitive act that supplies the raw material for the analytic effort. In this book, this preanalytic cognitive act will be called Vision. Schumpeter (1954, p. 41)

For that reason, it was Schumpeter's quest to look into the emergence of economic visions from Aristotle till the 20th century. These visions – deductive preanalytic perspectives – drive scientific progress and shape economic analysis, because they are the foundational elements of scientific models. Respectively, Schumpeter also notes that these visions form analytic cores, which should be more than less immune to ideological bias. He considers the major task of economic science as a process trying to minimize and eliminate ideological delusions

from the analytic core. In fact, this is exactly the point where Schumpeter (1954) takes off, to a journey of visions and analytic cores in economics. We will pick out one particular piece of this analytic story, i.e. Schumpeter's analytic lesson on population and evolution.

Schumpeter on population and evolution

When Schumpeter (1954, p. 250ff.) speaks about population and size of human societies, he emphasises that a '*perfectly detached observer*' would look into this issue at first, concerning economic questions. But is it possible to speak of a population as an aggregate with an optimal size and maybe an optimal economic life-style? And what can we even tell about the evolutionary story of populations? Schumpeter gives a rather prompt answer, he tells us that the key to understand historical processes lies in the variation of populations, which happens along technology, religion, class struggle and so on. These characteristics do all have institutional factors in common or at least cultural criteria or social norms. They transform societies and create populations from within. The idea of a population implies that there are certain borders constraining them or differentiating them from others in explicit terms. Nevertheless a major property of modern human societies persists, namely that they are not gradually distinguishable, because they are structured by overlaps between and within groups. A specific population problem emerges by over- or under-population, which may occur according to too high birth- or death rates or too high immigration or emigration. Schumpeter (1954, p. 251) made clear, that in history nations wanted to have a rapidly growing population, so that a lot of people work in order to create prosperity. This political attitude got shocked with the introduction of the *Malthusian trap*⁸¹ into economics at the end of the 18th century. When population grows that fast that agriculture cannot provide enough customised food anymore, people will have to rely on subsistent modes of economic production again, caring for their own food supply. This specific problem arises as an additional threat for all non-renewable resource markets today, because in a scarce world we are confronted with limited resource capacities. Hence the population problem invoked a new style of economic analytic thinking, since economists had to change their rationale from populationist to anti-populationist attitudes. This means in particular that the opinion had to change, that more

⁸¹ Schumpeter (1954, p. 255) insists that the original population problem was formulated 200 years ago, by Giovanni Botero (1544–1617), who was also characterised by strong pessimism, regarding population growth. Malthus took over these ideas and made it prominent. In Botero's time populationist thinking was too dominant for alternative attitudes. Additionally, it was William Petty (1623-1687) who introduced the *law of geometric progression*, which was, then, used by Malthus to demonstrate how population may grow.

people – equally an increase in population – increase per capita growth or wealth⁸². This is also why Adam Smith formulated this circumstance just as a natural fact and not as something we have to be threatened of.

If the law is something natural, shall we consider the *Malthusian trap* as a social or as an evolutionary problem? The point is that it does not matter whether we consider it as social or evolutionary, because in a naturalistic generic perspective the problem is of the very same nature; it can be treated by institutional regulation, still in a naturalistic and social picture.

Social phenomena constitute a unique process in historic time, and incessant an irreversible change is their most obvious characteristic. If by Evolutionism we mean not more than recognition of this fact, then all reasoning about social phenomena must be either evolutionary itself or else bear upon evolution. Here, however, evolutionism is to mean more than this. Schumpeter (1954, p. 435)

This uniqueness of socioeconomic phenomena produces variety and diversity in populations. Primarily Schumpeter distinguishes between five approaches to evolutionism, i.e. *philosophers' evolutionism*, *Marxist evolutionism*, *historians' evolutionism*, *the intellectualist evolutionism of Condorcet and Comte*, and *Darwinian evolutionism*. He considers these intellectual heritages as major influences of the *Zeitgeist* of the 19th century, where modern analytic economic science made its major steps. In the 19th century common opinion on evolution has *slightly* changed in scientific realms. Schumpeter invokes that in the 18th century people have considered evolution naively as *progress*. In the following century this perspective has changed, at least scientists started to recognise that evolution is just about *change*. It is rather embarrassing – keeping in sight – that in the 21st century people still associate the former with evolution to a great extent; unfortunately it seems that this notion will not change in the future. For now, we will briefly discuss four of these five major streams of evolutionary thought, which have significantly influenced the rise of economics and also Schumpeter himself. The historian perspective will be left out for two reasons. First, Schumpeter made only some short notes on List, Hildebrand and Roscher and their evolutionary thought. Their theories are described more precisely in later parts of Schumpeter (1954). Second, in this thesis we have already discussed a lot of issues concerning the difference between history and evolution, as well as the difficulty to combine history with theory, which is necessary for an evolutionary complex.

⁸² This was a belief in increasing returns from a growing population.

Hegel's evolutionary system needed metaphysics. It suggests to imagine absolute objective truth in a metaphysical state, then this state is defined as reality; i.e. '*...reality as the totality of all actual and potential observational facts.*', according to Schumpeter (1954, p. 437). The question then arises what are these observational facts: they are (*manifestations of*) that entity which are characterised along: '*whatever is, is rational (conforms to reason) and whatever is rational (thinkable), is.*' Schumpeter (1954, p. 437). The Hegelian evolutionary conjecture suggests that this entity is involved in a continuous evolutionary – still logical – process, characterised by the German word *Aufhebung*: '*The German verb aufheben means both to cancel and to raise. Hegel averred that a thesis, A is B, and its antithesis, A is not B, aufheben each other into something higher, a synthesis that comprises the content of both.*' Schumpeter (1954, p. 437) added in a footnote. Anything real entails such a dialectic process. The Hegelian story builds upon *creative destruction* as endogenous change, in a nutshell. Schumpeter expresses this conception as *emanatist*. The Hegelian *emanatist* conception of evolution serves as a theoretical template to turn ideas into something real observable; this can be shown along following quote: '*...reasoning from the conception of a metaphysical entity, which in unfolding its own contents produces a sequence of changes in the reality of experience, we call emanatist.*' Schumpeter (1954, p. 437). First of all, it is good to know that Schumpeter considers metaphysics as a conception, as a theoretical playground and not as nothing more. Then the evolutionary dialectics is described as an unfolding process from metaphysics (*ideational*) to the reality of experience (*matter*), along some object, which constitutes itself through some contents. That's the way how Schumpeter interprets Hegel and how he visualises the *emergence of novelty*. This system of thought or analytic corpus, suggests that ideas create real change, along evolutionary dialectic dynamics. Evolution is therefore considered as a generic system of change in human culture. Hence Hegel's evolutionary system is grounded on an idealism, which does not contradict a realism. Idealism and realism are complementary systems of thought. Moreover idea and matter manifest reality in a continuous, complementary and dialectic way. This notion of evolution is consistent with critical naturalism, elaborated in section 2.4. Naturalism needs to be exercised as critical theory, in order to integrate ideational perspectives of change.

Marxian evolutionism cuts out the ideational part of the Hegelian system, but stays independent from it. History develops in a dialectic process, but the unfolding is not *emanatist* anymore; it depends only on material changes. Schumpeter adds that Marx adopted the

language and the specific sound of reasoning from Hegel: his dialectics, but he introduced something independent. History, culture, the economy are not products of ideas anymore, they emerge out of production relations and are structured by economic forces. The rules for this hypothesis *by nature* are characterised as following.

- (1) All the cultural manifestations of 'civil society' – to use the eighteenth century term – are ultimately functions of its class structure.
 - (2) A society's class structure is, ultimately and chiefly, governed by the structure of production (*Produktionsverhältnisse*), that is, a man's or a group's position in the social class structure is determined chiefly by his or its position in the productive process.
 - (3) The social process of production displays an immanent evolution (tendency to change its own economic, hence also social, data).
- Schumpeter (1954, p. 439)

The point is that Marx's analysis of the capitalist system suggests that the class structure is made of two classes, namely the *bourgeoisie* and the *workers*. Thereafter we may follow that the class struggle '*... provides the mechanisms – economic and political – that implement the economic evolution's tendency to change (revolutionize) every social organization and all the forms of a society's civilization that exist at any time.*' Schumpeter (1954, p. 439). As a consequence '*...politics, policies, art, science, religious and other beliefs or creations, are all superstructures (Überbau) of the economic structure of society; historical evolution is propelled by economic evolution; history is the history of class struggles. ... This is as fair a presentation of Marx's social evolutionism as I am able to provide in a nutshell.*' Schumpeter (1954, p. 439). Schumpeter synthesises these concepts in an ingenious way. He is precise, brief and foremost comprehensive in his argumentation. He emphasises that the Marxian evolutionary system works only along economic constrains. In this respect it diverges from different social or cultural evolutionary approaches. Marxism insists on the dominance of economic productive circumstances, which decide on the future of culture and society and not the other way around, as many different cultural approaches to evolution would suggest. Further it is the only economic theory in that period, which was built on evolutionary thought. The economic process was considered through accumulation and crisis from within; i.e. immanent evolution. Perhaps it was also this specific characteristic of Marx's grand vision which influenced Schumpeter to think about endogenous change, creative destruction, innovation and business cycles.

Intellectualist Evolutionism, primarily associated with the Marquis de Condorcet (1743-1794), was the kind of social evolutionism that was made possible in the movement of the

Enlightenment and the French revolution. Actually it is that kind of evolutionism or rational constructivism which was heavily criticised by Hayek, as we have seen in the previous section. The idea of the human mind capable of creating or engineering social institutions along deliberate design is also criticised by Schumpeter (1954).

...it fails because it postulates what it is to explain. Changes – adaptive and, possibly, also autonomous – in beliefs, in stocks of knowledge and techniques, and in habits of thought are no doubt historically associated with other manifestations of social evolution. But they are conditioned, to say the least, by the facts of a changing social structure, and so are their *modi operandi*. ... In fact, we have done nothing: we have only renamed the problem. Schumpeter (1954, p. 443)

The problem is, as Schumpeter argues, that if we imagine a perfectly working human mind which is able to coordinate and redistribute everything totally perfect along some engineered institutions, we would have already won the game; this would be *the end*, the solution of all social problems. This kind of evolutionism misses the message, because it is not about the process itself, it is about a hypothetical, imagined solution for the still on-going process. Schumpeter also criticises Auguste Comte, because of his too narrow conception of the development of civilisation. There are three stages in Comte's system: the religious or magical stage, the metaphysical stage and the scientific stage. The critique comes up, because the theory is considered as a rather inflexible law, which can be too easily verified. For this reason, this kind of evolutionism treats the problem of continuous change in a far too linear way. Besides this focus on evolutionism, as the father of positivist social theory he remains eternal in any sociological context. In this respect it has to be noted that Schumpeter was always very critical with scientific colleagues as well as with theoretical conceptions at all. He was always very fast to announce something as naïve or superficial. Comte has made major sustainable improvements for social theory. His stage-like theory of social development fits even better with more group-like theoretical environments, like communities.

Concerning *Darwinian* evolutionism, it is briefly referred to Schumpeter's thoughts on the biological evolutionary concept and its consequences for the social sciences. Schumpeter (1954, p. 445) highlights the significance of Darwin's work as the most influential contribution to the *Zeitgeist* of the 19th century, because it broke with every traditional idea of change. In this respect he compares the impact of the theory with such innovations such as the heliocentric system; which also signals his huge respect in front of evolutionary concepts in biology. Though the first impact in analytic models for the social sciences, especially economics, came a hundred years later. This is where we still struggle.

ENTREPRENEURSHIP, INNOVATION AND BUSINESS CYCLES

Schumpeter got prominent for his emphasis of the entrepreneur and the role of the entrepreneur as a deviant force in the economy. More than this, Schumpeter made the entrepreneur responsible for swings in the business cycle. Her innovations emerge out of true uncertainty and the risk makes the soup. Insofar the entrepreneur is a dynamic economic agent who is loaded with lots of energy and adventure, standing on the opposite to static consumers or business men. For sure Schumpeter's story is a romantic one, but it has a very true theoretical core: the entrepreneur drives economic change in a path-dependent but still unpredictable way. The entrepreneur gains success through new combinations of goods and services in trade for high risk and experimental production. Hence from a theoretical point of view it is of utmost importance to understand and analyse the foundations of economic decision making under uncertainty. Schumpeter built upon methodological individualism in a heterogeneous way. These specific economic actions can be done only by distinct or even extravagant personalities, who differentiate themselves from the rather rational mass. His methodological individualism is something different to the usual rational choice, homo-oeconomicus model. He focuses on certain personalities who are able to change something real in the economy, because of their ambitious dedication. The entrepreneur's incentives emerge out of something irrational; success is a matter of variety, diversity and clever selection of combinations. This is something which cannot be simply learned, the entrepreneur has to be a disturbing force. Schumpeter mentions several times, at most in his writings on the entrepreneur, *Unternehmer – in Handwörterbuch der Staatswissenschaften (1928)*, reprinted in Leube (1996), that entrepreneurship is about leadership. Leadership is a very ambiguous concept and very difficult to discuss in the social sciences, because it is about *will* and *perseverance*. Especially in situations of uncertainty and risk it is rather tough to push decisions to actions as an entrepreneur. Further entrepreneurship is not just about a special personality, it is also about governing an organisation where conflicts are natural. Leadership cannot work along some rigid military hierarchy, where commands get simply accomplished. Schumpeter summarises the tasks of an economic leader – the *enforcement of new combinations* – as following.⁸³

⁸³ Compare also the original writing with more detail, in Schumpeter, J.A. (1997 [1911], p. 100ff.)

- (1) Die Erzeugung und Durchsetzung neuer Produkte oder neuer Qualitäten von Produkten.
The creation and enforcement of new products or new qualities of products.
 - (2) Die Einführung neuer Produktionsmethoden.
The introduction of new methods of production.
 - (3) Die Schaffung neuer Organisationen der Industrie (Vertrusting z.B.).
The creation of new industrial organizations.
 - (4) Die Erschließung neuer Absatzmärkte.
The disclosure of new sales markets.
 - (5) Die Erschließung neuer Bezugsquellen.
The disclosure of new sources of supply.
- summarised by Leube (1996, p. 168)

First of all, Schumpeter considers himself as one of these necessary, vital, energetic, dynamic, economic leaders, capable of changing the economic environment; he is one of them. In order to succeed as an entrepreneur and to reshape the economy it is necessary to do something new, to evade routines and to overcome our rules of conduct. ‘... *uns vom Diktat der Routine zu befreien.*’ Schumpeter, J.A. (1997 [1911], p. 100ff.) means in particular *to free ourselves from the dictation of routine.*

Die Bedürfnisse, die hier befriedigt werden, sind nicht die des ‘Wirtes schlechtweg’, nicht die, welche die ratio des Wirtschaftens bilden, und nicht die, auf welche allein deren Gesetze passen. ... Da ist sodann der Siegerwille. Kämpfenwollen einerseits, Erfolghabenwollen des Erfolgs als solchen wegen andererseits. ... Wirtschaftliches Handeln als Sport: Finanzieller Wettlauf, noch mehr aber Boxkampf. Schumpeter (1997 [1911, p. 138])

The entrepreneur has to be more than the ordinary/rational host. The needs which have to be satisfied are far away from common laws. He also speaks about *Siegerwille*, which means *will to win*; this is what an entrepreneur needs in his opinion, to succeed in the economy. Schumpeter’s conception of the entrepreneur is deeply connected to the vision of powerful liberal men, willing to break with habits and tradition. But how can this vision succeed in an organisational context, how may the leader create appropriate organisational circumstances?

Brian Loasby (1984) argues in line with Schumpeter, that innovations driven by Schumpeterian entrepreneurs are successful with newly-created enterprises. So that economic change also needs a change in the productive methods or means of organisation. In this respect all five rules (stated above) need to be satisfied for innovative, disturbing change. Organisational leaders have to be innovative in social and cultural matters as well, in order to prevail in economic terms.

... innovation implies change, whoever introduces it, and the question at issue is whether organisations which are well practised in a particular activity may be expected to be less adept at innovation than outsiders. Loasby (1984, p. 176)

This statement raises some crucial points regarding the role of organisational routines. Schumpeter himself has not cared that much about the practicability of routines or their specific evolution in organisations. The role of outsiders in a market always needs attention, because they work with different and novel organisational routines or industrial practices, so their chance to make innovations increases in niches. Otherwise routines play a specific role in adaptation to new innovations, because new organisational routines are selected by the market, in boom phases for example. This is also incorporated in Nelson and Winter (1982). They introduced organisational arguments into Schumpeter's entrepreneur and innovation argument. Additionally Nelson's and Winter's (1982) success was to a great extent dependent on a combination of Schumpeter's theory with elements of Herbert Simon's organisational decision theory, which built upon bounded rationality. The entrepreneur somehow needed to step out of the circular flow by *irrational* behaviour or decision making, that is where Schumpeter headed up. Nelson and Winter (1982) introduced competition in intermediate sectors, like industries; which are regarded as autonomous selection environments. Then organisations, their behaviour and their routines, gain more and more attention, even for the whole business cycle. In this respect Loasby (1984) argues as following.

A possible justification for this practice [*the use of the industry as a theoretical organising device*] is that innovation is not confined to pre-existing industrial boundaries: the process of creative destruction redefines the structure. Yet the impact of particular innovations is usually concentrated on a few sectors, and effective competition is usually competition among relatively few. Loasby (1984, p. 176)

Hence industries get redesigned along innovation in a process of creative destruction. Creativity enables a new product, a new mode of production or a new form of organisation, but the dominant selection environment gets disturbed and sometimes even destroyed. It is called creative destruction, because only the successful entrepreneur is considered in Schumpeter's theory, otherwise there would be also something like *apathetic* destruction, which would be rather unspectacular, but perhaps also innovative. Creativity may also endanger economic environments, especially when uncertainty and risk is very high; hence '*Crisis is always potentially around the corner.*' Loasby (1984, p. 177). The potential threat of crisis for an enterprise fosters more rigid organisational structures. Today large organisations have research and development departments, to derive *save* innovation. Nelson and Winter (1982) took the concept of routines as their main analytic element, so search routines are the innovative cores of corporations. Loasby (1984) announces some problems of routines for innovations, i.e. unlearning or deletion. Routines go hand in hand with

conducts, that employees probably follow for years; these routines have made corporations successful and entrepreneurs and employees happy, nevertheless they can represent constraints for further innovative capacities. In order to create something novel, new modes of production are necessary and these modes usually demand to erase old habits. Such issues invite complex problems for organisations, since people will not understand why they should give up their well-trained routines, their hard-earned tacit knowledge. Nevertheless it is unavoidable for the entrepreneur to comprise such organisational policies and to give up old routinised concepts, if she seriously wants to develop innovations, understood as real novelties. Leadership, firm size, efficiency in production and innovativeness form a bunch of trade-offs regarding innovative action and economic change.

The apparent conflict between well-structured operating efficiency and effective innovation may help to explain why most large firms seem to get a poorer return for their research effort than smaller firms. Loasby (1984, p. 180)

This is the challenge of entrepreneurship, the challenge of carrying out innovations, as Nelson (1984) defines it. In this article Nelson tries to analyse the incentives and motives for entrepreneurship. *'Entrepreneurship is seeing an opportunity that others may not see, or which others discount, and taking the plunge.'* Nelson (1984, p. 182). This is a notion which is not captured in neoclassical models of innovation, because they can only compete with risk, but not with uncertainty. Nelson heavily criticises the neoclassical approach, also concerning its narrowness, because in these models possibilities are given, so there is no room for a new introduction of organisational patterns or productive methods. Further Nelson (1984) summarises three classes of incentives for innovation.

- technological opportunity: requirements of R&D and other investments for innovation; which is also field dependent
 - the size of the market: number of potential users of an innovation and how much each could benefit from its use
 - ability of an innovator to appropriate the returns from his initiative: profits from innovation, differentiated from profits that imitators have made
- Nelson (1984, p. 186)

These factor classes are also associated with potential net social returns, at least the first two of them; according to Nelson (1984). Social gains create incentives for entrepreneurs to innovate, though it is not clear whether they strike out potential dangers from early adopters or so-called template-externalities. Then investments in innovations are not recapitalised anymore. Additional backups for the Schumpeterian engine of innovative progress are

institutional structures, like for instance universities or independent R&D (research & development) centres. Nelson (1984) argues that applied science is not implemented in common models of competition and innovation. In recent years this situation has changed a lot. A lot of work was done by showing the connection between knowledge spill-overs, patents, government support, institutional set-ups, science, technological diffusion, innovation and economic growth. Here we can refer to extensive work in the field of innovation systems, where institutional contexts nurture fruitful innovation. Schumpeterian competition and entrepreneurship needs a theoretically systemic approach, dealing with complex contexts. Innovation is about endogenous emergence and a theory of innovation needs to be about the parameter space of incentives and institutional factors nurturing creativity. Nelson (1984) indicates a strong trade-off between process and product innovation. Obviously it is easier to keep a product for secret with patents than to keep a whole production process for secret. In the latter case the entrepreneur will need trustworthy employees, able to protect important information on new processes and production methods. Potential joint gains from both kinds of innovations will make the success of good entrepreneurship. Regarding the connectivity of institutional structure and potential technological innovation, Nelson (1984) argues that science creates public as well as private knowledge. In particular, applied science creates higher incentives for entrepreneurs to cooperate and invest, because it develops private technological knowledge. Otherwise public technological knowledge is developed in the basic sciences, where *generic* knowledge is promoted. It is related with '*...broad design concepts, general working characteristics of processes, properties of materials, testing techniques.*' Nelson (1984, p. 191). The specific institutional context gives specific potential for innovative entrepreneurship, basic science needs to be open for access and cannot be patented.

The issue of government support for innovative entrepreneurship will be treated in the last sub-section on Schumpeter. The point is, when governments start to concentrate on innovation systems in the economy, they start to support specific industrial fields, so they start to develop technological preferences or at least expand them. These preferences will go along with a country's history and will therefore correlate with the specific cultural evolution of the country as well. Hence the perspective on innovation systems merges with institutional or governmental frames and entrepreneurship to complex wholes. So countries are able to specialise or focus on technology and industrial fields, which is appropriate and crucial for them via clustering of creativity, ideas, scientific professionalism, institutions, technology,

government and entrepreneurship. In this special respect governmental support must work along effective policies and not such via broadcast subsidies or even worse, via corrupt procurement. Hence democratic institutions will play a dominant role in this process.

The next critical step for the analysis at stake is invoked by the transition from entrepreneurship and innovation to business cycles. First of all, Schumpeter (1997 [1911], p. 318ff.) explains that his theory of business cycles is a theory of periodic waves which depends on innovative entrepreneurship, instead of a theory of periodic crisis. This theory majorly builds upon the work of Arthur Spiethoff (1873-1957) – who was engaged with modern business cycle theory his whole life and was a colleague of Schumpeter later – Joseph Clément Juglar (1819-1905) – who was one of the main modernisers of business cycle theory and Schumpeter respected him a lot – and Adolph Lowe (1893-1995). When entrepreneurs introduce new combinations, the market will move into a boom phase as long as new products are available. Such a phase is then followed by depression which lasts until the *resorption process* of the novelty is finished.⁸⁴ Schumpeter's main conditions for successful entrepreneurship are the existence of new possibilities in the private sector and a good, stable and calculable status of the political economy. A very crucial element for a rising boom phase is that new capital is arranged within new machines and equipment. Further, these new investments are impulses for the markets of resources, labour and interior. The announced properties of the boom phase are quite similar to Spiethoffs's explanations. The main difference between them deals with the reasons for depression at the end of a boom phase. Spiethoff concentrates on an overshooting in the production of capital goods, according to Schumpeter (1997 [1911], p. 318). This overproduction stands in no relation with available capital and cannot be satisfied by demand. Otherwise Schumpeter (1997 [1911], p. 318) explains depression with the massive occurrence of new firms, which interfere with the current conditions of 'old' firms and with the condition of the political economy in general. In this context it is of utmost importance that novelties do not grow gradually upon the old but emerge out of new combinations and consequently stand parallel to the old in strong concurrence, as already elaborated. This concurrency changes the economy from the bottom and invokes a strong integration process leading into disturbance and at last depression.⁸⁵

⁸⁴ Schumpeter (1997 [1911], p. 320): '*Und neuer Aufschwung folgt auf die Depression, wenn der Resorbierungsprozeß des Neuen beendet ist.*'

⁸⁵ Schumpeter (1997 [1911], p. 322): '*Wirkung des (in diesem Stadium bereits erklärten) massenweiten Auftretens neuer Unternehmungen auf die Lebensbedingungen der alten und auf den eingelebten Zustand der*

These major changes shape institutional structures as well, since the political economy needs to restart again. Pure economic actions, whether they even exist or not, are not able to pull out an economy out of a depression. The economy's institutions adapt and vary during such a down phase and at the end of the day *novel* socioeconomic patterns are selected for the next push, in an endogenous process. Schumpeter's theory consists of a huge transformation process which waxes and wanes in waves. The transformation itself can be that strong that even the most dominant values can be eliminated. Nevertheless, these waves do not follow strong geometrical rules; they are involved in chaos and asymmetry, only the periodicity of ups and downs may show some regularity. We need to consider that entrepreneurs do not emerge continuously one by one, but in discrete cumulated mass points. These critical points initialise boom phases. Their origin is almost always a major innovative recombination by successful entrepreneurship. Then adopters follow step by step and fuse an economic wave by changing the economy's institutions cumulatively. Schumpeter (1997 [1911], p. 369) concludes that waves are necessary even if they exaggerate economic conditions and values. Additionally the theory of long waves strikes out circular theories of capitalistic change in any respect. They produce rise and shine as well as crisis and conflict, but the process of creative destruction is needed for the emergence of something novel. Institutional environments – cultural, social, political or economic – depend strictly on the dialectic introduction of novelties.

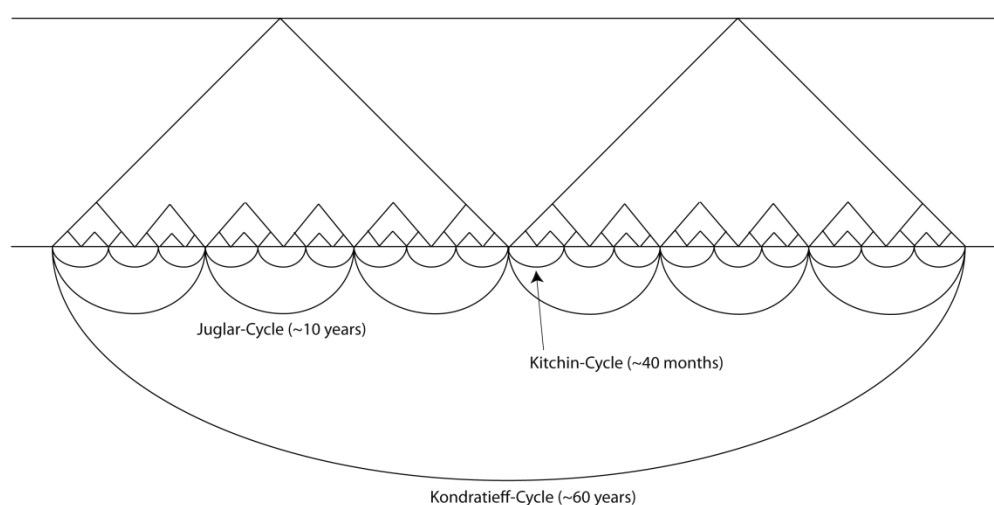
Beides, Auftrieb und Deklassierung, ist theoretisch und praktisch, wirtschaftlich und kulturell viel wichtiger als die Existenz relativ konstanter Besitzpositionen, auf deren Funktionieren allein so lange alle analytische Aufmerksamkeit konzentriert war. Und in ihrer besondern Art sind beide viel charakteristischer für die Wirtschaft, die Kultur und die Resultate des Kapitalismus als irgend etwas von den Dingen, die im Kreislauf beobachtet werden können. Schumpeter (1997 [1911], p. 369)

Hanappi (1987, p. 50ff.) explains in his work on *long waves*, by analysing Schumpeter's (1939) work on '*Business Cycles*', that Schumpeter considers all economic activities as actualisations of overlays between various cycles, which are of different duration. Furthermore, these cycles may also reflect major stages of economic periods, in case of Kondratieff cycles for instance. Schumpeter's cycles are composed of two waves in each case. The two waves are of fractal nature in his business-cycle theory (they look literally like a *M*), because any cycle, irrelevant of duration, can be reconstructed self-similarly via these waves.

Volkswirtschaft, unter Berücksichtigung der (im zweiten Kapitel) begründeten Tatsachen, daß das Neue in der Regel nicht aus dem Alten herauswächst, sondern neben das Alte tritt und es niederkonkurriert und alle Verhältnisse so ändert, daß ein besonderer ‚Einordnungsprozeß‘ nötig wird.

The first wave or *primary wave* is characterised by a period of prosperity invoked by extraordinary innovative entrepreneurial activity (e.g. Kondratieff *spring* ~15 years);⁸⁶ followed by a recession with a high amount of adopters after the peak of the prosperity phase (e.g. Kondratieff *summer* ~15 years). Prices get unstable at this point and disturb the market equilibrium. Increasing prices raise potential speculation, initialising a second slope (e.g. Kondratieff *fall* ~15 years) leading to the *secondary wave*, then overinvestments may lead to a bust of the speculative bubble where prices reach their real values again, and the recession becomes a depression (e.g. Kondratieff *winter* ~15 years). Afterwards a new cycle may start at this ‘equilibrium’ turnaround, explains Hanappi (1987, p. 51). In a chart-like visualisation these waves represent the characteristic *M*-style of a business cycle. It has to be noted that Schumpeter said a lot about the duration, composition and length of cycles, but he hardly spoke about their amplitudes. The duration of a cycle is dependent on the individual character of the innovation; ‘...*the structure of the industrial organism*’. Every long cycle meets a short cycle at ‘equilibrium’ points, so that the amount of short cycles needs to be a multiple of the amount of long cycles. Schumpeter subsumed his theory in a *three-cycles* schema. There can be respectively three *Kitchin*-cycles of a 40 months duration in one *Juglar*-cycle; 6 *Juglar*-cycles of a 10 years duration in each case in one *Kondratieff*-cycle of a 60 years duration. Figure 3.7 illustrates a stylised Schumpeter cycle.

Figure 3.7: Schumpeter’s long-wave 3-cycle scheme - illustration

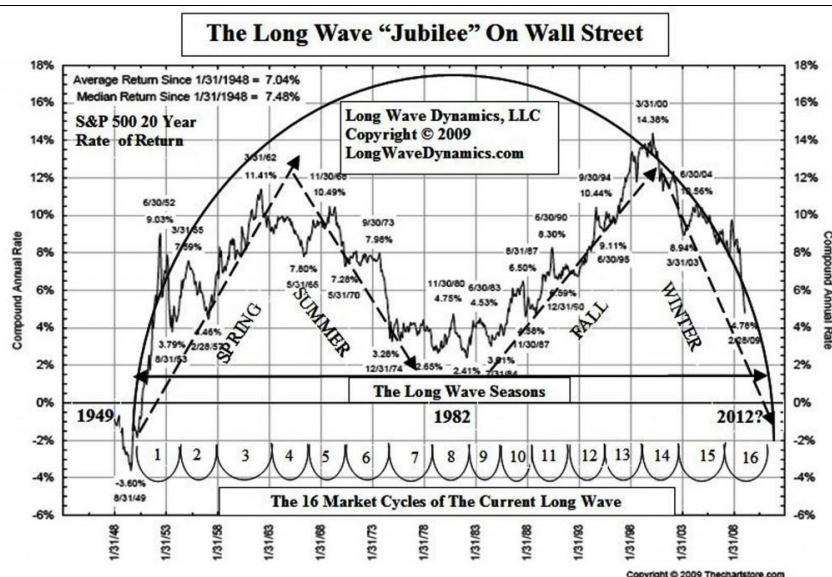


Source: own source

⁸⁶ Compare figure 3.8. for Kondratieff seasons.

Schumpeter considered the intersections of these cycles as unusual economic phenomena of extraordinary intensity; especially when the intersection phases are prosperity- or depression-phases. The intersection points at Kondratieff-cycles represent major economic turn-arounds then, which can be compared with the rise of ground-breaking inventions. Figure 3.8 shows the current Kondratieff-cycle associated with the S&P 500 index from the NY-Stock Exchange, from 1949 to 2009. According to investigations of *Long-Wave-Dynamics* the current cycle should end in the year 2012. Figure 3.8 also shows the so-called Kondratieff seasons. Every cycle is composed of two waves, which consists of two seasons, an up-season (fall and spring) and a down-season (summer and winter). The seasons correlate with the slopes of the S&P 500 in a very good manner, as one can see in the chart. Further they are interconnected with major institutional changes in society, due to the introduction of real novelties, compare table 3.5. Those can be considered as powerful inventions capable to turn upside down. The second industrial revolution was invoked by the invention of the steam machine leading to tremendous changes in society and culture. The manufacture of petrochemicals led to the fabrication of synthetic materials enabling new modes of production as well. Finally the last big invention was the internet leading to accelerated globalisation processes and communicative chaos (compare Web 2.0).

Figure 3.8: Long waves – Kondratieff cycles (S&P 500 from 1949-2009)



Source: Long-Wave-Dynamics (<http://longwavedynamics.com>)

Note: Long-Wave-Dynamics considers a Kondratieff-cycle with an optimal duration of 56 years, The current long wave began 1949 and will probably end in 2012, according to theoretical considerations.

Contemporary R&D focuses on bio- and nanotechnology for example, where we still do not know what we have to await. New findings of the *Human Genome Project* will lead to even genetic changes in human life; such processes will be followed by big ethical and moral discussions concerning the cultural future of humanity. Innovations like those change cultural, economic, social and political life dramatically. But remember these inventions wouldn't be drastic without the work, hope and good will of a bunch of entrepreneurs, backing these horses. Their mostly lagged impact forces new institutional developments. The introduction of new global unions was inevitable in international politics for example, like the UN, the IMF or the world-bank. These institutional changes got necessary with the rise of globalisation, which was driven by inventions like electrification and new communication systems like the telephone or the internet. Nevertheless they still lack fair and globally balanced governmentalities. In the post-war boom electronics and consumer products have driven the economic upswing. This upswing was connected with new production methods and new production locations. This period needs to be associated with tremendous labour and investment shifts from the OECD countries to the Non-OECD countries.

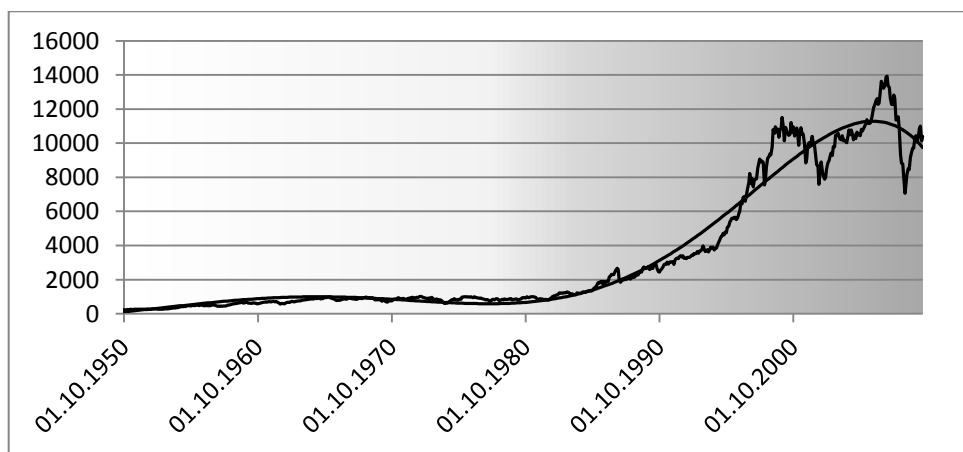
Table 3.5: Economic periods according to major inventions

Period	Date	Innovation	Saturation point
<i>First Industrial Revolution</i>	Circa 1800–1850	Cotton based technology; spinning weaving, etc.	1810 –end of Napoleonic Wars
<i>Second Industrial Revolution</i>	Circa 1850–1900	Age of steam; railways, shipping, heavy industry, iron and steel, etc.	1870s
<i>Third Industrial revolution</i>	1908–1947	Petrochemicals, internal combustion engine, electrification.	Inter-war slump 1920s and 30s
<i>Post-war Boom</i>	1947–1991	Consumer goods, electronics, etc.	1973
<i>Contemporary Era</i>	1991 – present	Internet, wireless technology, biotechnology, etc.	2010s

New institutional structures like trade unions, health organisations (WTO, WHO, etc.) emerged around the world and tried to shape global production and consumption. Global institutional networks are still in their infancy, concerning their educational and interfering duties. A good example is given by the semi-conductor industry; it is now well-known that electronics and semi-conductors are majorly produced in Asia and their corresponding necessary resources harvested in Africa. Low wages and cheap production conditions (factories, equipment, and resources) let multinational corporations manufacture their products in e.g. South-Chinese provinces like Guangdong. Such economic processes have to

be considered as post-colonial exploitation.⁸⁷ Insofar we have to admit that the huge economic upswing of Western OECD countries, compare the last wave of the Kondratieff cycle in figure 3.9, was made possible with the bleeding hands of exploited African and Asian workers.⁸⁸ Figures 3.9-3.11 show the development of the Dow Jones Industrial Average Index, one of the major indicators for industrial growth, along three different scales. These diagrams shall provide an empiric embedding for Schumpeter's cycle scheme. Obviously real data does not reproduce the same cyclic behaviour as theory proposes. All three diagrams include a polynomial trend calculation to the 6th potency, which shall stylise or illustrate the wave-like development of the index. In figure 3.9 we can follow the trend of the current Kondratieff cycle consisting of two waves, visualised in white and grey with an according duration of 30 years for each wave. Figure 3.10 and 3.11 are divided in 4 waves from white till dark-grey. Figure 3.10 provides the data for 2 Juglar-cycles from 1990 till 2010. Figure 3.11 shows the trend of two Kitchin cycles from 2003 till 2010. All diagrams are made on the grounds of the same monthly data set; consisting of index points for the Dow (at closing time). Even if the cyclic character is not a perfect fit, still the index shows the characteristic behaviour of the Schumpeter schema, but with a lot of volatility regarding the amplitudes.

Figure 3.9: Dow Jones Industrial Average 1950-2010 – Kondratieff cycle à 60 years



Source: data driven from <http://finance.yahoo.com>

⁸⁷ Compare *MakeITfair* and *WEED* reports on exploitation in mobile phone and computer production in Africa and Asia. *MakeITfair* (12/2007), *MakeITfair* (09/2008), *MakeITfair* (06/2009), *WEED* (12/2008).

⁸⁸ Compare also the movie-documentation on contemporary globalised exploitation of labour force in several industry sectors: miners in Donbass-Ukraine, sulphur carriers in Kawah Ijen-Indonesia, butchers in Port Harcourt-Nigeria, welders in shipbreaking yards in Gadani-Pakistan, steelworkers in Liaoning-China; by Michael Glawogger, *Workingman's death* – 2005.

Richard M. Goodwin always explained that the Schumpeter cycles are models and not prediction tools, hence they will never fit perfectly. Nevertheless they are able to explain and have to be understood as a theoretical kit for endogenous development. *'The Kondratieff will shape the Juglar and the Juglar will distort the Kondratieff.'* Goodwin (1990, p. 83) The different cycles have different causalities in real economic terms, but they do influence each other in recursive matters.

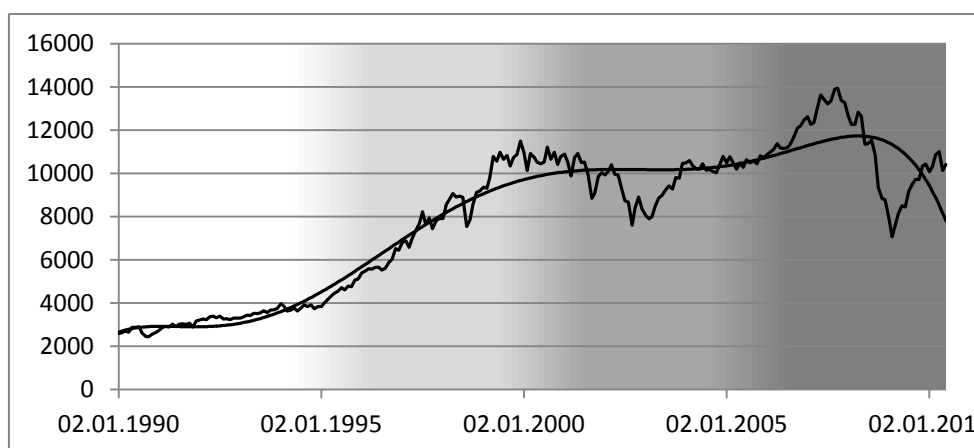
Schumpeter did not have the methods to model these dependences in an adequate, i.e. non-linear way. Goodwin (1990, p. 83-84) shows how to do it with contemporary methods, along the elegance of a neat non-linear difference equation system. His model is able to visualise Kondratieffs and Juglars in one system. He denied to model the Kitchins, because *'Innovations play no essential central role in the Kitchins'*. Goodwin (1990, p. 83) His simple abstract discrete-time model looks as follows:

$$x_{t+1} = ax_t - b(y_t - z_t)$$

$$y_{t+1} = bx_t + a(y_t - z_t)$$

$$z_{t+1} = cx_t - dy_t^3 + ez_t$$

Figure 3.10: Dow Jones Industrial Average 1990-2010 – 2 Juglar cycles à 10 years

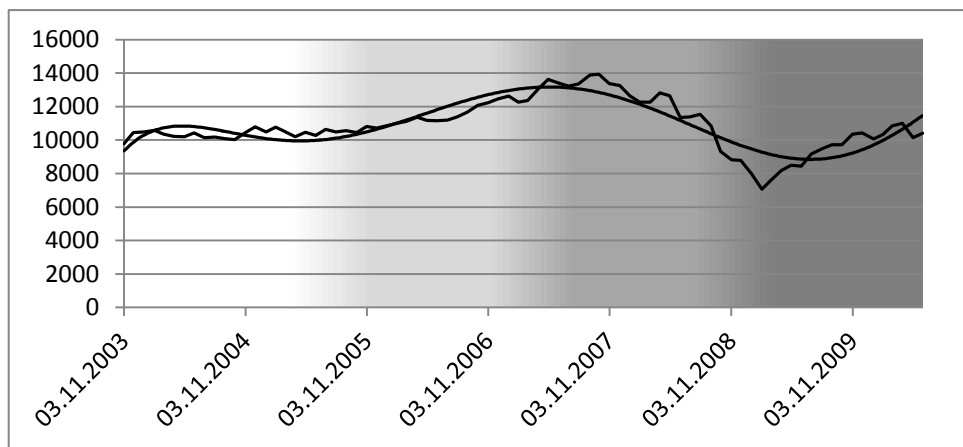


Source: data driven from <http://finance.yahoo.com>

Goodwin (1990) does not deliver much about the parameter space, just that the system has to follow a positive, constant trend. He uses *suitable* parameters for all of them; c remains the control variable. He simulates the system for a 100 year timespan and compares it with the Schumpeter cycles. Results and illustrations show the same characteristic behaviour as

theoretical investigations suggest and can be compared in Goodwin (1990, p. 84). At last Goodwin notes that the Schumpeter system is not a system to predict economic activities in the future or to use it as a speculation tool; moreover it just shows decent regularities within irregular metrics. The Schumpeterian business cycles represent his own vision, a model capable of explaining economic reality, but not of predicting it. It visualises *generic* change in a very self-similar way.

Figure 3.11: Dow Jones Industrial Average 2003-2010 – 2 Kitchin cycles à 40 months



Source: data driven from <http://finance.yahoo.com>

Business cycle theory helps us to understand generic institutional change in two ways. First, the economic dynamics of boom and bust influence directly institutional developments and cultural environments, still invoked by innovative entrepreneurship under uncertainty. In this case, economic activity triggers changes in the institutional domain. Second, the theory of business cycles dealing with emergence, diffusion and dissipation of innovation, can be used to build a similar theory of institutional life-cycles. This problem is majorly challenged by Kurt Dopfer in his work on *meso*-dynamics. In the last sub-section on *meso-trajectories and regional innovation systems*, we will see how business cycle theory can be used to create analogies, similarities and whole theoretical bodies for institutional evolution. This section will explain an institutional life-cycle theory, which builds upon Schumpeter's legacy, i.e. endogenous generic change, capable of dealing with the interdependence of long-run and short-run institutional evolution. This case gives also potential explanations for an inverse causality; institutional change triggers economic activity. We will see that both categories are

inseparably interwoven and need explanation within an endogenous wave-like feedback system, however this may look like.

CREDIT, INSTITUTIONS AND CAPITAL

...practically and analytically, a credit theory of money is possibly preferable to a monetary theory of credit. Schumpeter (1954, p. 717)

Schumpeter associates trust and safety with the emergence of bank notes. Bank money, understood as transferable deposit, was not the great novelty in the late 17th and 18th century, but the new practices and conducts involved with it made up the novelty; as we already elaborated by talking about the evolution of money along Ferguson (2009) in section 3.3.

... the note that was a goldsmith's receipt for gold actually deposited was really nothing but a device for increasing safety and convenience in handling one's money, and fitted in perfectly with older ideas. New, however, were the practices of which the bank note became the chief vehicle, and the importance it acquired in consequence. Schumpeter (1954, p. 317)

This safety and convenience created trust among people and merchants, by the introduction of a new institution, i.e. banking. Schumpeter's interest in the novelty of issuing money is also connected with the rise of new analytic economic practices. He argues that in earlier times trade was always considered as *perfect* trade, so that commodities were exchanged exactly, without any residue. The monetary system changed with the evolution of money to credit-money.

'Credit' operations of whatever shape or kind do affect the working of the monetary system; more important, they do affect the working of the capitalist engine – so much as to become an essential part of it without which the rest cannot be understood at all. This is what economists discovered in the seventeenth century and tried to work out in the eighteenth: it was then that capitalism was analytically discovered or, as we may also say, discovered or became analytically conscious of itself. Schumpeter (1954, p. 318)

The new possibilities, enabled by credit, changed the monetary system tremendously. The banker's function is about supply and velocity in this new system, it looks as she accelerates the cash flow among economic agents. The bank becomes a third intermediary, independent and impartial element within a trade – the *trader per se* –, which entails a very powerful function, the issuing of bank notes and the allocation of credits. Let us briefly consider Montesquieu's separation of state power in executive, judicative and legislative forces. Modern central banks do reflect a fourth force in this separation. The credit is therefore the most influential and powerful tool of a bank, which on the one hand earns and necessitates

trust, but on the other hand has to work as a national power-balancing instrument as well, in case of last resort lenders such as central banks. The credit '*is merely a method of using it [money] more efficiently.*' Schumpeter (1954, p. 319) At a first glance it seems that credit-money also speeds up the velocity of cash flows, but this observation just remains a superficial one. Credit creates additional money. Still banks have to balance out incoming and outgoing money, but the roots and paths of a specific credit are not uniquely traceable. A credit for person A cannot be traced back to a specific deposit of person B, because banks use customers' deposits as a single pot for further transactions, e.g. credits. Hence banks are able to create money independently from certain, custom deposits, so they do not merely exchange (understood as multilateral bank relations) money anymore, they expand or restrict it, in terms of money supply. Additionally created money let the banking system look like a cash-flow accelerator. Schumpeter (1954, p. 320) ads in this respect:

...it is clear and actually beyond dispute that what the banker does with money cannot be done with any other commodity – or, as some of us would prefer to say, with a commodity – for no other commodity's quantity or velocity can be increased in this way.

Here we may also find the most crucial link between the real and the monetary sector of the economy. Money is not a commodity anymore, only in the eyes of a theoretical metallist, as Schumpeter notes. The evolution of money also implies the evolution of the most dominant modern institutions. With the emergence of credit-money banks got more important than ever in the economy. Hanappi (2009, p. 4) explains that money as credit becomes a process, because its value gets *continuously* judged along different social and cultural environments. Credit is about the trustworthiness of a whole economic system, with the rise of banks this trustworthiness got institutionalised during the Middle Ages. The banks took over the role of a contractor between a debtor and a creditor just on a superficial layer. Money changed dramatically, from a commodity-based, feudal, metallist structure to a financial contract in continuous process, i.e. the credit. Within this specific development lies a very deep evolutionary process of economic institutions. Property and wealth got completely redefined.

And this process, due to the ongoing change of money and commodity forms representing different systems of social value in different countries, produces its own type of time: economic time. Economic time runs parallel but not synchronous to physical time. ... It is the growth rate of the amount of credit-money, which serves as measure of economic activity; if it falls to zero, then credit-money collapses and remains just money. Hanappi (2009, p. 4)

Therefore the interest rate determines economic time and consequently constitutes asynchrony of the economic agent and her corresponding biological identity. Now the argument goes on by defining the timers of the economic process. Hanappi (2009, p. 5) explains that the feudal structures broke down in the Middle Ages, because power moved on to the banks which grow out of networks of private households, compare for example the rise of the Medici in Northern Italy. These households used their savings to finance other non-feudal groups, e.g. merchants. Therefore we may conclude that these households induced institutional change by allocating credit-money. The new economic world built upon these emerging institutions concerned with this new kind of money. Credit-money also invoked the rise of private, independent, economic agents, because for the first time they could engage in separate economic activities, free from feudal ‘slavery’. Hence the contemporary economic rule-setting as well as our system of law builds heavily on the grounds of these unique changes in economic evolution. Major institutional changes were induced and the transformation from feudal, rural structures to the political entities of city-states and finally nation states came slow but steady. Nation states understood as accumulation regimes are primarily interwoven with the idea of capital, as Hanappi (2009, p. 6) argues. Otherwise Arena and Festré (1996, p. 117) argue that banks cannot be characterised as pure contractors or intermediaries, because of informational asymmetries between all of the participating parties. The authors support the idea of Stiglitz and Weiss (1988) that banks appear as *social accountants* in the economy, instead of mere brokers. The consequential role of the bank is to substitute the asymmetries between firms and banks within an auction market. The Schumpeterian story tells us that these auctions characterise capitalist development, the evolution of business cycles and the evolution of institutions in a very dominant way. Insofar we may suppose that Arena and Festré (1996) focus on the monetary and credit part of entrepreneurship, innovation and business cycles. They argue that mainstream economics as well as several other interpretations of the Schumpeterian concept considered the implications of capitalist development too narrowly by concentrating too much on factors of the real side of the economy, i.e. technology and structural change. The crucial point in their analysis faces Schumpeter’s break with the Walrasian general equilibrium system, where the market is just considered as *one hypothetical* auctioneer.

However, it is the *finance* side of Schumpeter’s writings that demonstrates his break with Walras, especially in light of the history of economic dynamics and of monetary theory. Arena and Festré (1996, p. 117)

The monetary argument for capitalist development also shows that there are analytic arguments beyond a single *hypothetical* auctioneer. The capitalist system has to be considered as a network of several heterogeneous auctioneers engaged in a market process, those are real persons fighting with uncertainty as well. Hence trust is dedicated to real people with flesh and blood, who are the real determinants of economic dynamics. According to Schumpeter there are two spheres in economic development: first, the *business sphere* where commodities are traded and money is circulated through banks by providing credit. Second, there is the sphere of the *money market* which enables the development of stock markets. Money is not circulated anymore, i.e. *idle* money. *Ad hoc* created credits in the commodity sphere provide financial instruments for entrepreneurs; hence entrepreneurs always have to be debtors in a first instance. In this respect banks earn a serious and respective role in the economic process of innovation. Of course they are more than less involved in daily deposit business, nevertheless they decide on the specific volume of credits for risky, uncertain economic activities. For that very reason it is impossible to explain innovation within a system of circular flow, because entrepreneurial activity is in need of money expansion; finally – regarding just the creation of extra money – it does not matter whether the specific credits come from other firms, banks or the government. This part of Schumpeterian economic thought has to be regarded as a pure dynamic one and we have to recognize that these dynamics are totally dependent on institutional structures, which represent the possible origins of money expansion. Here is the locus of economic development. As a parallel *modus operandi* for economic dynamics Schumpeter suggests the *steady growth* model, which builds upon mere saving and investment without any money expansion and credit. In this case we do not need any banks; it represents an economic scheme of subsistence. The third case which is not treated here builds upon the idea of arbitrageurs, who trade on the ease of incomplete information and asymmetries. However, the dynamic model implies a growing specialty of contemporary economic possibilities. Money expansion through credit involves a positive interest rate, which allows capitalists to increase their savings in the second sphere of economic development, i.e. the money market. This economic opportunity reflects a well-known practice today, since the money market spilled over during the last 30 years. In fact the problem is that capitalists do not focus on innovation anymore, because it is much easier to duplicate or to triple their capital via strategic financial investment in other mere financial structures in the money market; where the yields grow and grow till bubbles bust. It is also a

major economic threat that this money is not circulated anymore within the real sector of the economy; it will dissipate in virtual economies. Accordingly the authors cite the following:

...on the surface ... credit creation tends to lose its relation to innovation and ... becomes an instrument for financing business in general. Schumpeter (1939: I, 159) in Arena and Festré (1996, p. 123)

Schumpeter synthesises the two markets by arguing that the money market determines the *short run* rate of interest and that there is no such thing as a *long term* rate of interest, just given by industrial organisation in the real economy. Short term loans and long term assets are of the same nature. Schumpeter insists that long term assets are just trend values for short term loans. Consequently, long term assets are prevailed short term ones, where high risk amortised. Then banks do also shape the long term development of the economy, influencing technology, innovation and knowledge accumulation by determining the so-called trend-values. In conclusion Arena and Festré (1996, p. 126) note that Schumpeter introduced a circularity between industry and finance. This circularity makes his so-to-say monetary extension a serious competing theoretical body to orthodox monetary economics.

Institutions and capital

The classics majorly assumed that the institutional frame of capitalist societies stays constant; hence they took it for granted and exogenous, with some expectations. Mill argued that people may change institutional settings along rational projections, but the idea of institutional change from within remained a Marxian heritage. Schumpeter argues that the English classical economists envisaged institutional constrains just on the grounds of private property relations; which majorly emerged with the rise of money and credit. The one and only considered institutional body was the medium-sized firm, understood as a private partnership. These partnerships then shaped free competition, remaining the only institutional assumption. Therefore competition was not understood as a market property, resulting from economic actions; it was rather taken for granted. In fact, during the classic period political economy was built on *laissez-faire* arguments. The state's function was to protect the firms and to guarantee low taxes for good business, hence political economy was more than less made and controlled by the business class, by the owners of *capital*. And only these owners shaped institutional conditions, because capital involves power and nothing else.

And, though for different reasons in different countries, this was so in actual practice not only as a matter of fact but also as a matter of practical necessity: no responsible administrator could have held then, and no

responsible historian should hold now, that, social and economic conditions and the organs of public administration being what they were, any ambitious ventures in regulation and control could have issued in anything but failure. Schumpeter (1954, p. 548)

In Schumpeter's eyes political economy is just about scientific expertise and needs to make analytical progress in order to justify fiscal intervention and public administration along analytical terms. Schumpeter explains that economists were simply too inexperienced and analytically too weak, that they could interfere with the market without creating economic and political turmoil. This notion reflects on the one hand a very characteristic attitude of Schumpeter, regarding economic professionalism and realistically shows that economists were not equipped with the necessary knowledge and experience to handle the new complexity of the economic process in that period on the other hand. As a logical consequence, laissez-faire was the only political program appearing on the horizon. The institutional setup of the state was in its infancy, in comparison to the economic challenges it should meet. In the 18th and 19th century statesmen were mostly landlords and capital-owners, hence the incentives for increasing and improving the economic knowledge for restrictive fiscal policies were not really that high. These circumstances certainly changed with the rise of the working class during the industrial revolution and the idea of the *nation* changed as well. The formerly concept of a mere bourgeois nation got disturbed, since the proletariat gained more power. The nation could no longer just serve the ends of landlords and capitalists; a nation's population had to diversify its goals for the first time. The new categories of social classes invoked major institutional changes, slow but steady. Marx and Engels showed that the capitalist process built upon exploitation. Their economic analysis introduced heterogeneity into economics, whereby the English classic economists envisaged the economic agents in a single homogenous category. Schumpeter (1954, p. 552f.) argues that the conception of social classes also introduced a new economic analytical dimension, now also dealing with real public affairs, such as resource allocation and income distribution. In fact, this analytic turn brought political arguments into the economic realm and a new political economy was born. The class structure of a society constitutes along its distribution of capital and its productive methods in a first instance, but to a greater extent it deals with accumulation, especially with regimes of accumulation. This argument involves capital formation as an accumulation process, which is extensively treated by Hanappi (2009, p. 6 ff.). Capital is here understood as an abstract algorithm guiding economic action; hence agents are driven by this accumulation process. This specific idea applies very well to the general

theme of this work, because it deals with a generic principle of change. Hanappi (2009, p. 7) suggests following sequence of capital sub-processes encapsulated in a loop.

Capital Algorithm by Hanappi (2009, p. 7):

```

For each member of the set of currently possible visions do ('vision
loop')
{
  o Produce a vision of specific entrepreneurial activity
  o Check expected wage cost
  o Check expected interest on credit-money (vulgo 'capital cost')
  o Check expected effective demand
  o Compute expected growth rate of capital
  o Estimate the probability to achieve that growth rate
}
Choose the vision yielding the highest utility of a mean-variance utility
function
Check if the selected vision's utility exceeds the expected utility of a
supplier of credit-money
If the lender's utility is higher,
    then perform the chosen project,
    else become a supplier of credit money.

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This kind of algorithm shows capitalist performance within a Schumpeterian model of entrepreneurial innovation. Hanappi (1989) explains how capitalism developed in their characteristic stages, from merchant capitalism in Northern Italy until industrial capitalism. Then Hanappi (2009, p. 7) proposes that we act within an *integrated capitalism* nowadays, because almost all human action is already integrated and incorporated into this very capital algorithm.

In the end – in Hanappi (1989) – this stage is called ‘integrated capitalism’ – not only production units but every household, and every institution has become a private economic agent following the abstract algorithm of capital accumulation. Concepts like human capital and competence capital show that the higher degree of abstraction that money did arise to, enables and opens up an incredibly wide field of possible application. It is thus not surprising that in the history of economic thought a sharp turnaround took place: *the mirror image of the real course of economic development observed in its contemporary state started to be taken as its actual origin*. Hanappi (2009, p. 7)

By that we are able to explain the capitalist process as a self-similar generic principle trying to envelope all human spheres. For that very reason economics could develop as an atomist science of private economic utility-maximisers. Therefore mainstream economics could also reshape the idea of prices. In a stringent orthodox economic concept ‘...prices are exchange relations of quantities of commodities and not a monetary expression of the social value of a unit of a certain commodity’. Hanappi (2009, p. 8) We may conclude then, as also Hanappi

explains, that this conception led to the quantity theory of money, generally neglecting the role of money as credit and foremost as capital. The vision of *money as a process* is not incorporated in this model. Hence money remains exogenous in the orthodox model; consequently *institutions* have to be exogenous as well there, because their development is neatly interwoven with the rise of new forms of money relations and new forms of money interpretations; of course also including new forms of credit and capital. An endogenous theory of money is of utmost importance nowadays, we need to understand how money endogenously mutates into new forms. Hanappi (2009, p. 8ff.) shows what went wrong with economics along this argument, starting with the dominant rise of microeconomic theory, which neglected money as a social relation with a social value. Within such a perspective it was not possible to develop a theory of technological progress as well as institutional change. This would have been possible, as Hanappi (2009, p. 9) notes if economic agents would have been treated as what they really are: *exploitation maximizing enterprises and not as mere traders*. Such a perspective opens a realistic picture of capitalism and suggests looking into the various forms of money and more over into its evolutionary process, connected with the evolution of institutions.

TECHNOLOGY

Another dominant theme in Schumpeter's work is about technological change and creative destruction. In this short sub-section we will elaborate the main characteristics of the concept of creative destruction and its influence on technological change and the evolution of institutions. Metcalfe (1998) gives a brilliant introduction into the very idea of evolution in economics. His outstanding work is special in two ways and therefore relevant for this section. He focuses on economics as a rival and competitive process which changes from within in Schumpeterian tradition and he explains why structural change is not stationary or gradually.

Evolutionary processes are processes which explain the changing patterns in the relationships between entities. Creative destruction is an apt description of the genre, and what makes capitalism distinctive is the decentralized and distributed capacity for introducing new patterns of behaviour, whether they be technological, organizational or social, they are the fuel which drives economic change. Metcalfe (1998, p. 3)

Metcalfe (1998) also proposes that growth and economic change is fundamentally diverse and that technological impacts may trigger enormous and surprising growth rates, which then shape economic structure in new ways. He gives several examples regarding the rise of information technology in comparison to the automobile sector in the last decades or the rise of genetic engineering as an uncertain process regarding moral or ethical issues, but as a process which will certainly establish huge structural change. In fact capitalism is a system in need of speciation along competition. Metcalfe (1998) explains how evolutionary mechanisms work in a socio-economic context, by that he also emphasises that *'Economic variation is simply not random enough for the Darwinian process to work.'* Metcalfe (1998, p. 6). Hence it needs more than the Darwinian trajectory to grasp the nature of economic evolution, which is endogenously transformed by human beings. This notion is also a fundamental concern of Schumpeter which persists visible in his whole career. It encompasses creativity and novelty. In the chapter on ontology we have already discussed the issue of novelty along the work of Witt (2009). In this work we have learned how complex and difficult it is to describe the concept of novelty or to describe *idea* from an ontological perspective. Here in this heuristic context we are more concerned with the collective strive for something novel and its coordination or non-coordination process.

The individual acts of creativity on which its mechanisms of change depend are remarkable for their lack of co-ordination. Yet the consequences of this immense micro creativity depend deeply upon the strong co-ordination of the fruit of that creativity by market processes. The joining together of the uncoordinated striving for innovation with the subsequent market co-ordination of the resulting activities is for me the distinctive feature of the capitalist mode of change. Metcalfe (1998, p. 6)

The individual cognitive act of creativity is the tip of the iceberg; the whole process of innovation is involved with a variety of other factors, one of them is competition which is mostly also connoted with destruction. Innovations diffuse and create new patterns of behaviour, but they also trickle off old patterns. The relationship and dependency of technology and culture gets closer when new systems of thought or competitive relations are introduced along certain innovations. The differences in behaviour, the different patterns of habits and conducts govern the rhythm of economic evolution. This rhythm also tests new technologies for their practicability and degree of innovativeness. Metcalfe (1998) suggest in a Schumpeterian tradition that this continuous testing is a market process of trial and error, following an evolutionary logic, so innovation also remains an unpredictable bottom-up process. In this respect Metcalfe (1998) agrees with Schumpeter as well as Hayek, that

innovative contest is a competitive discovery process, shaping economic institutions. Hence equilibrium capitalism has to be a contradiction in terms. Different technologies set up a variety of industries, which are for themselves competitive. It is not only the number of firms making the industry competitive:

Thus an industry is not competitive simply by virtue of the number of firms it contains but because increasing numbers imply increasing scope for differential behaviour. Metcalfe (1998, p. 18) quoting Loasby (1982.)

Metcalfe (1998) compares competition with contesting, as a fundamental evolutionary property. Struggles or contests motivate people to participate and to innovate in the economy and to master the game. Industries are perfect arenas for these evolutionary contests, where firms compete for success, in order to influence the rules. Dasgupta and Stiglitz (1980) argue that the high economic performance of advanced industrial nations stems from their continuous innovativeness. Innovations emerge where competition within industries is quite dense and where the contests are fiercely disputed. A difficult topic within Schumpeterian economics deals with the degree of competition, or the composition of liberalism and regulation within a social market economy. It is an issue which concerns the whole heuristic character of institutional change. Competition may favour innovativeness, but it may also raise social costs. This trade-off influences economic debates on growth, technological change and welfare in a very fundamental way. Policies walk on this thin line. Nevertheless empirical findings have shown that the mantra of perfect competition tips over. Dasgupta and Stiglitz (1980) also argue that the concentration of an industry is more the cause of innovation and not the other way around, so that concentration has to be understood as endogenous in industrial organisation. In order to understand technical progress the authors look into three different market structures and analyse their nature of inventive activity and potential for innovation. This kind of economic research, as well as the development of the Neo-Schumpeterian doctrine of Nelson and Winter (1982), can be regarded as the upcoming of the new industrial organisation literature, concentrating on structural change and economic behaviour. Here the degree of concentration and potential innovation depends on, as Dasgupta and Stiglitz (1980) write, *more basic ingredients*, such as the technology of research (patents,...), demand conditions, the nature of the capital market (interest rates,...) and the legal structure. Further the relationship of industrial concentration and innovation is not regarded as causal. In fact, industrial organisation and technological progress depend on a complex bunch of institutional conditions.

We will see that the whole body of the new literature on *innovation systems* depends tremendously on the early work of scholars like Dasgupta and Stiglitz (1980), Nelson and Winter (1982), and Dosi (1982) for example. Micro-economic theory suggests looking into the decision-making of a single firm and aggregates it for a whole industry. Industrial organisation is far more complex, there are several firms competing for market shares, their decision-making has to be considered as interrelated. Why is the study of technological change and industrial organisation important for our concerns? The structure of an industry and its technological potentials influence the institutional setup of our society, feedback effects from innovations to institutional change have to be considered. Technologies of change conducts and create e.g. new modes of communication, transport and so on. Firms have to react on cultural change and need to consider them for their expenditures on R&D. Dasgupta and Stiglitz (1980, p. 202) refer to risk-taking as a crucial issue concerning strategy formation in industries. R&D strategies reach between pure imitation of other firm strategies and pure risk-taking; specific R&D risks will tremendously depend on the cultural background. Therefore a lot of R&D expenditures can be either wasted due to duplication and imitation strategies or a lot of production efficiency can be lost when too much risk is taken. This spectrum opens the decision radius for the entrepreneur and her organisation. Furthermore technical progress and aggregate output will depend on these decisions consequently. The most crucial thing is:

What makes the analysis all the more difficult is that each decision on the part of a firm has to be made within an industrial structure which is itself endogenous. Dasgupta and Stiglitz (1980, p. 202)

Technical progress is about endogenous structural change. Industries do not have constant structure and they do not look the same around the world. They are heterogeneous economic systems with a huge variety of different goals and duties. Together they create progress in a continuous way of creative destruction, in a non-random as well as non-determinant way, i.e. path-dependent. Additionally progress does not necessarily mean something normatively good. Conclusively, expenditures in R&D do have a strong impact on society. For a rather long time, economists have thought that there cannot be too much investment in R&D, so the only threat for an innovative industry – from the society's point of view – was the rise of a monopoly or a cartel. Overinvestment in R&D can raise similar problems as under-investment for technical progress. The analysis of competition in R&D brings in several advantages compared to the common analysis of product competition. Technical progress is not only

dependent on the invention and diffusion of a new product; it is mostly concerned with process innovation, which usually aims at reducing production costs. Dasgupta's and Stiglitz's (1980) study focuses especially on competition in R&D for process innovation, so that firms within an industry may gain comparative advantage. This comparative advantage generates technical progress within an industry, so that firms gain better knowledge on production processes in the long-run. These innovative firms consequently increase returns to scale per unit. Finally, building upon the work of Arrow (1962), three different market structures are investigated: the socially managed market, the pure monopolist and the competitive market. Arrow's (1962, p. 152) conclusion was that '*...the incentive to invent is less under monopolistic than under competitive conditions, but even in the latter case it will be less than is socially desirable.*' So Dasgupta and Stiglitz (1980) reconsidered Arrow's conclusions. They introduced possible competition in R&D regarding the degree of expenditures and analysed the three cases again. Hence research strategies for process innovation play the major role in their new model. It appeared that entry conditions and barriers into the market do not play a crucial role. More than that, the authors have shown that higher competition does not lead to a higher degree of innovation for the whole industry, because:

The point is that while the industry spends more on R&D as a consequence of increased competition, each firm spends less. The extra expenditure is essentially wasted in duplication. ... We conclude that for the model at hand (unit) cost reduction is insufficient in a market economy whether or not there are barriers to entry; and consequently, market price for the product is higher than is socially desirable. Dasgupta and Stiglitz (1980, p. 281)

Obviously the monopolist does not have any problems with duplication in R&D; otherwise she would not raise R&D expenditures, since she is protected with entry barriers. Nevertheless the authors acknowledge that *the speed and rapidity with which technological innovations take place* are greater if there is free-entry into R&D of the market-economy.

These findings do all support the evolutionary trend in the economic theory of innovation and technological change, thinking more in systemic than mere functional terms. Innovation policies need social adjustments via regulation. Market economies building upon perfect competition (still a myth) will not deliver expected innovation capacities for technological advances. Innovation systems combine the competitive discovery process of an industry with the knowledge and autonomy of states, regions, universities and of independent research institutions.

Dosi (1982) emphasises that the introduction of a new technological paradigm has to be considered as a discontinuity in the economic process. A technological paradigm is here generally compared with a scientific one, a kind of research program. ‘*Ordinary*’ economic change is induced along technological trajectories, defined by a technological paradigm, hence this progress moves on continuously. Dosi (1982) argues that Schumpeterian companies or entrepreneurs emerge along a paradigmatic shift, so consequently one cannot describe the innovative process within a one-directional heuristic frame. More factors have to be included into the game, as also elaborated by Dasgupta and Stiglitz (1980). These more than less institutional factors shall change the scope innovation theories. In mainstream economics there are two dominant types of models for technical change: the *demand-pull* model and the *technology-push* model. Dosi (1982, p. 147) ascribes disadvantages to both types, but his propensity goes for the latter. Demand-pull models of innovative change are problematic, because they majorly work in a reactive way, where technologies shall become readily available. The market is the so-called *prime mover* of technological advances within this concept. Whereas technology-push models are conceived too causally determinant, here innovation has to happen along a strict path from science to technology and finally to the economy, in a rather autonomous process. Economic concepts, frames and heuristic devices differ mostly on the same question: central control or emergent coordination. Here the issue at stake is technology and its related scientific knowledge, so the question is also a little bit about epistemology. Society needs to think if innovation and technological progress *can (positive)* be enforced or controlled as an autonomous variable – regarded as radical innovation – or if innovation is a mere emergent property of a market demand-side process? Then there is also discussion whether society *should (normative)* foster radical innovation or should take some tea-time and wait for great spontaneous emergence. Both questions cannot be answered in a straightforward way, because technologies – also social ones like institutions – need a complex mix of both strategies. This mix is restricted to on the one hand local situational conditions – i.e. singularities/discontinuities – and on the other hand global regularities/continuities, actualised as trajectories. Dosi (1982) also proposes that each technological paradigm has its own innate concept of progress, so that the mode of innovation is an in-built property. This concept emerges out of specific technological and economic trade-offs, having a certain direction of advance, i.e. the technological trajectory.

The basic argument however maintains that there generally exist a possibility of knowing a priori (before the invention process takes place) the direction in which the market is 'pulling' the inventive activity of producers and furthermore that an important part of the 'signalling process' operates through movements in relative prices and quantities. ... With respect to producers, this viewpoint implies that the 'choice sets are given and the outcomes of any choice known'. Dosi (1982, p. 149)

So the focus lies on the modelling perspective of a demand-pull theory; it simply imputes an *a priori* knowledge of the market. This point obviously contradicts Schumpeter's perspective on innovation and technological change. The *reactive* interpretation of an innovative process does not fit into the idea of the entrepreneur. Otherwise one has to admit that the technology-push concept tightens potential *emergence* of innovation, because it works foremost within a one-directional frame. We may summarize that innovation models need to compete with the *complexity* of industrial organisation, *relative autonomy* of technology, *uncertainty* of producers as well as demand-side economic factors, such as consumer trends, needs and wants. Within such a frame it should be possible to trace back the transformational process of the economy. Dosi (1982) builds upon the idea of *scientific paradigms* and *research programmes*, elaborated from Kuhn and Lakatos. We already discussed the epistemological issues of *scientific progress* in the section on ontology by referring to Hanappi (2003) and Dopfer (2005). The major idea is to take an analogy between science and technology as sets of certain epistemes with respective advance directions. The paradigm plays the most important role in both categories, by constituting the core where axioms are mapped and positive as well as negative heuristics are communicated. Therefore Dosi (1982) suggests following definition for a technological paradigm.

In broad analogy with the Kuhnian definition of a 'scientific paradigm', we shall define a 'technological paradigm' as 'model' and a 'pattern' of solution of *selected* technological problems, based on *selected* principles derived from natural sciences and on *selected* material technologies. Dosi (1982, p. 477)

Hence a paradigm serves as a generic heuristic advice for framing problems in general. A certain technological paradigm serves generic technological needs; Dosi (1982) refers to *transporting commodities and passengers, amplifying electrical signals* and so on. A paradigm is like a grammar, it consists of generic conducts. Certain actualisations or to-be-called technological phenomena building upon a specific paradigm are then part of a *technological trajectory*; i.e. in terms of Dosi (1982, p. 477) the '*...pattern of 'normal' problem solving activity (progress).*' The generic need for transportation was entirely solved by the invention of the internal combustion engine, so a new technological paradigm was

born. We will find a lot of proper solutions along the specific transportation trajectory, but the combustion engine remained as the triggering innovation. Still an essential difference between science and technology lies in the composition of knowledge. Scientific knowledge is a hundred per cent codifiable, whereas technologies as well as their paradigms involve a lot of tacit knowledge, which cannot be expressed explicitly. Hence paradigmatic boundaries of science and technology differ a lot. Further we have to mention the as well the not negligible difference between their *cores* and their *belts*, i.e. according to Dosi (1982, p. 478) comparable with the difference between problem-shifting and problem-solving. Trajectories shape the diffusion process of new paradigms, though they are still shaped by diffusion. This somehow typical economic paradox is representative for all opposing forces as well as feedback dynamics in economic processes. In the next few lines we will explain a hierarchical selection process where top-down and bottom-up forces are involved in the emergence of innovation. The issue of diffusion is rather easy to treat in this respect, but it is difficult to find out why given paradigms are selected and others not. A possible explanation is given by Dosi (1982) along the idea that economic, social, cultural and institutional factors select a certain paradigm, they serve as a *selective device*. Nevertheless these factors do also influence the spectrum of possible technological directions, i.e. the trajectory itself; after a specific selection of a core paradigm. Dosi (1982) imagines a technological trajectory as a *cylinder*, where the boundaries are stated by the paradigm. Hence institutions form this cylinder and shape technological progress, further we may conclude that mere markets are not able to form such a cylinder, because they just act *ex ante* on technological change. The author speaks of ‘bridging institutions’ which are needed to communicate knowledge between pure science, and applied R&D. This issue brings back competition, namely competition among possible new alternative technologies able to build up a new paradigm and a new trajectory. Consequently we are confronted with a two-stage selection mechanism. The above discussed selection happens between science and technology levels. At the next level we have to consider a technology-production selection, where the markets jump in as selective devices *ex post*. The first selection mechanism sorts out the *direction of mutation* (selecting the technological paradigm) and the second mechanism sorts out *possible mutations*. Dosi (1982, p. 481) refers to the latter as a more Darwinian selection, which is also in tradition of a Schumpeterian process of trial and error.

This subsection dealt with institutional issues enabling technological innovation. Institutions involve political processes which constitute frames for innovation (the boundaries of the cylinder), in sense of specific orders. If we consider political institutions from a mere micro or macro perspective, then innovation will also remain in these domains; that means innovation will specifically rely on private ownership or state-driven corporations. Though the idea of regional innovation shall focus on the innovative potential of groups or communities as well. It is argued that the innovative process has its origin in the design of a nation's democratic institutions. Innovation follows trajectories dependent on political power. The power distribution within a society determines its groups of innovators. Hierarchical democracy setups do not enhance regional innovation; innovation then just remains from a bird's eye perspective then. Democracy design can give detailed insights how power gets enhanced in potential groups, then communities may enhance processes of regional innovation as a feedback. Such democracy design would be *meso*-founded. The point is that the specific architecture of a democracy fosters corresponding innovation trajectories. Hence the idea of trajectories accompanies us again in the last sub-section. Here we will bring together Schumpeterian heuristic concepts and transform them in a specific abstract, generic, heuristic device, working with the concept of *meso* from several perspectives.

FROM MESO-TRAJECTORIES TO A DEMOCRACY DESIGN ENABLING REGIONAL INNOVATION

The concept of *meso* grounds on the idea to bridge micro- with macroeconomics. It is basically argued that traditional aggregation methods, from micro to macro levels in the economy, ignore the processes leading to aggregation. It is therefore a project to find common heuristic and analytical instruments to treat aggregation as an endogenous process. Mainstream economics does currently not provide adequate frameworks or tools to compete with this issue. Aggregation is usually understood as a straightforward causal functionalism, hence it is by definition impossible to integrate the idea of *emergence* within the used instruments. Concepts as the general equilibrium framework and the representative agent cut off the *complexity* of aggregation. Consequently the idea of *meso* came up in the heterodox realm of economics, firstly as fundamental critique indicating the lacking of traditional

aggregation heuristics. Then it has turned out that evolutionary economics offers shelter for the meso project, because it emphasises emergence and maintenance of economic processes in comparison to economic equilibria. Emergence and maintenance does also supply two different, still interwoven, perspectives of the concept of meso, which shall be outlined in the following. The Schumpeterian idea of *innovation* is one but not the only gateway to think in terms of meso. The innovation perspective focuses more on emergence and diffusion than on specific structuring issues of meso coherences. This theme is especially considered by Kurt Dopfer, who showed in several publications that meso may also provide generic principles of economic and therefore institutional change. On the other hand meso deals with maintenance or *stabilisation* processes, finally unifying elements to a consistent whole. Hence this perspective covers the logic of stabilisation within a meso process. Wolfram Elsner illustrates in various publications what criteria have to be considered for the process of meso as group formation or general stabilisation in the economy. Where the first approach focuses more on the diffusion within a meso process, the second approach focuses more on the unification of this diffusion process.

meso as a generic principle

Dopfer et al. (2004) consider the economy as a complex rule based system contained in the *meso*. Here the meso represents a heuristic layer where institutional change happens in a kind of Schumpeterian way. Each meso unit consists of a rule and its population of actualisations.

Micro refers to the individual carriers of rules and the systems they organize, and macro consists of the population structure of systems of meso. Micro structure is between the elements of the meso and macro structure is between meso elements. Dopfer et al. (2004).

This quote can be treated as a definition of the meso and its relations to the micro and macro. Meso works as a missing link in aggregation processes between micro and macro, which constitutes it as a promising tool for our analysis of democracy design and community-driven regional innovation. Aggregation from micro to macro represents a kind of miracle in science, as also announced by Caplan (2008). Nevertheless this miracle remains the major object of evolutionary institutional economic analysis. Now it is widely acknowledged that institutions are engaged in the core processes of aggregation. Dopfer et al. (2004) provide a theory of endogenous economic change along a Darwinian metaphor, namely a meso trajectory that consists of three generic phases: *Origination*, *Diffusion* and *Retention*. The first phase of such

a trajectory is regarded as a micro-meso process, where new knowledge is introduced in the economy by a Schumpeterian entrepreneur. This new knowledge provides the base for the second phase where early adopters take it over and create new rules, or new meso units. This phase represents innovative activity which emerges out of invention. The theoretical fine tuning concentrates here on the possibility that an innovation may only occur on the grounds of creativity. Therefore it is not for granted that new introduced knowledge will be adopted immediately. The third phase considers a meso-macro process where an innovation gets maintained in the economy which results in a new coordination of the macro structure, now the rules are changed. Within this concept, meso is regarded as innovative power striving for new rule settings in the economy. Dopfer et al. (2004, p. 265) especially claim that the mantra of *algebracism* in mainstream economic theory may never analytically compete with the problem of aggregation, because it is pinned within concepts like general equilibrium or the representative agent. Aggregation remains summing up of units from micro to macro and decomposing from macro to micro. Of course, these instruments have advanced tremendously in recent decades, nevertheless the issue of real aggregation along emergent economic processes goes beyond this traditional logic. The issue of complexity is left out completely. The meso framework provided by Dopfer and co-authors tries to develop instruments, which are able to compete with this complexity. Knowledge is considered as a rule-structure, where *'...rule structures are bundles of rules that bear complementary relationships with each other and these can be analyzed in a range of ways using network theory. The rules that matter for understanding economic systems are those that are generic.'* Dopfer et al. (2004, p. 266). Generic rules are treated as emergent rules, gathered from a network of rules. The emergence of a generic rule determines the rise of a new basin of syntax and grammar, where specific aggregated structures may evolve necessary for the accomplishing step of innovative aggregation. These rules lead to a population of actualisations; together they establish a so-called *meso unit*. The idea is to use this meso-unit as a generic hub for micro as well as macro perspectives. Hence focusing on a single generic rule and its corresponding carrier let us gain a micro perspective on the rule in a local environment. The idea applies vice versa for a macro perspective. The meso operates as a pivotal analytical lens, where micro perspectives focus on the complex structure of rules that constitute systems such as firms and macro perspectives focus on the complex structure of rule-populations such as industries or the whole economy.

When we observe change in the meso, by which we mean a change in generic rules, i.e. in the knowledge base, and/or in their respective populations, we can then analytically focus on both the micro and macro aspects of this process. ... The economic system is built upon meso; micro and macro are two perspectives that reveal the structural aspects of the changes in the meso populations that constitute the elementary units of the economic system. Dopfer et al. (2004, p. 267)

From the evolutionary perspective we have to add in an abstract way that change is the defining property of meso and coordination occurs as micro and macro structure. Then a generic meso trajectory, building upon origination (emergence), diffusion (adoption and adaptation) and retention (maintenance), actually introduces and retains a novel rule into the economy.

Meso 1- origination: The first phase deals with Schumpeterian entrepreneurs introducing new knowledge into the system. Origination deals with the creative act of inventing that means in particular that an idea is generated in form of a micro rule. Dopfer et al. (2004, p. 274) emphasise that this rule carrier is not necessarily a supplier. It is important to note that origination merely involves an *active*, risk-taking agent. Additionally the invention may be of economic, but also of social, cultural, political or mere ideational nature. A new rule requires new institutional coherences in order to diffuse, the monopolistic character of a micro rule determines only this first phase of the whole trajectory. The critical point of *phase one* is that variety occurs and order gets disturbed through new knowledge.

Meso 2 - adoption, adaptation and diffusion: The second phase is concerned with adaptations of this new rule into various local environments. The authors claim that exploration, differentiation and integration restructures the division of knowledge now. The monopoly of the micro rule carrier gets disturbed through early adopters and competition plays a significant role. Hence in the new environment leaders and their followers establish the diffusion process and new conducts begin to circulate within society. From the macro perspective this phase initializes growth of variety, leading to de- and re-coordination of the whole system. We may compare this phase with the Schumpeterian notion of creative destruction, which leads to a new structuring according to the *frequency* of the diffusion process, the rhythm of imitation and adoption between leaders and followers.

Meso 3 - retention, maintenance and replication: The final phase of a meso trajectory establishes retention of the emerged rule as an on-going process in the economic system. *'This is achieved through maintenance in the micro and replication in the macro and in both cases refers to a meta-stable distribution of normalized or institutionalized activities.'* Dopfer et al. (2004, p. 275) Emerging knowledge structures are institutionalised and consequently

normalised to a certain extent, still this structuring remains meta-stable, so it refers to relative stability on the micro side of the economy. From the macro perspective we may add that this phase involves an ordered state, where new orders break-off and replicate. Further such a state offers flourishing ground for a beginning new meso trajectory. Hence we may conclude that meso-trajectories attract the rise of new ones on basis of their meta-stability. The meso is pivotal anchor point for change and correspondingly offers starting points for analysis in both directions, micro and macro. Thus meso does not only provide an abstract lens for innovative processes, moreover it subsumes patterns of behaviour and conducts, which are not already established in fixed institutional settings. Therefore the meso sphere integrates norms, rules and the establishment of final institutions. Meso concentrates on generic rules, which crystallise the process itself, providing the economy with new language. Generic refers to the ideational component of change, which is not manifest. Hence we may say that a generic rule serves as a specific language, built on the new introduced knowledge. Dopfer (2010) offers a taxonomy for rules, where operant rules split off in subject and object rules and both may be deducted from a generic rule set; representing a meta-stable and on-going process for itself. Table 3.6 illustrates this taxonomy and also gives some examples of specific subject or object rules.

Table 3.6.: Rule taxonomy

<i>Generic Rules</i>			
<i>Subject Rules</i>		<i>Object Rules</i>	
<i>Cognitive Rules</i>	<i>Behavioural Rules</i> individual behaviour	<i>Social Rules</i> collective behaviour	<i>Technical Rules</i>
e.g. mental models and schemata	e.g. behavioural heuristics, algorithms and norms	e.g. organisation of enterprise or market	e.g. machines, instruments and techniques

Source: Dopfer (2010, p. 5)

In this classification rules represent an on-going inferential procedure involving continuous interplay between induction and deduction, resulting in an *abductive* format, according to Dopfer (2010); as already conceived in section 3.2 following Charles Sanders Peirce on American pragmatism. Then *generic* addresses the heart of all change. Generic refers to a

layer of change that is providing variety and diversity in language and grammar of systems. It serves as a template for change stimulating various actualisations. Generic rules provide the nexus of all categories of change; hence they are change for itself within the realm of complexity. At the heart of the concept lies the individual, the rule-guided agent. In contrary to the *homo oeconomicus*, the rule-guided agent acts on ground of social patterns, where the most abstract ones are of generic nature, like morals for example. The most abstract character necessitates the simplest explanations; hence the simplest rules represent generic ones. Obviously we may never determine them in explicit ways, because in the moment of cognitive insight we have already reshaped them. Therefore the idea of generic rules, hosting meso-trajectories along rule-guided agents remains an abstract and implicit one. This notion shows the simplicity as well as the complexity of institutional heuristics embedded within critical naturalism.

Dopfer and Potts have also received distinctive critique on their theoretical framework, especially critique on their book Dopfer and Potts (2008) - *The general theory of economic evolution*. The most recent critique stems from Runde (2009). The authors review on the one hand the general ontological attempt incorporated in evolutionary realism and the heuristic or analytical concept of meso and generic rules at all on the other hand. It is briefly referred just to the latter, for one reason. The ontological debate in evolutionary economics is a necessary and important one in order to distinguish and integrate common and basic concepts of a naturalistic approach in the social sciences. Nevertheless this discussion has recently reached a cognitive level which is quite tough to follow, if you are not a professional philosopher. Though Runde (2009) makes a perfect analysis of the lacking of Dopfer's and Potts' (2008) ontological statements, in a still comprehensive way, but to differentiate what is the right direction to go and what is just a wobbly fundament is getting somehow undecidable, in this respect. For that reason the critique on the heuristic part is followed. Here theoretical considerations of Dopfer (2010) and Dopfer and Potts (2008) are still not contradiction-free. A perfect example gives the definition of generic rules. Runde (2009, p. 370) explains that the definition of *generic rules* is not general after all, because it does not incorporate *genetic rules*. Insofar generic rules do not involve biological evolutionary processes, but they should by definition, they should encompass all *bimodal matter-energy* relations. A further lacking is situated in the taxonomy of rules, as illustrated in table 3.6. The separation between subject and object rules is ambiguous, as we already discussed in the ontological part on critical

naturalism, in section 2.4. Individual and social rules go hand in hand, it is impossible to build up dichotomies in this respect. Once individuals enhance their cognitive capabilities and build up new mental models, they may adapt a social rule. Are internal models really individual, since they are re-evaluated continuously in social contexts? This issue is very critical, since agents are otherwise not *only* defined or guided by social rules. Maybe the classification involved some misunderstandings, that these rules do not co-evolve. Another issue lies in Runde's (2009) argument that Dopfer and Potts (2008) use the term rule or idea already in *inflationary matters*. Rules are objects, types of categorisation, organisations, and on and on. Runde (2009) means in particular that the concept loses a lot of power if the terminology is set too broad and so-to-say over-stressed. As a consequence the framework also loses didactic power, so that people cannot follow anymore.

D&P would have been on far safer ground had they stuck rigorously to a more conception of rules, and presented what they call 'ideas' as generally accepted 'types' along with an account of how these may condition how people interact with the physical or social objects concerned. Proceeding in this way would have facilitated a far more natural and accessible account in which (1) the product ideas of innovators could be called product ideas, (2) the new products that flow from these ideas could be called new products, and where (3) the transformed and newly emergent practices that flow from the adoption of these new products, when they become institutionalized, develop normative counterparts that are reproduced in and through those practices, and which we might want to call rules. Runde (2009, p. 377)

This quote summarises Runde's critique quite adequate. It also shows that the main problem lies in the use of a specific language. The concept of rules in the micro-meso-macro framework is promising and well-elaborated, but it needs more detailed classification, as well the principle of *generic rules*, serving as a host for change and further development of new specific products, goods, ideas and rules. In a reply to that critique Dopfer and Potts (2010) remark that most of it builds upon the different approaches, the two parties follow. Runde (2009) follows a social ontology framework, manifested in critical realism; where economic instances merely emerge according to social rules. Dopfer and Potts (2010) add that this concept misses that cognitive individual development, the establishment of subject rules, is necessary to treat agents in a heterogeneous way, breaking with the representative agent. Then these subject rules may co-evolve with object rules, conditioning each other. In conclusion, the major debate grounds on different ontological positions, whether social rules constitute all economic instances or if the co-evolution of individual and social rules is a dialectic reshaping of economic reality. The authors conclude in respect of Runde's (2009) proposal to substitute some rule categories with the notion of *type* or just *idea*.

Ontologically, social rules are like technical rules, in that they are both an idea. There is no reason to split them at the theoretical level and call one (social) 'rules' and the others 'types'. We think our generic language is actually better because it captures how what exists from the ontological perspective is also what matters from the perspective of evolutionary economic analysis. Dopfer and Potts (2010, p. 412)

In fact there are issues in the ontological as well as in the heuristic domain, that cannot be simplified anymore to more conventional terms. They bear a complex, abstract, but still generic interpretation.

A simple logic of meso

Elsner (2009) tackles the concept of meso from a different and very promising perspective. We may locate this perspective by looking again into Dopfer and Potts (2010).

The meso unit represents therefore not so much an intermediate position on a quantifiable scale, but rather a theoretic concept for developing and integrating systematically micro and macro. Dopfer and Potts (2010, p. 411)

Meso is investigated as *an intermediate position on a quantifiable scale* there. Quantities like the meso-size of a group are scalable in Elsner's (2009) framework. Therefore the author provides a more concrete understanding of the meso. He focuses on its stabilising function in socio-economic dilemma, emphasising the evolution of cooperation. Contrary to Dopfer et al. (2004), institutions emerge to stabilise socio-economic conditions through the co-evolution of agents and groups. Elsner (2008) shows that by solving a coordination problem that critical masses are afforded, Schelling (1978). An emerging critical mass then represents a meso-sized group of agents which have overcome the coordination problem. By that, Elsner (2008) uses a *Prisoner Dilemma* logic to find this necessary group-size, which is able to stabilise a situation by transforming co-evolving action into social structure – an institution emerges.

Also, as has been argued, the institution emerges from an interrelation between the past history of interactions and the future. Overall, the institution's emergence depends on two critical interdependencies, i.e. *interests/expectations* and *past/future*. Elsner' (2008)

Agents are modelled with specific expectations, so they may adapt their behaviour considering *contingent trust*. Hence agents will choose with whom they play or engage in future encounters. The model in section 4.4 in this thesis builds upon a similar logic, though works with a different treatment of trust, as will be shown. Elsner's (2009) model consists of a network topology, where agents begin to connect in small groups, starting with total connectivity. Then along a matching process, where partners are selected following a PD

logic, the connectivity loses degree, because agents only engage in contingent, trusted relations. Conclusively the group size increases, but overall connectivity decreases. This evolutionary process generates meso-sized groups finally, which emerge in a meta stable state disconnected from the whole population. This process may be summarised as following.

In the present paper, thus, we will explore a simple logic of the co-evolution of (1) *a complex incentive structure*, (2) 'experienced' *expectations* ('to meet ...'), indicative, in turn, and in varying degrees, of (3) the *group size*, and of (4) the *institution* as such (as both quest and outcome of the individuals' efforts to improve their well-being). Elsner (2009, p. 4)

Thus the emerging institution is treated here as a concrete fixed set of agents, in contrast to a generic vehicle. Hence the focus firstly lies on the informal institutional emergence of a group-size which then concretes in light of a fixed public macro body and the individual agent. However the target values, which are emergent properties, are the *minimum critical mass* and the *maximum relevant cooperating group*. These two values deliver lower and upper bounds for possible institutional emergence under cooperation, depending on evolving trust along heterogeneous reputation chains. Hence the scientific strategy at stake is comparable to Ostrom's (2005) strategy handling collective/public good or common poll resource problems; where free-riding is on top of the list. Further it is important to assume that agents are equipped with some knowledge before the process starts. Institutions do not emerge out of nothing or without any starting equipment. Agents have social knowledge about learning, reputation and monitoring, hence these factors have to be considered as given or just as initial values which evolve then. Elsner (2009) starts with a single-shot analysis of the PD to explain how structure emerges along a specific population size, in its most simple form. In this single-shot, groups may emerge only in dependence on their incentive-structure, which is on the one hand in-built in the game and on the other hand influenced by the reputation rules, hosting the partner selection. Hence the payoff matrix determines possible rewards and consequently the agent's incentive to cooperate or to defect. According to a neutrally-stable strategy, i.e. TFT (tit-for-tat), population sizes and critical masses (min and max) can be calculated, resulting in an area of cooperation.⁸⁹ Nevertheless an institution relies on the habituation of agents and is therefore not emerging if agents act as short-run maximisers.

The institution will have to be a *semi-conscious* phenomenon, and may be so long as expectations of conformity with it are met, supported, e.g., by a favourable numerical result of inequality, and the incentive

⁸⁹ For details on the model and parameterisation issues compare Elsner (2009, p. 11f).

structure and importance of expectations of a common future (to meet again) remain unchanged. Therefore institutional emergence has to follow a *broader and long-run rationality*. Elsner (2009, p. 18)

This long-run rationality is of adaptive character and deals with happened encounters and possible future engagements. Additionally agents gain benefit from the institution, '*...to escape repeated frustration from common defection, to learn and to increase knowledge.*' Elsner (2009, p. 18). So agents do not gather in institutions just for fun, or because they are bored. These relevant motivation is not hidden in the payoff-structure and is therefore a necessary additional assumption of the model. It is then also dependent on the *expected probability to meet a cooperative agent*, which the author announces as *contingent trust*. Then the critical values become the size of the memory of an agent and its monitoring capabilities, since agents will meet randomly. The monitoring initializes certain reputation chains, where agents store remember previous encounters. So an agent can gain further knowledge about monitored partners as well as the partners of these partners. This process builds up the reputation chain, that an agent may gather information about third parties to improve her expectations. The emergent process involves heterogeneous search process of all agents, that may build a cooperative group, where they already *know* each other somehow. All these criteria are needed and necessitate the actual partner selection process, which sorts out neighbourhoods; i.e. potential meso-sized groups. These additional features are already well-acknowledged in social network analysis, where the specific clustering of agents in neighbourhoods play a dominant role. In such neighbourhoods or clusters we are engaged with synergetic effects providing net externalities to the whole group. The discussion on social indicators or parameters, as well as network gains that realistically effect a meso-sized group is definitely a major challenge for evolutionary economics. Finally Elsner (2009) explains possible gains of his attempt for the discussion on *varieties of capitalism*. He shows, by referring to trust polls, that smaller countries do reflect greater general trust. Such empirical foundations may foster research in this area even more.

The discussion on varieties of capitalism brings us to our next issue, namely democracy design. It is argued that the design of a society's democratic institutions involves varieties of capitalism. It influences the distribution of power and trust in society and therefore leads to specific political paths a nation may strive. These paths enable the organisational structure of a society tremendously. Further it is proposed that democracy design may enhance group or community processes as the ones ascribed above. Such a meso process enforces the stability

of a community and consequently its potential to innovate society in regional as well as in global matters in the end. For this reason it is appropriate to study democracy and its institutions also from a meso perspective. It is shown in the next section, how democratic research evolved and how it failed to enhance the power of the original democratic idea. In this respect the lacking of this research brings us to a new way of interpreting and understanding our political institutions. Such a meso-founded democracy design aims at fostering group processes and enabling possible institutional emergence, in an innovative as well as stabilising way.

meso-founded democracy design and regional innovation

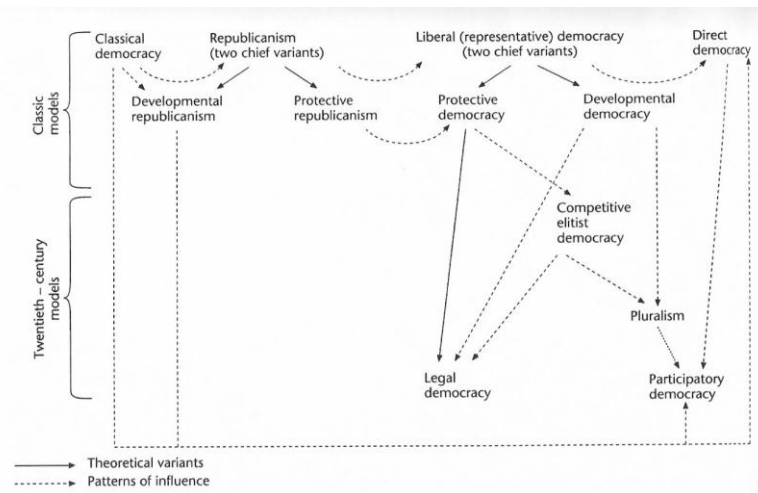
Democracy is a myth, at least in case of classic democracy, elaborated by Ancient scholars as Aristotle, Pericles, Thucydides and Plato. Our common understanding of democracy as the government of the people is more than less an ancient credo which survived till now. Democracies evolved in many variants from Ancient Athens to modern capitalist countries, from city-states to huge democratic environments such as the US. Now it is more important than ever to reconsider structure and function of democracy as the best proven practice of governance. The European Union is in a transition phase towards a huge democracy as well, nevertheless it is not clear yet where this vehicle should go and how political and economic institutions should change to confront its high expectations. In order to understand how democracy works and how it can get enhanced to foster regional innovation in several sub-systems of society it is proposed to investigate a long-time evolution from classic *macro models of democracy* (500 B.C. – 19th century) to *micro models* (20th century) and thereafter to *meso-models of democracy* (21st century). Democracy is therefore grasped as a self-transforming theoretical as well as practical process. This approach covers the essence of macro models – understanding the people as one entity and providing theoretical designs for that one entity as for example Rousseau's *Social Contract* – as well as the technical core of micro models – such as voting games and Arrow's *Impossibility Theorem* – additionally it opens discussion on future branches of democratic development – linking democratic actors to a meso level in political economy.

Democracy is a game between certain blocs in society that appear on the macro and on the micro level of the economy. These blocs are either top-down or bottom-up⁹⁰ organised. Obviously top-down organisations, like international enterprises, have better cards in this game of power relations, in particular in gaining influence on democratic institutions such as the parliament or the government. The game lost its stringent institutional boundaries of parliamentary democracy; hence we are confronted with powerful *global* players influencing national political spheres. Who these players are, what is meant by meso in this respect, where we can find bottom-up players, how power relations have changed or swapped and how we may enhance regional innovation as a counterpart to global business regimes? These are the questions associated with this last sub-section of Schumpeter's heritage.

Macro models of democracy

Democratic theory differentiates between classic and modern branches of democracy, as shown in figure 3.12.

Figure 3.12: Variants of democracy



Source: Held (1996, p. 5)

Modern branches came up in the twentieth century with a new understanding of democracy – *democracy as a political method*. Scholars such as Max Weber and J.A. Schumpeter provided a more competitive, more realistic view of democracy in the opposite to romantic often naive understandings. Karl Marx initialised these movements with his analysis of class conflicts

⁹⁰ Top-down organisations represent a vertical hierarchy of power; bottom-up organisations represent a horizontal hierarchy of power.

between owners of capital and the working class. In this period something has changed in the common political consciousness. Schumpeter (1993) [1950] clarifies that democracy does not realistically represent the public will, but the public will is the product of the political method, called democracy. Therefore it is necessary to understand democracy as a battle for votes between different interest groups. Also Max Weber (2005) [1871] emphasises huge social diversities in society and that democracy just cannot be a toy of the rich. Both authors can be seen as the most important protagonists of competitive/elitist democracy with technocratic visions. Such a democracy needs a huge bureaucratic institutional setting to lead the nation's occasions with and through experts. Otherwise classic models do all consider the people as one entity with one common preference, as it was set in Ancient Athens with Aristotle (384–322 B.C.) and Plato (427–347 B.C.); in medieval northern Italy with the republican conceptions of Marsilius von Padua (1275–1342) and Machiavelli (1469–1527) and in 18th century France with Rousseau (1712–1778); in England in early modern ages with liberal conceptions of Hobbes (1588–1679), Locke (1632–1704), Bentham (1748–1832) and Mill (1773–1836). The concept of one people⁹¹, and therefore one supposed single preference, got majorly disturbed by Karl Marx with conceptions of direct democracy. Karl Marx and Friedrich Engels emphasised social differences in society, because political participation was only an option for a few, male owners of capital. There the picture of democracy slightly changed from a macro perspective to a more micro perspective. Then in the early 20th century all social classes got the right to vote and democracy got a new micro focus, in particular the battle for the vote was opened for interest groups, such as parties as well as enterprises. Weber and Schumpeter opened the theoretical discussion for new models of democracy. Democracy evolved to a political method, cutting off its heritage for the first time. Politics was firstly conceived as a market with a principal-agent (representative-voter) structure. These elitist approaches wanted to install expert systems as bureaucratic, technical governments in fear of tyrannical encroachments on the nation states. Schumpeter wanted to avoid hegemonial spirals, as Plato and also Machiavelli feared.

All known forms of government – Monarchy, Aristocracy, Democracy – are instable and create a cycle of degeneration and corruption. Held (1996, p. 51)

⁹¹ Society was conceived as one aggregate entity. In early democratic times people were just represented by male citizens; women and workers were simply ignored and excluded in public affairs.

In that sense monarchy will be overtaken by tyranny, aristocracy by oligarchy and democracy by anarchy, which will be replaced by a totalitarian system again. Nevertheless next step of democratic evolution was set up by the upcoming pluralism with its approach of cooperative capitalism and pluralist democracy, instead of corporate capitalism. A major pluralist protagonist is Robert Alan Dahl with his early writings on classic pluralism Dahl (1956) and his later works on neo-pluralism and polyarchies, Dahl (1985). Within this approach democracy should enter the economic sphere as well. The society is made of many interest groups and they are all participating within a representative party system. Additionally democracy should serve as a base for decisions in several sub-systems of society as well as in organisations.

Then a new scientific branch of democracy design which investigates the aggregate social choice as an outcome of voter preferences was introduced. This more technical approach uses game theory and on a more basic level relational algebra for political theory. In a political macro sphere the democracy is observed as a whole, but in social choice theory the focus is on the political method as such, the accumulation of votes. This leads us into voting and coalition games, which represent the micro component of democratic theory.

Micro models of democracy

The micro-revolution in political economy is characterised by social choice and public choice theory. It is characterised by the willingness to find one theoretically public or social outcome as an aggregate of individual values. This also notion represents the main title of the major contribution in this field, Kenneth J. Arrow's (1963) [1951], *Social Choice and Individual Values*. Arrow (1963) [1951] tries to link individual preferences of lower order to a social or collective preference on a higher order. In this manner he tries to bridge micro values with macro values. These macro values are set normatively with very strict and strong assumptions. Hence he investigates how the accumulation of individual preferences meets the stated normative agreements. Then the *Impossibility Theorem* followed, which shows that any accumulation procedure (in case of democratic elections: voting) cannot meet all stated conditions; additionally they will not even meet three out of four conditions. Let's briefly remember the conditions⁹².

⁹² See for example Taylor (1995, pp. 102)

Pareto Condition: A social choice procedure fulfils Pareto Condition if for any pair of alternatives (x, y) applies, that if everybody prefers x over y then y cannot be the social choice.

Condorcet Winner Criterion: An alternative x is a Condorcet Winner, if x beats any other alternative in a 1on1 match. Hence x must be at least at one half of the preference lists ranged above y . A social choice procedure fulfils Condorcet Winner Criterion if there is a Condorcet Winner.

Monotonicity: A social choice procedure is monotone, if x is a social choice and an individual changes his preference setting that x ranks higher as before, x must still stay a social choice.

Independence of Irrelevant Alternatives: If a set of social choices includes x but not y and one or more individuals change his or their preferences, but not the ranking between x and y , then the set of outcomes should not change and y should stay excluded. Nevertheless it is possible that any alternative z ranks above x after the preference change, but y should stay excluded.

The most common procedures which are used in democracies as a voting procedure are *Plurality Voting* for single seat constituencies and *Proportional Representation* for multi seat constituencies. Plurality voting builds the social choice out of the most first rankings of individual preference orders, whereas proportional representation constitutes parliament seats out of the amount of votes for a specific alternative. In case of single seat procedures we can list the most famous alternatives as *Condorcet Method*, *Borda Count* and *Instant-Run-Off* (Hare System for single seat). Nevertheless there seem to be more improvements on non-ranked single seat systems, as discussion on *Approval Voting* shows, Brams and Fishburn (1978); Brams and Fishburn (2005). Going back to Arrow we may follow that none of these procedures can fulfil Monotonicity and Independence of Irrelevant Alternatives at the same time, which represents more than less the whole Impossibility Theorem. Additionally it is proposed that this theorem had a similar impact in social choice theory as Gödel's *Unentscheidbarkeit is Theorem* had in mathematics. Gödel's theorem disturbed the expectations of a whole generation of mathematicians who still thought that any mathematical theorem can be proven. Gödel logically proved that there are theorems which are undecidable; one cannot say in advance if a theorem can be proven.⁹³ Regarding Gödel's proof, Arrow proved that there is no social choice procedure which meets simple, but necessary restrictions. In this respect one has to ask if democracy design is locked-in?

⁹³ Hofstätter (1992)

From a technical micro-orientated approach we have to consider a possible lock-in. Perhaps we can improve our procedures and techniques for elections but we have to be sure that there are bounds that cannot be skipped. We can recognise various improvements in the democratic micro-sphere of social choice, the most prominent ones are Black's theory of *Committees and Elections*, Black (1958), where the importance is raised that single-peaked-preferences may overcome Arrow's paradox with simple majority rule, but neglect universality of individual preferences. Further Sen (1977 and 1999) shows that Arrow's theorem holds if the conditions are weakened, in particular relaxing the transitivity of individual preferences and removing the Pareto Condition. Nevertheless one has to consider that all normative approaches to the theory of social choice, that means to find the optimal welfare function with optimal social justice, do not improve democratic practice anymore. Election methods improved as well, as for instance *Range Voting* demonstrates. Election outcomes would change dramatically, as W.D. Smith (2000) shows. Range or Ranked Voting is a simple social choice procedure where voters are aimed to rank their preferences among the stated alternatives, in particular candidates, with scalars from 0-9 for instance and the highest average wins. This makes it possible to vote with a spectrum or vector of alternatives, not just with a binary argument for one alternative, which enables voting for coalitions. Smith (2000) also claims that voters would vote more honest than strategic, which is also a major problem discussed in Brams (2003). Brams (2003) emphasises the differences between sincere and strategic voting within a game-theoretic approach. Although there is still the open question why we cannot install new voting procedures in our democracies? The main argument against anything else than simple majority rule is the difficulty or complexity for voters to give up votes as vectors instead of binary statements. This argument holds if people vote via analogous media, like pen and paper, because otherwise the calculation of the results will be too complex to do in appropriate time. Nevertheless there are possibilities to introduce such a voting procedure via digital voting, in particular via e-voting. Many scientists and politicians regard e-voting as the new upcoming revolution in democracy, because then limits are reset for vector-weighted approaches such as Range Voting. The main problem for e-voting or digital voting lies in its infrastructure and in its security issues. Any voter has to get access to an e-voting terminal; therefore a democracy would need either public terminals in every voting district or a general voting platform in the internet. In respect of the latter the state has to ensure free internet access to everyone, which definitely creates barriers. The next problem, as mentioned above,

is a security issue. In 2001 the election in the US got manipulated via electronic voting ballots. So George W. Bush Jr. won decisive elections in Florida. Nobody knows who should be responsible to install the machines and the voting software, no one knows who should implement the voting software as well and no one knows who should supervise the calculations. These are all major complications which are not easy to overcome and induce potential corruption. Nevertheless the potentials of e-voting would possibly outweigh its problems, as the idea of vector-weighted e-voting proposed in Hanappi and Wäckerle (2005) shall show. Last but not least we still have to mention other improvements of the micro-oriented approach. Brams (2003) also emphasises *power* as one of the major determinants in coalition games. In order to build a strong political coalition in a system of proportional representation, the parties or candidates got to set their arguments wisely, to internalise power relations. The theoretical strand of coalition games finds its major argument in power indices, such as the Banzhaf or Shaply-Shubik index, Brams (2003, pp. 158). It is difficult to say either such indices are helpful for parties or candidates to go into strategic elections or not, but it is for sure important to underline the importance of power. Endogenising power relations will be a major step to a meso-centred democracy as well.

Regarding the technical barriers for an adequate social choice procedure, democracy is in a kind of lock-in. The major democratic obstacles to overcome this lock-in and to revitalise democracy again can be summarised to *Complexity, Rationality, Economic Imperialism, Information and Communication* and are elaborated in the following.

Democracy and complexity

Zolo (1992) provides an outstanding analysis of democratic theory in the 20th century, with a special emphasis on complexity. His approach is rather pessimistic, but still in the tradition of European realists such as Marx, Weber or Schumpeter. This pessimism emerges from the growing differentiation of social evolution, in particular the differentiation and specialisation of societal subsystems – economic, political, scientific, and so on.

Every subsystem tends to seek specialisation and to work on the basis of distinct and autonomous functional codes. The meaning of an event experienced within one social environment – a religious experience, for example – cannot be conveyed in the terms relevant to a different environment – a sports club, for instance, or an office, or a nuclear research laboratory. The different experiences are not at root consumerable. The variables of social behaviour increase in correlation, and there is a consequent growth in the difficulty of its understanding and prediction. ... Study of the different forms taken by this interdependence reveals diffuse and polycentric activity, with a characteristic tendency towards the breaking down of hierarchical structures. Zolo (1992, p.5)

Complexity is obviously not a linear phenomenon; it is clearly the opposite, a non-linear one. Possible consequences of complexity may engage in a break-down of democratic power structures or hierarchies, representing the most common fear of democracy as already mentioned in the macro-part by quoting Plato and Machiavelli. The break-down of democracy would firstly emerge in its most basic institutions, i.e. the government and the parliament. Tyrant and autocrats *'used'* complexity to gather power. Whenever a crisis emerges in a special sub-system of society, stability will be measured on the power of its institutions. Tyrants used the weakness of democratic institutions to abandon them. Whenever social complexity rises and people feel powerless, they lose trust in their sovereignty representing the most dangerous situation for a stable society to get overtaken by an autocrat. Zolo (1992) lists three major evolutionary risks for democracy, which arise from social complexity; i.e. self-reference of the party system, inflation of power and neutralisation of consensus.

Self-reference of the party-system

Modern democratic pluralism, as in Dahl (1985), has its foundation in group-politics. These interest groups are often hidden and produce political opinion or public will through their relationship to parties. Political parties as the representatives of their voters collect opinions and produce opinions. Schumpeter (1993) [1950] insisted that parties are only the media for political decisions, because when it comes to legislation, jurisdiction and execution, political tasks are delegated to experts or simply to bureaucracy. So why do we have these parties and why are they in the centre of the political process? The reflexivity of parties is democratically legitimized. We may consider parties as self-referencing due to the very reason, because they manipulate public will and not the other way around. Schumpeter also said that the public will is not an organic product of living discussion; it is rather a synthetic artefact, produced by the parties itself. The party system processes its own agenda via the media, though it tries to look transparent from outside. That is also why modern democratic systems are often called neo-absolutist, because they work in a self-referencing mode. By this mode the party system is able to manipulate society over years, which is possible through their extreme professionalism, acquired through strict rationalisation of political culture, also heavily criticised by Weber (2005) [1871]. The paradigm of democratic rationality legitimises the party system in front of the people. The major consequence of the self-referencing characteristic of the party system is that parties will try to establish themselves in the

economic and cultural sphere of society, in order to entangle their voters. This picture looks rather mechanistic, but it holds when political parties give up acting as a representative medium in favour of just getting votes, maintaining and acquiring more power. We can speak of an evolutionary risk, because this self-referencing dynamics cannot be controlled from outside, by for instance changing the institutional setting; it can only be controlled from within, by its actors, the party-system itself. On the one hand democracy understood as a pluralist system opens itself for many interest groups but on the other hand it is getting more and more a rational economic outlet and loses creativity and therefore the ability to innovate. This mechanism produces a marginalisation of conflicts and a self-legitimation. Furthermore it introduces homogenisation to the political sphere by decreasing political variety; contrary to the proposed openness of pluralism.

Inflation of power

The inflation of power is a rather simple phenomenon emerging from social complexity. In a connected world, power is getting more and more intransparent, especially when it comes to global or international problems, as for instance worldwide financial crisis or global climate change. In case of big problems we do not need risk-averse actors produced by the self-reference of the party system, we need actors who engage in groups and communities who use their power to tackle these problems. Risk-aversion means inflation of power in politics. The main problem is that parties do not reflect their power by activity and political practice; usually they reflect it by passivity. By the means of that, real power decentralises more and more and the whole conception of our vertical model of power bursts on its own foundations. Why do we need a vertical power system when nobody feels responsible for major problems? Our power system suggests looking for higher instances which can better solve specific problems. By that, power gets inflationary and evolutionary risky. If we play a scenario on grounds of the inflation of power there will always emerge power vacuum, which opens the way for autocrats, as history shows. Therefore Zolo (1992) suggests, in the spirit of Luhmann (1983), that we need a more horizontal, relational power system instead of our more vertical, causal one at the moment. Increasing decentralisation of power looks good in a first instance, nevertheless it produces uncertainty and mistrust in society in the long-run, when power cannot be localised anymore.

Neutralisation of consensus

According to Schumpeter's (1993) [1950] theory of democracy as a political method, the political sphere represents a market with suppliers and demanders. The main problem here is that actors on both sides do not have a functioning feedback system. In the political sphere the only feedback function, from 'bottom' to 'up', is the election, which occurs in most countries every four years. Firstly, this period is apparently too short to form something as a consensus. Secondly, it has to be admitted that voting campaign distort political supply through the oligarchic structure of the party-system. In particular, parties do not supply realistic programmes in campaigns, if they want to win the battle. Therefore we cannot assume that political competition is authentic. Contrary it is highly distorted resulting in a neutralisation of consensus. The voter cannot expect what is offered; hence consensus is more or less constructed and cleverly sold to the people. It is obviously not an evolutionary outcome of collaborative political participation, as it was thought in classic models of democracy. A desired political consensus is nothing more than a phantom or a myth.

Democracy and rationality

The Myth of the Rational Voter is another phenomenon in democracy, which needs more attention. It is also the title of Brian Caplan's (2007) payoff-book to neoclassical political economy. Rationality play a dominant role in democratic theory. Micro democratic models as suggested in social choice theory can be easily disentangled, by assuming irrationality or bounded rationality of voters. The *Tragedy of the Commons*, Hardin (1968), can be transported to democracy as well, as a barrier for optimal social choice. There is no technical solution for the *Tragedy of the Commons*, when we realistically assume bounded rational behaviour of the actors in charge, as Hardin (1968) correctly argues. Caplan (2007) astonishingly shows how voters are irrational, by investigating systematic biased beliefs of economics and politics. His theory is in its core similar to Zolo's view of democratic risks, but Caplan argues with a more micro-based approach, he starts with the voter. Caplan summarises biased beliefs of voters to an *anti-market* bias, an *anti-foreign* bias, a *make-work* bias and an overall *pessimistic* bias. The author argues that modern politics can be held guilty for these biases, in a very convincing manner, namely that the party-system tries to keep the people 'dumb', in order to retain power. Caplan (2007) reaches a point where irrationality is not enough, because the public will is constructed; hence he introduces rational ignorance and

rational irrationality. Democracy as a model got a concept of rationality firstly emerged in Schumpeter (1993) [1950] and Weber (2005) [1871]. Then Public Choice theory created a mathematical game for votes out of it and politics somehow lost against economics. Neoclassical economics made the model of rational expectations to its major doctrine, which atomises economic as well as political markets to machines. Caplan (2007) argues in a similar way, that these machines choose bad policies, because of the self-referencing modality, as it is also discussed in Zolo (1992). Hence this reflexivity nurtures political herding behaviour, which levels out democratic or on the whole political ideals. As a result we earn political reluctance of the intellectuals and a public herd of sheeps controlled by the parties, which leads to overall political stagnation.

Economic imperialism

Economic Imperialism occurs in many facets, here we emphasise on Reich (2008), *Supercapitalism – The Transformation of Business, Democracy and Everyday Life*. Reich (2008) remarkably shows how lobbyism has stroke out politics. In his study he concentrates on Washington DC, as the political metropolis in the US, which grew up to maybe the world's biggest centre for lobbyism during the last 30 years. Equipped with insider knowledge he shows that democracy increasingly loses its power for the sake of big business. International firms conquer the democratic sphere with big money and delegate politics for their own interests, i.e. tax affairs, export/import regulations and that like. Reich (2008) also warns that similar scenarios will take place in Bruxelles, as the metropolis of European policy, soon. We cannot estimate possible harm made from lobbyism, because as a fact economic capital is very intransparent in this sphere. Such scenarios are indicators for a new meso-sphere of democracy. Especially big firms – operating on an international level – obviously have the power to set policies through lobbyism. International firms are usually top-down or vertically organised, which is maybe the only reason why they are able to gain that much power. 20th century power relations have changed completely, the *fiskus* is often powerless in front of such enterprises. On the other side bottom-up or horizontally organised groups, unions and communities are not equipped with such power to infiltrate democratic affairs or to work with lobbyism as well. Bottom-up organisations are extremely difficult to lead, because power is base-democratically distributed, which makes it hard to gain enough economic capital for

such actions. We got to fear increasing lobbyism soon, because business is starting to design democracy for its own interest, out from a meso-sphere of democracy.

Information and communication

Information and communication processes frame the blood circulation of democracy. Democracy needs to process information to all its inner organs as well to its peripherals. We live in the 20th century and mass media has developed to a huge machinery. Obviously information and communication processes are very complex according to the size of a democracy, but it is even more interesting how transparent or intransparent these processes are. Traditional mass media, like TV or print-media face the problem of unilateral communication structure. Due to their technical architecture it is not possible that the receiver sends something back. Perhaps it is the biggest obstacle in modern democracy to establish bilateral or multilateral communication processes enhancing transparency of information. TV or domestic print media play a powerful role in democracy; they are able to control and manipulate democratic institutions. Therefore it is not deceptive to say that this kind of asymmetric communication structure of democracy distorts itself to a very high degree and that a lot of important information gets lost within the system. Voters can communicate their preferences just in long intervals, whereas politics is able to spam information daily. This involves asymmetric information flows. It shall be argued that it is not that people do not want to get informed and that people do not want to deliver information or messages to their representatives, but they cannot communicate it without an appropriate medium. Perhaps the internet may help out. The internet is the most appropriate media for democratic information and communication processes, because it can easily supply a symmetric communication structure. This issue is not about e-voting, it is about implementing internet infrastructure to design democracy, where all interest groups can participate. It does not need to replace all other media, but there is a need for a general democratic information hub.

May these democratic obstacles vanish within a meso approach?

Putnam's (1993) unique analysis on the performance of democratic institutions was more than a major step for future democratic research. His proposed major question was: *'What are the conditions for creating strong, responsive, effective representative institutions?'* (Putnam (1993, p. 6). This question fits perfectly in our analysis. Putnam's (1993) analysis was the

birth of *social capital* as an important variable of democracy design. He distinguishes between *bridging* and *bonding* social capital. Social capital can be seen as a kind of trust to connect with other people. Bridging social capital occurs in networks with friends and colleagues; it is a kind of indicator for business connections. Bonding social capital represents family connections on the contrary. Putnam (1993) found out by measuring indicators for trust that there is more bridging social capital in the northern regions of Italy and more bonding social capital in the southern regions. This is quite obvious regarding industry and commercial regions in northern Italy, where more business connections can be counted. On the other side concerning the power of Italian mafia in the south, like in Sicily, there are more family connections. The deep core of his theory lies in the correlation of his findings on social capital and institutional performance. Putnam (1993) argues that there has to be a specific share of bridging social capital for performing democratic institutions. If we consider social capital as a meso variable, as also Elsner (2008) used trust as a parameter for emerging institutions, it is an indicator to enhance further democratic research or design with a more meso orientated approach, since micro-macro approaches already found barriers. Social capital follows a heterogeneous preference approach which is needed for further democratic research and practice. By that, pluralism can be revived with heterogeneity in the meso sphere. Furthermore it will be necessary to integrate these approaches into democratic theory, as a contemporary theory of groups or communities. With a strong theory of group behaviour as a meso-foundation communities can be integrated in the political sphere. Then we may learn more about the mechanisms of bottom-up communities in comparison to top-down organisations. The meso level in political economy is the level of emergence and maintenance of institutions which are considered as social innovations and social stabilisations of complex conflicts. The meso is meant to overcome our complex micro-macro problems.

e-Democracy

What can we await from e-democracy, what is an e-democracy and why is it meso-centred? e-democracy should not contain any legislative, judicial or executive power in its first blueprint. On the contrary e-democracy should provide web-based access to acquire preferences from all participating actors in democracy, so that people can engage in new trust relations. Internet infrastructure may gather all interest groups on a symmetric communication basis, enabling transparent lobbying for all participants. This point is important to avoid economic

imperialism. Then lobbying can be considered as an institutional communication structure where international firms, national grown institutions (e.g. central banks), NGOs, NPOs and communities are invited. Communities are new social phenomena which gain a lot of power in respect of the WEB 2.0 revolution for example. The World Wide Web is full of communities of nearly every imaginable interest. The problem is that these groups do not have the possibility to interact within the political sphere, because they are not visible for it. The internet is an active political zone, which cannot communicate with democratic institutions unfortunately. Therefore a new preference-acquisition system is needed between democratic institutions, communities as well as other organisations. This would additionally reveal a new meso revolution in democracy by introducing a kind of ‘second-order’ symmetric feedback-system behind elections, which completely rests on the meso-level in political economy. Remember, it is just about acquiring information; therefore it would represent a huge database of interests concerning the future or past of the democratic environment. All announced obstacles of democracy – complexity, rationality, economic imperialism, information and communication – could be at least weakened. At this moment one cannot say how a democratic information hub should look like, but design or data visualisation will play the major role. Should it be revealed within an ordinary web-page/blog/forum approach or should it be built on a 3D approach like in Massive-Multiplayer-Online-Role-Playing games? These questions are of technical nature, but they will affect the whole project more than anyone would believe. Next questions arise from an old economic issue, namely what are the incentives to participate, how can we implement an adequate honour system for participating in this feedback system, how can we implement different honour systems for different groups and how can we guarantee fairness? Incentives may come from a regional innovation perspective.

Regional innovation - what does it mean?

The issue of innovation lies in the heart of Schumpeterian economics. Recent literature on innovation generally concentrates on the idea of *innovation systems*. These systems may be of national, regional, local, technological or sectoral character. Innovation systems are characterised through knowledge flows and the innovative process itself. The systems are usually thought as clusters of innovative firms or start-ups in a specific technological category or industrial section connected with research and development institutions, providing the

knowledge base. Moreover agglomeration externalities affect innovation systems a lot. Recent research focused on local and geographical matters. According to Christ (2007, p. 21f) we may summarise three types of regional innovation systems, where R&D and the state serves for distinction. The first type would engage in regional clustering of certain types of firms and start-ups with innovative potential, because they head up for niche products. The second type is also connected to R&D institutions like universities or local private institutions. The third type involves strict national regulation and planning from top-down. Here universities as well as industry clusters play the most dominant role. The critical point of a regional innovation system is that there is something special a region can provide for innovative capacities, this may be a geographical advantage or a specific cultural property of the people living in this region. In contrast to national innovation systems regional innovation has to rely on strong local effects, on emergent properties or agglomeration externalities. Neffke (2009) distinguishes agglomeration externalities according to localisation externalities, Jacobs externalities (e.g. cities with a lot of industries), urbanisation externalities, Porter externalities (e.g. competition between local firms), static versus dynamic externalities (e.g. immediate information spill-overs versus prior information accumulation on the local arena, leading in local trade secrets). Neffke (2009) focuses on *localisation*, *Jacobs* and *urbanisation* externalities as the main forces driving innovative change. They serve as geographical proximity in innovation and induce knowledge spill-overs, which emerge at the core of an innovative process. As a crucial factor the author brings in what he calls revealed-relatedness. Neffke (2009) concentrates on the development of a revealed-relatedness index for industries. This index goes beyond traditional macro-economic classification of industries.

...the Revealed Relatedness concept challenges the standard view of industries as simply a macro-economic division of labour in the overall chain of the creation of economic wealth. Instead, we emphasise the interrelatedness within the technological dimension of industries by representing them as nodes in a network – industry space – in which cross-fertilisation of ideas takes place along linkages of technological relatedness. Neffke (2009, p. 176f.)

Further, the index, because it is built on directed networks of *industrial players*, involves a dynamic category of industrial relatedness of the economy. Relatedness appears on technological grounds, on productive methods as well as on cognitive relatedness, these factors create an industry space. Neffke (2009) introduces a dynamic measure capable of

explaining the structure and clustering effects within relative values.⁹⁴ It represents a measure of the division of *knowledge* between industries in contrast to a mere division of *labour*. What can we learn from the idea of revealed relatedness in the light of democracy design and regional innovation?

First of all the idea can be applied to the idea of communities, mapping community spaces instead of industry spaces. This is possible by mapping internet communities for example within social network analysis. A meso-founded or community-driven democracy design fosters the gathering in groups, clubs, unions and raises their political power as well. This power may trigger innovative activity on a regional level. Regionality or regional innovation does not necessarily mean technological or industrial innovation. This kind of innovation needs a lot of energy and is highly scientific. But regional developments also include ecological innovations or social innovations, where communities engage with. It is argued that innovation may also appear in simple terms, especially on the regional level, where high scientific activity in form of academic ideas may also be hindering. Simple ideas for a better community-driven living or a better ecological treatment of living, these are matter which should be promoted. Regions are able to supply people with food and entertainment in the first place, but they need support from its democratic institutions. Putnam's (1993) research is fundamental in this respect, democracy works even better, if we foster regional institutions and increase general trust implicitly. Trust increases potential regional innovative activity and generally serves as an agglomeration externality, in the micro-cosmos of regional communities. Further, regionality may also play a dominant role in the internet. If internet communities gain more democratic power, they may also engage and foster their innovative projects. On the whole it is argued to foster community-driven activities to enhance democracy as well as innovation. Regionality needs to be restated as a matter of social space and group size and not just as a matter of geographical space, by that it becomes a promising institutional feature of democracy.

⁹⁴ For a detailed analysis of the concept of revealed relatedness and its technical nature compare Neffke (2010, p. 101ff)

3.5. Bourdieu's heritage

The reader might wonder why Pierre Bourdieu comes up in context of evolutionary economic analysis. The following introduction shall explain why and to what extent Bourdieu's theories and his heuristic tools are useful and inspiring for institutional concerns.

Bourdieu heavily criticised the neoliberal project as an active member of European's academia. Additionally he was one of the founding members of ATTAC (*association pour une taxation des transactions financières pour l'aide aux citoyens*). Nowadays ATTAC is one of the biggest and most active NGOs reflecting and criticising globalisation processes. This critique stemmed from natural discomfort with the neoliberal project, a political project which has market radicalism on the top of its list. The politics of Ronald Reagan and Margaret Thatcher are the most prominent examples for the implementation of such market radicalism. Bourdieu fought on several layers against the neoliberal idea, in the political domain, the socio-philosophical domain, the cultural domain and the academic domain. Two of his latest works in the political domain represent *Contre-Feux 1 et 2*, Bourdieu (1998 and 2001).⁹⁵ These two booklets indicate tremendous misconceptions about the neoliberal idea. European social values seemed to vanish for the sake of commerce. Such a strong program or anti-program needed resistance from the intellectual left. As a counter project, Bourdieu (2001) emphasised in *Contre-Feux 2* the need for a more social utopia for the European Union. European institutions should be built on social grounds instead of mere individualistic grounds. The neoliberal idea involves a model where economic agents are just self-enforcing free-riders. The idea of the free-rider entails the core idea of neoliberalism, where social orders do not play any role, they are even not mentioned. Free-riding is the most powerful instrument neoliberalism can build upon; it serves as a protective belt against more social values and cooperative agendas. Hence the rich can get richer, widening income gaps more and more. This issue already encompasses the socio-philosophical domain of Bourdieu's work. Neoliberalism has its theoretical root in methodological individualism, i.e. the model of the rational utility-maximising economic agent. Bourdieu's work finds a way between an overstressed focus on structure as well as on agency. Social scientists have to fight with this issue in a continuous way. Bourdieu originally belonged to the structuralist camp in

⁹⁵ For this thesis the German translations are used, i.e. Bourdieu (1998) - *Gegenfeuer* and Bourdieu (2001) - *Gegenfeuer 2*.

sociology; hence his way of arguing was influenced by the work of Durkheim and Weber for example, as well as Saussure. Nevertheless Bourdieu started to develop something special, a theoretical strand standing between the lines. This project was established with the concept of *habitus*. The habitus represents results of two of his main research focuses. Bourdieu's major scientific focus was located in anthropology, where he investigated cultural coherences in Algeria, mostly investigating the culture of the berbers. Bourdieu elaborated the idea of the reflexive field in his studies. Field studies make science attractive, because the scientist gets part of the object, the field itself. Hence the field is something morphological, it is always in flow and highly adaptive. A *field* emerges out of certain *habitus*. In Bourdieu's (1982) *La Distinction: critique sociale du jugement*⁹⁶ one can find a worked-out universe of human cultural dispositions and its relation to economic positions. The reader gets subject of the study itself, one is introduced to locate oneself in this universe. This is what habitus is about in general, it is about social practices, the logic of the social and how it is founded in daily life-style. Insofar it is a theory of what people do, what influenced their actions/practices and where they are socially and economically situated, therefore it is also a situational theory and not just a theory of cultural regularities. Bourdieu manages to canalise this theory in a very compact way in Bourdieu (1994) - *Raisons pratiques: sur la théorie de l'action*⁹⁷. There the focus lies on the emerging dynamics of habitus in society, how it gets a hub of social action and social living. The point is that habitus opens a socially rooted, dynamic frame for individual life-style. The imprinting frame of habitus depends on acquired characteristics, such as education, but as well on societal factors such as social class and economic status. Habitus is therefore a typically path-dependent concept, depending on cultural consumption patterns. Insofar, as also Trigg (2001) notes, we can find several analogies in the work of Bourdieu and Veblen. Trigg (2001) shows that both authors work with a model of cumulative cultural inheritance, where Veblen uses a trickle-down model, Bourdieu concentrates on circular dynamics, i.e. a trickle-around model. Cultural dispositions, social and economic positions get inherited in society to a great extent; this is what Bourdieu (1994) shows. Cultural inheritance works along historically accumulated institutions. Bourdieu gives a perfect example by referring to comparisons between the old French aristocracy and the new

⁹⁶ The referring German translation which is used in his context is Bourdieu (1982) - *Die feinen Unterschiede: Kritik der gesellschaftlichen Urteilskraft*.

⁹⁷ The referring German translation which is used in his context is Bourdieu (1994) - *Praktische Vernunft: Zur Theorie des Handelns*.

French *meritocratic* bourgeoisie educated at the *ecole nationale d'administration*. This example is investigated in the next sub-section. Finally Bourdieu also fought within the academic domain. In *Homo academicus*⁹⁸, Bourdieu (1984) shows, in a very insightful way, how science is built upon power networks, which established themselves cumulatively over decades. These networks pretend what science has to be and what science does not have to be. Publishing cartels around form scientific coalitions and confirm the so often criticised *ivory tower*. In such a picture science remains a closed institutional self-enforcing and self-fulfilling setup, without innovation and progress. It is argued that Bourdieu was an *evolutionary* sociologist and anthropologist, who emphasised culture as a self-transforming dialectic process.

HABITUS AND THE THEORY OF PRACTICE

The theory of action, that I propose (with the term Habitus), finally says, that most of human actions have in its principle something completely different than simple intention, namely acquired dispositions, which are responsible to interpret action as goal oriented, but without starting from a purposeful goal-orientation. Bourdieu (1982, p. 167 f.)⁹⁹

The term Habitus has among others the function to explain stylistic unity that joins the practices and goods of a certain actor or a class of actors. ... The habitus is the generative and unifying principle, that reinterprets the intrinsic and relational characteristics of a position into a unified lifestyle, that means into the consistent ensemble of people, goods and practices that an actor has selected. Bourdieu (1994, p. 21)

Habitus represents a generic principle of life-style creation and life-style maintenance among certain groups of people. The habitus urges distinction, it looks for distinctive properties among people and among consumption patterns. '*Habitus are differentiated and differentiating. ... The habitus are principles to generate distinct and for the distinction serving practices.*' Bourdieu (1994, p. 21). These distinctive principles evolve to symbolic distinctive principles and create a certain *language of distinction* in society. These languages can be understood as abstract meta-norms, *generic rules* or institutions in its origin. Bourdieu argues that the practices, the styles, its corresponding positions and distinctions work as distinctions between the symbolic systems. Hence his theory of distinction is not just a theory claiming distinction as the ultimate criterion for human behaviour, which remains a rather obvious assumption in his view. Bourdieu (1994, p. 22) refers in this issue to Veblen's theory

⁹⁸ The referring German translation refers to Bourdieu (1984) - *Homo academicus*.

⁹⁹ Following quotes are translated from the German texts into English.

of *conspicuous consumption* as an example for such a claim. The theory of distinction means moreover that nothing can ever be indifferent; existence as such is only possible along distinction. Additionally there would be no system of morals or ethics if there would not be any claims, norms or institutions making a difference. Within this picture it is also rather simple to explain why science cannot be purely true or why there cannot be something like an indifferent observer. Observing means that one is able to make a difference, otherwise one would be just a silicon-based data collector; this issue of making a difference, taking cognizance of something implies that one is already part of the investigated subject; for example a specific social milieu. Hence this notion of archaic or *generic distinction* generates systems of classification and categorisation, which are according to Bourdieu grounded on taste. There will never be any structure without distinction and its emerging tastes. Distinction is only possible via action; hence theory as such has to be practice as well; practice involves distinction. Bourdieu's theory of practice implies that action generates distinction, which then implies a theory.

The idea of acquired dispositions is illustrated within a certain example. A player who deeply internalised the rules of a game is not forced to recall the purpose or the goal of his action explicitly, in contrary the player just recalls certain routines like procedures from a program. The process of internalisation can be understood as habituation. Thus habitus projects an individual into a virtual social field or position in society, along its dispositions dependent on cultural, social, symbolic or economic practices. On the other hand habitus is also *modus operandi* according to Bourdieu (1982), it embraces generic rules in society. Nevertheless it does not claim to explain rationality or rational behaviour, because it is a theory of social practices than of cognitive processes. Habitus is intrinsically a bridging concept; it tries to connect objectivism and subjectivism, by investigating social practices. These social practices depend on acquired dispositions. Conclusively social and organisational learning plays a very important role in such a theory. Habitus creates distinction, variety, conflict, innovation and stability. Bourdieu emphasises social habitus as the driving force for human action. Further he investigates routines in socio-economic life and endows a social theory where the individual is defined by breaking her out from society within distinctive life-styles, instead of defining society via a representative individual or defining the individual via mere society.

Maybe the main difference between Veblen and Bourdieu lies in the causality of inheritance of tastes.

Veblen's trickle-down model, in which tastes transmit from the upper class through to the middle and working class strata. For Bourdieu, however, there is rather a 'trickle round' of tastes, with upper class tastes drawing at times from popular working class tastes and also transmitting to the less sophisticated middle class. Instead of one-directional flow of tastes the transmission is circular, ... Trigg (2001, p. 106-107)

Bourdieu's approach of cultural transformation emphasises a circular logic between social classes or fields. Veblen works within a one-directional top-down logic. Veblen's direction of inheritance starts in the upper class, goes along the middle class and ends in the working class where the process ends until a new habitus is generated in the upper class. In Bourdieu's model inheritance is made of circular flows, each class influences its neighbour. Both scholars have in common that they work with a cumulative process of social and cultural practices, with the evolution of tastes. As we will see later these inherited dispositions can correlate with positions in the social space representing classes or virtual social fields, distinguished by economic capital or profession. Further Bourdieu insisted that habitus is more than simple intentional behaviour. Habitus display generic rules of being and doing, hence they have the power to structure institutions, because they bear conflicts. Wherever conflicts emerge there will be a need for new borders, frames, rules, laws or distinctions and as such there will be a need for new institutions. It is the institution's nature to arise from contradictions. Institutions emerge from conflict, they play an integrative role to stabilise conflicts. A certain habitus colonises a virtual social field of economic agents through their composition of cultural and economic capital, as Bourdieu (1994, p. 13 ff.) lines out. Within this concept one can deal with 4 major quadrants of capital compositions which are stylised through the amount of cultural and economic capital. These quadrants host various virtual social fields dependent on their habitus, their social practices. The more a virtual field moves away from the centre of all fields the more difficult it is for an individual to enter a different virtual field or to exit its own one, thus the fields propose only certain paths for action. We propose to understand these virtual social fields as social spaces one can inhabit. These social spaces are different from social classes.¹⁰⁰ We consider an agent's entry into the education system as a selective process

¹⁰⁰ A specific social space is only virtual; it consists of social practices of individuals. For example the field or space of secondary education lecturers can be described through low until medium economic capital but medium until high cultural capital (Bourdieu, 1982, p. 19). This field may develop to a specific social class through political action or political movement; it only becomes a class through a collective actualisation in the opposite

dependent on the agent's habitus. Bourdieu describes this selection mechanism along the idea of a *Maxwell Daemon*.

...it (the daemon) divides, ..., the owners of inherited cultural capital from the non-owners. The differences of competence cannot be separated from the social differences, which are conditioned on the inherited capital, thus it [*the selection process*] will contribute to the actual social differences.¹⁰¹ Bourdieu (1994, p.36).

Within this thesis it is argued that educational institutions work as carrier systems of social practices. They judge young people according to their established practices and they re-enforce these practices by cultural inheritance from generation to generation. In society specific habitus are heavily influenced by the education system, they transport acquired characteristics. Hence these institutions also select students or pupils with certain cultural capital. Regarding this issue please consider the boom of private education institutions, which build up closed cliques for certain social fields. The point is that the educational institution itself builds the structure for the selection process, because it also emerged from a specific habitus. This process is self-organising and self-enforcing. Bourdieu (1994, p. 39 ff) illustrates this process within following example. The aristocracy was the major class in France in former centuries, even if the aristocracy mostly vanished in the 20th century it reproduced itself within a kind of meritocracy. The aristocracy has transformed itself, but their habitus still remains the same. Bourdieu calls the new aristocracy the educational aristocracy or educational noblesse in France. The new aristocracy evolved through their social practices, but created new institutional frames. Hence one can argue that the old aristocracy inherited its cultural capital and its habitus to the new one. Then carriers of the new cultural capital had to build new structures/institutions to follow the very same lifestyles, in order to hold their social position in the long-run. Once this is managed the cycle can go on and on. Social needs necessitate institutions. People who inhabited a specific virtual social field cannot follow their social practices anymore (like it was the case within the old aristocracy), it had to establish a new structure which reproduces the specific habitus to stay in its path. It is proposed that the first common goal of a virtual social field aims stability to store and secure its social practices, rather than to innovate them. This theory of social practice allows us to observe different practices over time and their evolution. The core of this theory lies in the structural environment that a certain social practice or habitus inhabits. The

to virtualisation. Every actualisation necessitates virtualisation but a virtualisation does not necessitate actualisation.

¹⁰¹ Brackets added.

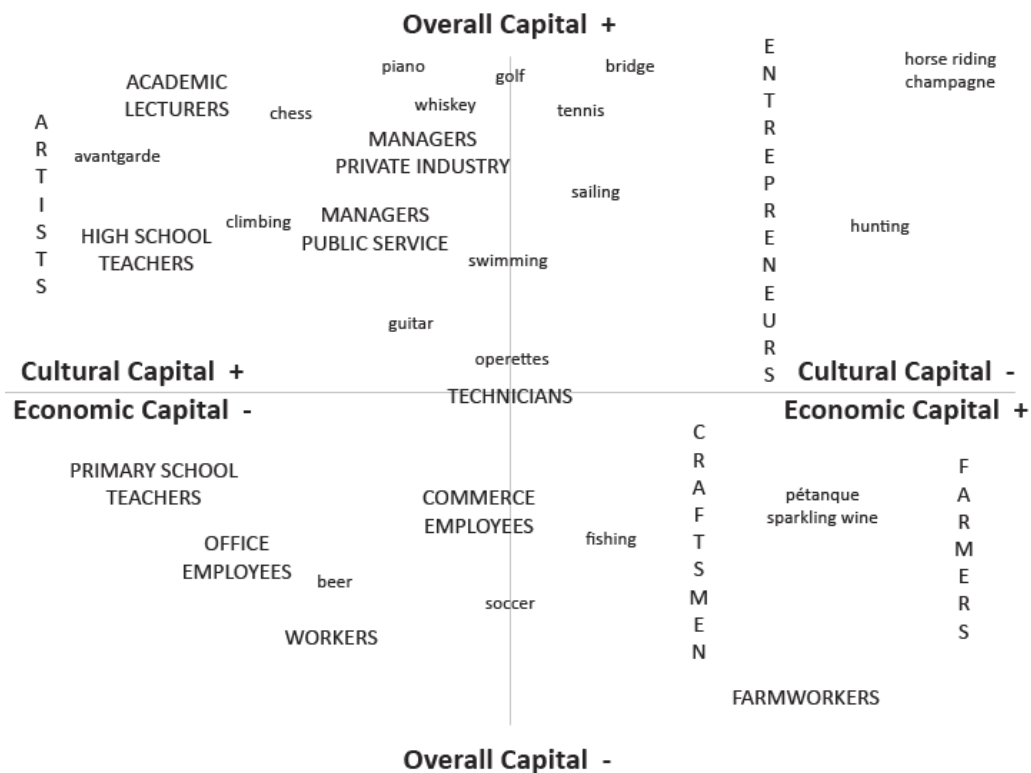
new aristocracy had to build a new structure - an education system for the bourgeoisie; for a closed society. Education systems are mostly closed systems; they want to keep things behind their walls. Special high education programs, e.g. private universities or private colleges, are very difficult to enter, which makes them very powerful. Not only codified knowledge can be learned, mostly a specific life-style is educated depending on the social field. These life-styles are like business cards for an education institution. The educational system is the hub for cultural transformation, they transform people and their habitus. This transformation may come back, when alumni start to reinvent the institution and transform it as well within a feedback mechanism. Nevertheless once an education program is finished, it is impossible to neglect the proposed and semiskilled habitus or the proposed and semiskilled social practices adapted there. Therefore education is not only the proxy for knowledge; it is also the proxy for all sorts of capital, life-styles and for specific virtual fields. In case that the field hosts a kind of new aristocracy as mentioned before it is surely interested in strict borders rather than openness in the education system. This kind of defensive management also represents an evolutionary instinct, protecting one's hegemony. A general rule persists, concerning the openness of systems. The more opened an institutional system the better is its capability to distribute knowledge.

Cultural dispositions versus economic positions

Educational institutions, such as schools, universities or specific teaching or research departments maintain certain social practices. Educational institutions provide basic knowledge to foster human capital and capabilities, nevertheless they are not able to distribute knowledge quite equally. A stable and open education system can be the only starting point for the modern knowledge society. In order to foster better education and knowledge systems we need to understand their social dynamics. Therefore we need to observe flows in society between different virtual social fields as the driving forces for cultural transformation. Bourdieu's schema (1994, p. 19) of the '*space of social positions and lifestyles*' offers a stylised map for social and cultural spaces. This schema was originally developed in Bourdieu (1982, p. 212-213), but we will work with a simplified and more adequate version developed in Bourdieu (1994). The schema of cultural dispositions and economic positions builds upon data collected from France from the 1950ies until the 1970ies. It represents social dynamics from France, hence we cannot rely on it for other countries and other epochs, but we can use

it as an illustrative guide. If we want to deal with the aspect of knowledge accumulation in society we should take a closer look into dominant social practices. Bourdieu (1994, p. 19) illustrates four major quadrants of social space, associated with the composition of economic, cultural and overall capital. The overall capital or the whole volume of capital represents all forms of capital that can be assigned to an individual or a virtual social field, like social, cultural and economic capital. This emergent overall property represents the symbolic value of an individual’s spectrum of capitals, which is somehow a relative indicator for power relations within the field. Figure 3.13 sketches positions (economic) and dispositions (cultural) in a diagram. The interesting point of this diagram concerns the distances between the groups. These distances emerge out of cultural regularities, like playing the piano or going fishing, and regulate entry and exit between groups. The cultural dispositions are habituated indicators of certain social fields. It makes a difference if one interested in soccer or not, but the difference itself will change according to the field’s cultural perspective.

Figure 3.13.: Bourdieu’s social space



Source: reconstructed from Bourdieu (1994, p. 19)

These social practices also indicate an agent's status as a representation of the amount of economic capital one spends on social practice, but the main difference in comparison to mainstream concepts of homo oeconomicus is that cultural capital serves as a proxy for overall symbolic status. Going to an avant-garde theatre session necessitates a lot of cultural capital, in order to even know where and when it happens. Therefore a lot of experience is necessary to attend and foremost enjoy it. The amount of necessary overall capital may be the same as compared with sailing, but the composition of the *varieties of capital* makes the difference. It is proposed, as Bourdieu (1998, p.21 ff.) concludes, that movements between these quadrants are path dependent on education. This very basic model shows the multidimensionality and complexity of dispositions and positions. The entry card towards specific cultural dispositions or habitus is made on domain-specific knowledge, because different milieus follow distinct habitus. It is further proposed that this kind of knowledge is of social nature and can only be accessed through specific education and through specific institutions of knowledge and education. Such institutions do also include social networks, which may act as knowledge carriers, which are distinguishable along their composition or focus on certain varieties of capital.

Varieties of capital

One of Bourdieu's major concerns was to criticise economic imperialism. Neoclassical economics managed to invade all domains of the social and cultural sciences. As a consequence methodological individualism got an interdisciplinary paradigm. The main problem of economic imperialism stems from the fact that any behaviour will be evaluated along economic capital and that economic capital gets the only pivotal reference for all social and cultural processes. Bourdieu's model grounds primarily on cultural capital and the corresponding evolution of economic and social distinction. In this sub-section we will briefly discuss the nature of Bourdieu's variety of capitals. In this concept a significant role is played by symbolic capital, which has to be considered as an emergent property dependent on specific compositions of the other forms of capital. One of the critical essences of capital is in general, that capital needs time, it has to be accumulated by work. It can be objectified or incorporated, but people need to accumulate it, regardless of its type. Additionally, capitalism is in its nature not a gambling process, where sudden profits emerge. Entrepreneurs or artists are not successful, because they are lucky. They probably have invested a lot of time in their interests. We may classify forms of capital according to Bourdieu (1992, p. 49 ff.), as

following. Economic capital gets institutionalised within property rights and is convertible to money. Cultural capital can be transformed into economic capital under certain conditions and gets primarily institutionalised within academic titles. Social capital is dependent on social relations and social responsibilities, hence it can also be converted into economic capital and it gets institutionalised within ‘aristocratic’ titles.

Cultural capital

Trigg (2001) defines cultural capital:

Cultural Capital can be defined as the accumulated stock of knowledge about the products of artistic and intellectual traditions, which is learned through educational training and –crucially for Bourdieu– also through social upbringing. In a powerful explanation of how inequality in the social structure is reproduced in the education system (Bourdieu and Passeron 1990), the key role of cultural capital acquired outside of education is used to explain the superior performance of children from privileged backgrounds. Trigg (2001, p. 104-105)

Bourdieu (1992) goes beyond this rather general assumption of cultural capital. He introduced three different types of cultural capital, i.e. *incorporated, objectified and institutionalised*. The first one deals with durable dispositions of an organism that means in particular that it is bound to the body and needs to be internalised. Culture and education represents capital which has to be learned cumulatively, it gets internalised step-by-step and needs a lot of time. This incorporated cultural capital becomes habitus, because it gets a fixed component of the individual. Bourdieu (1992, p. 52) adds in this respect that ‘having’ becomes ‘being’. Cultural capital cannot be owned as a kind of property with regards to physical property. It is part of being, nobody can take it away. In this respect it is the most difficult form of capital to be traded. Carriers of economic and social capital have a hard time to seek cultural capital externalised from their carriers. Due to these conditions it is also the only form of capital which is bound to biological individuality. Nevertheless it can be transmitted implicitly by cultural inheritance and social learning, as an invisible process. In contrast objectified cultural capital is comparable with codified knowledge and appears in form of cultural goods, such as books, pictures, songs and so on. This form of cultural capital is explicitly transferable into economic capital, but only concerning the property rights. The knowledge how to consume a book, a picture or a song – or how to enjoy and develop something like taste – deals again with incorporated cultural capital. Institutionalised cultural capital emerges in academic or scholarly titles. This procedure makes incorporated cultural capital suddenly visible and explicit along objectification. It gets institutionalised within a culturally self-transforming

system of institutions. Academic titles make a difference between the cultural capital of autodidacts and people who get scholarly educated. It is extremely difficult to prove cumulated incorporated cultural capital for autodidacts. Norms and institutions legitimate acquired knowledge within straight rule-sets. These titles reflect institutionalised power, which obviously and repeatedly produces problems within large-scale social cooperation.

Social capital

Bourdieu (1992) refers to social capital as the resources originated and associated with being part of certain groups. Social capital is therefore always associated with a social network of actors. These actors form relations which can be more or less institutionalised.¹⁰² Bourdieu (1992) speaks also of the *principle of social effects* and of *social creditability* in correspondence with social capital. Social relations are otherwise not comparable with economic properties, because a social relation has a vaguer, but still cognizable characteristic. The profits which may be gained from the participation in a group are the basis for the *solidarity* that enables these profits. Accumulation of social capital is not possible without bilateral or multilateral solidarity. In order to sustain and reproduce social capital continuously, durable networking is the most important factor at all. Networking is very time- and money-intensive, insofar we may conclude that economic capital is tremendously involved in the process of social capital accumulation, again dependent on the type of social capital. Participation of certain events or the mere maintenance of a social network involves high costs. Additionally, gains from social capital do have higher lags than gains from economic capital. This notion stems from the fact that social capital gains are naturally group-based gains, so they are not purely assignable to sole individuals, like economic or cultural capital. These gains are of emergent nature, they are *network resources*. However these network resources can be easily manipulated by strategic social actions. These resources are critical hubs to gain power. Wherever social capital may emerge there is also exploitation and corruption, hence innate conflict. This is a very important notion of Bourdieu's concept, that social capital emerges where power plays a significant symbolic role. Nevertheless the study of social capital and social theory has changed a lot in the last decades. Bourdieu's notion of social capital has tremendously lost on significance. Scholars, like Granovetter, Coleman or

¹⁰² Compare section 3.4 on democracy design and Putnam (1993). Bridging social capital is bound to more formal institutions like business, politics, clubs and so on, whereas bonding social capital refers to more informal institutions, like the family or friendships.

Putnam made social capital very popular, because they made it more accessible in empiric and quantitative dimensions. These scholars do not need to be blamed; they have done a great job for the promotion of concepts like social networks and endogenous social research. The dark side of social capital can be found in rational choice theory and neoclassical economics. The concept has somehow developed to an individualistic measure of an actor's social gains; it got yet another variable to maximise. Rational-choice advocates like Gary Becker rendered social capital to a target variable in the usual suspects of mathematical economic modelling, it became a silent particle in an individual's utility function. Certainly, Bourdieu has imagined something different. A critical role also played the Washington consensus in this respect. Fine (2001) shows how social capital got misused by the World Bank research programmes and how it got indoctrinated into a generation of young researchers. Nowadays neoclassical economists use social capital as a black box externality, which needs to be optimised. According to Fine (2001) several examples indicate how a social, historic and intrinsically critical concept like social capital got misused by neoclassical economics over the years and moreover how Bourdieu also contributed to this misuse. Fine (2001) shows that Bourdieu introduced the concept of capital into several disciplines, though he always insisted on prevention against economic reductionism. Capital was always considered as an economic resource to produce goods in an organised way. Then capital gets a pivotal controversial and critical subject, because it lends power due its productive flavour. Bourdieu introduced a variety of capitals to avoid economic reductionism and semiological reductionism, i.e. reduction to social exchange or communication, as it is understood in pure structuralism for example.¹⁰³ What has happened is that there are two camps now depending on two different kinds of reductionism; one camp reducing everything to economic capital and one camp reducing everything to social capital. Of course the most attractive issues of Bourdieu provided by cultural and symbolic capital vanished from the discourse. Fine (2001) ironically notes in conclusion.

It is surely tempting to conclude, in gentle irony, that 'social capital' is itself a form of social capital, and of the other types of capital, in the sense of Bourdieu. It has created a 'field' of endeavour and a 'habitus' for its participants, the social capitalist. Fine (2001, p. 63-64)

¹⁰³ Compare Bourdieu (1992, p. 56).

Emergent symbols

It seems that Bourdieu's (1992) concept of capital transformation and convertibility is quite ambiguous. Of course the transformation issue drifts easily into economic or semiological reductionism, but Bourdieu tries to solve this problem along the idea, that any act of transformation from cultural, to social or to economic and vice versa necessitates transformation work. The degree of transformation work depends on institutional setups, which may hinder or facilitate certain transformation processes. However the critical issue is that transformation work is needed in contrary to the concept of transaction costs, as he critically notes.

The relation of exchange loses its monetary character, what can be exemplified by the personal design and styling of a certain gift. Bourdieu (1992, p. 57)

Transformation work is different from transaction costs, because it cannot be measured in mere economic terms. It involves time, attention, courtesy, concern, worry and so on; it involves empathic criteria or affects; which may already be of institutional nature (i.e. explicitly confirmed) or of mere personal and emotional nature. Of course the varieties of capital are always connected with economic capital, which certainly serves as a hub, but the act of transformation needs *symbolic additives* and cannot be directly managed in economic terms, they are differently coded. Hence it may be concluded that *symbolic capital* is a kind of pivotal transformation capital, which manifests in power relations, honour and other symbolic characteristics of status. Its nature remains emergent, because it cannot be reproduced directly. Symbolic capital emerges as a necessary additive for the accomplishment of a transformation process between two sorts of capital, which may be of economic, cultural or social nature. Hence the idea of transaction costs in the *new institutional economics* is yet another example for economic reductionism. Institutional relations are reduced to economic costs, therefore *new institutional economists* believe that cultural or social expressions (all institutional variants) are all 100% convertible into economic capital or simple money. If that would be the case, concepts like power or trust would lose significance. Emergent and symbolic additives are then denied for the transformation of one sort of capital into another. This is not what institutionalism is about. Institutionalism has to deal especially with these emergent and symbolic characteristics between two or three different sub-systems of society, where translation and transformation necessitates cumulated work.

Theory of practice

Bourdieu's social philosophy builds upon a praxeological approach. He established a theory between objectivism and subjectivism. In this sub-section we will discuss some of his theory of practice along Schwingel (1995). First of all, a theory of practice deals with the overcoming of objectivism and subjectivism. Such an overcoming of formerly scientific controversies was also issue of the already mentioned *Methodenstreit* between the Austrian and the German historical school of economics in the last century. A theory of practice has to be continuously critical and reflected, because it needs to ground on a so-called *tentative objectivism*, as it is understood in critical realism or critical naturalism. This tentative objectivism needs a subjectivist entanglement of the primal experiences of the social actors. Insight from an objectivist and a subjectivist epistemology have to be considered as complementary and not supplementary and need critical assessment of their boundaries. Schwingel (1995) adds that these epistemologies deal on the one hand with '*...the illusion of immediate insight*' (subjectivist) and with '*...the illusion of absolute knowledge*' (objectivist). Bourdieu treats this problem in a very interesting and creative way. He says that these illusions form scholastic fallacies, which create *epistemocentrism* and carry feigned intellectualism. This dualistic picture involves the danger of intellectual drifting-away in turn, that is, to confuse the perspective of the actor with the spectator. Scientists and theoreticians of any discipline are actors and certainly not spectators. Hence there is a need for more praxeological approaches in the sciences to overcome such old *wanna-be dichotomies*. A very crucial role in this attempt manifests in the usage of theoretical time. Time in practice is irreversible, as well as evolutionary or historical time, modelling time or logical time is in principally reversible.¹⁰⁴ Theoretical time is maybe to fixed on model or logical time. Bourdieu's instrument to compete with the issue of time is his construction of the *habitus and its dialectics with the field*. Habitus is in his respect a *theory of creational modi of forms of practices*. It suggests a theory of practical insight of the social world, hence a practical epistemology, also comparable with the already discussed evolutionary epistemology. Both epistemologies build upon historical and irreversible time, where try and error plays a dominant role. Bourdieu's theory of practice, with his focus on habitus and varieties of capital is, according to Schwingel (1995), varying theory (eidos), ethics (ethos) and aesthetics (taste).

¹⁰⁴ Here we speak of models with a strong traditional mathematical approach. Approaches from the complexity and system sciences do also deal with irreversible time, where bifurcations, attractors and chaos introduces critical time-steps where there is no point of return.

This interplay constructs a social sense appearing as the habitus, which is necessary for orientation within a social field and space. Hence Bourdieu uses habitus not only as a social sense, but also as a kind of instinct, because it is partly innate, but reproduced within socialisation. This kind of theorising is also very close to Veblen's attempts, as we elaborated in section 3.2. Veblen's instinct of workmanship is also a kind of instinct or social sense, serving as social orientation device. Of course it opens discussion about the degree of freedom and determinism, but this is implied in the dialectics of habitus and the field. According to Schwingel (1995, p. 77), we may speak of a theory of *sociogenesis*, where the habitus is *modus operandi* for the announced dialectics. This sociogenesis is a kind of genetic or (better to be called) evolutionary structuralism. Sociogenesis actualises structures of habitus in real life along social practices and cultural dispositions. It involves a process of circular or spiral reproduction, i.e. cultural evolution. This kind of circular reproduction was already discussed by looking into Trigg (2001); trickle-down (Veblen) versus trickle-around (Bourdieu).

FROM COMMUNITIES OF PRACTICE TO EVOLUTIONARY EDUCATION POLICY

Communities of practice surround a new spirit within theories of social, organisational and institutionalised learning. Though Bourdieu has not directly influenced this stream, his theory of practice can be regarded as a visionary pointing into this direction. Nevertheless some contradictions emerge by regarding communities of practice within the idea of habitus, as for example Mutch (2003) illustrates.

The idea of communities of practice generally attempts to stretch the notion of social and organisational learning. Communities act as specific knowledge clusters, where knowledge is passed on along certain community-based practices. Hence the concept is comparable to the idea of group selection, because both build on the notion of tacitness and tacit knowledge. Knowledge becomes an innate property of practices, as it is imagined within habitus. The theory of communities of practice also engages in knowledge management consequently. The critique, established by Mutch (2003), emphasises the causal dependencies between habitus and practices. Bourdieu's habitus serves as a structuring device for interacting practices, whereas the *communities of practice* literature suggests that habitus is an emerging property

of interacting practices. Mutch (2003) proposed along empirical studies that experimentees changed their habitus instead of reproduced them in a new field, by acquiring new practices. It is suggested that communities of practice may overrule certain habitus. Following quote may explain in more detail:

Tacit knowledge is grounded in knowledge and skills acquired through membership of a particular social group. It includes the taken-for-granted and embodied competence of habitus. ... Bourdieu's notion of habitus is not just about embodied forms of practice, but modes of thought that are unconsciously acquired, that are resistant to change and transferable between different contexts. The communities of practice literature, by contrast, focuses on changes brought about through practice itself. Mutch (2003, p. 388) also citing Delamont and Atkinson (2001) in the beginning of the quote (italics).

The critique follows an often made argument that Bourdieu's theory of practice is structurally *frozen*, leaving no place for human agency. Maybe the picture looks seemingly like this, but just at a first glance. Following thought experiment is proposed to clarify the issue of practices versus habitus. Let us reconsider Kuhn's notion of the scientific process again. A scientific paradigm consists of a paradigmatic core and a protective belt around it. Habitus plays the role of the scientific core, because it structures an individual's dispositional axioms as well as the axioms of a whole community. Social practices surround the protective belt, protecting the embodied habitus from different social codes. Development in the core can be considered as *reproduction* of habitus and development of the belt can be regarded as *change* in practices, which are attracted through either the core itself – the habitus – *other habitual paradigms* or as Harker (1984, p. 121) notes: '*specific historical circumstances*'. Actors have to change their practices due to multi-membership in various communities, which then lead to changes in the greater structuring process within the process of habitual reproduction. Habitual reproduction is not a mere circular process; it is at most a spiral process, because *time (history) and space (geography)* always distort the so-called photocopies of certain habitus. Therefore reproduction implies change, since individuals will need to adapt their behaviour due to new community-based, historical or geographical circumstances. Hence actors theoretically *never get locked in* a specific structure, because time alone may change or shift their habitual reproduction. Such a systemic view, as it is incorporated in Bourdieu's theory deals with frequent changes along multi-membership on the one hand and with major paradigmatic changes concerning core habitus on the other hand. Bourdieu's theory implies change in human agency as well as social change. The core and the protective belt necessitate and condition each other simultaneously. Communities of practice have to be considered as an extension to investigate the variety and flexibility of changes in the protective belt of certain

habitus. Such integration may lead to new approaches within education policy as well. Bourdieu always emphasised the rigidity of the education system, where cultural capital gets reproduced in too structured paths. This notion reflects that cultural capital works similar as economic capital. Harker (1984) explains this issue more precisely.

Just as our dominant economic institutions are structured to favour those who already possess economic capital, so our educational institutions are structured to favour those who already possess cultural capital, defined according to the criteria of the dominant hegemony. Harker (1984, p. 118)

These paths need to be opened in various ways. The current status of European education policy shows major lacks in several matters, but foremost the linkage between secondary and tertiary education policy needs extensive rework. The European economy always profited from its high skilled labour force and could consequently compete rather good with countries from abroad. Within globalisation these advantages tend to break apart, even more when education budgets are shortened more and more. But budgets only will not do the job. Education is considered as cultural practice, therefore we may conclude that schools, universities, in fact the whole education system works along certain habitus as well. Changes within these habitus in order to compete or just to adapt to new economic, technological or political circumstances conclusively happen rather slowly. Nevertheless it does not mean that efforts in such directions are useless or futile. Education policy has to be reformed with strong emphasis on the role and situation of pupils. It is argued that we care too less about the decision-making of young pupils in secondary education and their possible engagement in tertiary course of education. The decisions follow either complete random processes or are made too restrictively on grounds of a *non-reflected personal habitus*. Pupils do not get enough time and the necessary support from third parties (e.g. universities) to think about education profiles in more detail. The theory of habitus can be very well applied to such necessary field work within schools. It raises the question how a habitus influences education decisions and how it can positively help to build up more profiled internal models of oneself. Habitus offers a great variety of individual choices, if it is understood and reflected within internal model-building. Pupils obviously reflect too less on their habitus and build education decisions dependent on exogenous factors, such as trends, media and their social network. The theory of communities of practice let us investigate how pupils follow certain communities, how they change their practices and further ask if these practices are still part of their own habitus. A habitus should build the fundament for personal models of the future. It

is argued that knowledge accumulation should be an integrated part of habituation, of the reproduction of habitus. Once an education strategy leaves the core of one's own paradigm it should be reconsidered. In that respect, communities of practice play a dominant role, because they influence the youth at most, like for instance in clubs. All these elements are helpful in more micro-oriented research strategies for education policy. In this last sub-section a macro-oriented approach is discussed, building upon a simulative and algorithmic framework.

In order to get a better understanding of educational decision processes of pupils on a more nation-wide level it is suggested to combine empirical field studies with agent-based simulation. By that we are able to gain more knowledge on the decision process and are then able to simulate it for more appropriate evolutionary university design. Emphasis is therefore taken on higher education policy. This kind of university design focuses on variety and diversity in education policy instead of mere efficiency in output quota. It shall follow core concepts of habitus and the idea of communities of practice, especially on the issue of learning in practice. The idea starts with the notion of an AVATAR. Role models currently play a very dominant role in gender studies. A great extent of gender studies focuses on the development of role models in the early age of girls and boys. It is argued that children take over the roles their parents play, for example in the household. Further, parents, teachers and other relevant authorities, who are involved in the major steps of a child's development, also actively create specific roles for the children. These role models are a dominant factor for habituation and stimulate certain practices which open and close doors to communities. Hence children's internal models are actively as well as passively influenced by these authorities. Nevertheless children also learn how to improve and maintain their own models, their own avatars. The idea of an avatar got a renaissance in the computer-gaming community, where gamers are able to create alter-egos, i.e. an avatar in this respect, in a virtual world. The proposed attempt focuses on the creation of avatars and its relatedness to habitus. In role-playing computer games young people are fascinated by thinking the unthinkable, by creating parallel worlds. These parallel worlds do have a great influence for development in real life, they host the very same internal models. We should take advantage from this new culture instead of just ignoring it as irrelevant side-show effects. It is suggested to make field studies in schools on the grounds of role-playing, but within the real world. Pupils shall be motivated to create real-life avatars, as internal models for their own future, based on questions such as: How do you want to develop yourself, what factors are influencing you and where shall this

development head up? The same questions are relevant for computer-gaming. Any role-model based computer game demands such internal model-building, hence a great amount of pupils would be already aware of such questions, but has not applied them to their real life. The aim is to locate possible paths for the future, how such paths can be followed and how realistic such paths are. The empirical part shall consider social network analysis as well, in order to reveal the pupils' communities of practice. Then in a second step, the created avatars serve as fundamentals for simulations. Heterogeneous agents interact in communities of practice and learn how to create and maintain internal models along social learning mechanisms. These internal models are implemented in an agent-based framework, where the higher education system is simulated. This kind of evolutionary university design tempts to implement different agents all engaged in the very same process, considering pupils, student, teachers, professors and administrative personal. It heads up to reveal the socio-psychological adaptive processes of these agents. Therefore the agents are able to adapt their behaviour along social learning, by imitation and adaptation. Outcomes shall draw possible paths of education policy. Within the simulation it is further possible to test certain education policies and the reactive adaptations of the agents. If this attempt is proportionally successful the area for the field can be widened, insofar that more and more pupils can be possibly motivated to engage in reflected internal model-building, crystallising their habitus. The concept would lead to great benefits for the pupils themselves, to rethink their ambitions for further education. The avatar can then be used as a pivotal virtual structure, which serves as an anchor. Insights can be reintegrated in the theory of social learning. Of course, such a project is still in its infancy, but it could reveal possibilities to integrate concepts like habitus, communities of practice and simulation approaches along the idea of complexity. The idea is to rethink education as a complex adaptive system, where policy has to be judged continuously, not just every 50 years.

4. Complexity – Methodological Considerations

Methodology refers to more than a simple set of methods, moreover it represents the scientific investigation of used methods and their appropriateness for certain domains. Methodology involves discussion on methods and their *assumptions*. Assumptions form the pre-analytical elements of methods, they guide methods in certain directions. In this thesis, investigations on ontological and heuristic stances aimed at finding realistic assumptions about institutional evolution. Questions were raised about economic reality, about the economic process itself and the variety of possible treatments of these processes. In fact economic methodology is the next step of scientific inquiry concerning the formation of models finally. Models act as translators between reality and the images we collect about it. Economic modelling has a strong mathematical focus and its methodology is embraced by efficiency. Economics is prominent for its continuous struggle on its methods, as the famous *Methodenstreit* exemplifies. Methodological considerations were always constrained by awaited success. In short, economics always broke up necessary discussion on methodology, because scholars focused too much on working results. Milton Friedman¹⁰⁵ went so far that he even neglected the importance of assumptions about economic models. They should just deliver results, which should be compared with empirical data then. As long as the results fit with the data, the methodological discussion gets redundant as well as discussion about assumptions. Problems came up in the last decades concerning the most basic assumptions of economic modelling and enabled new discussion about methodology. The conception of *homo oeconomicus* completely lost its relation to reality, even if results fit with the data. The problem is that one cannot trust data in the long run, since data gets entangled by methods. Data is also just another image of reality. It is a model for itself. Methods create their own data in an indirect way, when detailed focus gets detached from overall systematic. This problem cannot be solved either, but on the other hand it does not mean that we should use

¹⁰⁵ Compare section 3.3.

just the same old methods, though they are still improved. Methodological considerations about economic and institutional change invite new methods, to bring back economics to its assumptions. Several methodological sets emerge in such discussion, like bounded rationality, social learning, heterogeneity and so on. All of them break with the traditional methodological dominance in economics, which consists of differential calculus and its appliance in the representative agent, general equilibrium, utility-maximisation and overall in the *homo oeconomicus*. Of course it is possible to enhance all these methodological tools for a better fit with its assumptions, but those remain mighty tricks to hinder major change. Methodological individualism cannot be separated from these tools and is definitely representing the tipping point. Modern economies are highly interactive on a global scale. People engage in community-based organisation and learn in social terms. Otherwise nature gets continuously damaged by the strong individualistic tension of economic action. Many scholars miss the point that a methodological apparatus influences real world economics, people do finally act *as if* these models offer the only way to manage life. Methods get somehow burnt in brains and practices in the long run. Economics needs a new methodology for two reasons. First we have to rework assumptions about economic action. Second we need to change methods, because they serve as guides for real economic action. The former issue deals with methodology on a mere theoretical level, but the second issue brings in practice. The way we are actually doing economics needs to be changed, if we keep on doing like this, the system may collapse earlier than expected. Several scholars are convinced that methodology will change in economics from an unnamed era, compare Colander et al. (2004), towards the era of complexity, as for instance Holt et al. (2010) argue and show at hands of certain examples.

Recent tendencies in economic thought invite a complex approach to economics' methodology, an approach capable of concentrating on the economic process instead of augured aggregated outcomes. The science of complexity may host as such a methodological approach. Complexity focuses on the level between chaos and order, as Stuart Kauffmann explains.

Eighteenth-century science, following the Newtonian revolution, has been characterized as developing the sciences of organized simplicity, nineteenth-century science, via statistical mechanics, as focusing on disorganized complexity, and twentieth- and twenty-first century science as confronting organized complexity. Kauffmann (1993, p. 173)

Organised complexity within the realm of the social sciences deals with interacting heterogeneous agents evolving to adaptive systems. Hence complexity brings the notion of

time and history into a system theoretic picture of society. Herbert Simon admitted that complexity does not necessary mean complicatedness, that complexity even follows a pragmatic perspective of life, because it focuses on locally interdepending phenomena.

Roughly by a complex system I mean one made up of a large number of parts that interact in a nonsimple way. In such systems, the whole is more than the sum of its parts, not in an ultimate metaphysical sense, but in the important pragmatic sense that, given the properties of the parts and the laws of interaction, it is not a trivial matter to infer the properties of the whole. In the face of complexity, an in-principle reductionist may be at the same time a pragmatic holist. Simon (1962, p. 468)

A central issue concerning complexity, emphasised by Simon in this article, is about the hierarchy of systems. He also ascribes that hierarchy needs to be used in more complex relations than in formal organisation theory as following.

Etymologically, the word 'hierarchy' has had a narrower meaning than I am giving it here. The term has generally been used to refer to a complex system in which each of the subsystems is subordinated by an authority relation to the system it belongs to. More exactly, in a hierarchic formal organization, each system consists of a 'boss' and a set of subordinate subsystems. Each of the subsystems has a 'boss' who is the immediate subordinate of the boss of the system. We shall want to consider systems in which the relations among subsystems are more complex than in formal organizational hierarchy just described. We shall want to include systems in which there is no relation of subordination among subsystems. Simon (1962, p. 468)

Dependencies among subsystems build up abstract and foremost non-linear hierarchies, these dependencies represent the *power relations of a complex systems*. Thereby power is understood as a productive field resource, stabilising, destroying and innovating human relations in a manifold way. Michel Foucault (2005) [1994] understood power as such a productive force and insisted that hierarchical systems do not necessitate a top-down logic, as also explained by Simon. Hierarchy allows us to understand or to even grasp complexity. When we describe something complex, we will begin with the simplest hierarchical constrain of the system and then continuously add complexity step by step. Evolutionary processes do also follow such hierarchies. It is argued in this last part of the thesis that *power* is the most influential factor for complex, hierarchical evolution, structuring relations in a bottom-up as well as top-down organisational way. Power involves variety and distinction of and between organisational and hierarchical patterns in a complex system.

In this section we will deal with complexity along three sections. In section 4.1. we will concretely discuss the notion of *power* in institutional networks. Power is here understood as an emergent property of networks between actors, it is therefore considered as a non-individualistic variable of institutional change. Further power is conceived as a highly productive complex force, by influencing social relations in manifold ways. Hence it is also

argued that power may play a dominant role as a unifying principle for a naturalistic foundation of economics, within a complexity oriented methodology. In section 4.2. we will refer to two basic methodological sets among the realm of complexity. The major idea of agent-based modelling and social network analysis shall be briefly introduced. We will also focus on advantages as well as complications with these two methods. Finally section 4.3. offers a model on the evolution of institutional systems, dealing with trust and power relations, where both agent-based modelling and social network analysis are integrated. Results from these models about processes of institutional change are finally compared with postulations of the whole thesis. These three sections shall provide a direct and practical access to complexity. Complexity opens such a vivid scientific realm, that it is best described in practice.

4.1. Power within complex systems

Power involves potential. Potential involves and necessitates innovation. As we have seen in the section on generic heuristics, innovation is a naturalistic and foremost social act of creation and dissemination of novelties. Power relations determine the hierarchies which control innovation flows; hence domination within a complex system means partial control of specific information flows. Domination is not something which can be acquired instantly; domination necessitates institutional growth and cumulative change over long periods. Compare for instance the system of the mafia. The mafia, in its various facets, is one of the oldest institutional structures which builds upon consequent authoritative and totalitarian hierarchies. These control structures have evolved over long periods, so that even endogenous sanctioning mechanisms could evolve to sustain long-time cooperation within their system, of course for a very high price, i.e. for instance the *Omerta* in Italian organised crime. Trust and terror in this respect enable specific hierarchical formation within a complex system and determine the distribution of power. Institutions are nothing without power, just empty shells. Power may emerge in several forms within institutional coherences, in a more visible fashion within strong authoritative formal organisation and in more invisible decentred form. Hence power is distinguishing and distinctive argument of institutional variety; that is a very productive role, comparable to Foucault's concept of power. Foucault's idea of power is

somehow similar to Hayek's approach to knowledge, which we elaborated in section 3.3. Both conceptions have a naturalistic foundation which goes beyond mere dialectic approaches by emphasising the complexity of social systems. Foucault also focuses on the relation between knowledge, power and the discourse. Power is therefore a natural, relational component of specific discourses, which are for our concerns envisaged as complex hierarchical systems, as institutions themselves. Hayek always insisted that knowledge is naturalistically encapsulated; it just needs to be discovered. This discovery process is considered within an evolutionary logic. The specific paths and roots of this discovery procedure are constrained by certain institutional frames, which lock and open doors dependent on hierarchical positions. Again hierarchy is here understood in a horizontal as well as a vertical system. Power follows the very same processes. Power as well as knowledge can be incorporated or embodied within a certain habitus, in form of symbolic or cultural capital, but it cannot be possessed as a kind of equity, either by an individual or by a group. Hence in the end power is a network or institutional property, rather than an individualistic property.

Foucault explains what power is not. It is not a group of institutions and mechanisms which ensures the subservience of the population of a given state. It is not a general system of domination exerted by one group over another. Analysis should not at the outset assume an overall unity of domination, whether this be seen as law, or the sovereignty of a state, or any other single principle. The possibility of power is not conditional upon and '*... should not be sought in the primary existence of a single point, in a unique source of sovereignty from which secondary and descendent forms would emanate.*' (Foucault, 1984, p. 93) He also clarifies what power is; it should be understood '*... as the multiplicity of force relations immanent in the sphere in which they operate and which constitute their own organization.*'; this seems consistent with the view of context as emergent, rather than given. Rather than a central point of sovereignty, power is '*... the moving substrate of force relations which, by virtue of their inequality, constantly engender states of power, but the latter are always local and unstable.*' Fox (1999)

By summarising this citation we may conclude that power is an immanent property of institutional/force relations, nevertheless it constitutes these relations within a structuring process. Therefore power is an emergent property of complex systems. Its relations are by virtue unequal, which leads to variety and heterogeneity within the system. Further, this inequality creates spontaneous states of power, which are by nature local and unstable phenomena. Interestingly this explanation by Foucault on power is of great similarity to Hayek's concept of spontaneous order through engagement of systems of rules of conduct, as well as his conception of natural knowledge. Power is in Foucault's picture a naturalistic variable; it follows all common characteristics of organic, complex and transformational processes; i.e. interactive, local, unstable, spontaneous, heterogeneous, emergent, immanent

and so on. As a consequence Fox (1999) argues that we should engage in research of power relations which does not primarily concentrate on power between institutions or organisations, but rather look into the outward dynamics of power. Such an emphasis suggests analysing more the horizontal potential and variety of power. Power emerges where social practices and actions clash, which follow shared knowledge paths.

POWER AS A NATURALISTIC NETWORK PROPERTY

Herrmann-Pillath (2004) also emphasises the strong correlation of power and complexity and power as a necessary property for the evolution of complex systems. He urges power as a unifying concept in a naturalistic foundation of the social sciences. Hence power is here essentially understood as an emergent network property. Herrmann-Pillath (2004) focuses on three different roles of power, which shall be summarised here: power as a *transdisciplinary bridging concept*, power as *potential for creative adaptation* and *power as a communication medium*. First of all, a naturalistic foundation heads up at linking the fields of biology, psychology, economics and the social sciences in general. Evolution and complexity play a major role in this attempt, because power is understood as an endogenous emerging *structural and motivational category*. Power then serves as a linking device for a common understanding of evolution for all scientific disciplines. Herrmann-Pillath's (2004) research strategy to improve power as a bridging concept tries to clarify the role of traditional core concepts in the sciences and their potential for transdisciplinarity. Most of these concepts failed to prevail on a transdisciplinary level, due to reductionism. Methodological individualism as the core concept of economics failed, because it focused on mere subjective utility and there are no equivalents in social terms. Fitness on the other side could serve as a bridging concept between genotypic and phenotypic change, but cannot be transported to the utility domain. Herrmann-Pillath (2004) tries to connect utility and fitness with the concept of power. Therefore power is on the one hand used in terms of technological fitness, with *power to do* something and on the other hand with the social, relational and productive Foucaultian character of power, *power over* something or somebody. Power is then also related to a selection argument of fitness, but not within individualistic selection. Selection is understood – compare section 2.4. on macroevolution, group selection and developmental system

approach – as hierarchical selection, comparable to Simon's explanations above. Then power refers to inter-group as well as to between-group relations in complex systems, this possibility integrates the micro (utility) and the macro (fitness/population) perspective again and power gains status of *relative productive success*, which can be applied to all mentioned scientific fields of interest, i.e. a bridging concept.

The idea of power as creative adaptation is again similar to Foucault's conception of power as productive force relations. Inequality creates differences and these differences create knowledge vacuums, where power gets creative and new knowledge is stimulated within structural holes. Creative adaptation also heads up at the social character of power. Creativity focuses on possible opportunities to take or to think the unthinkable, but this is not a mere individualistic property. In order to create something, which is a very powerful human act, it is extremely important to be aware of the situation, by that it is inevitable to adapt to the environment. This kind of power characteristics cannot be treated within the realm of subjective utility, because there is no environment, there is no situation and there is no social network within the utility concept, where actors could adapt to anything be creative, using their power. Socioeconomic as well as political solutions necessitate creative adaptation through social actors, which on the one hand use their individual creativity as an act of human agency and adapt their behaviour regarding the specific environment on the other hand, like the idea of developmental systems suggests; coevolution of human agency and system development. This co-evolutionary process creates structural holes, where power may emerge, but this power does not stem from rationality or individual choice. The problem of the subjective utility concept and a possible integration of the notion of power lies, as Herrmann-Pillath (2004), critically emphasises that it is an actor-centred approach and not a problem-centred approach. Therefore it is impossible to integrate something like adaptation, because there is no reference point where one could adapt to, like for instance a certain problem and its environment. Herrmann-Pillath (2004, p. 13f.) urges that Amartya Sen provides a framework where adaptation plays a major role. Sen introduced the idea of *functionings versus capabilities* of economic actors, where the former represents objectives of successful action and the latter deals with institutional and individual prerequisites for successful action. Individual problems can be solved along knowledge as a capability in contrast to choice, where complete information is necessary. Such a welfare approach hints at a more adaptationist direction.

Sen does not need to locate full instrumental knowledge in the individual, because a part of this may be stored in the functionings as historically evolved structural determinants of human action. The capability concept is open with regard to the actual realization of different functionings, and because capabilities include different states of knowledge which may be determined via certain functionings. Herrmann-Pillath (2004, p. 15)

In such a picture the human being is not instrumentalised towards a mere calculation machine anymore and it advocates the notion of adaptation along specific environments. Additionally the capability approach invites the idea of complexity, since local knowledge overrules rational choice. But how is power connected with the idea of capabilities and functionings within a complex adaptive system?

Herrmann-Pillath (2004) claims that Sen's approach misses a systemic equivalent to utility, therefore he proposes power for this position. Power is then understood as the capacity of an individual to act on an environment and to adapt to an environment, linking functionings and capabilities. Such action introduces a new set of productive force relations finally, foremost when it changes the constraints of the environment itself through an act of creativity, in a Schumpeterian way. Thus the system of actor and environment transforms and reproduces itself in a complex adaptive way by the evolution of power. Power understood as a complex communication process involves additional features, like strategy formation and signalling. Herrmann-Pillath (2004, p. 27) admits that communication merges the concept of *power to do* and the concept of *power over*. Then force relations within a social network become communication signals or expressions within communication. Such a theory of the complex evolution of power involves so-called *signal selection*, which may contribute to the idea of power as a transdisciplinary bridging concept as well. Signal selection is in fact a proposal for a theory of influencing and manipulating communication processes for the own benefit; i.e. better control over the environment – power. Signals may be visible or invisible, hence violence and domination do also represent a kind of signalling, a coercive and visible one. Non-verbal language and specific basal cultural forms of signalling represent invisible signals. Bluffing, ignorance, arrogance, pride and many other *strategic and emotional signals* – tactics and affects – do also count as invisible signals. Then signal selection deals with the appropriateness and applicability of specific signals for specific environments, in order to effectively influence power relations. Obviously creditability plays a dominant role regarding this issue too. Actors need to select signals which seem authentic, credible and adaptive to the environment and to other actors; else they may not be able to engage in the production of power. This process involves a strong learning component, since signalling evolves

cumulatively. Then *meaning* emerges as a synthetic component of power within a complex system. This notion of signalling brings us back to the discussion on group selection and the role of symbolic markers, in section 3.3. Symbolic markers render groups together and distinguish them from other ones. These markers work as signalling traits for power relations, between and within the group. Hence the communication processes around power crystallise groups or cultures. In conclusion we may propose signal selection as an appropriate feature of cultural evolution in contrast to natural selection, because it governs power relations. Then language re-conquers its essential role in the production of power relations and the establishment of culture; *language as discourse* in Foucault's words. Discourse opens a variety of governmentalities for the evolution of power within complex adaptive systems, but this is part of another story.

4.2. Agent-based modelling and dynamic social network analysis

Complexity serves as a host for several methods and various scientific domains. The issue of institutional change needs methods and tools capable of doing *social simulation*. Social simulation can be regarded as an attempt to simulate processes of interacting agents, which rely on rules of thumb. Hence the object of investigation is the cumulative change within macro patterns, due to micro regularities. The logic builds upon the idea of change from bottom-up instead of top-down and concentrates on endogenous effects. The social system needs to transform itself from within the simulation. Social simulation depends very much on the used topology, which serves as the major *agglomeration externality*. Several modes of topology are possible. Typical agent-based models rely on a spatial grid interpreted as a geographical space, where agents are able to move around freely. Such grids are mostly wrapped at their ends to form a torus, so agents may move infinitely around. These ‘...*models in which the environment represents geographical space are called spatially explicit.*’ Gilbert (2008, p. 6). A network topology is considered as a mere social space where the agents are engaged in pairwise connections, links. The former space is exogenously given and is heterogeneous by nature, since agents are randomly distributed and accumulated. The latter space is of social nature and is represented by graphs, hence distance plays a more abstract role and is not a physical barrier anymore. Generally such techniques can be applied to all social sciences, in economics we speak of agent-based computational economics when social simulation methods are applied for the simulation of dynamics of interactive agents from a complex economic system’s perspective. These agents usually interact according to some underlying game-theoretic logic or apply to some evolutionary replication dynamics. Therefore interaction may follow a more pairwise strategic interaction approach or a more population approach, where adaption and imitation stands in the front of certain relatively successful behaviours. In both cases are local phenomena and local developments decisive for further evolution of the system.

NOTES ON AGENT-BASED MODELLING

Agent-based models refer to experimental techniques among formal methods. Hence simulation runs always represent certain experimental situations, like in the lab. This is also a notion emphasised by Gilbert (2008, p. 2), where he speaks of models as computer programs. In the end programs interact with each other in artificial societies. If we reconsider Dopfer's (2004) emphasis on the economic agent as a rule-maker and rule-user, we may imagine a software program as such a rule-guided agent. The point is that the agents are of heterogeneous nature and consequently show up with different conducts and behaviour patterns, but still following the same rules of thumb. The software program works within algorithmic bounds and follows the idea of bounded rationality to a certain extent, if properties like learning or adaptation are implemented. As a consequence agent-based computational economics may be also compared with computer games, where gamers govern their avatars.

Such games can be very close to computational modelling, although in order to make them fun, they often have fancier graphics and less social theory in them than do agent-based models. Gilbert (2008, p.2)

This notion invites the idea to make computer experiments where software agents as well as real human probands play interact, but not just as a strict Turing experiment. Computer games are then getting experiments for real-world situations. Another notion of agent-based modelling deals with its experimental character, as a way of doing science. Experiments play a very dominant role in all the sciences; nevertheless they are quite cost-intensive in the social sciences. Computer experiments have the huge advantage that they can be easily done and evaluated on several issues. Another great benefit of computer experiments is that they can be repeated and reconstructed, so results can be compared easily as well. Simulations are built upon models; these models try to establish formal environments capable of mapping reality. There are several methods to implement models in the social science. Neoclassical economics relies on equation- and equilibrium-based modelling for example. In agent-based computational economics scientists try to establish models with a focus on behavioural rules or social practices in contrasts to universal rules. A further advantage of agent-based models according to Gilbert (2008) deals with information and communication processes between the agents. These processes indicate the endogenous character of simulations, since they represent a kind of social learning. Information flows and communication systems within an agent-

based architecture influence the transformational process of the whole system. Gilbert (2008, p. 21) ascribes following characteristics to agents within an agent-based model.

-*Perception*: They can perceive their environment, possibly including the presence of other agents in their vicinity. In programming terms, this means that agents have some means of determining what objects and agents are located in their neighbourhood.

-*Performance*: They have a set of behaviors that they are capable of performing. Often, these include the following:

-*Motion*: They can move within a space (the environment)

-*Communication*: They can send messages to and receive messages from other agents.

-*Action*: They can interact with the environment, for example, picking up 'food'.

-*Memory*: They have a memory, which records their perceptions of their previous states and actions.

-*Policy*: They have a set of rules, heuristics, or strategies that determines, given their present situation and their history, what behaviors they will now carry out.

Gilbert (2008, p. 21-22)

Most of these characteristics were already discussed in the heuristic section of this work and form essential features of generic institutional change. Hence agent-based modelling represents *the technique* for evolutionary institutional economics. Ontological, heuristic and methodological properties of social systems can be represented within agent-based computational economics in an appropriate way, because the process itself is the ultimate criterion.

NOTES ON DYNAMIC SOCIAL NETWORK ANALYSIS

Of course, social network analysis denotes only analysis on a specific topology of agent-based systems, but his topology provides incredible characteristics. A network can be formalised along relational algebra, in the end it is just a linear symmetric mapping which can be illustrated by a $n \times n$ matrix. This matrix indicates a graph, which can be either directed or undirected. So why should we use graphs for social network analysis?

First, graph theory provides a vocabulary which can be used to label and denote many social structural properties. This vocabulary also gives us a set of primitive concepts that allows us to refer quite precisely to these properties. Second, graph theory gives us mathematical operations and ideas with which many of these properties can be quantified and measured. Last, given this vocabulary and these mathematics, graph theory gives us the ability to prove theorems about graphs, and hence, about representations of social structure. Like other branches of mathematics, graph theory allows researchers to prove theorems and deuce testable statements. Wassermann and Faust (1994, p. 93)

The possibility to use mathematical operators on these structures makes social network analysis a perfect extension for agent-based computational economics. The crucial point is

that it is relying on a mathematical structure which ‘...stresses the importance of relations rather than the atomization of reductionism or the determinism of ideas, technology, or material conditions.’ Mark Granovetter in the foreword of Wassermann and Faust (1994). Relational data expresses the intensity and durability of social relations; hence it is perfectly suitable for institutional analysis. Networks consist of nodes and edges, where the latter indicate the weight of a relation between two nodes. These weights usually determine the structure of the network and its evolution, if it is a dynamic model. In dynamic social network models networks change from within, nodes create new links and dismiss old ones due to rules of thumb. Dynamic models show up clustering effects and other structural components of networks, like the degree of *centrality* for example, as Scott (2000) emphasises. Within dynamic network analysis it is also possible to analyse the development of cliques and its relatedness to other cliques, so group selection within and between groups is a natural feature of this kind of analysis. Social networks may be of different structure and may evolve in various forms. The evolution of social networks deals with *scale-freeness*¹⁰⁶, *nestedness*¹⁰⁷, *small-worldness*¹⁰⁸ and mere *random* phenomena. Network formation itself has earned a lot of attention in the economic community, research in this area created a huge variety of practical approaches for the formation of networks, with exogenous as well as endogenous properties. For a detailed survey of models of network formation compare Jackson (2003). Possibilities are manifold and combinations seem to be infinitely, even evolutionary game-theoretic techniques can dock on, as the model in section 4.3 shall show. Evolutionary game theory may profit a lot from social network analysis, because it relaxes the traditionally strict and sometimes misleading population approach and brings in more locality along *pairwise stability* and other characteristics. Network analysis allows us to investigate the spread of ideas, technologies as well as the dissemination of knowledge and its maintenance. These are hot topics in economics nowadays and with network analysis we have the tools to model them. Moreover social network analysis represents relatedness and covers a naturalistic foundation of the social sciences. In section 2.4 we have discussed the idea of critical naturalism and its emphasis on natural relations and relative productive success in embedded developmental systems, social network analysis offers the methodological link to the broader ontological picture. Further, according to heuristic characteristics of generic institutional

¹⁰⁶ Compare Barabási (2003)

¹⁰⁷ Compare Csermely (2009)

¹⁰⁸ Compare Watts (2004)

change we may consider social network analysis as the most appropriate tool to analyse the notion of *social capital, trust and power relations*, because it offers powerful techniques to investigate relatedness and betweenness over time as well as the emergence of durable social structures. The notion of power can be investigated along so-called structural holes, as for instance Goyal and Vega-Redondo (2007) show. Theory on power suggests that actors who are able to fill structural holes have relatively more social capital than others, or in more detail.

Connections facilitate timely access to important information – on trade opportunities, job vacancies, project deadlines, and novel ideas for research. In some important instances – e.g. trade opportunities – the payoffs an individual entity gets in a network will clearly depend on his relative importance in bridging gaps in the network between others. The potential benefits from bridging different parts of a network were important in the early work of Granovetter and are central to the notion of *structural holes* developed by Burt¹⁰⁹. In recent years, a number of empirical studies have also shown that individuals or organizations who bridge 'structural holes' in networks gain significant payoff advantages. Goyal and Vega-Redondo (2007, p. 461)

Conclusively structural holes hold innovative potential of any character, economic, social, cultural, political and so on. They are enabling power relations and stretching social capital by continuously transforming networks by working as dynamic attractors. Hence benefits for economic theory are tremendous, since processes are emphasised along the idea of structural change.

In conclusion it has to be admitted that agent-based modelling as well as social network analysis involve a mass of concepts, tools and features, all for the best of social sciences, which cannot be elaborated here in a holistic methodologically theoretical way. Nevertheless the next section proposes a model and experiments within simulation runs which tries to combine agent-based modelling and social network analysis within a two-layer topology. Several theoretical issues are covered there, which are perhaps not clear yet about these two methodological sets. Hence they shall be revealed in an implicit way along a practical example.

¹⁰⁹ Compare Burt (1992)

4.3. Evolution of institutional systems

Institutions are analysed in manifold ways today, but rarely as endogenous and self-transforming economic phenomena. Institutional settings are not constant; they change from within over time and space. Economic policy usually takes institutions for granted, though policy authorities are themselves emerging and changing entities. Therefore institutions – whether they are still informal steady states of ubiquitous coordination problems or social norms, conventions shaping cultural rules of conduct or already a formal apparatus governing macroeconomic social orders – do all have problems with strategy formation for the future and need to adapt to changing economic conditions as quickly as possible. Strategy formation requires *distinction and indication*¹¹⁰ of an observer, able to interfere with its own environment in a self-observing way. Conventions, norms and other informal institutions are ultimately guided by emerging effects, they do not have an explicit governing authority. Formal institutions usually have elected sovereigns committed to active strategy formation. Elinor Ostrom (2005a) suggests in her *grammar of institutions* that an institutional statement underlies an evolutionary process from strategies over norms to rules finally. She came up with these observations after year-long studies of common-pool resource phenomena. The well-known *tragedy of the commons* also suggests one important point, institutions are part of the emergence of a lock-in of multilateral relations between internal models. Such lock-ins manifest relations of the institutional coherence, which then create power hierarchies of different order in an endogenous and still manifold way. Hence as long as an institutional statement has not evolved to a legal apparatus of rules there is no explicit *sanctioning* hierarchy and authority, people either have to trust or to fear each other in a very primitive way in informal institutions. The point is that these relations can only emerge endogenously and are never exogenously given like in the concept of social preferences; hence institutions do always rely on very *weak links*. The immense diversity of endogenously evolving institutions suggests speaking of institutional systems, where co-evolution shapes the future. It is proposed to define an institutional system as a network of interacting institutions on at least two different topologies. Institutions may emerge in a bottom-up way between micro relations of economic agents, but need a second topology to interact among them. Policy decisions do affect institutional settings in various ways, on different topologies. A specific

¹¹⁰ Compare Füllsack (2010) referring to Luhmann (1984, p. 63ff).

policy decision may only interfere with a certain political level, as several examples from European policy-making can show. Reality has shown that this is never the case; policy decisions have always influenced institutional relations on other political levels as well, because institutions evolve as complex adaptive systems, which makes economic policy a rather sophisticated and far-reaching decision process. This is insofar a feature of complexity. Decisions may have non-linear consequences in sub-systems. It is suggested to model institutional systems within an evolutionary framework to better understand the complexity of a specific policy environment. Additional methodological research gains can then be targeted along a synthesis of complex adaptive systems (e.g. multi agent simulation) and evolutionary dynamics (e.g. replicator dynamics).

THE MODEL

Institutional coherences dominate global political economy, built on more than less loose contracts. These contracts generate power relations around the world and sustain the rules of the game, as Douglas North once called them. It is a phenomenal property of human culture that these contracts or coherences, as loose as they can be, are inherited over generations. Several scholars investigated or announced this cumulative change as the major economic force, as an endogenous process of self-transformation. Among these economists, the most prominent ones may be Th. Veblen, F.A. v. Hayek and J.A. Schumpeter; as discussed in sections 3.1.-3.3. All three of them tried to elaborate causal relations between agency and structure. Veblen worked with habits and cumulative causation, Hayek with rules of conduct and spontaneous order and Schumpeter with entrepreneurship and creative destruction. Habits and conducts stand for regularities in human agency, whereas entrepreneurship or innovative activity stands for singularities in human agency. Cumulative causation involves structuring as stabilisation, in contrary spontaneous order and creative destruction involve structuring as innovation. These counterparts can be played infinitely along this domain of history of economic thought. It is important to recognise that institutional processes are in general dialectic, because it nurtures emergence. Emergence is at home in the universe of system theory and the science of complexity, but it got a very prominent concept in evolutionary economics as well. At least since the work of Schelling (1978) economists recognise that

aggregation processes between a micro and a macro perspective of the world are not happening straight forward, that the whole is mostly more than the sum of its parts. Institutional coherences are complex relations, by that it is meant in particular that they are basically not linearly transformable. Complexity brought important dimensions into economics, one of them deals with thinking in bottom-up processes and another one is thinking in networks. Everything is connected in the modern world, the rise of information technology brought people and their organisations closer together as anybody would have thought 30 years ago. A crucial feature, in this respect, are the properties of weak links in evolving networks. Granovetter (1983) created a classic with his paper on the *strength of weak ties*. Social networks are in general of heterogeneous nature, in particular nodes and links are mostly scale-free distributed. So there are some nodes with a lot of links – mostly considered as hubs – and a lot of nodes with only a few links. Such a distribution is also called a *power law*, as critically observed by Barabási (2003) for instance. Now as one can imagine the point is that the so-called hubs are connected through weak links. They are called weak, because if they break down the whole network may collapse, hence they can be regarded as system-relevant. This issue is intensively discussed by P. Csermely (2009). He observed networks in processes, so he brings in an evolutionary argument into the discussion of networks. Networks changing over time face so-called phase transitions, these transitions happen when weak links break down. Phase transitions can be also regarded as processes of creative destruction, because after such a transition the system can never be the same as before. During a transition the system is set under heavy stress and it needs all its power to regenerate and restructure itself; i.e. it needs to build new weak links again. Economic crisis can be considered as such phase transition processes as discussed in section 3.4. But what are the micro interacting processes, making such a system possible? This question involves the agency part of institutional economic analysis, it involves discussion about human relations, about social variables. The critical point of micro institutional analysis is to focus on social variables from an emergent perspective, instead of a mere individualistic one. A pure individualistic analysis would suggest emphasis on the major variables and then calculating their optima. These variables can then be social ones as well, as the recent literature shows. Social capital, in light of a neoclassical perspective, is just another individualistic target variable. It is argued that such an analysis comes too short in several aspects. Hence a critical micro institutional analysis needs to cover social variables from a bottom-up, interacting and

emerging perspective; i.e. a systemic view. Trust and power are such social variables which can only be regarded from a systemic, but still micro perspective. Several scholars in the discipline of evolutionary institutional economics, such as K. Dopfer or W. Elsner, suggest using another in-between layer for the analysis of such variables, this layer is then called *meso*, between micro and macro, as was shown in section 3.4. The existence of such a layer and its appropriateness for scientific study still needs discussion, but such a path has to be taken for fruitful research in this domain. Besides this discussion trust and power relations have constantly as well as erratically shaped institutional evolution since the rise of mankind.

It is proposed to model and explain the capitalist process as a self-similar generic principle of institutional change. Capitalism has to be considered as an innate property of human life, as a kind of human virus. In this model leaders govern institutions and compete with other leaders. The incorporation of capitalism into economic life is rendered along trust and power relations here. *Credit involves trust* and *capital involves power*. These two variables shape capitalist institutional evolution. Further, groups may protect themselves from others via the establishment of norms, rules and institutions. These structures govern cooperation between and within groups. This notion represents the credit part of the model, where credit is understood as a *social trust credit*. Once credit relations are established between committing institutional members and the leader, the leader protects her members from possible invasion, for a sustained long-run cooperative environment, i.e. a formal welfare institution. During this very process, a specific leader gains power by acquiring economic capital (members pay in, give credit), which represents the other side of the coin. The trustworthiness of her institutional members equips her on the one hand physically with economic capital to maintain the institution and symbolically with a surplus of power on the other hand. Power gained through capital represents the structural part of this process, it retains social hierarchies and hegemonies. Then this power is used to compete with other institutional leaders on a second layer, in a top-level game. Of course leaders compete within an abstract game, so there is no assumption on the specific purposes of these conflicts. Leaders merely engage in abstract power games, where the focus is set on the specific methods to gain power (through cooperation or through defection), which then influence the abstract distribution of power, i.e. relative productive success. Credit and capital is here understood in a very abstract and generic way as well. Credit refers to lending trust in order to gain protection. Capital refers to borrowing trust in order to gain power. It is obvious that this process is a very difficult

balancing act for both parties. In this first instance agents give credit in form of paying a policing fee. Leaders are involved in two main duties, on the one hand protecting agents against possible defecting invaders and competing with other leaders on the other hand. In a second instance leaders could get a third duty, namely to give credits back to agents, that they could engage in micro enterprises. Then leaders and agents would all be debtors as well as creditors. This second instance is currently not considered in the model, whereas the first instance is treated as following.

The model deals on the one hand with the emergence and exit of *organised institutions/institutionalised organisations* in an artificial political economy, based on trust interactions of individuals on the micro-level and in a second model logic deals with power interactions among evolved institutions on a network layer on the other hand, i.e. the institutional environment. The idea is to start with a *micro setup* within a specific geographic space which represents the political economy. Agents populate this space and interact with each other locally. The interaction is based on a Prisoner's Dilemma logic, i.e. in every time step agents play the Prisoner's Dilemma game with their neighbours. According to the logic of the ordinary 2x2 Prisoner's Dilemma agents can either cooperate or defect. In the model agents are endowed with cognitive capabilities (a crude memory of events in the recent past, and a decision mechanism using this memory) which feed their individual decisions. In the course of the simulation different agents accumulate different memories, and thus naturally evolve into a *heterogeneous* set of individual decision makers. This local logic builds upon Wäckerle, Radax and Rengs (2009). Repeated cooperation between agents builds up overall trust which in turn influences the emergence or disappearing of institutionalised organisations. It is important to distinguish between *institution-building proper*, which by itself just constitutes part of the 'rules of the game', of the simulation, and its structuring as some *special form* of organisational arrangement with some members of this organisation enforcing compliance to the rule set. The special form, the realisation of an institution, needs to be modelled explicitly by some agents taking over the role of enforcers, the role of executive power. Executive power is needed for two distinct tasks: (1) It guarantees internal stability (compliance to the organisational rules), and (2) it warrants security from external threats. The organisational apparatus necessary to exert executive power needs to be financed by tribute payments of its members to their ruling executive, which needs to be divided into a division of powers into executive, legislative and judicative as it was once suggested by Montesquieu,

in later improvements of the model. The mechanism of institution building only represents a small - but essential - subset of the highly complicated processes observed historically. It is just a first approximation to the emergence of institutional authority within a set of agents. With a similar (and consistent) logic the model proposed also takes care of the possibility of the break-up of institutions. In that respect it concentrates on the internal discrepancies, which may lead to the exit of the institutions.

The *institutional setup* of the model is linked together with the micro setting through feedback loops, explained below. First of all, institutional leaders are involved in a 2x2 Hawk-Dove game. In the Hawk-Dove game there is one evolutionary stable strategy: a mixed strategy where players play hawk with probability q and dove with probability $(1 - q)$. Leaders are either hawks or doves and all of them are connected in a network of power relations, depending on defection and cooperation. Links between institutions are weighted with a specific force, which influences the stability of the network. The main benefit for the whole model concerns a process of endogenous heterogenisation, now institutions can be either led by defecting hawks, which are more isolated in the network, or cooperating doves, which build up very dense and stable networks. The model also features feedback mechanisms between these two layers now, especially influencing the leader influence, i.e. the power or authority radius of leaders, so institutions may grow with different sizes. Power relations emerge out of capital accumulation in the micro game, they are measured relatively to the richest leader in the game. This relative power is integrated in the institutional setup to influence the link evolution along force-updating.

The micro-setup generally builds upon the work of Sanchez-Pages and Straub's (2006), Sanchez-Pages and Straub's (2010) and various improvements in Radax, Wäckerle and Hanappi (2009) and Wäckerle, Radax and Rengs (2009). The institutional-setup is influenced by the literature on endogenous network formation; especially by Tomassini et al. (2006), Luthi et al. (2009) and Tomassini et al. (2009). How these two interwoven models look in detail, is explained in the following sub-sections of the paper.

Micro setup

The micro part of the model is based on Sanchez-Pages and Straub's (2006), Sanchez-Pages and Straub's (2010) analytical model on the emergence of institutions. In their model, homogeneous agents are matched randomly to play a game of Prisoner's Dilemma. As usual,

each of the two agents participating in the Prisoner's Dilemma (PD) has the choice between the two actions of cooperation (C) and defection (D). Since the game is played simultaneously and communication is prohibited, a priori the two players are not aware of their respective opponent's choice of action. If both players cooperate, they both achieve a payoff of R (reward), if they both choose to defect, they both end up with a payoff of P (punishment). Finally, if one agent cooperates and the other defects, then the cooperator gets a payoff of S (sucker's payoff) and the defector receives T (temptation). Payoffs satisfy $T > R > P > S$ and $2R > T + S$ (as requirement for iterated games).

In the Sanchez-Pages and Straub-model, within a state of absence of an institution, agents achieve the cooperative outcome (C,C) with probability $\alpha \in [0,1]$ and arrive at mutual defection (D,D) with probability $1 - \alpha$ ¹¹¹. The parameter α represents the level of trust within the society and is exogenously given. However, agents have the option to establish an institution that enforces cooperation between its members. To this end they must choose a leader whom they can delegate the work of enforcing cooperation to. The leader may not participate in the PD game but she may set a fee that all agents willing to join the institution have to pay. Games between members of the institution always reach the cooperative outcome. Games between a member of the institution and an outsider, however, are not under institutional supervision and are treated like games in the state of nature. For convenience, the former case (enforced cooperation) is labelled as *formal games* and the latter as well as games between two institution-less agents as *informal games*.

With this basic setup, Sanchez-Pages and Straub go on to analyse equilibrium solutions on the number of agents within the institution, optimal fees and threats of secession. While their approach is instructive with respect to a number of issues, it considers only the case of *one* institution versus no institution. Furthermore, their model is static and regards only one time period. In our opinion, a dynamic approach is surely far better suited to catch the subtleties of the emergence and exit of such coalitions between individual agents.

Since an analytical model of this dynamic version would hardly be tractable mathematically, we resort to the method of agent based computational modelling (ABM). The current version of the model is implemented in Netlogo 4.1.¹¹²

¹¹¹ The two asymmetrical outcomes (C,D) and (D,C) are not considered there.

¹¹² The reader is invited to experiment with the simulation via an applet version or to download the complete file under: http://www.econ.tuwien.ac.at/waeck/sim/eis_160910.html (September 2010)

In the model, the world is a two-dimensional grid on which the agents can move around freely. Borders are wrapped around so that the matrix topographically is a torus. If an agent happens to meet other agents within her Von Neumann-neighbourhood she plays a game of PD with each of them. If a cluster of at least three agents exists, these agents may decide to become sedentary, choose a leader and build an institution. Members of institutions are able to leave the institution in each time step, the leader of an institution is allowed to set a new fee in each period.

Initialisation

At the start of a simulation run, n_A agents are distributed randomly across the grid. The random numbers are drawn from a pseudo-random number generator following a uniform distribution. Each agent is endowed with a memory of size m . In this memory the agent stores the opponents' choices of the last m *informal* games. We define informal games as games played between, first, two agents who are not members of an institution, second, an agent who is member of an institution and an agent who is not, or third two agents who are members of different institutions. In short, informal games are those games which are not supervised by the same institution. On the other hand, games played by two agents, who are members of the same institution, i.e. those games where the cooperative outcome is enforced, are labelled *formal games*.

Further, we define the share of cooperative actions stored in an agent's memory as his personal value for α . If we assume, for instance, each agent to have a memory of the last ten informal encounters, i.e. $m = 10$, then $\alpha = 0.6$ is equivalent to the case that in *any* six out of the last ten informal encounters the agent's opponents cooperated. The size of memory thus represents an assumption on the flexibility of an agent to adjust to new experiences. In this way, we are able to endogenize the evolution of trust α according to those new experiences of an agent. If, for instance, an agent meets a lot of other agents who cooperate, her personal α , i.e. her trust in society, will rise and she will be more likely to cooperate herself in the future. Since we state that only informal games are memorized, we assume that enforced cooperation within an institution does not influence an agent's personal level of trust. Obviously, at the initialization of a simulation run, no games have been played and therefore no actions would be stored in the agents' memories. Since the initial memory shall represent the agent's past, it would be a quite artificial assumption, that all agents have the same (non-equilibrium) value of alpha at the start. Hence we initialize each agent by assigning her an alpha value, which is

normally distributed along the population. With this starting value, we construct a random history of encounters for each agent, i.e. a hypothetical history of events that corresponds to the given value of his personal α_0 . In contrast to the perfectly homogeneous agents in the Sanchez-Pages and Straub-model, the agents in this model are heterogeneous with regard to their location and their personal history and trust level within the simulated world.

The current version of the model employs *asynchronous updating* for the agents, which means that every agent takes her actions all in one go, before the next agent is activated. This is a much more realistic assumption than *synchronous updating*, which introduces game phases for specific agent's actions during each round. The latter method was shown to be very problematic by Huberman and Glance (1993), who examined that some simulation outcomes could only be reached because the agents were activated in a specific non-random order and used *synchronous updating*.¹¹³ At the beginning of each time step, the activation order of every agent is shuffled randomly. Then every agent is activated and takes all his actions before the next agent is activated. The following subsection describes the actions which every agent may take during his round. For instructive reasons, the following sequence does not match the sequence in which the agents take the actions in the simulation¹¹⁴.

Movement

The agent moves randomly to an unoccupied site within her immediate Von Neumann-neighbourhood.

Playing the PD

Leaving institutions aside for a while, the next step lets each agent play a game of PD against each of her Von Neumann-neighbours in random order. In informal games, each agent plays a mixed strategy of cooperating with probability α and defecting with probability $1 - \alpha$. As stated above, the parameter α evolves endogenously for each agent. This setup is in contrast to the Sanchez-Pages and Straub-model. While the latter only considers cases of mutual cooperation or mutual defection, our model allows for the cases of (D,C) and (C,D) as well.

Building an Institution

A cluster of at least three agents connected through their Von Neumann-neighbourhoods may decide whether to build an institution. An institution guarantees enforced cooperation between its members at the cost of a membership fee. The process of institution formation proceeds in

¹¹³ For a detailed analysis and categorisation of timing events in agent-based simulations, compare Radax and Rengs (2010).

¹¹⁴ For the correct order of actions in the simulation, see the pseudo code in the Appendix.

four steps. (1) Each agent within the cluster calculates if she pays to participate in the future institution. (2) Each agent willing to join the institution proposes a fee she would collect from the members of the institution in the case that she would become the leader. (3) The agent proposing the lowest fee is appointed as the leader. (4) Each agent aside from the leader decides whether to effectively participate in the institution under the designated leader and her proposed fee. If after these four steps, a connected set of members and the leader of $size > 2$ remains, then this connected set becomes an institution.

Step 1: Decision of Participation

At first each of the agents in the cluster calculates if she pays to participate in the future institution by comparing her potential informal payoff (rogue state) with her potential formal payoff (member state) as a member of the institution. We assume that agent i estimates her potential profit of an informal encounter in time-step t as:

$$\pi_{t,i}^I = \alpha_i[\alpha_i R + (1 - \alpha_i)S] + (1 - \alpha_i)[\alpha_i T + (1 - \alpha_i)P] * nle \quad (1)$$

where the superscript I stands for informal payoff as compared to formal payoff (within an institution) and nle stands for the number of local enemies (neighbours), remembered from the previous turn. Hence the agent has at least a short time realistic assumption on possible multiple encounters in the future. This would be the simplest version of an expectation for an institution-less agent (called a rogue).¹¹⁵ The payoff for a formal game is then given as:

$$\pi_i^F = R(1 - ld_{i,L}) \quad (2)$$

with l determining the leader-influence. Thus, for the member state we expect an overall payoff:

$$\pi_{t,i}^M = k_{t,i} \pi_{t,i}^F - \varphi + (nlr * \pi_{t,i}^I) = [k_{t,i} R(1 - ld_{t,i,L}) - \varphi] + (nlr * \pi_{t,i}^I) \quad (3)$$

with $nlr = num_rogues_on_local_neighbors$ this expectation method also regards possible games with informal neighbours. Further, this calculation takes into account the number of neighbours k within the institution who the agent would be guaranteed to cooperate with, which gains even more weight with the introduction of heterogeneous institution sizes, through the integration with the institutional setup; where the evolution of institutional size is endogenized then.

Additionally, it is assumed that the quality of enforcement of cooperation decreases with the agent's distance $d_{i,L}$ to the leader. The distance to the leader is measured as the Euclidian

¹¹⁵ Obviously, this formula is a rather naïve guess, since it doesn't take into account the probability of not meeting any agents at all and ending up with no playing partners.

distance that traverses only members of the institution, each of who is a Von Neumann-neighbour of the former. The parameter $l \in [0,1]$ is exogenously given and serves as a weight for the loss in quality of enforcement. Finally the fee φ for participating in the institution is deducted. Since the institution hasn't come into existence yet, distance to the leader cannot be determined. For the sake of simplicity it is assumed that each agent believes she will become the leader, so that $D_{I_l} = 0$ during this step of institution formation. The fee φ is given by

$$\varphi = c/(s - 1) \quad (4)$$

where c denotes the cost accruing to the leader from enforcing cooperation and s is the size of the institution, i.e. the number of members including the leader. It is assumed that the leader herself needn't pay the fee. Since at this moment it is not clear to the agents how large the institution will be in fact (see below), they use as an estimate the size of the cluster they are part of. Finally, the cost of enforcing cooperation is given by

$$c(\bar{d}, s) = \bar{d}\sqrt{s} \quad (5)$$

where \bar{d} represents the average Euclidian distance of the leader to all members of the institution. Obviously, the chosen cost function is just one of many possible alternatives, but it serves as a first reasonable and parsimonious approach. Once again, since the leader is not known at the moment, each agent assumes that she herself will become the leader of the institution in order to calculate Euclidian distance to the other agents. Each agent in the cluster now evaluates the benefits of participating in the institution and compares her informal payoff π_i^I with her member-state payoff π_i^M . Only if the latter exceeds or equals the former, the agent is willing to participate in the institution.

Step 2: Proposing a Fee

In the next step, each agent willing to participate in the institution proposes a fee. It is assumed that an agent estimates her fee proposal such that the sum of collected fees would equal the cost of being the leader, i.e. we assume that leaders do not factor in a profit margin or formally

$$(s - 1)\varphi = c(\bar{d}, s) \quad (6)$$

Please note that in contrast to Sanchez-Pages and Straub, in our model leaders are allowed to play the PD game. This choice was guided only by the comparable ease of implementation.

Step 3: Appointing a leader

Next, the agent proposing the lowest fee is appointed as the leader. If more than one leader proposes the lowest fee, one of them is appointed randomly.

Step 4: Final Evaluation

Finally, each agent aside from the leader compares her informal payoff with her member-state payoff given the designated leader and her proposed fee. The institution is only formed, when all cluster-members agree to form the institution after re-evaluating the distance to the *to-be* leader once it is announced. Only if after this final evaluation a connected set of at least three agents (including the leader) remains, an institution emerges. All agents participating in an institution become sedentary and remain so until they eventually leave the institution or the latter breaks apart. Every agent may only find, join or leave an institution once per round.

Joining an already existing institution

As shown in the pseudo code in the appendix, if an agent is located in the Von Neumann-neighbourhood of a member of an institution, the former may choose to join the institution as well. Again, this agent compares her informal payoff with her hypothetical payoff from joining the institution. If the member-state payoff is larger or equal than the informal payoff, the agent joins the institution.

Leaving an institution (re-evaluating membership)

In each time step, every member of an institution re-evaluates her gains from participating in the institution. If due to changed circumstances (e.g. changed neighbourhood), her member-state payoff no longer exceeds or at least equals her informal payoff, the agent chooses to leave the institution. All members not connected anymore to the leader are forced to leave the institution as well. If the size of an institution falls beneath 3, it ceases to exist.

Re-evaluating the fee

In every period, each leader of an institution re-evaluates the fee she collects from the members of the institution. If the sum of fees collected in the previous period is smaller than the cost accrued to her for enforcing cooperation, the leader suffers a loss. In this case, she raises the fee such that the collected fees would equal the cost in the current period.

Institutional setup

Basically, the institutional setup follows the logic of Tomassini et al. (2010). In this paper the authors investigate the evolution of mutual trust and cooperation in a Hawk-Dove game, also known as game of Chicken, on a network topology. The authors explain that this topology is a more realistic spatial structure for modelling social interactions, because new insights from network theory have shown that social networks usually organise as small worlds or even

scale-free networks, as we already elaborated in the introduction. Hence in this paper they look into the specific effect of network topologies on the evolution of cooperation. The Hawk-Dove game has two Nash-equilibria in a one-shot game in pure strategies. Both equilibria are represented through the symmetric mixed strategies. Nevertheless the only evolutionary stable strategy within repeated games is the mixed strategy of playing hawk with probability q and playing dove with probability $(1-q)$. Research concentrated on the evolution of cooperation under certain conditions within these games. Several examples in the literature have shown on the one hand that cooperation is sustainable in the PD under certain conditions and on the other hand that cooperation is also sustainable in the HD if certain topologies are used.

The payoff order in a Hawk-Dove game looks as following: $T > R > S > P$. The sucker's payoff and the punishment are transposed in comparison with the Prisoner's Dilemma. Insofar mutual defection delivers the worst individual outcome (hawk-hawk), in contrast to the Prisoner's Dilemma where individual defection delivers the best. The authors explain that several social situations, especially conflicts follow a Hawk-Dove logic. They compare it with '*...situations in which 'parading', 'retreating' or 'escalating' are common.*' Tomassini et al. (2010). Maynard-Smith (1982) introduced the game into evolutionary game theory by observing ritual fights among animals and the replication of patterns of behaviour or mere strategies. The Cuban missile crisis can be regarded as an excellent example in human relations for the Hawk-Dove game. We may follow for our concerns that the Hawk-Dove game represents social situations where *power* relations play a very important role, compare Herrmann-Pillath (2002). Players *intimidate* (defect) or *retreat* (cooperate). Hence the Hawk-Dove game fits perfectly in our framework of competing institutions. The network structure or topology plays a dominant role for the evolutionary outcome of an iterated Hawk-Dove game. Small-world networks do have short-path lengths and have a high clustering coefficient, so they sustain cooperation very quickly, nevertheless scale-free networks reflect real world social networks even better. As recent literature has shown¹¹⁶, scale-free networks enhance mutual trust better than any other topology. Tomassini et al. (2010) make clear that they focus on the co-evolution of strategy and network structure, which is for us less important than the overall resulting dynamics. But the real novel part of their study, which is integrated in our model stems from '*...pairwise interactions that are dynamically weighted according to mutual satisfaction.*'

¹¹⁶ Compare Santos and Pacheco (2005) for example.

Agent properties

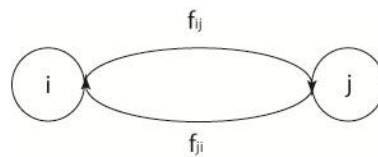
Remember that in our model these agents are all leaders of institutions, they already have a process of institution-building behind them, hence they have history and are somehow *experienced*.

Agents (later also called nodes) know nothing else than their own strategy and their actual neighbourhood, all neighbours which are directly linked to them. Further they do not follow a specific rationality; they just adapt their behaviour through imitation according to a specific *local* replication rule, which is explained below. Agents may also cut off relations with other nodes, if they do not trust them anymore.

Network properties

The network is represented by a directed graph, so that every node has potential in- and out-links. We use the same terminology as in Tomassini et al. (2010), compare figure 4.1.

Figure 4.1: Directed graph



Source: reconstructed from Tomassini et al. (2010)

Figure 4.1 represents a directed relationship between *node i* and *node j*. The links are weighted with a corresponding force, f_{ij} between *node i* and *node j*. This force ($0 < f_{ij} < 1$) shall indicate the relation between these two nodes, in the model of Tomassini et al. (2010). In our model, it shall cover the complexity of power relations. The authors explain that the idea has its origin in the so-called Hebb-rule, which tries to model potentiation/depotentiation among neurons in neural networks. The forces indirectly store the history of the power relation between two specific nodes. Insofar it does not represent a memory as in the micro-setup of the model, because it is not a cognitive property of the individual; though it is somehow a *cognitive property of the link*; i.e. a *mere social memory*. Hence agents cannot access this past knowledge on their own individual will; they gain this knowledge (force in time step $t - 1$) at the moment (time step t) of the actual encounter. Further, agents are

individually satisfied with their ‘situation’. Every agent i has a network property s_i , which is weighted according to her specific neighbourhood. The satisfaction of an agent i is defined as:

$$s_i = \frac{\sum_{j \in V_i} f_{ij}}{k_i} \quad (7)$$

where V_i represents the neighbourhood of agent i and $0 < s_i < 1$. Tomassini et al. (2010) explain that this kind of satisfaction shall report ‘...the average willingness of a player to maintain the current relationships in the player’s neighbourhood’.

Dynamics

The original model of Tomassini et al. (2010) works with a constant population of about 1000 agents, which are initialized as a random graph with a mean degree of 10. Simulations are done numerically in runs, where one run goes through the whole population. Players are initialized as hawks or doves, each with a 50% probability and links are also initially weighted with a 50% force. The speed of the dynamics is majorly regulated by a temperature or frequency parameter. It determines the speed of reorganising links, so to say the speed of link evolution. If the temperature is rather high, let’s say above 50%, the network reorganises very fast and vice versa.

A leader is elected when an institution emerges, corresponding to the micro part of the model. Hence in our model leaders have to be initialized as hawks or doves again with 50% probability. Consequently, institutional leaders start either to intimidate other institutions or to retreat and connect with other institutions. New leaders emerge isolated from the network; thus we have to connect them randomly with other institutions at a given connection probability. In our model they build up a bilateral (in- and out-link) connection with every institution at this probability - following a random graph logic. Usually this connection probability is set rather low, otherwise institutions would be too highly connected from start – also resulting in calculation intensive on side of the computer. Otherwise if an institution gets isolated during the simulation, it reconnects just with one other random institution and creates links (in and out) with a 50% force. The latter issue of reconnecting follows the logic of the original model. If an agent is connected with at least one other agent, she starts to update her strategy according to a replicator dynamics rule. Additionally she may also break up a connection with a specific agent if she is not satisfied anymore. The updating of links will be described later, but at first we focus on the replicator rule:

Tomassini et al. (2010) use a rather new rule for replication. Usually the payoffs are accumulated and if the average payoff of a random drawn neighbour is higher than the individual one, the agent will change her strategy. The problem is, as Luthi et al. (2009) worked out, that this payoff-scheme does not work well for degree-inhomogeneous networks (as our network is), where agents have different numbers of neighbours, different *degrees*. The major problem is that in such a case the model is not invariant to changes (affine transformations) in the payoff matrix anymore. Hence the authors claim a new updating rule. The probability p_i to change a strategy is a function of the payoff difference and looks as following, in general form:

$$p_i = \phi \left(\prod_j - \prod_i \right) = \begin{cases} \frac{\prod_j - \prod_i}{\prod_{j,max} - \prod_{i,min}} & \text{if } \prod_j - \prod_i > 0 \\ 0 & \text{otherwise} \end{cases} \quad (8)$$

where $\prod_{x,max}$ and $\prod_{x,min}$ are the maximum and minimum payoffs a player x can get. These two values usually refer either to the accumulated or the average payoff. For our concerns, we use the new payoff- invariant scheme elaborated by Luthi et al. (2009, p. 216). The authors explain: ‘*Thus, we propose here a third definition for a player’s payoff that retains the advantages of the accumulated and average payoff definitions without their drawbacks.*’ The logic builds upon the idea that agents know the worst case scenario, i.e. their minimum payoff. In the Hawk-Dove game this is the punishment payoff (P), thus the agent only needs to switch strategy towards cooperation, to gain a slightly better outcome, i.e. (S) then. The authors summarise: ‘*Intuitively, it can be viewed as the difference between the payoff an individual collects and the minimum payoff it would get by playing it safe.*’ Therefore the new benchmark is defined by:

$$\widehat{\prod}_i = \sum_{j \in V_i} (\pi_{ij} - \pi_\gamma) \quad (9)$$

where π_γ denotes the above suggested payoff-strategy of ‘playing safe’, hence heading up for the sucker’s payoff. Then we may rewrite the replicator rule as follows:

$$p_i = \phi \left(\prod_j - \prod_i \right) \quad (10)$$

$$= \begin{cases} \frac{\prod_j - \prod_i}{k_j(\pi_{j,max} - \pi_{j,\gamma}) - k_i(\pi_{i,min} - \pi_{i,\gamma})} & \text{if } \prod_j - \prod_i > 0 \\ 0 & \text{otherwise} \end{cases}$$

k denotes the connectivity degree of an agent (which is in our case represented by the sum of outgoing and ingoing links in her specific neighbourhood). Further, for the Hawk-Dove game we can insert the payoff-values for the maximum and minimum payoff a player can get:

$$p_i = \phi \left(\prod_j - \prod_i \right) = \begin{cases} \frac{\prod_j - \prod_i}{k_j(T - S) - k_i(P - S)} & \text{if } \prod_j - \prod_i > 0 \\ 0 & \text{otherwise} \end{cases} \quad (11)$$

Hence the updating rule only regards the neighbourhood of a certain player for replication, where a benchmark neighbour is randomly drawn for each turn.

The dynamics of the whole model additionally depend on the logic of link evolution or the rewiring part of the model. An agent (in our case a leader) will break up a connection, if she is not satisfied with her ‘situation’ anymore. Hence a random number (r) between 0 and 1 is drawn and compared with the satisfaction. If $r \geq s_i$, the agent will break up one of the neighbour links, dependent on the specific forces. A neighbour j is randomly chosen with probability proportional to $1 - f_{ij}$. That means in particular that, for every neighbour j , a specific random value between 0 and 1 is compared with the force between i and j . If the random number exceeds the force between them, following conditions are activated: First, the link is chosen to dismiss dependent on the exogenous frequency (speed of link evolution). Second if this condition triggers, the neighbour j has to admit to the cancelling procedure; thus in order to dismiss a link a bilateral decision is necessary. The neighbour may refuse the decision according to following probability: If a random number between 0 and 1 exceeds $\frac{f_{ij} + f_{ji}}{2}$ then the link is cut off.

Hence it is preferable for agent i to break up a connection with a specific neighbour j if she contributes little to i 's payoff over time. Further j is included in the decision process, so that she may object the ‘decision’, if she appreciates i ; i.e. if f_{ji} is high in comparison to f_{ij} . Now if a connection is cut, a new link is initialized (in and out). For this reason i looks up her neighbourhood for a trustee k with a high force. Then k looks up her neighbourhood to choose someone with a high force as well and recommend her to i . If they are not already connected, links between them (in and out) will be established. If they are already connected, the process is repeated till somebody is found, otherwise i gets isolated; then she will get reconnected with a random agent from the population. All new links are initialized with a 50% force. Finally, forces are generally updated according to following rule:

$$f_{ij}(t + 1) = f_{ij}(t) + \frac{\pi_{ij} - \overline{\pi}_{ij}}{k_i(\pi_{max} - \pi_{min})} \quad (12)$$

π_{ij} is the payoff of i when interacting with j and $\overline{\pi}_{ij}$ is the payoff earned by i playing with j , if j plays the other strategy. The denominator represents the maximum and minimum payoffs in a single encounter, so we may rewrite for the Hawk-Dove game:

$$f_{ij}(t + 1) = f_{ij}(t) + \frac{\pi_{ij} - \overline{\pi}_{ij}}{k_i(T - P)} \quad (13)$$

At last we have to add that $f_{ij}(t + 1)$ will be reset to 0 if it is negative and to 1 if it exceeds 1. Updates are performed in both directions (in- and out-links).

Feedbacks between micro and the institutional layer

Feedbacks on the leader influence from top-down:

Tomassini et al. (2010) found out that cooperation is evolutionary stable, but they did not know to what degree. For that reason they tested whether cooperative *cliques* would get disturbed if a highly connected node switches from cooperation to defection suddenly. Experiments have shown that cooperation remained stable. That means in particular that doves built up clever and trusted neighbourhoods, where cooperation gets propagated very fast. In fact hawks got no chance to interrupt their well-connected neighbourhoods. In this simulation the evolutionary stability of cooperative *dove cliques* is tested as well, in a continuous way. Therefore random hawk-invasion got included, but in a different manner. Invasion gets established along a so-called *hawk-bonus* on the leader-influence, hence the hawk-bonus is strictly not a feedback mechanism. It was just an arbitrary decision to implement continuous random invasion of hawks; which nevertheless creates feedbacks in a more indirect way. Hawk leaders get a start-up bonus by enhancing their leader-influence, i.e. policing radius. Remember equation (3):

$$\pi_{t,i}^M = [k_{t,i}R(1 - ld_{t,i,L}) - \varphi] + (nlr * \pi_{t,i}^L) \quad (3)$$

Members expect their member-state payoff in dependence on their neighbours and the associated policing influence of their leaders (l). Now we transform (3) into(14):

$$\pi_{t,i}^M = [k_{t,i}R(1 - l * (1 - HB) * d_{t,i,L}) - \varphi] + (nlr * \pi_{t,i}^L) \quad (14)$$

HB represents the hawk-bonus. $0 < HB < 1$ is assumed, hence HB works as a discount-factor on the leader-influence (l). The critical point of this feedback mechanism on leader

influence is that the perspective of the members have to be considered, who may leave the institution or stay, according to $\pi_{t,i}^M$. If the leader influence gets discounted, with say $HB = 0.3$, then the leader influence parameter will decrease at 70% from the perspective of the member. This is good for the leader, because her institution will grow. A small leader influence increases her power radius, as described in the micro setup. Leader influence does always appear from the perspective of the member, to stay or to leave the institution, this may appear a little bit tricky but it remains fully consistent within the model. Hence a decreasing leader influence means easier policing for the leader, since it is perceived from the member state.

Neutral feedbacks on the leader influence are done along the connectivity degree of leaders. Leaders who are highly connected on the institutional layer are getting popular and new members shall join easier. So a *degree-bonus* DB ; $0 < DB < 1$ was introduced, resulting in equation (15):

$$\pi_{t,i}^M = [k_{t,i}R(1 - l * (1 - HB) * (1 - DB) * d_{t,i,L}) - \varphi] + (nlr * \pi_{t,i}^L) \quad (15)$$

The degree bonus usually favours doves, because they are on average more connected and build tighter cliques. Leaders who have more connections than the median degree of the whole network get the degree-bonus, so principally doves as well as hawks have the same chances to receive DB . If a hawk receives a high degree of connectivity, both bonuses will trigger, leading to an ultimate leader-influence bonus.

These feedback mechanisms lead to the emergence of heterogeneously-sized institutions, because the leader-influence is endogenized via the second order game logic now.

Feedbacks from bottom-up

Feedbacks from the micro to the institutional sphere of the whole simulation work along relative power. As described in the introduction power emerges as symbolic surplus from the micro-leader perspective. Earned credits enhance the leader's power. Hence power (Ω) is absolutely measured by the sum of earned credits (member fees) plus regular payoffs (all rewards) per round minus policing costs for the associated institution; also shown for leader i in equation(16):

$$\Omega_i = [k_{t,i} * R + k_{t,i} * \varphi] - c \quad (16)$$

with $c = \bar{d}\sqrt{s}$ as shown in equation (5). Following improvements have to be added for equation(16). We faced a modelling problem regarding the incentives of leaders to increase their power. Power needs to be become fully symbolic and relative. Therefore we decided to

measure power just in relative terms as a first start. Hence every leader (i) is symbolically equipped with relative power to the most powerful leader (p). Then we get:

$$\omega_i = \Omega_i / \Omega_p \quad (17)$$

hence the relative power of the most powerful leader (p) is conclusively 1, this leader is the reference leader for the whole population of leaders. Now that we have a relative, i.e. symbolic, measure, we may do some improvements with it. Power should lead to a growing institution and vice versa. For now, the power of a leader is only lightly affected by her institution's size, by the policing fee. As a more realistic assumption and as a higher emphasis on heterogeneous size a profit rate ($0 < \lambda < 1$) is introduced, which virtually increases the profit per size of the institution; therefore it is linked as a discount factor to the costs in power equation(16):

$$\Omega_i = [k_{t,i} * R + k_{t,i} * \varphi] - c * (1 - \lambda) \quad (18)$$

That means in particular that leaders gain more relative power if their institution grows. Policing-costs are still paid for real as equation (5) urges, but their symbolic effect on power is reworked.

Further, fees have to be adapted symbolically in our power equation, because they are of different scale in comparison to the rewards. Fees are a 100 times lower than rewards in absolute terms at the moment; hence they have a 100 times lower weight on power than rewards and definitely need a reworking, in symbolic terms. This was not an issue in the old simulation, because wealth was just a side effect. Again, members still pay the real fee, because the model needs to stay consistent, but the relative symbolic power of leaders gains a fee multiplication with factor 100, in order to establish balanced weights on power. Rewards and fees need comparable scale; otherwise leader incentives to gain power are only reward-dependent, which seems rather unrealistic. Now leaders' incentives depend on rewards (leaders still play PD) as well as on gathered fees at comparable scale. This rework leads to equation(19):

$$\Omega_i = [k_{t,i} * R + k_{t,i} * \varphi * 100] - c * (1 - \lambda) \quad (19)$$

Once all leaders are equipped with symbolic power, emerging on the micro level of the model, we can easily compare them. Comparisons are done via the relative power function(17). Forces are initialized and dismissed dependent on previous encounters between leaders and overall satisfaction. The aim was to include relative power into the process of link

evolution, i.e. force updating. Powerful people generally like to connect with other powerful people, less powerful people like to engage with powerful people, but powerful people dislike engaging with less powerful people. Hence another discounting factor for the forces was introduced, influencing the link evolution with other leaders. Forces are weighted with relative-relative power (*power weight*) now, so a neighbour's relative power is compared with the agent's relative power. Then the *relative power ratio* between leader (*i*) and (*j*) can be rewritten from equation (13):

$$f_{ij}(t + 1) = \frac{\omega_j}{\omega_i} * (f_{ij}(t) + \frac{\pi_{ij} - \bar{\pi}_{ij}}{k_i(T - P)}) \quad (20)$$

Further, if a leader is rewired, the new force between them gets initialized with the power weight and the usual 50% start-up weight:

$$f_{ij0} = \frac{\omega_j}{\omega_i} * 0,5 \quad (21)$$

What happens with a leader's power if an institution dissolves? First of all, the leader loses her corresponding relative power, because she is not a leader anymore, she is either a rogue or a member. But she does not lose her accumulated payoff, her accumulated utility-credits. Since she was a leader for some time, she earned more credits than rogues or members, because payoffs are a kind of accumulated historical memory of past encounters. Therefore when she becomes a leader again, her stored utility-credits give her a boost in relative power, in comparison to another new leader who was just a rogue before, as an example.

DATA AND RESULTS

The model is extremely complex but still comprehensive. Trust and power relations engage in institutional networks, where an institutional system may evolve, always with a certain balance of power. Various simulation runs have shown that institutional variety got tremendously intensified as well as the variety of trajectories of institutional systems. Data analysis shall show how this variety emerges, what parameters are influential and how do specific volatilities react to structural changes. In the following we will recall some results of the baseline-case, compare Wäckerle, Radax and Rengs (2009) (only micro setup).

Sensitivity of parameters

Results from simulation-driven data are extremely sensitive towards starting parameters. This is also the case in this model. The dynamics basically depend on the starting parameters as illustrated in table 4.1.

Table 4.1: Starting parameters

<i>micro</i>	<i>feedback</i>	<i>institutions</i>
payoff-matrix, memory size, initial level of alpha, leader influence	hawk-bonus, degree-bonus	payoff-matrix, initial population share (hawk-dove), connection probability, force-initialisation, frequency

It is unfortunately not possible to offer a full-fledged sensitivity analysis through the whole parameter space at the moment. Such an analysis would include 9×4 (if you consider 4 different initial values for each of 9 parameters; payoff-matrix excluded) parameter conditions which have to be combined; leading into 36×36 combinations for each run. Then every run needs at least 50 replication runs to confirm only basic statistical significance. Replication plays a very important role in random-driven simulations. Different random numbers create different dependencies and involve chaotic processes. In order to reveal the model-specific attractors and bifurcations one has to run these replications and test them on robustness. Hence we get $36 \times 36 \times 50$ (64800) simulation runs to compute. Due to the fact that you need to compute about 20 different variables (for this analysis 18 variables were computed), these runs would create 64800×20 different columns in your table. Runs should take at least 5000 steps, because one wants to know how the system crashes or converges to specific final points or if it just oscillates infinitely in the long-run. Conclusively these runs would create $64800 \times 20 \times 5000$ ($6.480.000.000 = 6,48$ Mrd) data points, which have to be analysed statistically. Conventional spread sheet or table-based software will possibly not be able to handle this amount of data, so you will need to export the data to some database, hosted on a computer-cluster, and on and on....

Therefore it is very important to reduce the parameter space as small as possible. How can that be done? Empirical calibration is one big issue concerning sensitivity analysis of complex adaptive systems. But if your model is quite abstract and there are no comparable empirical experiments you can find, you need to switch to the computer cluster variant or you follow a

step-by-step logic, which is followed here. In Wäckerle, Radax and Rengs (2009) we have analysed the baseline-micro case of the model and we have found out, along qualitative testing, how the central dynamics of the model work. Hence the analysis starts from these base-line scenarios, which host as quite stable settings, because they are controllable. This strategy has the advantage that most of the parameters can be kept constant and treated as *enabler-variables* in comparison to real *target-variables*, that means in particular that the focus and the granularity changed. Still, the sensitivity analysis remains qualitative, but good enough to present some exemplary and representative sample runs indicating general dynamics.

Additionally such a complex framework of interactive agents, playing iterated Prisoners Dilemma and Hawk-Dove games following interactive rules of thumb, depends very sensitively on the values of the payoff matrix. As it is described above the values shall be primarily framed by the usual conditions: for the PD: $T > R > P > S$ with $2R > T + S$ and for the HD: $T > R > S > P$. Though these conditions enable well-behaving dynamics, the dynamics differ a lot when it comes to emergence and exit of institutions. The payoff values influence on the one hand the average level of societal trust and on the other hand the link evolution along the force and consequently the power relations in a very sensitive way and therefore the overall stability of institutional regimes. Hence there are two ways to choose the right values for the payoff-matrix. One possibility is to use the payoff values as dependent variables such as the other parameters. This includes an additional sensitivity analysis through the parameter space of the payoff-matrix. The second possibility is to choose the payoff values arbitrarily. Hence it was decided to use quite usual, balanced payoff values as the matrices in table 4.2 and 4.3 shall show, which additionally satisfy the *nondegeneracy* condition¹¹⁷.

Table 4.2: Payoff matrix for the micro games (Prisoner Dilemma)

	Cooperate	Defect
Cooperate	4,4	0,5
Defect	5,0	2,2

¹¹⁷ $R - S - T + P \neq 0$ and $R - T - S + P \neq 0$, in our case $4 - 0 - 5 + 2 \neq 0$ and $4 - 5 - 0 + 2 \neq 0$, for details compare Young (1998, p.33). This condition has strong consequences for the calculation of the informal payoff of agents. If we would pick payoff values not meeting the nondegenerative condition (e.g. $R - S - T + P = 0$) then the informal payoff function would be in linear dependence of alpha (trust), i.e. a very special and singular case.

Table 4.3: Payoff matrix for the institutional games (Hawk-Dove)

	Cooperate	Defect
Cooperate	4,4	2,5
Defect	5,2	1,1

The initial idea of the model was to show how institutions may emerge, disappear and interact – i.e. institutional change – in a formalised agent-based model. At this moment the model may explain the emergence and exit of organisational institutions as mentioned in the introduction, because the agents are *informed* about the possibility to build up institutions with other agents, they are already aware of the rules how an institution may emerge. Hence it is possible to explain institutional change on the institutional level of the society via the evolution of average trust and average power and its relationship to the stability/age of institutional settings/regimes. Hence the data analysis will stick to qualitative and descriptive analysis of time series (dependent variables) according to variables shown in table 4.4.

Table 4.4: Target variables

<i>agent properties</i>	<i>institution properties</i>
trust, power, rogue ratio, hawk-dove ratio, force, satisfaction	the age of institutions, the number of institutions, the size of institutions, degree of institutions

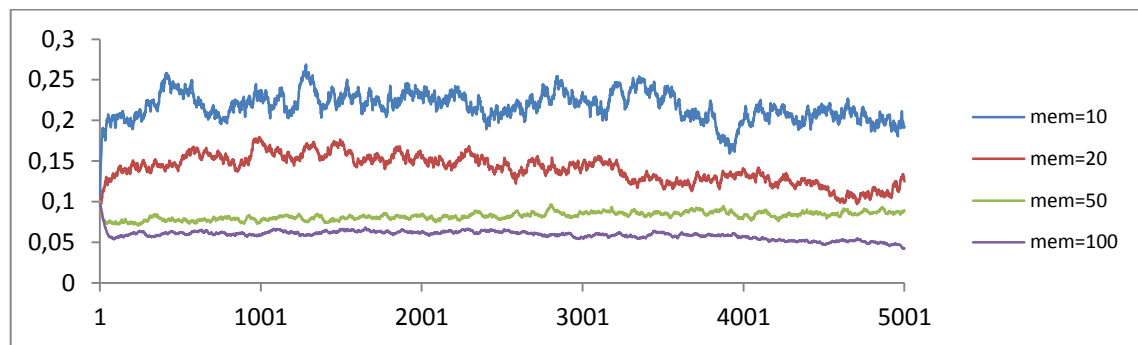
The main triggers for the baseline-case – as shown in Wäckerle, Radax and Rengs (2009) – are *mem* (memory size of agents), α_0 (initial trust) and *l* (leader-influence). The analysis will then be switched and expanded to the parameter space of *l* leader-influence, *HB* hawk-bonus and *DB* degree bonus. The analysis remains qualitative, in the sense that qualitative change of dependent variables via changes in independent variables is shown through sample runs. All following data analysis grounds on simulation runs within a 50x50 grid and a 25% population density, i.e. 625 agents distributed over 2500 patches.

Baseline-case results and system dynamics

Smoothing memory

In Wäckerle, Radax and Rengs (2009) we tested the micro setup and its dynamics on the influence of the agents' memory sizes, their cognitive capacity to store past encounters. Overall we concluded that the memory size has a strong smoothing effect on the overall evolution of societal trust. Figure 4.2 illustrates these results, the higher the memory size the straighter and smoother the path of societal trust. Correspondingly, we do have more stable environments with a higher memory per agent. The more and the faster agents forget or ignore past encounters the higher will be the volatility in trust and in all other aggregated values. For a more detailed revision of experiments with the memory size in the baseline-case consider Wäckerle, Radax and Rengs (2009).

Figure 4.2: Average societal trust (α) dependent on different memory sizes



Initialisation of trust

The initial level of trust is also a very critical factor for simulation runs. It defines the level of cooperation or overall societal trust and mistrust, where the simulation starts or heads upon. Remember, total mistrust is represented by $\alpha = 0$ and total trust (pure cooperation) is represented by $\alpha = 1$. Simulation runs will never converge to total mistrust, because the possibility to build up institutions as protective social structures against defection will be exhausted by the agents. Otherwise total trust is a possible outcome of simulation runs, since institutions may break down if general trust is rather high, then agents do not need institutional refuge anymore. Hence such populations do either converge towards a non-

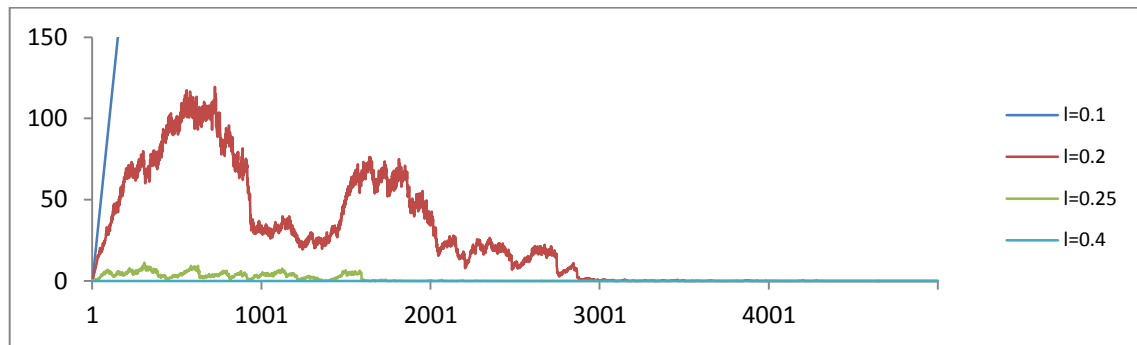
organised state of pure cooperation ($\alpha = 1$) or converge towards a specific level of trust in a *frozen* state of institutions, in the long run. It was interesting to observe that very high starting values for overall trust converge to rather low ones in the long run. A reasonable argument involves that the high initial level does not motivate agents to build up institutions, then when defectors emerge more and more they suddenly build up institutions very fast and freeze the system with a rather low level of trust. This process covers a *single wave of institutional change*, where institutions are built rather late but fast and do not break anymore. The other case involves a *double wave of institutional change*. Low initial trust motivates agents to build up institutions very early, to protect them. Then agents sequentially learn how to cooperate along encounters with institutional members and rogues. These encounters have a strong *social learning effect* by imitating cooperative behaviour. When trust reaches a critical upper-bound level, institutions break down, because they are not needed anymore. In such a case societal trust converges to pure trust in the long run.¹¹⁸

Leader influence and basic system dynamics

The leader-influence is the most critical starting parameter within the model. In the baseline-case we have found out that interesting values lie between $l = 0,2$ and $l = 0,25$. These initial values lead to very volatile and diversified system dynamics. The dynamics can be generally classified in three scenarios: a defective world, a cooperative world and a world of institutional cycles where institutional regimes boom and bust in an alternating way. Figure 4.3 visualizes these scenarios by indicating the evolution of average age of institutions, dependent on varying leader influence. The experiment was done with initial level of trust $\alpha_0 = 0.3$ and a memory size of 20. The average age of institutions can be considered as a stylized measure of institutional stability and innovation, because it reflects periods of institutional boosts and busts.

¹¹⁸ For a detailed data analysis on the effects of initial trust in the baseline-case please compare again Wäckerle, Radax and Rengs (2009).

Figure 4.3: Average institutional age – Institutional stability



Scenario 1: Static institutional freeze – A defective world

Leaders have a very high influence factor (e.g. $l = 0.1$), so that they can build up bigger institutions. Here institutions emerge very early and are very stable over time. Mostly all rogues become institutional members sooner or later. Hence we can follow that all institutions emerge together in an early phase of the simulation and *freeze within a static state*. Therefore scenario 1 shows that in a highly defective world, agents look out for institutions, in order to gain executive protection.

Scenario 2 – Static state without institutions – A cooperative world

Leaders have a very low influence factor (e.g. $l = 0.4$). We can identify a strong tendency towards cooperation and agents do not need the institutional settlement anymore. Further we also have to consider that institutions indeed come up frequently, but they just keep stable for a short time and that kind of sequence – pulsing behaviour – keeps very long till societal trust converges to pure cooperation.

Scenario 3 – Institutional cycles – Boom and bust of institutional regimes

The third scenario is probably the most exciting one. This case is really representative for complex adaptive systems, i.e. its state is always on the edge between chaos and order and it involves very volatile dynamics. Such a scenario emerges if the initial values of trust and leader-influence are balanced (e.g. $\alpha_0 = 0.3$ and $l = 0.25; 0.2$). The dynamics and implicit processes show very high volatility; in particular one can observe a kind of boom and bust of institutional regimes over time. Figure 4.3 visualises the case within the red time series. The series represents the average age of institutions. The stability of institutions swings in cycles over time, hence we may follow that also the agents' societal trust cycles slightly over time,

because agents have phases of cooperation (where the number of institutions decreases) and phases of defection (where the number of institutions increases). Mostly this type of scenario converges to a static state of pure cooperation (scenario 2) in the long run (>5000 periods). In this case we may conclude or state the hypothesis that institutions work as kind of *social learning vehicles* for the agents; agents learn to cooperate over time via institutions. It seems quite obvious, that in the early phases agents tend to take refuge in institutions, because trust is very low, then trust rises because the number of institutions increases (enforcing cooperation), then the system jumps, because cooperation has higher profits outside the institution on average and agents start to cooperate again, but without institutions.

On the other hand this scenario may also converge to a static state of frozen institutions (scenario 1) in the long run. This is the case when cooperation without institutions takes to high costs in the long run, or when defection is still more profitable. Hence societal trust may converge to a constant institutionalised level.

Sensitivity analysis of the two-topology simulation

The introduction of the new leader games and the explained feedback mechanisms with down- and upward causation lead to even more variety regarding the system dynamics, especially within a tighter window of investigation. The established endogenous network formation of institutions brought diverse heterogeneity for the size of institutions, its number and its critical stability over time. Hence the aim of the following data analysis was to reveal, still in a qualitative way, how heterogeneity in institutions emerges and how leaders compete with each other, then affecting again the overall societal level of trust and power. For this reason the data focus switches to the instruments of hawk and degree bonus. The former role of trust thus switches as well into a role of an enabler-variable. Trust enables institutional emergence and its exit, but the target variables switch to the diversity of institutions and its various power relations, executed by the corresponding leaders.

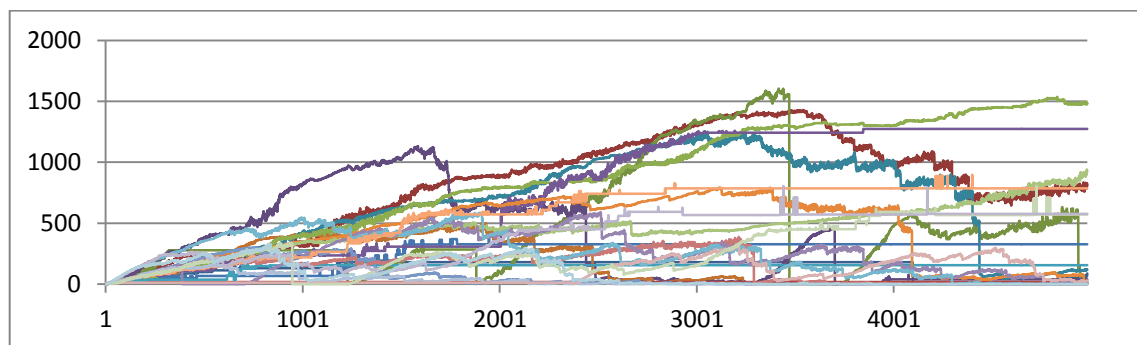
Data analysis is split in agent- and institution properties, as shown in table 4.5. The experiments were all conducted with the fixed initial parameters presented in table 4.4. All runs were stopped after 5000 periods. Connection probability is hold very low, so that networking represents a rather slow searching and learning process. The same holds for the frequency, which indicates the overall speed of link evolution.

Table 4.5: Initial parameter settings

Population density	25 %	Hawk-Dove initial ratio	50%
Number of agents	625	Conn-probability	1%
Initial level of trust	30% cooperators	Force-initialisation	50%
Memory size	20	Frequency	10%

All experiments build upon scenario 3 from the baseline-case and try to investigate the space between this corridor of institutional variety. The extension brings in more variety into this corridor, as the following cases shall indicate. Hence experiments search through the parameter space with initial leader influence of $l = 0,2$; $l = 0,225$; $l = 0,25$. Then the hawk bonus and the degree bonus are varied as critical values between 10% and 70%. These 3 parameters build the space of investigation. Seven exemplary runs are taken for qualitative analysis on the target variables. As a first try, 20 runs were tested and regarded as too difficult to illustrate. The problem came up to present the data of these 20 runs in a comprehensive way. Due to the qualitative focus it was not possible to demonstrate all the collected data. Figure 4.4 shows such an exemplary plot for 20 runs, as one can easily see it is not suitable to explain the nature of the dynamics. In order to get a better understanding and a comprehensive picture of the general system dynamics of the model it was decided to pick out the most representative ones.

Figure 4.4: Exemplary sketch of institutional stability, tested with 20 different settings



Agent properties

The influence of the hawk and degree bonus can be best visualized along the evolution of average power and its deviation, the development of the hawk-dove ratio and the strategy

evolution; concerning the agent properties. These characteristics emphasise the heterogeneity among leaders and their strategy evolution. They indicate the network evolution in general. Nevertheless in order to show the steady character of the process we may refer to figure 4.5, indicating the deviation of trust per turn. We see that the deviation levels between 10% and 20%, i.e. not very volatile. This is good to know, because we have to rely on a very stable and steady base process enabling variety on the institutional layer, offering a solid fundament for more interesting spots. The same effect can be recalled by looking into the rogue ratio, i.e. the relative share of rogues compared to the whole population for each turn, as figure 4.6 indicates. Only two cases ($l = 0,2; HB = 0,1; DB = 0,3$ (violet curve) and $l = 0,225; HB = 0,1; DB = 0,1$ (grey curve)) indicate a late growth in the amount of rogues, that means in particular that these cases end up with rather few institutions, where the other cases involve institutional growth in the long run.

Figure 4.5: Deviation of societal trust

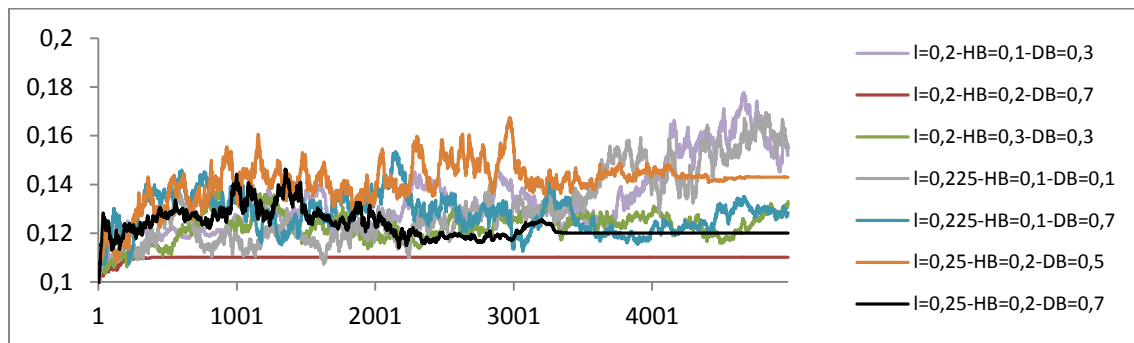
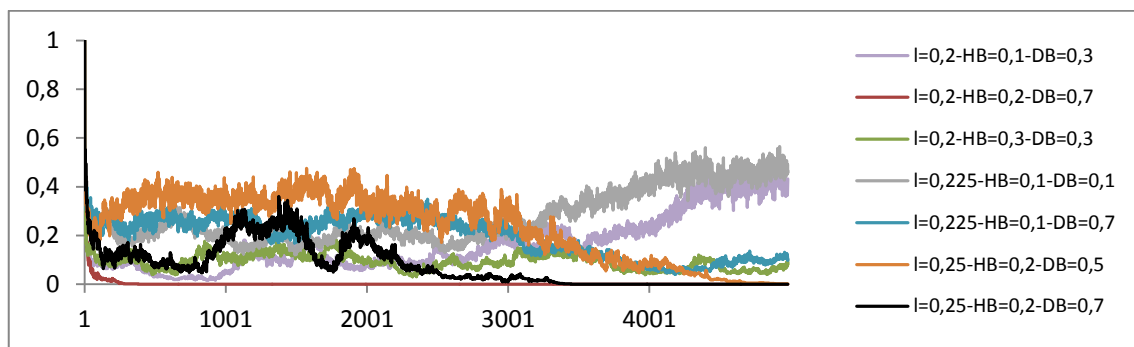


Figure 4.7 shows the evolution of the hawk-dove ratio, which is measured as hawks per dove per round. The share between hawks and doves within the population of leaders is completely sensitive to the introduced hawk and degree bonus. Doves build up very fast and tight networks as the original model of Tomassini et al. (2010) proposed. These doves create cooperative cliques with short paths to other cliques to sustain cooperation successfully (idea of scale-freeness); hence doves should get a greater benefit from the degree bonus than hawks, because they do not connect that much and often, since forces are rather low due to repeated defection. The higher the connectivity degree the greater will be the leader influence as a feedback. Therefore the highly connected doves will be able to build greater institutions, protecting more and more members. This bonus triggers especially when general initial leader

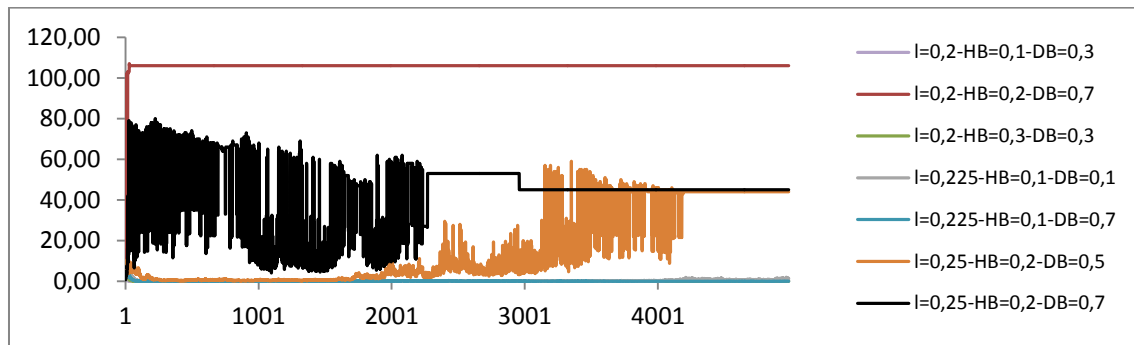
influence keeps institutions small, so the bonus triggers as a kind of start-up credit, which then may accelerate institutional growth. The same holds for the hawk-bonus. This bonus was primarily introduced to test the robustness of cooperative dove cliques on defective invasion. The hawk-bonus triggers continuously new hawk institutions, which disturb the cooperative nature of the dove-connections. In this manner the simulation runs consist of opposed or contrary processes which incorporate wave-like dialectics. This is one of the most important features of complex systems, the co-existence and co-evolution of contrary processes. Figure 4.7 shows three different process dynamics of the hawk-dove ratio, whereas the black and orange case represents their evolutionary stable strategy.

Figure 4.6: Rogue ratio



The leader population is either completely invaded by hawks ($l = 0,2; HB = 0,2; DB = 0,7$ (red curve)) or converging into a pure dove population ($l = 0,225; HB = 0,1; DB = 0,7$ (green curve)). An interesting issue referring to these two cases is that hawk and degree bonus have nearly the same values. The low leader-influence of 20% let institutions emerge very fast in the former case, the additional hawk bonus of 20% pushes a lot of hawk institutions in the beginning. The crucial thing is that this process happens very fast, so doves do not have any time to sustain cooperation, because no cliques come up. Further, the connectivity bonus triggers also for hawks, if they are well connected which is the case within this parameter setting.

Figure 4.7: Hawk-Dove ratio



The latter case starts with a higher leader influence of 22,5% and a fewer hawk-bonus of 10%, which indicates that it is more difficult for rogues to get integrated, because institutions are of smaller nature in the beginning and hawks have a lower bonus so they cannot start up that fast. This kind of acceleration brake hinders early hawks to spread with the same degree as in the previous case. Hence institutions grow slower, which favours the doves' ability to build up cliques and finally profiting from the high connectivity bonus of 70%. The two cases in between ($l = 0,25; HB = 0,2; DB = 0,5$ (orange curve) and $l = 0,25; HB = 0,2; DB = 0,7$ (black curve) represent the mixed evolutionary stable strategy. In this special case leaders divide in a stable mixed population of about 50% hawks and doves, nevertheless the high volatility indicates that the population size of leaders is lower than in the other cases. We come back to this issue later by discussing the institutional properties, for now we may conclude that these two cases are of rather interesting nature, because variety remains steady.

Figure 4.8: Force (left diagram) and satisfaction (right diagram)

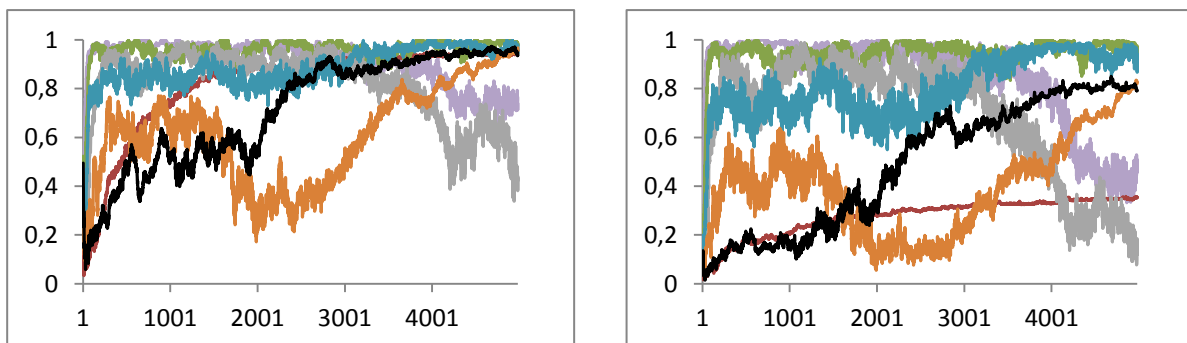


Figure 4.8 illustrates the development of the key variables for the link evolution, structuring the topology of the network. The two diagrams confirm results from the previous target variables. The black and orange cases consist of a rather unsatisfied population of leaders in the beginning, as well as in the red case. This indicates a huge amount of hawks, because it is represented by a steadily growing process. The pair of blue ($l = 0,225; HB = 0,1; DB = 0,1$) and green ($l = 0,225; HB = 0,1; DB = 0,7$) follow a very steady and satisfied path with high forces, that means these cases consist of a stable network, where links are not that often dismissed. The pair of violet ($l = 0,2; HB = 0,1; DB = 0,3$) and grey ($l = 0,225; HB = 0,1; DB = 0,1$) follow also quite interesting dynamics. They represent contrary processes in comparison to black and orange. In the long run the stability of the network breaks down and satisfaction decreases seemingly. Whereas black and orange start with high volatility in force and satisfaction (indicates that institutions break up and emerge in pulses, then consequently initializing new links with new forces close to 50%) and end with quite stable networks, with high forces and high satisfaction. Maybe we find another indicator for these dynamics in the evolution of relative power. Relative power is measured relatively to the most powerful leader in the population. If relative power falls below 50%, then each leader of the population has half of the power on average in comparison to the most powerful one. The more relative power decreases on average the more slate and skewed will be the distribution of power among leaders. That means in particular that power distribution shows hints at a few very powerful leaders and a lot of leaders with low power in comparison to the most powerful one. Such a distribution is considered as a power law in the literature, compare Barabási and Albert (1999). The 7 cases do all represent such a power law distribution of power, except the red case, where hawks dominate and power stays constant and not skewed. All other cases fall below 30% in the long run; indicating that about 70-80% of leaders do have 20% of the power in comparison to the other 20-30% of leaders, who have 80% of the power, as figure 4.9 visualises. Further, figure 4.10 shows the deviation of relative power among leaders. The deviation shows how steady the development of a specific variable is. As one can see, only two cases (orange and grey) have sudden vast volatility in deviation; the orange case at about 2500 periods and the grey case at the end of the time horizon. This high volatility shows that these short phases are highly unstable concerning the networking, because power also influences the force updating. Here results are consistent with figure 4.9 and the corresponding development of force and satisfaction.

Figure 4.9: Evolution of average relative power

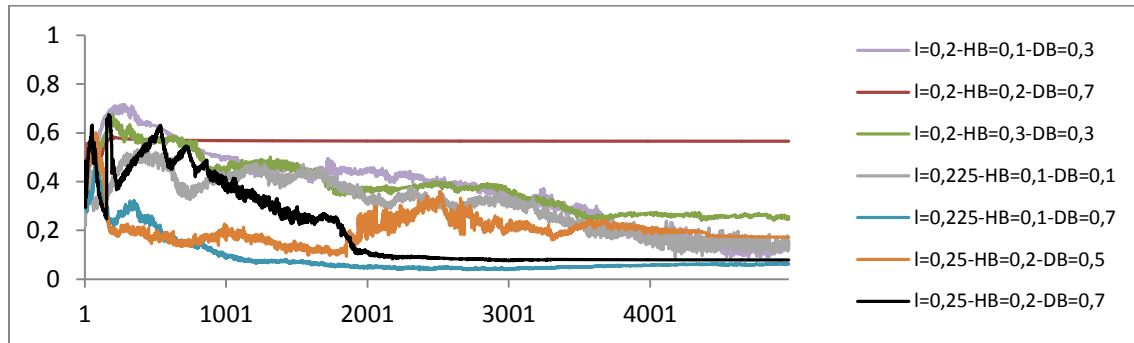
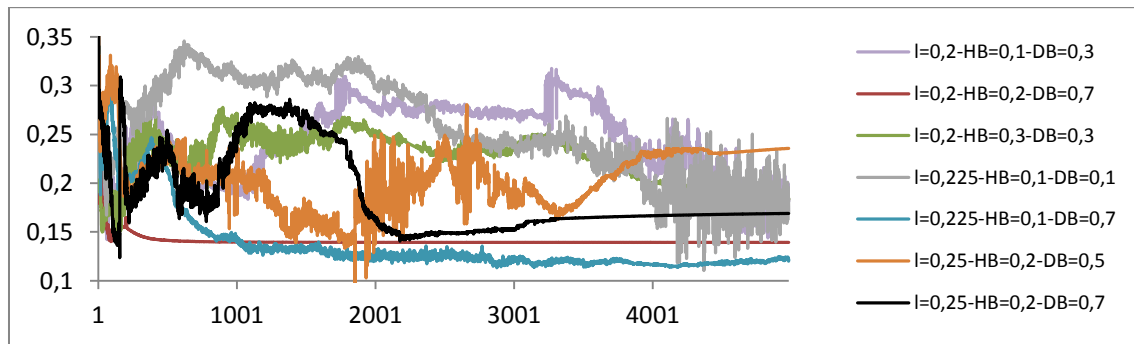


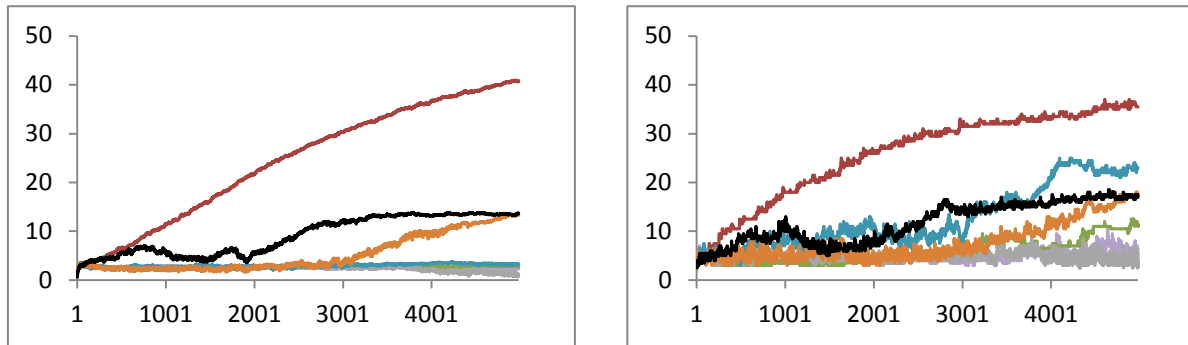
Figure 4.10: Deviation of relative power



The last observed agent property deals with the degree of connectivity, it is a property standing between the agent and the institution context. Of course, only leaders are able to connect with others, but the effect on the agent goes along the bonus mechanisms. The highest degree in networking shows the red case with the dominating hawks, compare figure 4.11. The problem, concerning the degree variable deals with information on the distribution of the network, because the degree is measured in absolute terms in contrary to the relatively measured power variable. Hence it is unfortunately not possible to show or prove the scale-freeness or small-worldness of the network topology at the moment. Nevertheless the difference between average- and median-degree can be taken as a relative indicator for the skewness of the network. Comparing the two diagrams in figure 4.11, we are then able to identify the blue case as the one with the skewest distribution of links (where a lot of nodes have a lot of links and a few nodes only a few links – in contrary to a power law). The other

cases face parallel developments in average- and median-degree which means that these networks are not skewed regarding their degree.

Figure 4.11: Average (left) and median (right) degree

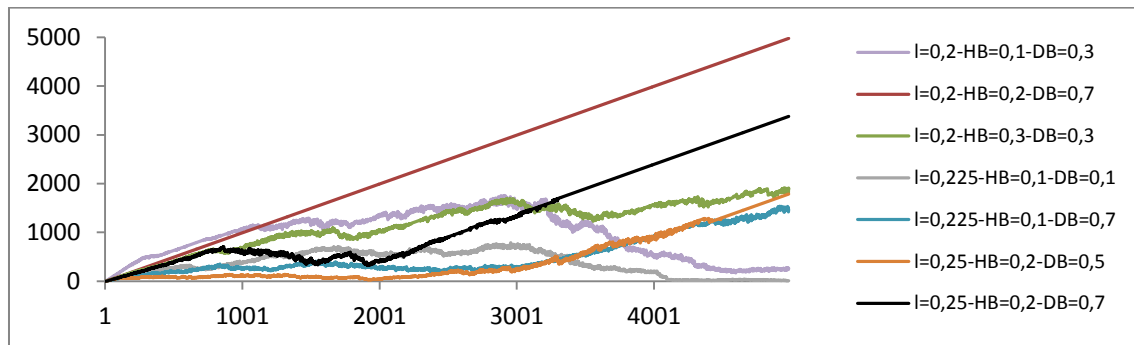


Institution properties

Institutional properties are investigated to show the variety of institutional regimes (age of institutions over time - stability) and to show the variety within institutions (diverse size of institutions and affiliation to hawk or dove breed).

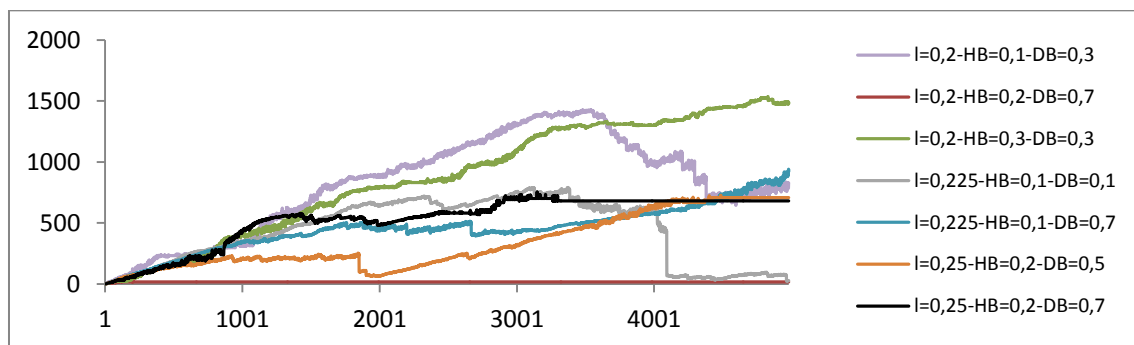
Due to the new improvements of the model, endogenisation of leader influence, simulation runs have expressed a huge variety between institutions. The amount of institutions varies between 100 and 40 institutions within the seven simulation samples. Institutional stability is measured along the development of average age of institutions per turn. Sample runs have shown that there are cases where institutional cycles has not converged after 5000 periods, which is quite astonishing. Within the green and blue case, we see, regarding figure 4.12, that institutions still emerge and exit after that long period. In the other cases we are confronted with institutional freeze (red, black and orange) or slow disappearing of institutions (violet and green). Of course these cases represent again the three scenarios of the baseline-case, but now we have on the one hand a lot of variety between institutions and on the other hand long-living oscillations of emergence and exit in a steady process. These results indicate evolutionary complex dynamics. In general, institutions follow a steady process of change: they persist between 500 and 1500 periods, then new regimes come up.

Figure 4.12: Age of institutions – Institutional stability



Variety and consistency can be also shown along the deviation of average institutional age, as figure 4.13 indicates. This observation confirms the announced 500-1500 range of stability of institutions. This diagram is denoted as *variety (I)*, because it shows that the processes follow a huge variety within a specific corridor of change. This corridor frames the steadiness of institutional change on the whole, but consists of diverse cases. Further improvement of the simulation along the endogenous leader-influence can be regarded along continuous, steady change. That means in particular that institutions do not break apart collectively in sudden moments. Now the network character adds substantial stability over time, it slows down collective sudden breakdowns.

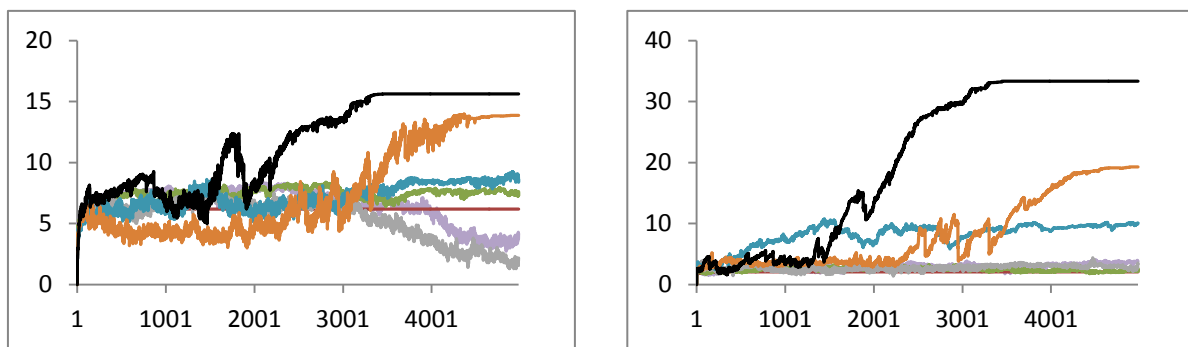
Figure 4.13: Deviation of institutional age – Institutional variety (I)



The last figure presented here, illustrates the size of institutions, figure 4.14, denoted as *variety (2)*. Here we can follow the real changes along the integration of the network-component and its feedback loops. Size does matter now. On average, institutions consist of

between 3 and 15 members. Though it is more important that they vary a lot during a single sample now, as the deviation shows. In the black case we even reach a variety of about 30 members of institutions; in the orange case we reach a variety of about 20 members of institutions. This is what heterogeneity is about. Of course not all processes show such a strong variety, but the tendency and potential is really astonishing.

Figure 4.14: Size of institutions (average and deviation) – Institutional variety (2)



Further it would be very interesting to investigate the distribution of institution size, how many institutions have grown and how many of them stay quite small? This is obviously an issue which will be observed in the next step of research in this direction. Another interesting point indicates the growth rates of institutions and the speed of growth. Figure 4.13 indicates that institutions grow rather steady in the first 1000 periods, then the bonus feedback on connectivity triggers tremendously by leading to some really big institutions with a lot of members (~40 in the black case) in comparison to a great extent of small ones, which is expressed along the deviation graph.

INTERPRETATION

After all, experiments have shown that the integration of the endogenous network led to real fascinating results in qualitative terms. Foremost the evolution of power in comparison with the link evolution showed great dialectics between different samples. Within these samples we have seen that we have to deal with emerging opposing processes, indicating diverse path-dependencies. Further the evolution of relative power represents a power law distribution, as many real-world social networks follow as well. Finally institutional change turned out as a

manifold phenomenon in this model configuration. Since institutions vary in number, size and stability tremendously, they still follow steady processes. The emergence of institutional corridors shall give further insights for the general development among varieties of capitalism.

Further, it has to be mentioned that even the three base-line cases follow similar complex dynamics as Stuart Kauffman found within his analysis on NK Boolean networks. Kauffman showed that three major trajectories crystallised within the self-organising system. These trajectories were either chaotic, ordered or complex, where the latter indicates a path on the edge between chaos and order. These dynamics, including endogenous changes, indicate what complexity is about and what it can offer for the social sciences.

A critical issue of the model deals with the leader-influence and spatial barriers. The experiments and simulation runs should look deeply into variety and diversity of institutions. Therefore leader-influence and the two bonus parameters were varied. One phenomenon can be noted without any doubts, namely that the degree-bonus accelerated institutional growth at certain breaking points, but it cannot be shown either the bonus affected all institutions with a degree greater than the median or just some random ones. A great amount of institutions surely could not exploit their potential, since agents are not reproduced. Randomness plays a very crucial role regarding this issue, because accumulation of huge institutions in certain areas of the grid may build up *spatial barriers for other institutions*, since agents will not pass if leader influence is close to zero and institutions may grow infinitely. In such a case we are confronted with an indecisive situation either the feedback bonus operates or randomness has a greater effect. Obviously this issue has to be investigated more extensively within a series of experiments. Even the possibility that agents may move on the same patches or that institutional patches may be stocked three-dimensionally would change the situation and would be a good starting point for such an experiment. Further, the diminishing function of the leader influence for expected payoffs in the formal state needs some redesign. This function works linearly at the moment, so expected payoffs can have negative values. It would be a good improvement to introduce an exponential function of the leader-influence, and then the expected formal payoff can be asymptotically close to zero.

Several improvements are still outstanding for the model, at most in the micro part of the model, like a redesign of the cost function and the policing fee, an introduction of real endogenous feedback mechanisms and demographic population dynamics.

5. Concluding remarks

Generic institutionalism is about rules creating variety, diversity and distinction from a common source. Nevertheless this source remains an implicit, intuitive and foremost natural phenomenon. For this reason it is difficult, arbitrary and in many cases fatal to announce explicit and determined terminologies for genesis. In this thesis it was suggested to work along a critically naturalistic conception of socioeconomic, cultural and political activities/practices engaging in institutional change. Such a picture is advocated by Bhaskar (1989) for instance, it tempts to synthesise the natural with the social sciences. Obviously the project of critical naturalism involves a tremendously difficult ontological challenge, not just because it needs to find a path between reductionism and scientism. Moreover critical naturalism has to aim synthesis among idealism and realism, within a concept of bimodality between idea and matter, as Dopfer (2005) remarks. A generic source for institutional change can never be universal or strictly treatable in nomological terms, but always accompanies its various and particular actualisations. Therefore it is proposed to treat generic principles as processes for themselves, as the idea of evolution suggests. Evolution is not a genetic optimisation procedure. Developmental system's approaches, compare Oyama (2000), suggest treating evolution within a systemic view, where unit and environment develop in a co-evolutionary way, necessitating and conditioning each other. Obviously culture gains a significant role within this idea. Further in such light, evolution appears to follow the logic of a complex adaptive system and therefore needs a more hierarchical approach to selection; compare Simon (1962) for instance. The issue of selection currently represents the most crucial concerns for such a naturalistic outlet of science. Hence it requires careful treatment and critical reflection. This reflection may stem from the heuristic layer within evolutionary institutional economics, where institutional change follows certain generic heuristic devices. Heuristic devices offer systems of thought to frame the issue of change, transformation and endogenous processes. These processes may then be treated for specific sets of actualisations within the economic domain, as it was exercised along discussion on the heritage of Veblen, Hayek, Schumpeter and Bourdieu. These scholars have shown that it is necessary to think

about institutional change in complex terms and that institutional change involves contradictory processes. Dialectics are complementary by nature and do not reflect dichotomies in this respect, they serve as discourses. Often used dichotomies in economics, like agency-structure or micro-macro, have to be understood as dialectics of change, because they are compatible and complementary elements instead of incompatible ones. Regarding this issue, history has proven that agency-structure as well as micro-macro are perfectly compatible, else the social sciences would have not any right to exist today. Such dialectics come up repeatedly in economics, especially when it comes to economic policy and decision-making. Within the thesis it was suggested to enter four different realms of economic policy and treat them along the heuristic conceptions of Veblen, Hayek, Schumpeter and Bourdieu. The investigated problems are of institutional nature and are conceived as problems in need of a critical composition of global and regional governance. Veblen investigated institutional change by looking into habits and habits of thought and their cumulative causation. It is proposed to treat the policy issue of climate change within this conception. Climate change is certainly a global concern, but its causal origins begin with individual habits. Conspicuous consumption destroys nature and consequently our planet in the long run, if it gets accumulated in society. Further, diversity plays a dominant role regarding evolutionary environmental policy. Economics needs a better ecological foundation, where concepts such as optimal efficiency get replaced by diversity. Hayek's heuristic devices work similar in these concerns. He introduced the idea of rules of conduct, emerging social orders and group selection. Institutional problems have its origin within the society. The issue of finance and banking represents a hot topic in economics in light of the current economic crisis, therefore it needs special attention. Group selection offers a profound framework to investigate the emergence of cooperation, of herding and of endogenous sanctioning mechanisms. Groups defend their traits within the group and between other groups, which drives cultural transmission of traits. Banking is considered as such a cultural trait, which emerged and developed with the rise of distinct economic groups. Merchants and bankers engaged in symbiosis and credit evolved. Today manifold banking traits have developed and global finance got a complex science. It is argued that the concept of nestedness may reduce this complexity by looking into global and regional financial institutions along a network approach. Within such an attempt it is possible to reveal systemic risks and estimate the stability of the economic system even better. Further a network topology of finance would

indicate dependencies among several layers of finance, from regional to global, which is needed to judge overall creditability. The third issue of economic policy in the thesis deals with democracy design and regional innovation. Schumpeter's conception of entrepreneurship and its role for technological change, as well as the notion of business cycles and capital have been analysed. His legacy lies in the heart of innovative capabilities. As a sequel to Schumpeter's legacy the emergence of innovation is treated along a *meso*-trajectory, which indicates a process of origination, diffusion and retention of new knowledge, introduced to the economy. Nevertheless *meso* does not only cover change as innovation, it is also regarded as a critical group size, necessary for the stabilisation of an institution. Then *meso* gains an important social character and deals with issues of reputation, monitoring and contingent trust. Both notions of *meso* are used to sketch a picture of modern democracy design, focusing on the power of communities and enabling processes of regional innovation. Regional innovation is therefore regarded within non-geographical regionality, hence within social regions and social spaces governed by communities. Communities play also a dominant role regarding the work of Bourdieu and his heuristic devices. The theory of *habitus* explains how social practices develop, how cultural distinction emerges and how varieties of capital (cultural, social, economic and symbolic) are engaged in this process. Bourdieu's theory of practice is a dialectic theory between habitus and the social field. Conclusively it is also a theory transcending objectivism and subjectivism within the idea of practice. These notions of heuristic change are applied to educational institutions, which also played a dominant role in Bourdieu's work, regarding the persistence of cultural capital. It is suggested to emphasise an evolutionary education policy building upon the idea of habitus and communities of practice. Focus is given to the linkage between secondary and tertiary education. Pupils are engaged in a process of internal model-building in order to decide on the one hand if they should enter a tertiary course and what course they should choose on the other hand. These models are treated as avatars, comparable to virtual avatars in computer games. It is argued that these avatars carry certain habitus and incorporate them in their models. Further, network analysis shall provide maps of communities of practice among pupils to understand decision-making in juvenile groups even better. As a consequence the socio-psychological findings concerning the habituated avatars and the map of practices shall serve as stereotypes for an agent-based simulation of university design. Such a simulation involves complex-adaptive decision making of pupils, teachers, researchers, lecturers, administrative personal and the state in

order to visualise the dynamics of tertiary education. For this purpose it is necessary to concentrate on a methodology able to deal with complexity, which concerns the last part of the thesis. Conventional concepts of aggregation do all ignore the idea of emergence, hence they are not able to imagine dialectics as positive features of change and transformation. Ironically rather the opposite is needed. The science of complexity offers a methodological set, dealing with adaptive and counteracting processes, such as chaos and order. So it is not a question of feasibility anymore at the methodological level. Agent-based modelling and dynamic social network analysis are perfect examples for such a kind of analysis, focusing on emergent properties and the process itself. In a concrete model of institutional change agent-based methods and methods of dynamic social network analysis are combined to study the complexity of institutional emergence, decline and conflict. The model builds upon a two-layer game logic. On a micro layer agents are engaged in iterated Prisoner Dilemma and are able to create formal welfare institutions through the assignment of a leader. Institutions protect their members in front of invading defectors if overall trust is rather low. Trust is endogenised along the introduction of a memory size; hence agents are able to remember past encounters and form their future strategy accordingly. On the top-level institutional layer leaders are engaged in iterated Hawk-Dove games. These games influence the power relations among institutions by continuously updating their link relations regarding strategy and relative power. Leaders connect and dismiss links between them dependent on their strategy formation with regard to a replication rule. Relative power is then given as the share of a leader's power to the most powerful leader in the game. It is therefore a measure of relative institutional success, since greater power also leads to institutional growth. In the end data analysis of simulation runs has shown that institutions evolve in various regimes of boom and bust, according to low and high endogenous trust. Further, institutional variety is very high, since the introduction of feedback mechanisms on the connectivity degree of leaders. The simulation has shown that trust and power relations do heavily influence the process of institutional change in a generic way. In conclusion it has to be repeated that the idea of *generic* addresses the heart of all change. Generic refers to a layer of change that is providing variety and diversity in language and grammar of systems. These languages and grammars introduce new knowledge along institutional discourse, which is the determinant force for the evolution of power within society. Unfortunately the issue of power and power as a naturalistic foundation of the social sciences could only be touched within the thesis.

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Appendix

Pseudo code of the simulation in section 4.3

```
Initialize model
DO t times
  Shuffle activation order of agents
  FOR EACH agent DO

    Move

    IF agent is a leader of an institution
    THEN
      Re-evaluate fee
      Become hawk or dove with 50% probability
      Calculate relative leader power
      Determine network degree
      Replicate strategy
      Change to hawk or dove
      Play Hawk-Dove with linked neighbours
      Rewire on institutional layer with other leaders
      Force-updating
    END IF

    IF agent is a member of an institution
    THEN
      Re-evaluate membership in institution
      Dependent on leader influence, hawk-bonus and degree-bonus
    END IF

    IF agent is without institution AND member of institution
      within Von Neumann-Neighborhood
    THEN
      Decide whether to join institution
      Dependent on leader influence, hawk-bonus and degree-bonus
    END IF

    IF agent is (still) without institution AND part of a
      cluster > 2
    THEN
      All agents in the cluster decide whether to build an
      Institution (effective immediately for all agents)
      Dependent on leader influence, hawk-bonus and degree-bonus
    END IF

    Play prisoner-Dilemma against all Von Neumann-neighbors in random order

    IF agent is a member of an institution
    THEN
      Pay fee to the leader of the institution
    END

    IF agent is a leader of an institution
    THEN
      Pay the cost of policing the institution
    END

  END DO
END DO
```