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DISSERTATION

Relationship between Knowledge Transfer and Business Models in the framework of Business Model Explicitness

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Abstract

Business models play important roles when organizations are designed to interact with their partners. Such organizations can become effective in terms of creativity when they acquire capability building knowledge resources like, skills, know-how and expertise from other sources. In order to acquire these tangible and intangible capability building knowledge resources, organizations must collaborate with their suppliers and customers. Therefore, the innovative performance of an organization can be affected by collaboration and inter-organizational exchange of capability building knowledge resources. This thesis addresses the issue of effectiveness of an organization in the context of business models. The main research question of this thesis states that in a value network, how effective an organization can be to create new products and services, and to acquire knowledge from partners, in the context of electronic commerce?

In order to provide answer to this problem statement, the framework of business model explicitness (BME) has been proposed in this thesis that can evaluate how effective organizations are in terms of creativity. It is proposed that through the framework organizations can know exactly what types of capability building resources are required from the right suppliers and customers for creating new products and services. The thesis is designed to address three aims. The *first* aim of this thesis is to highlight the importance of the explicitness of the business model and the *second* aim is to evaluate the effectiveness of organization in terms of creativity and the *third* aim is to use some modern statistical methods to validate various causal (direct and indirect) links that are proposed in the causal link diagrams.

This thesis describes the exploratory research methodology that is based on a triangulation method that includes three distinct research phases, based on three research methods namely, analysis of related literature, evaluation of websites, questionnaire survey analysis. Corresponding to each research phase, different research hypotheses have also been tested through these research methodologies. ***Hypothesis I*** has been tested within phase I to affirm that the BME framework enables organizations to make their business models evident not only to themselves but to their partners as well. ***Hypothesis II*** has been tested within phase II to affirms that effective organizations do exhibit their business models explicitly to the outer world.

Hypothesis III has been tested within phase III that affirms that effective organizations with an explicit business models acquire knowledge from their partners.

In this thesis, chapters are designed according to the research model. Chapters 2 - 5 explain different research steps and outcomes of the phase I. The contents of chapter 6 explain research method applied in phase II which consists of evaluating websites of different companies doing business over the Internet. Chapters 7 - 9 are based on the implementation of phase III that consists of survey analysis. These chapters describe research methodology, data processing and analysis and discussion on results. All chapters are inter-related; therefore, it is important to review the thesis in a chapter wise manner.

The first open research issue that invites researchers to explore this framework is related with designing an empirical study. Based on research questions highlighted in this exploratory study, an empirical study can be designed for validating the hypotheses proposed in this thesis. The second open research issue is related with mapping the framework with business modeling techniques. An exploratory study can be designed that proposes mapping of different elements of BME along with the elements of these business modeling ontologies. The third open research agenda is the evaluation of a company's business model through its website. This will provide useful recommendations on the practical implementation of the framework.

The first major contribution is *theoretical* in nature, i.e., the framework of BME addresses various issues that are also related to strategy. On one hand, it provide answers to the questions like, what *products and services* a company can offer to its customers; who are the *partners* (suppliers, developers, affiliates, etc); what are the specific *sources of revenue* (why)? On the other hand, it facilitates to distinguish strategy and business models. It not only provides a common language to describe different types of business models, but also address a particular aspect of different business models, thus, diminishing the chances to ignore or overlook those business models that have yet to be discovered. The second contribution of this thesis is the *practical* implementation of the BME framework as described in phase II and phase III. The BME framework supports managers to evaluate the effectiveness of their business models in a particular sector or industry. It supports managers not only to identify weak areas in business models that can either be improved or abandoned, but also to innovate the existing business models.

Kurzfassung der Dissertation

Geschäftsmodelle spielen eine wichtige Rolle, wenn Organisationen mit ihren Partnern interagieren. Solche Organisationen können in Bezug auf Kreativität effektiver werden, wenn sie Fähigkeiten zum Aufbau von Wissenressourcen wie Fachkönnen, Know-How und Expertisen von anderen Quellen erwerben. Um dieses materielle und immaterielle Potential zu erwerben, müssen die Organisationen mit ihren Lieferanten und Kunden zusammenarbeiten. Daher kann die innovative Leistungsfähigkeit einer Organisation durch die Zusammenarbeit als auch dem inter-organisationalen Austausch von Wissensressourcen beeinflusst werden. Die vorliegende Arbeit befasst sich mit der Frage der Effektivität einer Organisation im Kontext von Geschäftsmodellen. Die zentrale Forschungsfrage dieser Arbeit beschäftigt sich einerseits, wie effektiv eine Organisation innerhalb eines „Value Networks“ sein kann, um neue Produkte und Dienstleistungen zu kreieren, und andererseits, wie das Wissen von Partnern im Umfeld des E-Commerce zu akquirieren ist?

Um eine Antwort auf diese Forschungsfrage geben zu können, wird in dieser Dissertation das „Framework of Business Model Explicitness“ (BME) vorgeschlagen, um die Effektivität einer Organisatzion evaluieren zu können. Es wird vorgeschlagen, dass durch den Einsatz eines Frameworks die Organisationen genau wissen könnten, welche Ressourcen von Anbietern sowie Nachfragern benötigt werden, um neue Produkte und Services schaffen zu können. Diese Dissertation geht drei Zielen nach:

Das erste Ziel befasst sich damit, die Wichtigkeit der Explizität[1] des Geschäftsmodells aufzuzeigen. Das zweite Ziel stellt die Evaluierung der Effektivität von Organisationen, im Konkreten von Geschäftsmodellen, dar und das dritte Ziel dieser Dissertation ist die Verwendung von statistischen Methoden, um die kausalen Verbindungen (direkt und indirekt) zu validieren, welche in den Kausalitätsdiagrammen dargestellt sind.

Diese Arbeit folgt der Methodik der explorativen Forschung, die auf einem Triangulationsverfahren, welche auf die drei folgenden verschiedene Phasen von Forschungsmethoden basieren, beruht: (i) die Analyse der einschlägigen Literatur, (ii) Bewertung von Websites, sowie (iii) eine Umfrage-Analyse.

[1] Explicitness

Entsprechend jeder Phase werden die verschiedenen Hypothesen anhand dieser Forschungsmethoden getestet. Hypothese 1 wurde innerhalb der Phase 1 getestet, um zu bestätigen, dass das BME-Framework Organisationen ermöglicht, ihre Geschäftsmodelle nicht nur ihnen selbst, sondern auch ihren Partnern evident zu machen. Hypothese 2 wird innerhalb der Phase 2 getestet, um zu beweisen, dass effektive Organisationen ihre Geschäftsmodelle explizit der Öffentlichkeit zugänglich machen. Hypothese 3 wird in Phase 3 getestet, in welcher bestätigt werden soll, dass effektive Organisationen mit einem expliziten Geschäftsmodell Wissen von ihren Partnern akquirieren können.

Der erste wissenschaftliche Beitrag dieser Arbeit liegt einer theoretischen Natur zu Grunde, beispielsweise die Thematisierung strategischer Inhalte durch das BME-Framework. Einerseits liefert es Antworten zu Fragen wie *Welche Produkte und Services könnte das Unternehmen ihren Kunden anbieten? Wer sind die Partner*? *Welche spezifischen Einnahmequellen gibt es?* (und warum?). Andererseits erleichtert es die Unterscheidung von Strategie und Geschäftsmodell. Der zweite wissenschaftliche Beitrag bezieht sich auf die praktische Implementierung des BME-Frameworks wie beschrieben in den Phasen 2 und 3. Das Framework soll Manager dabei unterstützen, die Effektivität ihrer Geschäftsmodelle in einem bestimmte Sektor oder Industrie zu evaluieren. Es unterstützt Manager aber nicht nur in der Identifizierung von Schwachstellen, sondern auch im Innovieren von bestehenden Geschäftsmodellen.

Offene Punkte, die sich aus dieser Arbeit ergeben sind: Der erste Punkt, bezieht sich auf das Design der empirischen Studie. Basierend auf den Forschungsfragen, die in dieser explorativen Studie vorgehoben werden, wird eine empirische Studie für die Validierung der Hypothesen entworfen. Der zweite offene Forschungspunkt bezieht sich auf das Mapping des Frameworks gegen Geschäftsmodelltechniken. Eine explorative Studie könnte entworfen werden, um das Mapping der verschiedenen Elemente der BME auf Elemente der Geschäftsmodell-Ontologien vorzuschlagen. Der dritte offene Punkt stellt die Evaluierung eines expliziten Unternehmens-Geschäftsmodells anhand dessen Website dar. Dieses Ergebnis könnte Empfehlungen für die Implementierung des Frameworks geben.

Contents

1. Introduction

The origin of the business model concept dates back to 1990s when the dotcom bubble was about to mature. It was a common understanding that the Internet could make existing businesses or even the economic theories obsolete (Osterwalder, 2004) and there would be a new array of theories and concepts related to the Internet business. The academic research in the field of the business models has not yet matured. Although, a myriad of concepts, definitions, ontologies and frameworks have been added since last the decade of the twentieth century, however, still, there is heterogeneity in the theories of the business model concept (Lambert, 2006).

1.1. Why Business Models are Important?

Being defined as the architecture of the flow of products, services, information and resources (Timmers, 1998), the business model concept provides an important insight about

1. '*What*' value object the organization offers to its customers and what is the value proposition.

2. '*How*' this value object and value proposition can be delivered to customers.

3. What should be the source of revenue for the organization (*Why*).

By assuming knowledge as a critical resource for creating value, it can be suggested that the business model concept plays an essential role to deliver value when the knowledge is being exchanged among organizations collaborating in the networked environment. For an organization that is connected to a number of partners (either through horizontal or vertical integration), it has always been an interesting questions that how effectively the value can be delivered to final customers through different types of business models. As the business model concept has also been defined as a set of assumptions for earning profit in a competitive environment (Picken & Dess, 1998), therefore, it is the strategic edge for the organization to attain competitive advantage by illustrating the successful business model. However, business models have different implications for different organizations. For one company, a particular business model may confer to a very high competitive advantage, but for other companies, it is of less value (Chesbrough, 2006). One justification for this disparity may be hidden in the very nature of the individual organization. Different organizations

possess different assets and resources (tangible and intangible); producing different products that make them to look at opportunities differently (Chesbrough, 2006); face external environmental factors, like, economic, legal and competition, etc., in different contexts. Since business models are based on market driven strategies that are influenced by different environmental factors (Joyce & Winch, 2004), different organizations have different business models.

It's a well known fact that knowledge is the primary source of collaboration (technological, production, innovation) in various industries, e.g., information technology, biotechnology, pharmaceutical industry, chemical industry, telecommunications, etc. (Ahuja, *et al*., 2000). These industries are specialized by having larger networks of collaboration and can be categorized as the knowledge intensive clusters. The transfer of knowledge is very frequent within these knowledge intensive clusters. Quite often, the location and availability of knowledge within these networks can be a prime factor for innovative performance. Therefore, it can be possible to re-design the collaboration pattern among interacting organizations due to this prime factor. As the information technology (IT) has brought prominent changes in how organizations do their business and collaborate with their partners, the information technology and telecommunication (commonly known as ICT) sector has received extensive consideration from researchers for analyzing different collaborative strategies, e.g., strategic alliances, joint ventures, etc. (Haagedorn & Schakenraad, 1991).

Under these circumstances, one can raise many questions, e.g., how effectively an organization creates value through its business model, how does transfer of knowledge among the organization and its customers is related with its performance, how the transfer of knowledge can be reflected by its business model? This dissertation aims providing answers to these questions in a scientific and systematic way. In today's dynamic environment, every organization has the possibility of acquiring various tangible and especially intangible knowledge resources. Therefore, it is of great importance to these organizations to sustain a competitive advantage through these resources.

1.2. Motivation

Customers, competition, information technology and organizational development are few among various factors that motivate organizations to revisit their basic equation of economic activity (Papazoglou & Ribbers, 2006). Most often, the business literature confers business models with the evolution of e-commerce. The business model is a conceptual

implementation of strategy that allows organizations to align information technology, business processes and strategy (Osterwalder, 2004). With the advent of the information technology, the more and more organizations are connected which blossoms new organizational interaction patterns. Thus, information technology plays a major role to formulate a particular business model (Figure 1.1).

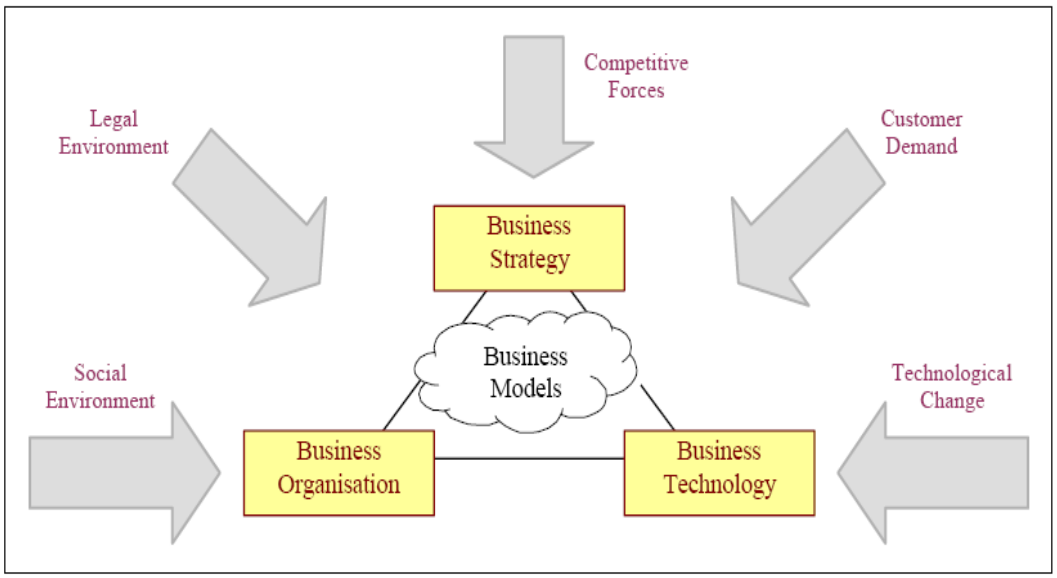


Figure 1.1: Business Model, Strategy, Process and Information Technology, Osterwalder & Pigneur, 2003

The emergence of the Internet has made a major impact on the way organizations perform. Many businesses are now being benefited with the Internet presence and are serving their customers in a more efficient way. An example can be quoted here from Amazon which has changed the dynamics of doing business on the Internet in less than two decades. Founded in 1994, by Jeff Bezos, the company was launched online in 1995. Figures 1.2 & 1.3 show the image of the Amazon web page captured on 13th October 1999 (web archive: http://web.archive.org/web/19991013091817/http://amazon.com/) and the image of the web page captured on 28th of December 2009, respectively.

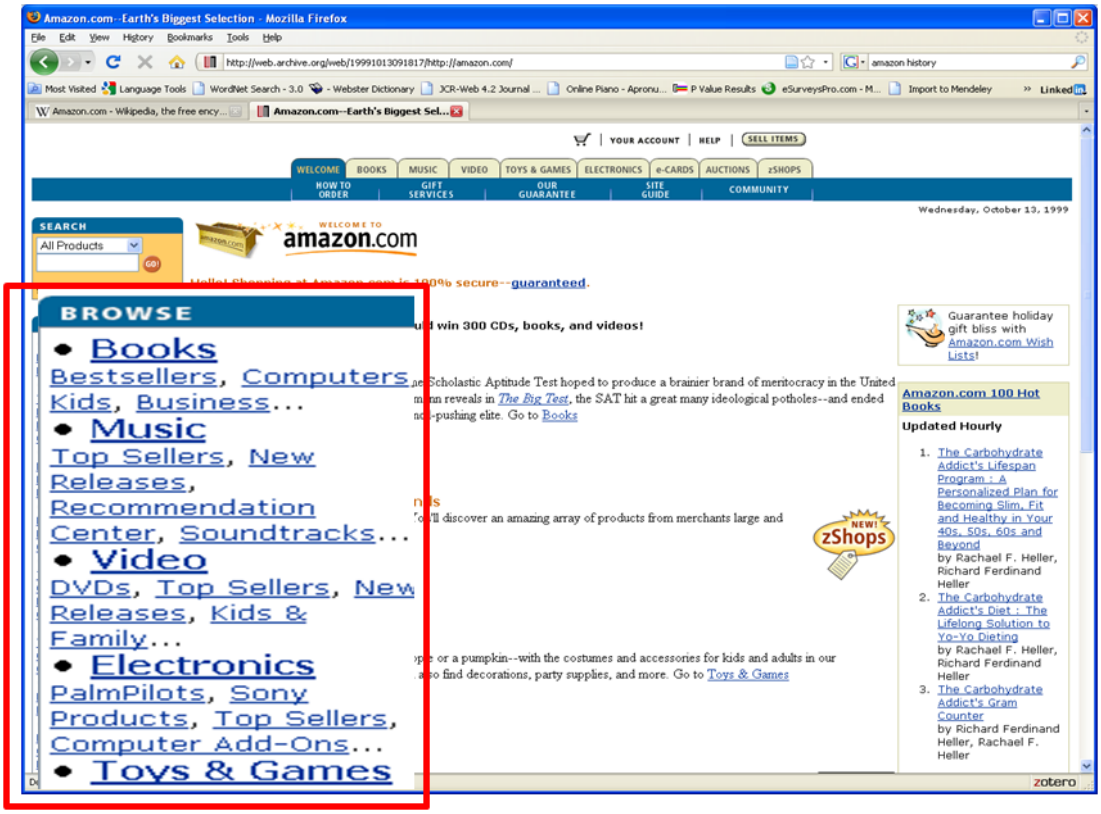


Figure 1.2: Image of a web page for Amazon.com, Inc. from 1999

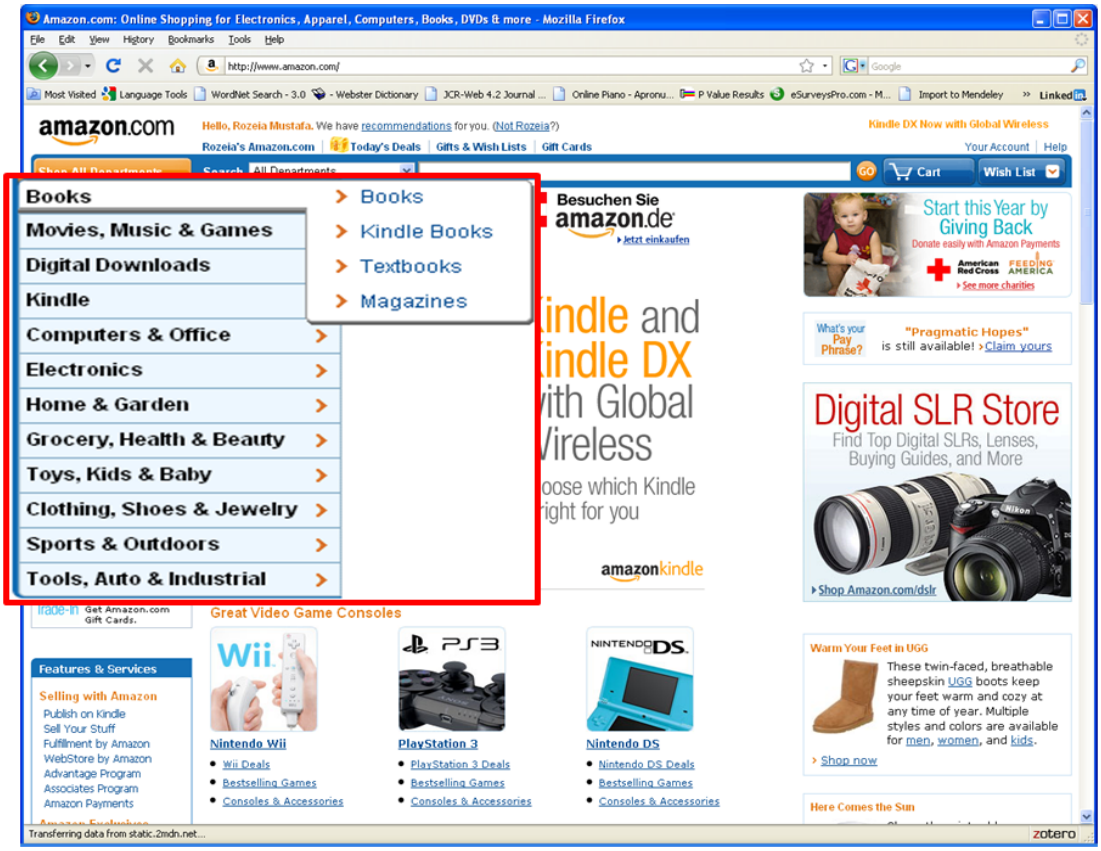


Figure 1.3: Image of a web page for Amazon.com, Inc. from 2009

These figures provide a lot of information about the Amazon's business model in the years 1999 and 2009. For example, one can observe that in the year 1999, Amazon offered a number of items ranging from books to toys and games, targeting customers all over the world via the Internet. In the year 2009, the assortment of offers grows out as it includes many more items, e.g., home and gardens, grocery, health & beauty, clothing, shoes & jewellery, automotives & industrial applications, etc. This is very simple example where one can know about the Amazon's core businesses from its webpage. It can be learnt from these web pages that Amazon offers its customers the opportunity to buy whatever product they like; based on their needs and requirements, their purchasing power and interests. These customers include end consumers, partners, suppliers, associates and general visitors to its website. One can also observe that the logic behind the web portal of Amazon is to provide a platform for a large clientele on the Internet through value chain integration mechanism.

It is a historical fact that by sticking with its original business model, i.e., selling online via the web portal, the company remained successful through all these years and now Amazon is among top 6 online companies for traffic ranking within USA and among top 20 companies traffic ranking Worldwide, (http://www.alexa.com/siteinfo/amazon.com#trafficstats).

Now the question arises, what could be the factors that lead companies (like, Amazon) to achieve sustainability on the Internet that is the core of their business models. Many researchers studied the case of the Amazon and found various factors, i.e., being an early mover, 24x7 presence, innovative online mechanisms, building customer loyalty (Kotha, 1998), innovative supply chain management (Simchi-Levi & Kaminsky, 2003) and enhanced web (e-commerce) services (Nabi & Luthria, 2002). It is eminent that while connecting with its customers over the Internet, Amazon exchanges value objects in the form of products, services, different types of resources and capabilities and strategic assets. Thus, the exchange or flow of products, services, resources and strategic assets among Amazon and its customers can be visualized as its business model. Through this business model, one can identify: What are the products and services Amazon provides to its customers via the Internet and other physical distribution mechanisms; who are the partners for Amazon in its value chain; what types of resources, capabilities and strategic assets Amazon can acquire from its partners and customers; and what are the potential revenue resources for Amazon. Therefore, by answering these questions, one can probe the financial and non-financial performance parameters for any organization via evaluating its business models.

So far, the discussion on Amazon's business model reflects the importance of delivering services and products over the Internet for several years that can be assumed as a major factor to sustain competitive advantage among other competitors. Paul Timmers (1998) has provided the first formal definition on the business model concept for companies doing business on the Internet. He stated that it is *"architecture for the product, service and information flows, including a description of the various business actors and their roles and a description of the potential benefits for the various business actors and a description of the sources of revenues"*. Thus, the *"architecture for the product, service and information flow"* can explain how these companies earn profit. In the light of this definition, one can ask many questions regarding a business model of an organization, for example: *what* products and services a company can offer to its customers; *who* are the target customers; what is the value proposition; who are the partners (suppliers, developers, affiliates, etc), what and how they can contribute to deliver value objects (products and services) to the final customers; what distribution channels a company may use to deliver value objects to its target customers; what are the specific sources of revenue (*why*); what are the price model for a particular business model?

Based on these main questions, it is now important to revisit various definitions and frameworks that have already been proposed by various authors. By reviewing these definitions and framework, one can analyze whether the answers to these questions can really be provided by a single business model concept. Based on the empirical studies in the domain of business models (Timmers, 1998; Amit & Zott, 2007; Weill, *et al*., 2005; Chesbrough, 2006; Osterwalder, 2004; Zimmermann, 2000), information and knowledge (Yu, 2001; Dubosson-Tobay, *et al*., 2001; Choi, 2008; Cummings, 2002) and organizational performance, it is possible to provide answers to the question: how effective an organization can be to create new products and services through acquiring knowledge from its partners, in the context of electronic commerce.

1.3. The Research Question

In this thesis, explorative research methodology has been employed for research. The main objective is to explore the concept of business model in depth and propose framework that can be used to evaluate the effectiveness of organization's performance. The basic research question, which this thesis aims to answer, is:

In a value network, how effective an organization can be to create new products and services, and to acquire knowledge from partners, in the context of electronic commerce?

Based on this research question, the thesis is aimed to provide answers to the following main hypotheses:

Hypothesis I: the organization can become effective when its business model is evident not only to itself but to its partners also.

This statement has two parts; one part is related with the business model, and the other part is related with the effectiveness of the organization, i.e., innovative performance. As organizations may have several business models at a time, it is therefore, important that the most relevant business model should explicitly be identified. Thus, the *first* aim of this dissertation is to explore the appropriate framework to evaluate the distinctness of a business model and the *second* aim is to explore whether organizations are effective in terms of innovative performance. This dissertation also aims to provide a detailed discussion on the existing business model frameworks. It is also an aim of this thesis to discuss various characteristics pertaining to business models and make them distinct from the term strategy. Therefore, an appropriate framework (Business Model Explicitness, BME) must be discovered that helps organizations to evaluate how effective their business models are. There must be some essential features or elements of these business models that make them noticeable not only for organizations but also for their partners and customers.

Hypothesis II: When business models of organizations are explicitly stated, they can perform better in terms of financial as well as non-financial performance.

Therefore, when organizations exactly know what type of offerings can be delivered to the right customers, it is quite obvious that they can earn maximum profit. Similarly, when organizations exactly know what types of resources are required for creating new products and services, they can easily approach the right partner and perform well. Therefore, the framework of business model explicitness can be used to evaluate organizational performance. Based on this hypothesis, three sub-hypotheses are proposed in this dissertation. These sub-hypotheses are proposed to explore the relationship between different elements of BME and innovative performance of an organization. These sub-hypotheses are:

Hypothesis 1a: the [CONTENT] element of BME is positively related with the *Innovative Performance* of the organization.

Hypothesis 2a: the [CONTEXT] element of BME is positively related with the *Innovative Performance* of the organization.

Hypothesis 3a: the [STRUCTURE] element of BME is positively related with the *Innovative Performance* of the organization.

Hypothesis III: In order to build up capability for creating new products and services (innovation), it is important for organizations to successfully transfer knowledge from suppliers and partners. The successful transfer of knowledge depends upon various factors.

Organizations are effective in terms of creativity when they acquire knowledge from other sources. Apart from other inputs, the capability enhancement requires skills, know-how and expertise from these suppliers and customers to perform innovation activities. These skills, know-how and expertise constitute intangible knowledge resources. The tangible resources may include raw material, technology, IT infrastructure, etc. Therefore, in order to acquire these tangible and intangible capability building knowledge resources, organizations must collaborate with their suppliers and customers. Therefore, the innovative performance of an organization should be affected by this collaboration. Similarly, the intangible knowledge resources which are acquired from suppliers also affect the innovative performance; therefore, inter-organizational transfer of knowledge (expertise, skills and know-how) should also affect the innovative performance. Thus, organizations should know exactly what types of capability building resources are required from the right suppliers and customers for creating new products and services. This can be evaluated in the framework of BME. In the following, 8 sub-hypotheses are proposed in this thesis to validate the indirect effects of inter-organizational knowledge transfer and collaboration on innovative performance of an organization.

Sub-hypothesis 1b: the positive correlation between the [CONTENT] element of the business model explicitness can be enhanced by mediating effect of *Knowledge Distance* between the source and the recipient organization.

Sub-hypothesis 1c: the positive correlation between the [CONTENT] element of the business model explicitness can be enhanced by mediating effect of *Activity Context* between the source and the recipient organization.

Sub-hypothesis 2b: the positive correlation between the [CONTEXT] element of the business and the innovative performance of the organization can be enhanced if *Absorptive Capacity* (learning) is increased.

Sub-hypothesis 3b: the positive correlation between the [STRUCTURE] element of the business and the innovative performance of the organization can be enhanced if *Activity Context* is higher.

Sub-hypothesis 3c: the positive correlation between the [STRUCTURE] element of the business and the innovative performance of the organization can be enhanced if *Physical Distance* is decreased.

Sub-hypothesis 3d: the positive correlation between the [STRUCTURE] element of the business and the innovative performance of the organization can be enhanced if *Knowledge Embeddedness* is decreased.

Sub-hypothesis 3e: the positive correlation between the [STRUCTURE] element of the business and the innovative performance of the organization can be enhanced if *Absorptive Capacity* is increased.

Sub-hypothesis 3f: the positive correlation between the [STRUCTURE] element of the business and the innovative performance of the organization can be enhanced if *Collaboration* is increased.

The subsequent details of each hypothesis and sub-hypothesis are provided in the related chapters. This thesis is based on the exploratory research to answer these fundamental questions. It is proposed that if the organization knows - what to offer, to whom to offer, how to offer and what are the potential benefits to offer a particular value object - it can perform better. It is also proposed that by identifying the interaction patterns and transfer of knowledge, the recipient organization can enhance its innovative performance.

Based on the problem statement and suggested hypotheses, the *first* aim of this thesis is to highlight the importance of the explicitness of the business model. This dissertation will provide a new insight to evaluate the explicitness of the business model. Different research methods will be employed to support this insight. Along with the questionnaire survey method, a formal website evaluation method will also be used to measure the instantiation of BME framework.

As also stated earlier, the *second* aim of this thesis is to evaluate the effectiveness of organization in terms of productivity. For this purpose, a relationship is proposed between the BME framework and the innovative performance of an organization (hypothesis III & III). Previous empirical studies have emphasized that business models are linked with the firm's performance (Rajgopal, *et al*., 2003; Zott & Amit, 2006; Malone, *et al*., 2006). Based on these studies, a theoretical model will be proposed. Through this theoretical model, different theoretical constructs will be identified. The causal links among these theoretical constructs will be presented in the hypothetical causal model.

The *third* aim of this dissertation is to use some modern statistical methods to validate various causal (direct and indirect) links that are proposed in the causal link model. A survey analysis will be conducted to get data from the sample organizations chosen from ICT sector.

The discussion on business models is initiated on two assumptions in this dissertation: 1) organizations can be assumed as knowledge repositories, and 2) the business model concept can be defined ontologically, based on the existing frameworks and taxonomies. Inspiration for the first assumption comes from theories related to the knowledge based view of the firm; whereas, motivation for second assumption is based on the existing definitions and frameworks of the business model concept in terms of taxonomies, components, instantiations and evaluations.

1.4. Contribution of the Research

In this thesis, few basic questions are raised and discussed in the perspective of an organization's business model related to the innovative performance. These questions are, *what* products and services a company can offer to its customers; *who* are the target customers; what is the value proposition; who are the partners (suppliers, developers, affiliates, etc); what distribution channels a company may use to deliver its products to the target customers; what are the specific sources of revenue (*why*); what are the price model for a particular business model? Therefore, the first major contribution is *theoretical* in nature, i.e., the framework of Business Model Explicitness (BME) can provide answers to the questions stated above. A business model can be evaluated in terms of the types of products and services (value objects) and related value propositions a company can offer to its customers. It can be evaluated in terms of value configuration, types of resources and role of partners in value creation. The business model can also be evaluated in terms of existing as well as future revenue sources and cost models to create and deliver value to the customers.

The second major contribution of this thesis is related with the *practical* implementation of the BME framework. Application of the BME framework, through different research methodologies, reveals how effective a business model can be in terms of:

- Support managers to evaluate the effectiveness of their business models in a particular sector or industry.
- Support managers to innovate their existing business models.
- Support organizations to invent new business models.
- Incorporating different partners in a value network to exchange strategic assets, like knowledge.
- Support organizations to address successful transfer of knowledge in the context of their business models.
- Support managers to measure how effective are their business models in terms of organizational productivity.

1.5. Methodological Approach

A research project has a rationale to bring higher level philosophical ideas and theories down to implementation level where a manager or an applicant of that particular project can create relevancy and practicality (Alvesson & Sköldberg 2000). In order to address this rationale, the research should be conducted with identified research methodology. The objectives of the research could be; 1) to gain an insight into a phenomenon; 2) to portray the characteristics of a particular concept in accurate manner. The phenomenon or the concept can possibly be an unsolved problem, thus, the research methodology is a way to systematically solve a particular problem (Kothari, 2004).

In order to gain a deep insight into the phenomenon of the business model explicitness, I selected different exploratory research methods. The exploratory research methodology is an approach that is applied in situation where no prior theory or empirical research exists (Pedersen *et al*., 2009). The research presented in this thesis is exploratory in nature; however, the concept of methodological triangulation has been applied in this research. The exploratory research used in this dissertation has been done in three distinct phases. The Phase I consists of the literature review of various core concepts that contribute towards building of business model explicitness (BME) framework. During this phase, different expert opinions were also gathered from renowned scholars in domains like e-commerce, strategy and business model. The first objective of this process was to brush-up

the basic concepts regarding business model explicitness and organizational performance. The second objective was to seek guidance to adapt a right path to explore further within the initially identified concepts.

The Phase II of this exploratory research then consists of discovering the presence of explicitness of business models through website evaluation of different companies that are operating online in the domains of individual and business consumes (i.e., B2B and B2C) for products related to information technology, biotechnology and pharmaceuticals, business services, consumer goods, retail, financial services, etc. This phase led to draw the conclusion that a company's business model can be made explicit through its website.

The Phase III of this exploratory research consists of exploring relationship of BME with firm's innovative performance. For this purpose, a group of SMEs have been selected from IT service sector and the target respondents were requested to fill out a questionnaire designed for this purpose. The *first* objective of this phase is to identify causal relationship between the business model explicitness and the innovative performance of the organization. The *second* objective of this phase is to analyze whether organizational intangible strategic assets, i.e., knowledge embedded into human beings or technological resources, do have an impact on the causal relationship of BME and the innovative performance. The *third* objective of this phase is to identify direct and indirect relationships, between BME and the innovative performance through successful knowledge transfer and collaboration, by evaluating qualitative data from the questionnaire.

Corresponding to each research phase, different research hypotheses have also been tested through these research methodologies. ***Hypothesis I*** states that the BME framework enables organizations to make their business models evident not only to themselves but to their partners as well, it will he tested in phase I. ***Hypothesis II*** states that effective organizations do exhibit their business models explicitly to the outer world, it will be tested within phase II. ***Hypothesis III*** states that organizations with an explicit business models acquire knowledge from their partners in order to perform innovatively, it will be tested within phase III. The consistency of the research results among phase I & II are supported by the ***Hypothesis I***, whereas, the consistency of research results from phase III with other two phases are supported by ***Hypothesis II*** and ***III***.

1.6. Structure of the Thesis

The structure of the thesis is designed according to the research model and is composed of three distinct phases. A detailed discussion on the proposed research model is provided in Chapter 5 of this dissertation. Figure 1.4 shows the diagrammatic view of the thesis structure. Phase I is discussed in Chapter 1, 2, 3, 4 and 5. Phase II is described in Chapter 6. Phase III is discussed in Chapter 7, 8, 9 and 10.

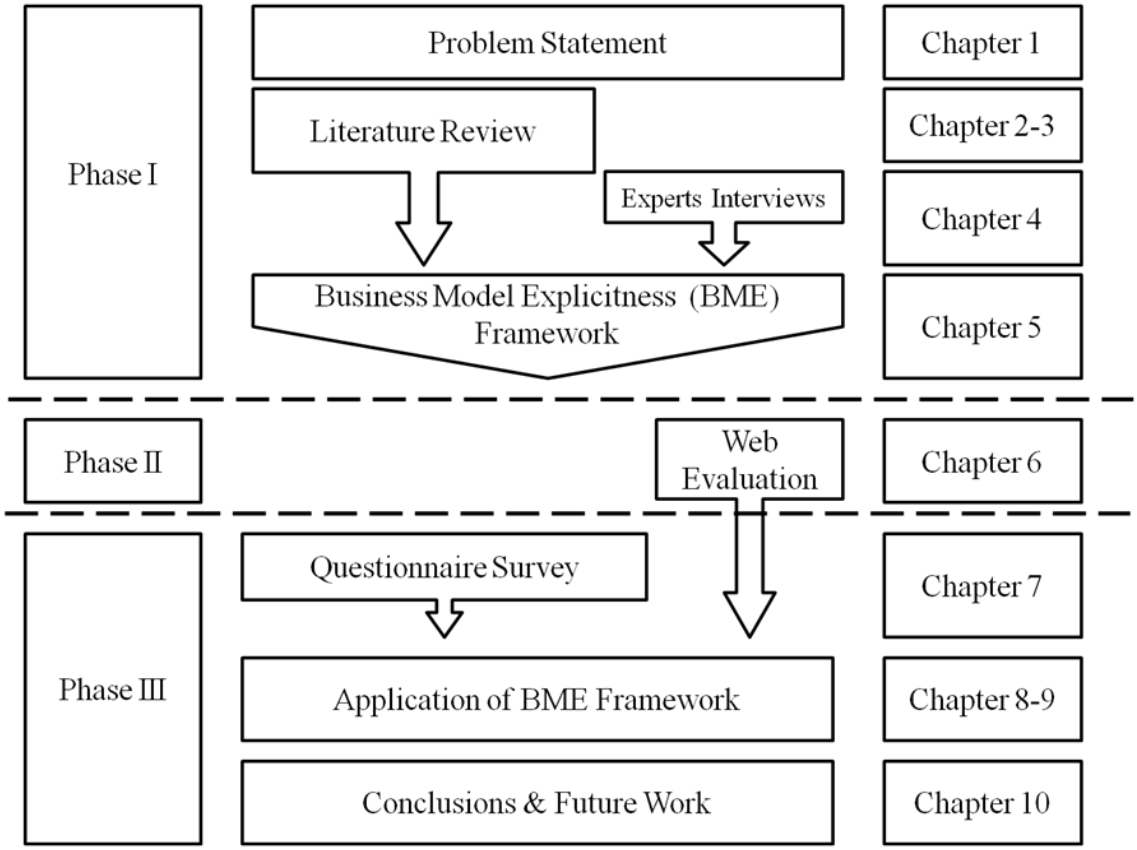


Figure 1.4: Thesis Structure

Chapter 1 provides an overall view of problem statement identified for this thesis. Chapter 2 introduces the research proposition and presents a literature review of the business models concepts. Chapter 3 provides an overview of different theories related to the organizational performance, collaboration and inter-organizational knowledge transfer. Chapter 4 provides insights to the contributions of the interviews with academic experts. Chapter 5 provides discussion on the first major contribution of this PhD research, i.e., the framework of BME. This chapter also presents some evaluations done by comparing existing business model frameworks and taxonomies with BME framework. The research model used in this dissertation, for qualitative and quantitative survey analysis, is also discussed in this chapter. Chapter 6 describes phase II of this research. It presents the evaluation results for

websites of different companies in various business domains that exhibit e-business models over the Internet. Chapters 7, 8 and 9 describe the research activities and their results from phase III of this research. Chapter 7 presents the research methodology that is used for questionnaire survey. It describes sampling and questionnaire design related issues. Chapter 8 discusses the data processing and analysis for phase III. Discussion on the key findings from phase I, II & III is provided in chapter 9. Chapter 10 provides commentary on final conclusion and open research issues.

2. Overview of the Core Concepts – *The business model concept*

2.1. Introduction

This chapter introduces the core concepts that are used as theoretical constructs in this dissertation. According to the research model, this doctoral research consists of three distance phases. The Phase I can be further divided into different steps. The first step is related with the overview and the analysis of the core concepts. The second step consists of interviewing different academic experts in the relevant area. The third step consists of proposing a framework for defining explicitness of the business model. Figure 2.1 represents the overview of different research steps of the phase I in this dissertation.

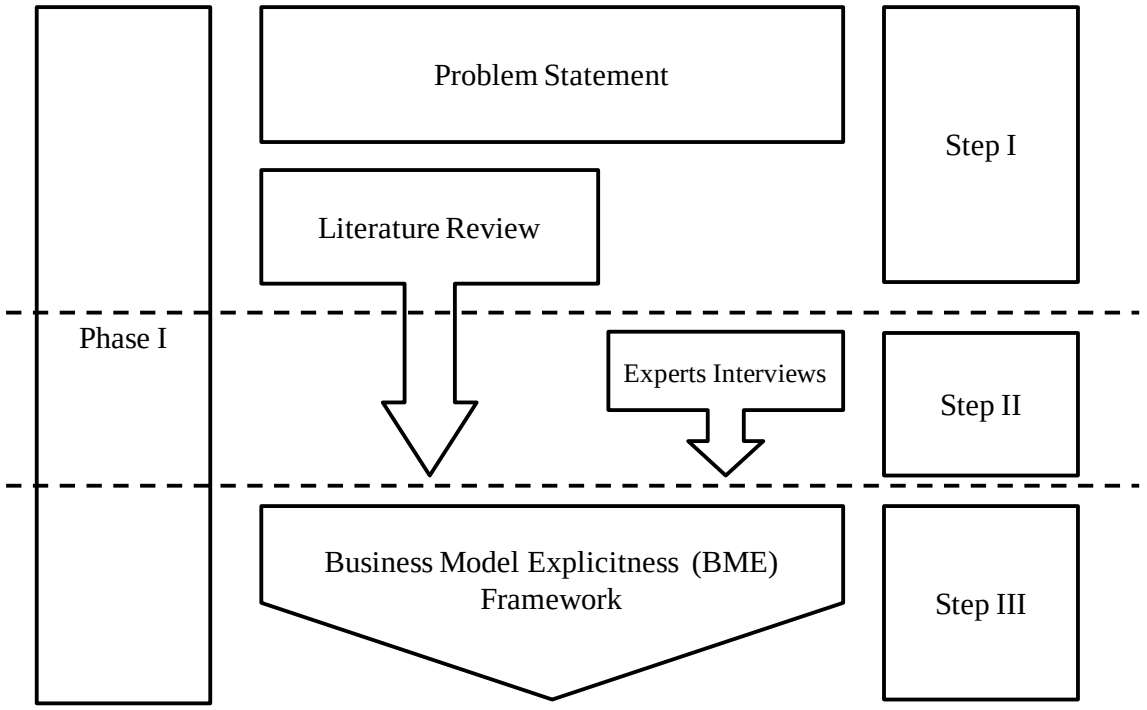


Figure 2.1: Overview of different research steps in Phase I

According to the research model, a research proposition is presented in this chapter which is based on the review of academic literature, to extract different core concepts from previous research studies and bring them together. The theoretical

constructs, which are identified from a variety of fields like, strategy, business models, knowledge management, etc., include:

1) The explicitness of the business model concept

2) Inter-organizational knowledge transfer

3) Collaboration

4) Innovative performance of the organization

The discussion on these proposed theoretical constructs is divided into two chapters for this thesis. This chapter relates the previous and ongoing research efforts in the field of business models. The discussion on the remaining proposed theoretical constructs is provided into Chapter 3 of this dissertation.

The first part of this chapter will explain this research proposition. The remaining part of this chapter provides an overview of one of the theoretical constructs, i.e., the business model concept. Thus, a foundation will be prepared in this chapter to define and explain the first major contributions of this thesis, i.e., the concept of Business Model Explicitness (BME) framework. The relevant details on BME will be provided in the following chapters.

2.2. The Proposition of Approaching the Research Problem

As described in previous chapter, one of the major problems for many organizations is to identify correct tools to measure their financial and non-financial performances. In this regard, a large number of empirical and non-empirical researches have been going on in the field of business models, knowledge management and innovation. Various research streams, in an isolated manner, have provided different overviews of the organizational performance in the context of knowledge management, innovation management or the business model concept. Various researchers have provided insights on how a business model concept is linked with the organizational performance (Chesbrough, 2006; Chesbrough & Rosenbloom, 2000; Pisano & Teece, 2007). On the other end, researchers like Vinding (2000), Duguet (2004), Leiponen

(2006), Choi (2002), etc., have probed to interlink knowledge management (KM) with the innovative performance of the organization. Another stream of literature supported the concept of knowledge repository in terms of knowledge transfer mechanisms (Davenport & Prusak, 1998; Englebart, 1992; Bannon & Kuutti, 1996). Therefore, based on this wide variety of available literature that is mainly focused on innovative performance of the organization, a research proposition can be put forward which states that specific core concepts should be identified from these broader areas that are pertinent to organizational performance. Figure 1 represents a diagrammatic overview of previous research efforts and their relationship with each other. According to this proposition, different concepts from these broader areas are capable of providing a holistic overview of organizational performance (Figure 2.2).

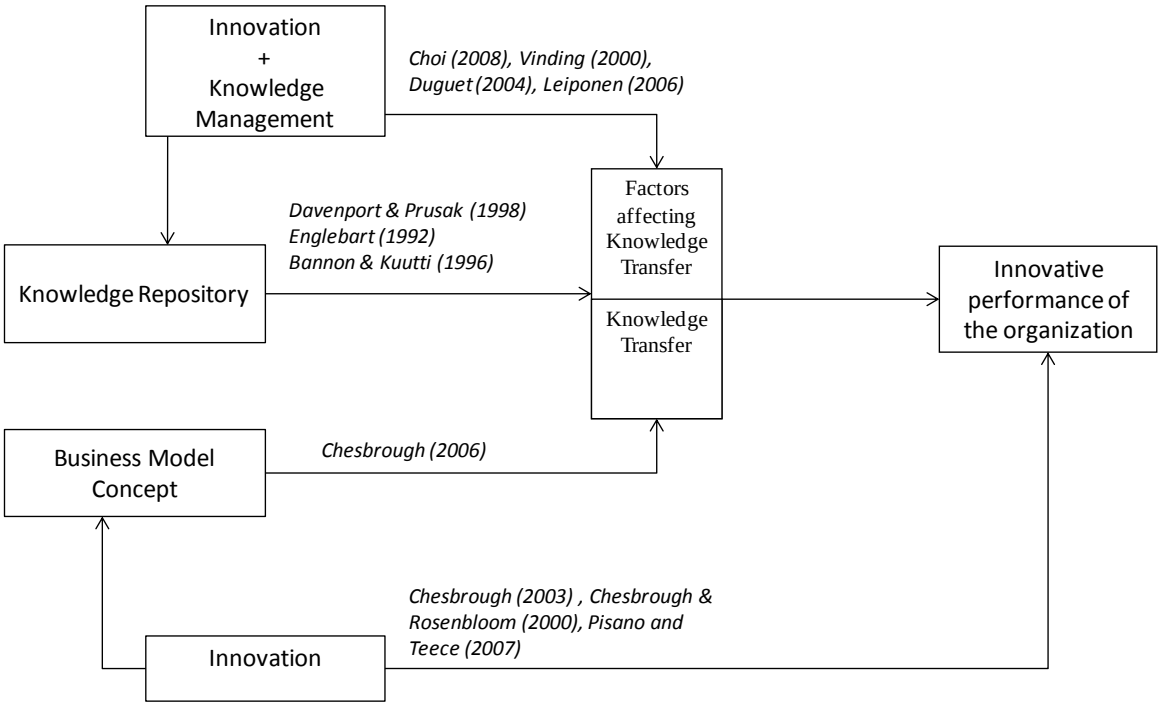


Figure 2.2: Previous researches and their relationships

Figure 2.2 represents how different research efforts, done in disparity, are inter-related with each other. This is the basics of the research proposition. For example, the concept of business model suggests the infrastructure of flow of products, information and resources (tangible and intangible) among organizations. If these organizations are connected through a network, they can effectively increase their performance by managing flow of products, information and resources. The above figure suggests that

various research streams have provided different views of organizational performance in the contexts of knowledge management, innovation management or the business model concept. For example, Chesbrough (2006) proposed the concept of the open business model that suggests organizations revisit their business models to improve innovative performance. On the other end, researchers, like, Vinding (2000), Duguet (2004), Leiponen (2006), Choi (2002), etc., have concentrated on interlinking knowledge management (KM) with innovative performance of the organization. Another stream of literature supports the concept of knowledge repository in terms of knowledge transfer mechanisms (Davenport & Prusak, 1998; Englebart, 1992; Bannon & Kuutti, 1996).

From this figure, it is suggested that certain broader domains can be identified that facilitate organizations to enhance their performance. From these broader domains like knowledge management, innovation management, or business models, few core concepts can be identified. According to the research proposition, these core concepts can be used to propose the main hypothesis for this dissertation that states that in a value network, organizations can effectively create new products and services when they acquire knowledge from their partners.

The research proposition that is proposed above, have certain advantages for this doctoral thesis. *Firstly*, this research proposition provides information about different past and present ongoing researches in each related domain. *Secondly*, it also identifies the dependency of different areas, i.e., how innovative performance of an organization can be measured through different aspects, like, effectiveness of business models, innovation management, knowledge management, etc. *Thirdly,* It also indentifies how other researchers combine different core areas, e.g., Chesbrough (2006) addressed the innovative performance of the organization by proposing the concept of 'Open Business Models' that are based on allowing knowledge to flow freely through organizational boundaries in either directions. Thus, the research proposition provides a broader view of the problem that will be addressed in this dissertation, i.e., effectiveness of the business model in terms of innovative performance of an organization.

2.3. The Theoretical Constructs

According to the research proposition, four different core concepts can be identified as main theoretical constructs for the proposed hypotheses. These theoretical constructs are: 1) the explicitness of the business models, 2) inter-organizational knowledge transfer, 3) collaboration, and 4) the innovative performance of the organization. Different theories, that have been used to explain these theoretical constructs, will be explained in the following chapters of this thesis. The main input comes from the resource based theory of the firm (Grant, 1991; Barney, 1991; Penrose, 1959; Porter, 1985), the knowledge based theory (Grant, 1996; Nonaka & Takeuchi, 1995; Kogut & Zander, 1992; Spender, 1989), the value creation and value capturing through the business models (Zott & Amit, 2007; Chesbrough, 2006), the business model concept for e-commerce (Timmers, 1998; Rappa, 2001), inter-organizational knowledge transfer (Cohen & Levinthal, 1990; Argote & Ingram, 2000; Cummings, 2001; Szulanski, 1996; Choi, 2002), collaboration theories (Hagedoorn, 1991& 1992; Simonin, 1997) and different innovation theories (Hipple, 1988; Toby, 1998; Koberg *et al*., 2003).

2.4. Introduction to Business Models

The first core area identified in the conceptual model is the business model concept. The notion of business model is reported to be in use since 1947 when an author supplied an abstract containing this term (Lange, 1947), it again appeared in a listing of subject terms published in 1949 (Santos *et al*., 2009). It was then used in the academic article in 1957 with the reference of constructing business games that can portray various aspects of economic and industrial interactions. The basic idea was to use a game simulating actual business practice that involves a limited number of resources (physical and human) to analyze the viability of the actual business (Bellman *et al*., 1957). In 1960s, it once again appeared in another academic journal (The Accounting Review), but this time with a slight change in the context, i.e., importance of the business model for teaching business games by educators (Jones, 1960). The last decade of 20th century has seen a sharp rise in the awareness and usage of this terminology (Osterwalder *et al*., 2005). However, most often the term remained associated with the business over Internet. With the rupture of the dot.com bubble by the end of the twentieth century, some

important contributions were made to understand the exact nature of this term. Therefore, the history of the concept development for business models is almost a decade long.

For clarity purposes, the term 'business model' can be disintegrated and discussed separately in order to understand the logic behind using this term consistently in the past. The term 'business' can be defined as a commercial activity which has different aspects, i.e., the activity of providing goods and services involving financial, commercial and industrial aspects (WordNet Search 3.0), while a *model* is '*a standard or example for imitation or comparison*' (Osterwalder, 2004). Some other definitions of 'model' suggest that a model is '*a hypothetical description of a complex entity or process'* (WordNet Search 3.0) or '*an abstract and often simplified conceptual representation of the workings of a system of object in a real world* (Webster Dictionary). Thus, the both terms 'business' and 'model' suit well for the business model concept used in this dissertation. In simple words, the term business model can be described as a conceptual description about how a company buys and sells goods & services and earns money.

The literature review of the business model concept reveals that many researchers have discussed more than one aspects of the term business in their business models definitions. For example, some business model concepts emphasize the description about the offers, customers, architecture or structure to offer or deliver value (operation, production, marketing, etc.) and others describe it as a pure business logic to earn money (revenues, profits, etc.). The following table shows some of the definitions provided by different researchers from 1996 till 2005 (Table 2.1 & 2.2).

Sr. No.	Definition	Auther & Year
1	The totality of how a company selects its customers, defines and differentiates its offerings, defines the tasks it will perform itself and those it will outsource, configure its resources, goes to market, creates utility for customers and captures profits.	Slywotsky (1996)
2	The patterns and strategies which enable the firm to make profits.	Slywotsky & Morrison (1997)
3	Architecture for the product, service and information flows, including a description of the various business actors and their roles and a description of the potential benefits for the various business actors and a description of the sources of revenues.	Timmers (1998)
4	A set of assumptions about how company earns a profit in a competitive environment.	Picken & Dess (1998)
5	A coordinated plan to design strategy along three vectors, consumer interaction, asset configuration and knowledge leverage	Venkatraman & Henderson (1998)
6	The design of key independent systems that create and sustain a competitive business.	Mayo & Brown (1999)
7	How a company makes money by specifying where it is positioned in the value chain.	Rappa (2000)
8	A statement of how a firm will make money and sustain its profit stream over time.	Stewart & Zhao (2000)
9	How a firm leverages assets to generate value for all stakeholders.	Libert & Samek (2000)
10	A unique blend of three streams that are critical for business success: the value stream for business partners and buyers, the revenue stream and the logistical stream.	Mahadevan (2000)
11	An architecture for the product or service addressing certain customer needs, A definition of the relevant business community, including a description of the various agents and their roles and protocols of interaction, A description of the potential benefits for the agents, A description of the sources of revenue.	Zimmermann (2000)
12	The business model is not a description of a complex social system itself with all its actors, relations and processes. Rather, it describes the logic of a 'business system' for creating value that lies behind the actual processes.	Petrovic et al. (2001)
13	The method by which a firm builds and uses its resources to offer its customers better value than its competitors and to make money doing so.	Afuah & Tucci (2001)
14	Description of the roles and relationships among a firm's consumers, customers, allies and suppliers and it identifies the major flow of products, information and money, as well as the major benefits to the participants.	Weill & Vitale (2001)

Table 2.1: List of various definitions on the business model concept from 1998 to 2001

Sr. No.	Definition	Auther & Year
15	The architecture of a firm and its network of partners for creating, marketing and delivering value and relationship capital to one or several segments of customers in order to generate profitable and sustainable revenue streams.	Dubosson-Tobayet al. (2001)
16	The business model comprises of the illustration of the workflow as well as the flow of materials and information both within the organization and between the organization and external stakeholders, and finally the stream of revenues.	Wirtz (2001)
17	The business model can be defined as a conceptual architecture for representing entities and relationships of model components with identified critical success factors of electronic businesses.	Yu (2001)
18	A depiction of the content, structure and governance of transactions designed so as to create value through the exploitation of business opportunities.	Amit & Zott (2001)
19	A business model is the way a company, a networked organization, or an industry creates value, giving answers to the partial models i.e. value offering concept, communication concept, revenue concept, and growth concept, configuration of competencies, organizational form, cooperation concept and coordination concept.	Bieger et al. (2002)
20	Business model as a mediating construct between technology and economic value with different functions.	Chesbrough & Rosenbloom (2002)
21	Business models are “stories that explain how enterprises work”.	Magretta (2002)
22	A business model is something very simple. It is a model of an existing business or a planed future business. A model is always a simplification of the complex reality. It helps to understand the fundamentals of a business or to plan how a future business should look like. Business model description comprises the value proposition, the configuration of value creation, and the revenue model.	Stähler (2002)
23	A business model is a conceptual tool containing a set of objects, concepts and their relationships with the objective to express the business logic of a specific firm. business model describes the value a company offers to one or several segments of customers and the architecture of the firm and its network of partners for creating, marketing and delivering this value and relationship capital, in order to generate profitable and sustainable revenue streams.	Osterwalder (2004)
24	A representation of a firm’s underlying core logic and strategic choices for creating and capturing value within a value network.	Shafer et. Al (2005)

Table 2.2: List of various definitions on the business model concept from 2001 to 2005

In 1996, Slywotsky defined the term ‘business design’ that can be equated with the concept of business models. It is the totality of how a company defines and differentiates its offerings (value objects) according to the selected customers, it also describes how different tasks should be performed to deliver the value objects to these customers and earn profits. Thus, he concluded that it is about the complete system for

delivering utilities to customers and earning profit from a single business activity. This definition encompasses both the strategy and the business model concept.

The literature on business model can be differentiated into three major categories, the business model definitions, the business model frameworks and ontological modelling of business models. The business model frameworks includes the taxonomies, typologies, frameworks, classifications and components identified and discussed until now in the academic literature. Ontological modelling of business models offers techniques to represent business models in a tangible manner. This approach is heavily supported by Information Science (IS) concepts. However, this differentiation, so far, is not strict and definitive due the fact that various authors have simultaneously provided definitions, classifications and different components for the business model concept. The selected overview of these classifications and the research contributions from different authors is presented in Table 2.3. This differentiation can be extended by including other categories, e.g., the change methodology and evaluation (Osterwalder, 2004; and Pateli, 2002). However, the discussion is delimited up to three main categories, i.e., definitions, frameworks and ontological modelling. Table 2.3 represents the main contributions from selected researchers whose work has been analyzed in the following pages.

Research Contribution	Definition	Framework	Ontological modelling
Paul Timmers (1998)	★	★	
Venkatraman & Henderson (1998)	★	★	
Tapscott *et al*. (2000)	★	★	
Rappa (2001)	★	★	
Petrovic *et al*. (2001)		★	
Gordijn & Akkermans (2002)			★
Stähler (2002)		★	
Osterwalder (2004)	★	★	★
Richardson (2005)		★	
Chesbrough (2006)	★	★	
Lambart (2007)		★	★
Conte (2008)		★	

Table 2.3: Overview of the contribution made into business model literature

2.4.1. Business Model Definitions

The term 'business model' was first defined by Paul Timmers in late 90's as a pure business concept explaining the logic of doing business of a firm in the context of electronic commerce. According to his definition, 'a business model can be defined as architecture *for the product, service and information flows*, including a *description of various business actors and their roles* and a description of potential benefits for various business actors and a description of sources of revenues'. The terminology was reviewed in the context of the B2B scenario, and therefore, he has established the concept of inter-networking among various actors in a value chain. A total of 11 business model classifications have been provided by Timers that are based on the concept of value chain deconstruction and re-construction. He has proposed that these business models can be mapped qualitatively along two dimensions, i.e., the extent of innovation of the business model and the extent of the integration of information and functions along the value chain. Details of some of these classifications will be presented in the following sections of this chapter.

Venkatraman and Henderson (1998) have defined the business model concept as a strategic implementation of the information technology that can be extended into three vectors, i.e., the customer interaction, the asset configuration and the knowledge leverage. The customer interaction vector subsumes that IT allows customers to remotely experience products and services. The asset configuration vector addresses the firms need to establish different resources to create business networks. The knowledge leverage vector deals with enabling knowledge and expertise to become business drivers of value creation.

Rappa (2001) has defined the business model as a method of doing business to generate profit by specifying its position in the value chain. Just like Timmers (1998), he has also used Internet commerce as a basis to identify and group various types of the business models. However, he is of the view that the proposed taxonomy should not be meant to be exhaustive or definitive due to the very nature of evolution of the Internet business models.

Petrovic *et al*. (2001) have defined business model as the description of the logic of a 'business system' for creating value that lies behind the actual processes. They propose different tiers of the business logic that consists of the business model layer, the business process layer and the information and communication system layer. They state that '*business models gives sense to the various business processes by describing why certain processes are designed the way they are'*. Their conceptualization of the business model is based on system dynamics. System dynamics as a methodology has the ability to deal with dynamic complex systems (Sterman, 2000). They concluded that the business model, i.e., the logic of the system, is based upon a complex mental model and it can be modified or changed only if the mental representation of the real world is changed first.

Various other researchers defined the business model concept in the context of different characteristics, e.g., Weill & Vitale (2001) have explained the business model as a tool for relationship among actors; Linder & Cantrell (2000) described the business models as change models. Gordijn & Akkermans (2002) proposed the concept of the e3 value model, a graphical representation of business models. Tapscott *et al*. (2000) introduced business webs as "*a distinct system of suppliers, distributors, commerce services providers, infrastructure providers, and customers that use Internet for their primary business communications*". Amit and Zott (2001) defined the business model that "*depicts the design of transaction content, structure and governance so as to create value through the exploitation of business opportunities*".

2.4.2. Business Model Frameworks

This section provides an overview of the various frameworks provided by different researchers (Timmers, 1998; Venkatraman & Henderson, 1998; Tapscott *et al*., 2000; Rappa, 2001; Petrovic *et al*., 2001; Stähler, 2002; Osterwalder, 2004; Richardson, 2005; Chesbrough, 2006; Lambert, 2007; Conte, 2008) for business models. These researchers proposed various business model components and building blocks and simultaneously used various terms to describe their business model frameworks. These terms have been referred as 'elements' 'building blocks', 'functions' or 'components' 'attributes' of business models (Pateli, 2002).

Timmers (1998): has proposed eleven classifications of e-business models that can usually be found on Internet. These classifications are based on the two dimensions, namely, degree of innovation and degree or integration. The mapping of different classifications on these two dimensions is represented in Figure 2.3.

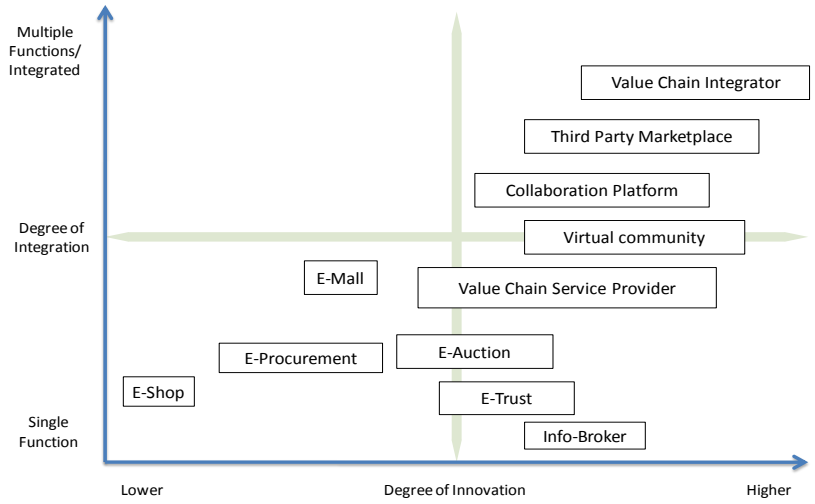


Figure 2.3: Business Model Mappings - Degree of Innovation and Degree of Integration – Timmers, 1998

This classification includes e-shops, e-procurement, e-mall, e-auction, virtual communities, collaboration platforms, third party market places, value chain integrators, value chain service providers, information brokerage, trust and other third party service. It is important to note that some of these models are in fact the modified or revised versions of some other e-business models, e.g., e-auction is actually a collection of buyers and sellers on a technology platform that can be provided by a third party as marketplace or as a collaboration platform also by a third party. Similarly, many e-businesses that run the model of e-procurement may also run a model of virtual communities (e.g., Amazon) simultaneously. Therefore, it is rather necessary to identify the number of the business models run by a particular company if the business model concept is used as the evaluation unit for any academic research. Table 2.4 represents various classifications of business models by Timmers for Amazon.

Model	Description
E-Shop	Amazon offers Kindle, the online reading device, as a manufacturer through its website. The partners are the Amazon, ISP provider, advertisers, PayPal etc. The sale of Kindle through Amazon's website is the source of reveneu. Other source of revenue is the 3rd party content downloaded into Kindle from the Amazon's website and adverstisement fee.
E-Procurement	Amazon offers online procurement for all the products offered via its website. It includes online opportunities for ordering, trading, payment, order tracking, delivery status, return items, magazine subscriptions, downloading, gifts and many more. The partners are The partners are the Amazon, ISP provider, advertisers, PayPal etc. Sources of revenue are sales, listing fees, delivery charges, memberships, subscriptions, bidding fees, trading commissions, transaction fees and VAT etc.
Virtual Community	Amazon offers facility for memberships to virtual communities (VCs). These VCs include Amazon Associates (tools for conncetedness are Bloggers ®, Twitters ®), Amazon Webservices (discussion forums), Reviewers discussion boards and customer communities etc. Key partners might be the experts or members of the VC, the website visitors, the ISP provider, Amazon, advertisers, PayPal etc. The sources of revenues are advertisements, membership fee, banner ads etc.
Third Party Marketplace	Amazon also serves as 3rd party marketplace where buyers and sellers meet and exchange goods and services. Items traded via Amazon are books, music, digital downloads, Kindle, computers, electronics, groucery, clothing and sports etc. Amazon offers branding, payment, logistics, ordering and full scale implementation of secure transactions. Key partners may include service operators, ISP providers, domain owners, Advertisers, Bank, logistic and freight companies etc Soruces of revenues are membership fee, service fee, percentage of transaction value etc.

Table 2.4: Business mode classifications for Amazon – Timmers, 1998

Venkatraman and Henderson (1998): has proposed the concept of business models for virtual organization. The framework they have provided consists of three vectors, i.e., the customer interaction, the asset configuration and the knowledge leverage. In their opinion, the current business models of strategy and structure are inadequate to meet the imminent challenges of the information age. Being virtual-ness is the strategic characteristic of the organization that uses information technology as enabler. In their words, '*virtual Organization is an organization that adopts the ability of the organization to consistently obtain and coordinate critical competencies through its design of value-adding business processes and governance mechanisms involving external and internal constituencies to deliver differential, superior value in the marketplace*' (Venkatraman and Henderson, 1998). Therefore, virtualness as a strategy can be reflected by these distinct yet interdependent vectors. Thus, the business model is a coordinated plan to design strategy along all three vectors rather than leading in any one vector. Table 2.5 shows the presentation of different components of business models in vectors.

Vectors and Characteristics	Stage 1	Stage 2	Stage 3
Customer Interaction (Virtual encounter)	Remote experience of products and services	Dynamic customization	Customer communities
Asset Configuration (Virtual Sourcing)	Sourcing modules	Process interdependence	Resource coalitions
Knowledge Configuration (Virtual Expertise)	Work-unit expertise	Corporate asset	Professional community expertise
Target Locus	Task units	Organization	Inter-organization
Performance Objectives	Improved operating efficieny (*ROI)	Enhanced economic value added (**EVA)	Sustained innovation and growth (***MVA)

*ROI = Return on Ivestment

**EVA = Economic Value Added

***MVA = Market Value Added

Table 2.5: Different Vectors of Business model components - Venkatraman and Henderson, 1998

According to their framework, each vector operates at three different stages. Stage one focuses on the task units, i.e., the functions performed by individual units, e.g., purchasing, new product development or customer service. Stage two focuses on coordinating activities or functions at organizational level to create superior economic value, e.g., developing new product and introducing in the market, inventory management for production, etc. Stage three focuses on inter-organization collaboration for innovation and growth.

Tapscott *et al*. (2000): presented the concept of the b-webs (business webs). This typology was based on the differentiation dimensions of the b-webs that differ on the account of the degree of economic control and value integration). There are five types of b-webs namely *Agora*, *Aggregation*, *Value Chain*, *Alliance* and *Distributive Networks*. Their concept of business model focuses on patterns of organizational relationship with customers, consumers and other organizations in a network environment. A diagramtic representation of b-webs is shown in Figure 2.4.

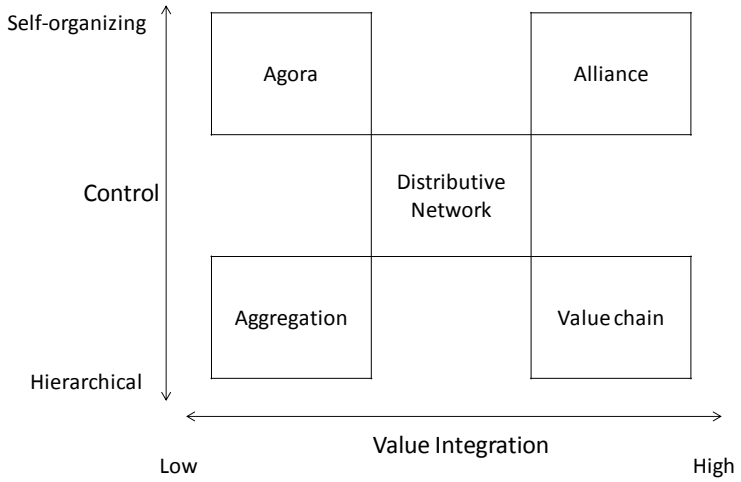


Figure 2.4: Business Web Typologies - Tapscott *et al.*, 2000

'*Agora*' represents the virtual or real markets (Richardson, 2005) where buyers or sellers meet freely to negotiate and assign value to goods. Buyers and sellers differ from each other and may offer a wide variety of goods or services; however the value integration is low for both of them.

In '*Aggregation*' b-webs, there is a third link (intermediary) between producers and customers. The leader or the main operator (intermediary) directly deals with the customers and takes responsibility for selecting products and services, targeting market segments, setting prices and ensuring fulfilment.

'*Value Chains* design, produce, and deliver products or services to meet a specific set of customer needs' (Tapscott *et al*., 2000). The 'integrator' is the so called web-leader that manages the network of partners to deliver highly integrated value proposition.

An '*Alliance*' '*strives for high value integration without hierarchical control*' (Tapscott *et al*., 2000). The value proposition provided by the alliance b-web is the collaborative offering of the participants that design goods, create knowledge, and offer dynamic, shared experiences.

'*Distributive networks*' serve as connecting mechanisms for the other b-webs, thus, neither they create nor consume a product. In other words, '*the core value proposition of the distributive network is to facilitate the exchange and delivery of information, goods and services*' (Tapscott *et al*., 2000).

Rappa (2001): has proposed nine categories of business models on the web that include brokerage model, advertising model, infomediary model, merchant model, manufacturer or direct model, affiliate model, community model, subscription model and utility model. Some of the commonly found business models on the Internet are the brokerage model, the advertising model and the manufacturer models. The brokerage model serves for managing the large numbers of online buyers and sellers together at a web portal. The target markets are segmented as B2B, B2C or C2C. Partners in this model are the brokers (who control the transactions), online sellers and buyers, ISP providers or service operators who operate such web portals, advertisers and other transaction brokers that provide the support for online transactions. Sources of revenue are identified as commission, listing and maintenance fee, advertisements, etc. An example of brokerage model is shown in the Table 2.6.

Type	Model	Description
Brokerage Model		Designed for B2B, B2C or C2C market, where brokers are the market makers. The source of revenue is a fee or commission charged for each transaction.
	Market place Exchange	Offer online services e.g., transaction processes, market assessment, e-bidding, e-auction etc . Also offers market assessment, negotiation and fulfillment.
	Buy/Sell Fulfillment	Takes customer orders to buy or sell a product or service, including terms like price and delivery.
	Demand Collection System	Provide customized online consoles for inventory or order management where prospective buyer makes a final (binding) bid for a specified good or service, and the broker arranges fulfillment.
	Auction Broker	Provide facility to conducts online auctions for sellers (individuals or merchants). However, auctions vary depending on offering and biding rules.
	Transaction Broker	Provides a third-party online payment mechanism for buyers and sellers to settle a transaction
	Distributor	Offers online catalogues to connect large number of buyers and product manufacturers. It also facilitates business transactions between franchised distributors and their trading partners.
	Search Agent	A software agent or 'robot' that offer search engine facilities to search price and availability specified by the buyer.
	Virtual Marketplace	Provide services like e-mall or a hosting service for online merchants to do online transactions.

Table 2.6: Brokerage Model - Rappa, 2001

Advertising model also serves to manage the large number of online visitors (potential buyers) by offering items listings for sale or purchase. The important features are the advertisements that are also the main source of revenues for the broadcaster (of the listings over web portal). The target markets captured by this model can also be segmented as B2B, B2C or C2C. The partners in this model are the web visitors (potential buyer or seller), ISP providers or service operators who operate such web portals, broadcasters (owner or distributor of the website content) and advertisers. Sources of the revenue are identified as banner ads, advertisements, sponsored links, etc. An example of advertising model is shown in the Table 2.7.

Type	Model	Description
Advertising Model		Designed for B2B, B2C or C2C market, where broadcaster (the web portal or website owner) offers listings of items for sale or purchase. The sources of revenue are banner ads, advertisements, sponsored links etc.
	Portal	An online presence usually through a search engine. Two types, the personalized portal, allowing customization of content to user, and the niche portal that cultivates well defined user demographic.
	Classifieds	Lists of items for sale or purchase.
	User Registration	Provide user registration facilities for customized information.
	Query-based Paid Placement	Offer favorable link positioning (i.e., sponsored links) or advertising keyed to particular search term in a user query.
	Contextual Advertising/Behavioural Marketing	Mainly for freeware developers who develop bundle adware with their product. It provides content specific and user behavior sensitive freeware, pop-ups etc.
	Content-targeted Advertising	Relevent advertisements are delivered that are sensitive to users navigation behaviour on internet.
	Intromercials	These are animated full-screen ads placed at the entry of a site before a user reaches the intended content.
	Ultramercials	They are interactive online ads that require the user to respond intermittently in order to wade through the message before reaching the intended content.

Table 2.7: Advertising Model - Rappa, 2001

The manufacturer models are based on brand specific products or services that focus to identify types of potential customers based on market segmentation, i.e., B2B or B2C. The important feature is the online opportunity for personalized sales process, i.e., user/visitor registration, payment, order tracking, delivery status, usage limitations, terms

of use of agreements, etc. There is also a possibility that manufacturers possess physical stores to sell products to the customers. The partners in this model are identified as the manufacturers themselves, buyers (possibly end consumers), website visitors, service operators, ISP providers, domain owners, advertisers, banks, logistic and freight companies, etc. Sources of revenue are identified as sales revenues, service fee, etc. An example of manufacturer model is shown in the Table 2.8.

Type	Model	Description
Manufacturer Model		Designed for B2B, B2C market, where manufacturer offers brand specific produrct or service. The sources of revenue are sales revenues, service fee, etc.
	Purchase	The sale of a product in which the right of ownership is transferred to the buyer. Here the online opportunity for personalized sale process i.e., user/visitor registration, payment, order tracking, delivery status, usage limitations, terms of use of agreements etc, is provided to the buyer.
	Lease	In exchange for a rental fee, the buyer receives the right to use the product under a .terms of use. agreement. The product is returned to the seller upon expiration or default of the lease agreement.
	License	The sale of a product that involves only the transfer of usage rights to the buyer, in accordance with a terms of use agreement. Ownership rights remain with the manufacturer (e. g., with software licensing).
	Brand Integrated Content	In contrast to the sponsored content approach (i.e., the advertising model), brand integrated content is created by the manufacturer itself for the sole basis of product placement.

Table 2.8: Manufacturer Model - Rappa, 2001

Wirtz (2001): has proposed business model classification based on illustration of workflow and the flow of material and information both within the organization and between the organization and external stakeholders to capture stream of revenues (Conte, 2008). Wirtz classify business models into six partial models that combine to an integrated business model. The *market model* can be divided into competition model and the buyer model. It describes Porter's five forces model for organizational environment. The *procurement model* describes input factors related to acquire particular sources for production and value creation. The *value creation model* describes how to combine goods and services in order to transform them into offerings. The *value offering model* refers to groups of goods and services that are being offered to a particular customer segment. The

distribution model is linked with the value offering model that describes how and why the goods and services are made available to the customer. Conte (2008) proposed that a distinction should be made whether the goods are distributed physically or transmitted electronically. The *capital model* illustrates what are the financial opportunities and potential revenue streams for the company. A diagrammatic representation of integrated business model is presented in the Figure 2.5.

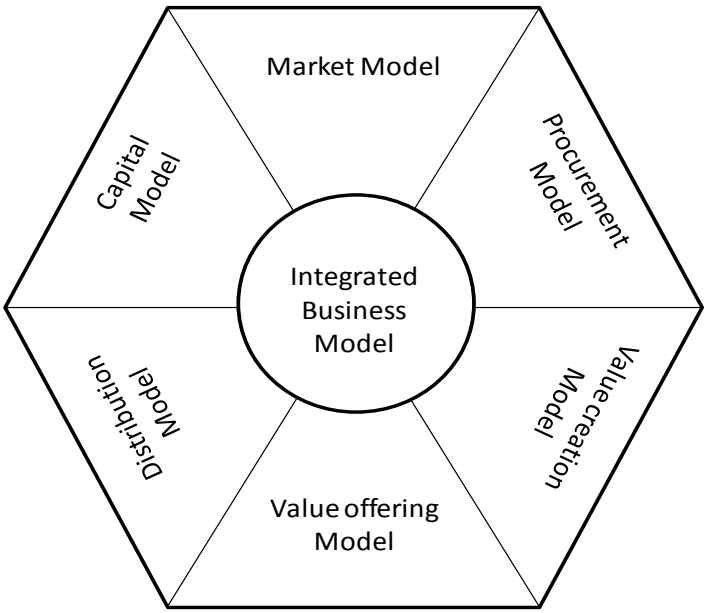


Figure 2.5: Partial business models - Wirtz, 2001

Based on these six partial models, Wirtz and Lihotzky (2003) proposed a typology to classify e-business models that is called the 4C-Net-Business-Model. The four 'Cs' stands for 'Content', 'Commerce', 'Context' and 'Connection'. An example of 4C-Net-Busienss-Model is presented in Table 2.9.

CONTENT		
e-Information	***e-Entertainment***	***e-Education***
•E-policies •E-Security •E-Economics	•E-Games •E-Movies •E-Prints •E-Music	•Virtual university •Public education

COMMERCE		
Attraction	***Bargaining***	***Transaction***
•Banner advertisement •Email operator	•Demand Aggregation •Auction •Price seeking •Haggling	•Payment •Delivery

CONTEXT	
Search engines	***Web Catalogue***
•Search engines •Meta-search engines	

CONNECTION	
Intra-connection	***Inter-connection***
•Community •Mailing service	•Fix connection •M-connection

Table 2.9: 4-C-Net Business Models – Wirtz & Lihotzky, 2003

The typology of 4C-Net business model has been established by to Wirtz and Lihotzky (2003) in order to discuss the relationship between customer retention strategies and the relevant business models. The *content* component of business model provides convenient online access to information, education or entertainment to the end user. The *commerce*-oriented business model pertains to support or even substitute the economic transactions through electronic media. The *context*-oriented business models focuses on aggregating and structuring available information on internet for end users. The *connection* business models are communication-oriented and provide physical and virtual network infrastructure for end users. Whether a company employees either one or many business model types depends on aligning set of criteria along with business models. The alignment criteria are relevant to different customer retention strategies. Therefore, Wirtz (2003) has in fact, tried to distinguished between what is strategy and what is business model and he first provided a comprehensive note that how business models can be aligned with strategies in order to earn revenues.

Petrovic *et al*. (2001): have proposed that the business model can be divided into seven sub-models namely; *value model*, *resource model*, *production model*, *customer relations model*, *revenue model*, *capital model* and *market model*. Their proposed sub-models are the extension of the Wirtz's business model concept. An example of their business model concept is presented in Table 2.10.

Model	Sub Model	Description
Value Model		Describes logic of *what* core products, services and experiences are delivered to the customers. It also includes other value added services that derived from the core competences.
Resource Model		Describes the logic of *how* elements are necessary for the transformation process, and *how* to identify and procure the required quantities.
Production Model		Describes the logic of *how* elements are combined in the transformation process from the source to the output.
Customer Model		The logic of how to reach, serve and maitain customers.
	Distribution Model	The logic behind the delivery process.
	Marketing Model	The logic behind reaching and maintaining customers.
	Service Model	The logic behind serving the customer.
Revenue Model		Describes the logic of what, when, *why*, and how the company receives compensation in return for the products.
Capital Model		Describes the logic of how financial sourcing occurs to create a debt and equity structure, and how that money is utilized with respect to assets and liabilities, over time.
Market Model		Describes the logic of choosing a relevant environment in which the business operates.

Table 2.10: Seven sub-models of the business model concept - Petrovic *et al*., 2001

They emphasize that it is important to develop business models as every entrepreneur has a unique (and intuitive) understanding of the company's logic to create value. Their logic is based upon the complex mental models which influences important decisions regarding business. Feedback from the real world in the context of existing business model affects the mental model, therefore, development and improvement of existing business models depends upon learning. Thus, a methodology for developing business models is based on three pre-requisites, namely: ability to handle complex systems; support to structuring and sharing of knowledge; supporting risk free experiments; creating learning environment; and based on grounded theory and practically applicable.

Alexander Osterwalder (2004): has proposed the business model ontology (BMO) through nine building blocks with an ontological approach. These building blocks are based on four pillars, i.e., product (value proposition), customer interface (target customer, distribution channel and relationship), infrastructure management (value configuration, capability and partnership) and financial aspects (cost structure and revenue model).

The four pillar of his business model ontology are then further divided into nine building blocks. Table 2.11 represents the nine building blocks along with the relevant detail of each building block.

Pillar	Building Block of Business Model	Description
Product	**Value Proposition**	A Value Proposition is an overall view of a company's bundle of products and services that are of value to the customer.
Customer Interface	**Target Customer**	The Target Customer is a segment of customers a company wants to offer value to.
	Distribution Channel	A Distribution Channel is a means of getting in touch with the customer.
	Relationship	The Relationship describes the kind of link a company establishes between itself and the customer.
Infrastructure Management	**Value Confirguration**	The Value Configuration describes the arrangement of activities and resources that are necessary to create value for the customer.
	Capability	A capability is the ability to execute a repeatable pattern of actions that is necessary in order to create value for the customer.
	Partnership	A Partnership is a voluntarily initiated cooperative agreement between two or more companies in order to create value for the customer.
Financial Aspects	**Cost Structure**	The Cost Structure is the representation in money of all the means employed in the business model.
	Revenu Model	The Revenue Model describes the way a company makes money through a variety of revenue flows.

Table 2.11: Nine Building Blocks of Business Model - Osterwalder, 2004

Patrick Stähler (2002): has proposed the concept of the business model based on value network approach (Osterwalder, 2004). He has described the concept of business model as the abstraction of a real business or a future business. He also proposes four components of business models namely: *value proposition*; *product or service*; *value architecture*; and *revenue model.*

He affirms that the term business model refers in the true sense of the word only to a business. However, due to maturity of certain industries, the business models of the competitors have been converged and thus, one can use the term business model also for industry. Therefore, the convergence of business model can be used as a defining characteristic of a mature industry. An example of his business model components is provided in Table 2.12.

Component of business model	Description		
Value Proposition	**Customers**	Value is being created by fulfilling a customer need. With the determination what value the firm wants to create the value proposition implies also what the firm does *not* offer to its customers	
	Value Partners	A business model also contains a value proposition for partners that are required to fulfill the value proposition to the customer. The value proposition to the partners must be strong enough to motivate them to participate in the business.	
Product or Service	The product or service is the link between the firm and the customer. The product or service fulfills the value proposition and generates the promised benefit to the customer.		
Value Architecture	**Market design**	In its business model the firm designs what markets it wants to serve. The market can be segmented by geography or customer characteristics like demographics or kind of customers (B2B, B2C).	
	Internal Architecture	**Resources as building blocks**	The internal resources of the firm are its *Core Competencies* and its *Strategic Assets*. The core competencies comprise what the firm knows; the strategic assets are what the firm owns like brands, patents, or customer relationships
		Value Steps	Besides describing the value steps and their sequence the business model contains the economic agents and their roles in each value step.
		Communication Channels & Coordination Mechanism	The communication channels connect the agents, with the coordination mechanism the firm determines how the agents coordinate their activities.
		Demarcation towards the external Value Architecture	Part of a business model is the deliberate decision which value steps the firm sources from external partners and which are conducted internally. The decisive factor is who controls the necessary resources to fulfill the given value proposition.
	External Value Architecture	**Customer Interface**	The customer interface are the *distribution channel*, the *information*, a firm has *about its customers* that are used in the value creation, the *communication channels* between the firm and its customers, between the customers and the firm, and among the customers themselves
		Value Partners	The business model contains the external value partner that create value along the value chain to fulfill the value proposition. Potential value partners are suppliers, complementors, customers, competitors, or any other stakeholder.
		Communication Channels and Coordination Mechanisms	Another component of the external architecture are the communication channels and the coordination mechanism between the value partners and the internal value architecture. The coordination mechanism governs the rules between the value partners.
Revenue Model	The revenue model contains a description from what sources in what ways the firm generates its revenues. The business can have different sources of revenue. All sources together make up the revenue mix of the firm.		

Table 2.12: Components of a Business Model - Stähler, 2002

Richardson (2005): has utilized the concept of generic value chain of Michael Porter (1980) to propose his business model framework. He states that a business model concept can be represented with a simplified framework that incorporates different components related to the value proposition, the value creation and delivery system and the value capture along with the value chain. The business model framework consists of three main components, i.e., the value proposition, the value creation and delivery system and the value capture. Table 2.13 represents the business model framework by James Richardson.

Components	Elements	Description
Value proposition	**Offering**	A wide variety of brand name or recognized quality merchandise (What is the offering?).
	Target customer	Explicit statement of the the intended customer or target market (Who is the target customer?).
	Generic strategy and building blocks of competitive advantage	The firm's reason for existence, the basic approach to winning customers and gaining competitive advantage (Why will they buy it? What is the basic competitive strategy?).
Value creation and delivery	**Value chain**	What activities does the firm undertake?
	Position in the value network	How does the firm fit into the larger value creation network?
	Distinctive resources and capabilities	What distinctive resources and capabilities does the firm have/need?
	How activities link to competitive performance	How are the activities linked together and with competitive performance dimensions?
Value capture	**Revenue model**	How does the firm get revenue?
	Economic model	How does the firm make money? (economic model, operating cash flow model)

Table 2.13: Business Model Framework - Richardson, 2005

The term 'value proposition' has been used in the traditional and the broader concept of the 'offerings' the firm provides to the customers. The 'customers' are defined as who intend to accept this offering and the 'firm's strategic positioning'. The second component of this framework is the value creation and delivery system. It describes the organization and its architecture of the firm that creates and delivers the value

proposition. It includes the value chain, activity system and the value network as structural elements of this framework. The third component of this framework is the value capture that represents revenue model and economic model as the money making logic of the firm.

Figure 2.6 represents the way he evaluated Wal-Mart's business model in the framework of the generic value chain.

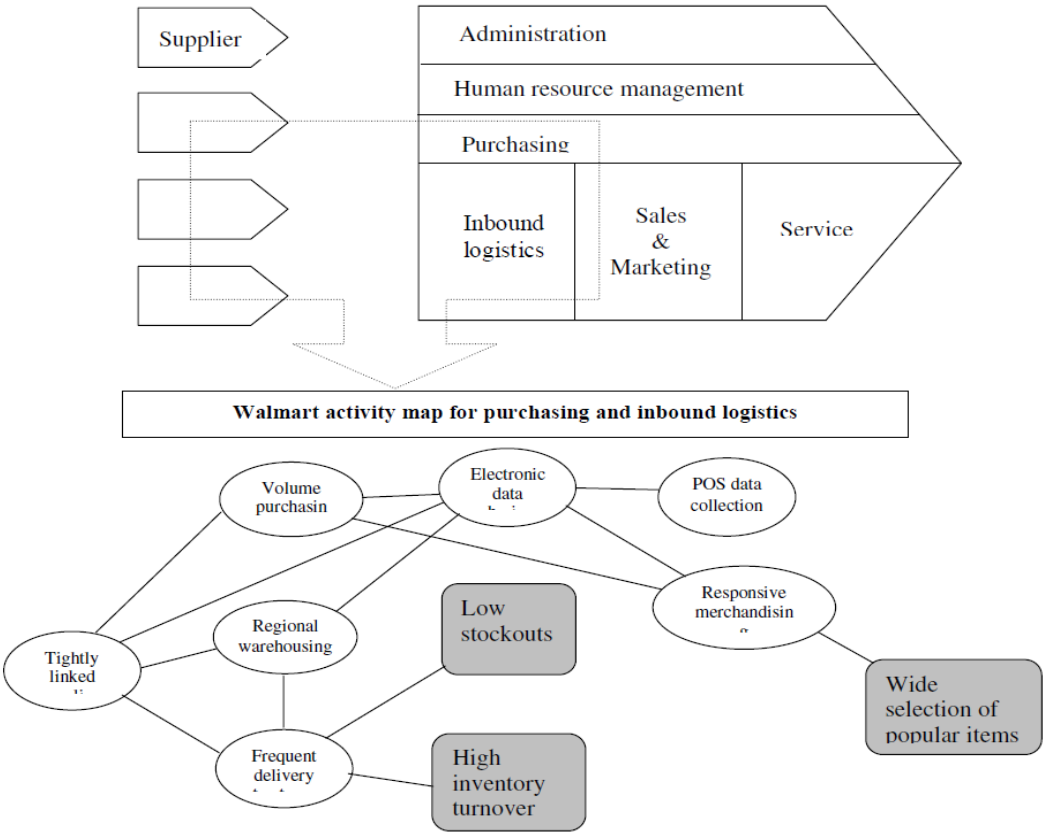


Figure 2.6: Wal-Mart Value Chain and Activity Map - Richardson, 2005

In above example, Richardson discusses that various activities and their position in the value network work facilitates to implement company's strategy. He also acclaims that the business model framework provides a simple and logical structure for the strategist to think about how different activities of the firm work in a coherent way to execute the strategy. Therefore, the business model framework provides an intermediate logical structure to link competitiveness and performance. In the above figure, the Wal-Mart is positioned at the end of the value chain as a retailer that sells goods produced by

other firms to the end consumer. Wal-Mart's lowest price strategy is linked with the efficiency which is achieved by designing and allocating activities around purchasing and inbound logistics between Wal-Mart and its supplier. Designing and allocation of these activities led Wal-Mart to achieve low stockouts, high inventory turnover and increased sales.

Henry Chesbrough (2006): has defined and proposed the concept of 'open business model' in the context of value chain analysis. According to this concept, the business model can create value when it explains sets of activities across value chain. Thus, the importance of each partner across the value chain can be assessed and the company can assess its strengths as well as its partner's strengths. A business model can be opened up when it performs two functions, i.e., '*it creates value and it captures a portion of that value'*. A portion of the value created by the company can also be captured through the business model concept. Thus, by assessing the position of the company and its partners in a value chain, the company can remodel its product line extension or it can enter into adjacent markets to generate profit or to neutralize some risks. Figure 2.7 represents how company can create new sources of revenue by opening up its business models for external ideas.

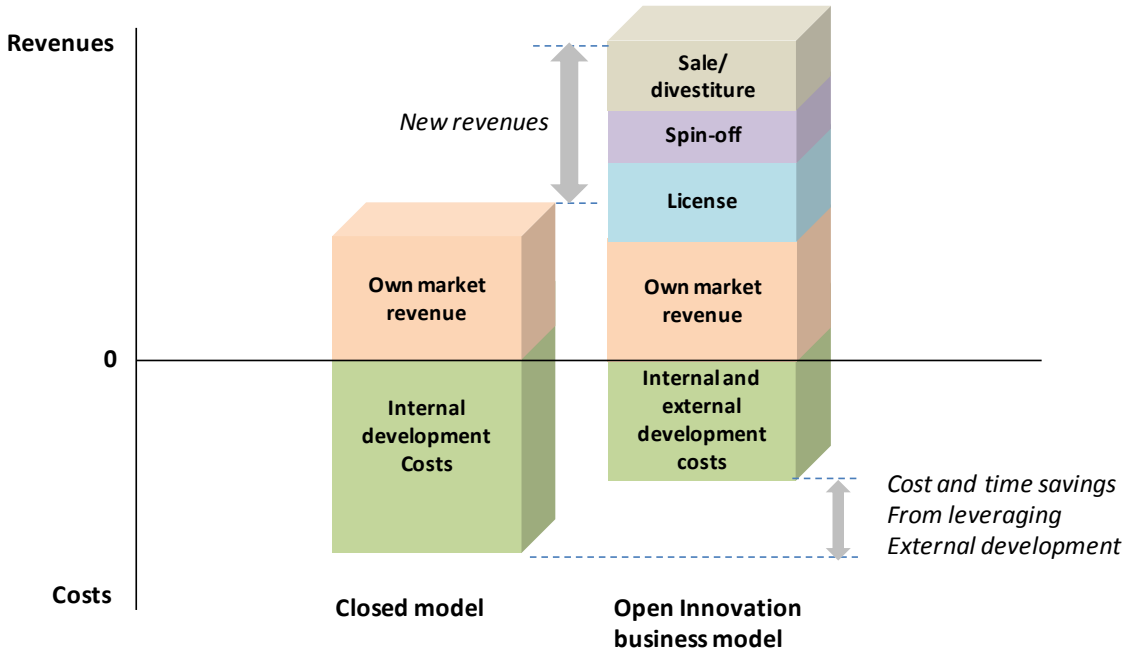


Figure 2.7: The new business model for open innovation - Chesbrough, 2006

Based on the concept of open innovation business models, he propose a systematic framework to evaluate and improve the business model of the company on two dimensions, i.e., the depth of investment made to support the business model and the openness of the business model. The more the company opens its business model in terms of licensing its technology, allowing spinoffs, selling business unit, the more the sources will be generated for new revenues and less will be the development costs.

Chesbrough (2006) has proposed six types of business models. Table 2.14 shows the types of business models proposed by him based on the two dimensions discussed above.

Type	Description of business model	Innovation process	IP management	Example
Type 1	Undifferentiated	None	Not applicable	Mom-and-pop restaurants, entry level companies.
Type 2	Differentiated	Ad hoc	Reactive and random	Start-up technology companies
Type 3	Segmented	Planned	Defensive	Technology push companies
Type 4	Externally aware	Externally supportive	Enabling asset	Mature industrial R&D firms
Type 5	Integrated	Connected to business model	Financial asset	Leading financial firms
Type 6	Adaptive	Identifies new business models	Strategic asset	Intel, Wal-Mart, Dell

Table 2.14: Business model framework - Chesbrough, 2006

Type 1 business model is undifferentiated and companies are mainly focusing on selling commodities. Companies with such business models also lack a much of process to innovation and IP management. Many family run companies, faces, and entry level services establishments possess such type of a business model. Companies having type 2 business model have some degree of differentiation in their products and services that leads to differentiate the business model as well. With this type of business model, the

company's primary focus is to execute business. Innovation process in such companies is also sporadic and on ad-hoc basis. They employ very little resources to sustain their innovation processes. Most of the start-up technology companies can be categorized having the type 2 business model. Companies having the type 3 business model segment their markets and serve multiple markets and support the firm's ability to plan for future. Useful outcomes are selected from the company's internal R&D activities and are commercialized through its business models. The type 4 of business model allows companies to incorporate external technologies for serving current customers and searching new opportunities. Incorporating external innovation inputs reduces internal costs of research and development, reducing time to bring new offerings to the market and sharing the risk of new products and processes with partners. It gives greater role to customers and suppliers in the innovation process. IP is managed as enabling asset to generate value. Type 5 of the business model allows company to focus on new markets and businesses along with the current business and the company strives to align customers and suppliers with its business model. The innovation process is a business function and is shared with customers and suppliers. Type 6 of the business model allows company to innovate its own business model. The key suppliers and customers become business partners, thus, creating a relationship in which both technical and business risks are shared. The more the business model is open for changes and revisions, the more the company will be innovative in terms of business model and it will treat its intellectual property (IP) as a strategic asset.

Susan Lambart (2007): has provided two concepts pertaining to the business models, i.e., the basic business models and the comprehensive business models. A diagrammatic representation of these business models is provided in Figure 2.8.

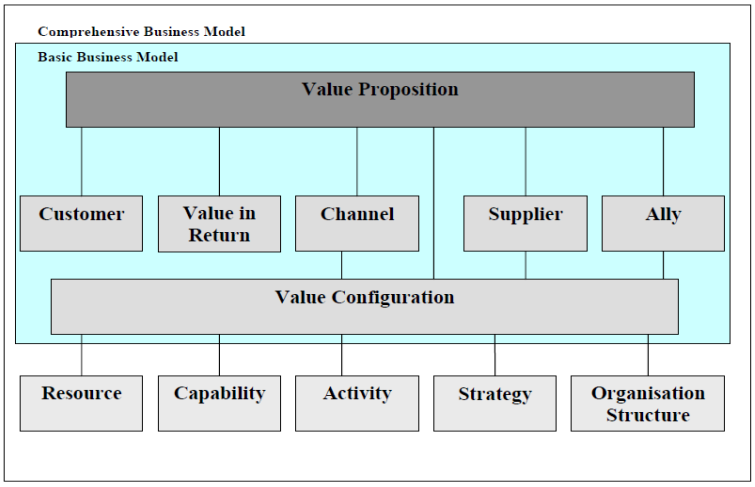


Figure 2.8: Basic and Comprehensive Business Models - Susan Lambart, 2007

These business model concepts are the extension of nine building blocks of the business model by Osterwalder (2004) and value chain analysis. The basic business models are composed of the elements that describe the business concept and compare business models to understand the requirements of the business. The elements of the basic business model are value proposition, customer, value in return, channel, value configuration, supplier and ally. The comprehensive business models are composed of additional business model elements that can evaluate the potential of new business initiatives including e-business initiatives. The elements of comprehensive business models are activities, resources, capabilities, strategies and organizational structure. Table 2.15 represents different elements of basic and comprehensive business.

Business Models	Elements	Description
Basic Business Model	**Value Proposition**	The object(s) of value offered to the customer i.e. products, services and information.
	Customer	The entities targeted with the value proposition, a group of consumers or other businesses.
	Value in Return	the entity receives in return for the value proposition i.e. the money or other value objects.
	Channel	The channel describes how the value exchanges take place. More than one channels can be used to effect a transaction.
	Value Configuration	It can be a manufacturing process, a retailing operation or a service process. It describes how the value proposition is provided.
	Supplier	The entity that provides the inputs to the value configuration.
	Ally	Based on Weill and Vitale (2001), any third partner or entity that affect the value creation processes in one way or other.
Comprehensive business model	**Activities**	The actions that are undertaken by the entity, they involve converting resources into value propositions using the capabilities of the entity and its allies.
	Resources	Include information technology hardware and software, intellectual property, financial, physical and human resources.
	Capabilities	The expertise required by the entity to perform the activities; they are provided by the resources such as human resources and machinery.
	Strategies	Relate to all parts of the entity both at the value proposition level and the overall entity level. Decisions relating to the nature of the value configuration, how activities will be performed and by whom are dealt with by this element.
	Organisation structure	The organization structure impacts at an entity and a value proposition level. It is both deterministic and consequential of the value configuration.

Table 2.15: Elements of the basic and the comprehensive business models - Susan Lambart, 2007

Tobias Conte (2008): has proposed the business model framework for business value networks (BVNs) that consists of five basic pillars. Table 2.16 represents the pillars and components of his business model framework.

Partial business models	Business model compenents	Short description
Value creation model	**Value configuration**	Arrangement of activities necessary to provide value for the customer.
	Core competencies	Major capacities of an organizational unit.
	Position in value system	Position/role a company takes over in the overall value creation provided by the network.
Partner model	**Partners and their roles**	Actors involved in the value creation and offering including their roles.
Value offering model	**Service/product portfolio**	Bundle of goods and services offered to the customer.
Customer model	**Target customer**	Bundle of goods and services offered to the customer.
	Distribution channel	Channels a product or service is delivered to the customer.
	Customer integration	Role of customer in the value creation process.
Profit model	**Revenue**	Way of revenue generation and its sources.
	Pricing	Price mechanisms allocated to service/product offerings.
	Cost structure	Expenditures connected with creating, offering, and distributing goods and services.

Table 2.16: Components of the business model framework for BVNs - Tobias Conte, 2008

His framework is mainly based on the concepts of b-webs and the basic pillars of business models identified by Osterwalder (2004) and Wirtz (2001). The first pillar of his framework is the value creation model that includes three components, i.e., the value configuration, core competencies and position in value system. The partner model is based on partners and their roles, the value offering model consists of the service and the product portfolio, target customer, distribution channels and customer integration. The profit model is built upon by revenues, pricing and cost structure depicting money making logic of the company. He also states that all these components are dependent on each other.

Alt and Zimmermann (2001): have distinguished six generic elements of a business model that includes mission, structure, processes, resources, legal issues and technology. They have followed Shipley (1995) by arguing that it is not possible to apply a single set of business models to all organizations, which is also true for even a majority

of IS organizations that formalize business models for focusing and measuring IS activities and results.

2.4.3. Ontological Modeling

Two main contributions have so far been provided that constitutes the sub-domain of Ontological Modelling of business models. The first approach, referred here, comes with the lightweight engineering perspective, i.e., the e3 value, which was developed by Gordijn and Akkermann (2001). The core objective of this approach was to develop a methodology for identifying flow of value among different partners during business transaction. The second approach, referred here as BMO, was developed by Osterwalder and Pigneur (2005) as a conceptual tool to describe core business logic. This approach also incorporates different business actors and the mechanisms of value exchange among these actors. The additional benefit of this approach is that it also incorporates the cost and revenue models of an organization.

2.5. Business Model Components and Elements

As explained earlier, various researchers have described different components and elements of business model concepts quite distinctly. In the following, I will explore different elements and components that have been most frequently used in the academic literature.

Value Model: Value model has been described by Petrovic *et al*. (2001) as logic of what core products, services and experiences are delivered to the customers. It also includes other value added services that derived from the core competences.

Value proposition: Value proposition has been described quite rigorously by different authors with different sets of components. Stähler (2002) proposed that value proposition addresses two different stakeholders namely: customers and value partners and product or service. He defined value proposition as the benefits and therefore the value a customer or a value partner gains from the business model. Osterwalder (2004) provided rather a comprehensive definition of value proposition. According to his definition, a value proposition is an overall view of the company's bundles of products

and services that are of value to the customer. Since this is the nearly comprehensive description of this important concept, thus I will use it in my dissertation with the same context. Few others describe this terminology as 'what the firm will deliver to its customers, why they will be willing to pay for it and the firm's basic approach to competitive advantage' (Richardson, 2005), 'the objects of value offered to the customer, i.e., products, services and information' (Lambart, 2007).

Products& Services: Value offering model consists of services and product portfolio and can be described as bundle of goods and services offered to the customer (Conte, 2008). It has also been defined as ***offering*** (Richardson, 2005) or ***service/product portfolio*** (Lambart, 2007). Stähler (2002) has described product or service as a link between the firm and the customer that serves foundation for value proposition and generates promised benefit to the customer. For this dissertation, I will use the term product or service in the context of what Stähler has described in his business model framework.

Customers: Customers are the entities that are targeted for final output; they could possibly be the group of consumers or other businesses (Lambart, 2007). This definition suits the purpose of this dissertation; therefore, I will retain this definition for the rest of the discussion. Some other authors used ***target customer*** equivalent to this term and described it as the group of customers who are addressed (Conte, 2008) with service or product portfolio and for whom value is being created to fulfill their needs (Stähler, 2002). Target customer is a segment of customers a company wants to offer value to (Osterwalder, 2004). Thus, a term '***customers' specialty***' can used to describe particular customers for whom customized products are delivered according to their needs.

Resource Model: Petrovic *et al*. (2001) described resource model as the logic how elements are necessary for the transformation process and how to identify and procure the required quantities. Lambart (2007) defined ***resources*** that include information technology hardware and software, intellectual property, financial, physical and human resources. Richardson (2005) described it as ***distinctive resources and capabilities*** that a firm need to create and deliver value. Osterwalder has included

resources within ***value configuration*** element of his business model framework. According to his supposition, resources as part of value configuration are necessary to create value for customer. For this dissertation, I will borrow the concept of ***resources*** partly from the Petrovic *et al.* (2001) resource model and partly from Lambart (2007). For this dissertation, I use the concept of ***resources*** that include information technology (IT) hardware and software, intellectual property (IP), financial, physical and human resources that are necessary for the transformation process.

Production model: Petrovic *et al*. (2001) have described production model as the logic of how elements are combined in the transformation process from the source to the output. Lambart (2007) has defined production model as ***value configuration*** that can be supposed as a manufacturing process, a retailing operation or a service process that mainly describes how value proposition is provided. She also proposed ***activities*** as the action undertaken by the entity that involves converting resources into value propositions using the ***capabilities*** of the entity and its allies. Osterwalder (2004) suggests ***value configuration*** as the part of ***infrastructure management*** and which describes the arrangement of activities to create value for the customer. He also proposed that ***capabilities*** and ***partnerships*** are part of this infrastructure management. Conte (2008) defined production model in terms of ***value creation model*** that consists of value configuration, core competencies and position in the value chain. Whereas, Richardson (2005) has distinctively associated value creation model with the value chain concept and propose four components, i.e., value chain, position in the network, distinctive resources and capabilities and linkage of activities with competitive performance. For this dissertation, the concept of ***value configuration*** can be borrowed from various business model frameworks (Lambart, 2007; Osterwalder, 2004; Conte, 2008; Stähler; 2002) and define it as a manufacturing process, a retailing operation or a service process that mainly describes the arrangement of activities to create value for the customer. It also includes components like distribution channel (Osterwalder, 2004), communication channels, customer interface (Stähler, 2002) and customer integration (Conte, 2008).

Partnership: Stähler (2002) has defined ***value partners*** as suppliers, complementors, customers, competitors or any other stakeholders that are external to the

organization along the value chain to fulfill the value proposition. Conte (2008) has defined ***partner model*** comprised of actors who are involved in the value creation and offering including their roles. Osterwalder (2004) has defined ***partnership*** as a voluntarily initiated cooperative agreement between two or more companies in order to create value for the customer. The term partnership can be borrowed from all these perspectives for this dissertation. Thus ***partnership*** is the voluntarily initiated cooperative agreement between different value partners along the value chain who are involved in the value creation and offering including their roles to fulfill the value proposition.

Revenue model: Revenue model has been described as '*which sources generate revenue for the firm*' (Stähler, 2002). It is also the ***value in return*** that the firm receives for the value proposition, it can be the money or other value objects (Lambart, 2007). Petrovic *et al*. (2001) have described it 'as logic of what, when why and how the company receives compensation in return for the products'. Osterwalder (2004) has described revenue model as 'the way a company makes money through a variety of revenue flows'. For the purpose of describing the business model concept in this dissertation, I borrow the concept of revenue model from Petrovic *et al*. (2001).

Cost structure: Osterwalder (2004) has proposed that the cost structure is the representation in money of all the means employed in the business model. Conte (2008) has defined cost structure as expenditures connected with creating, offering and distributing goods and services. For the purpose of describing the business model concept in this dissertation, I borrow the concept of cost structure from Osterwalder (2004).

2.6. Characteristics of Business Models

Based on the review of various frameworks and definitions, various characteristics of the business models can be identified. In the following pages, some of the business model characteristics are discussed in order to understand this concept in more depth.

2.6.1. Strategy and Business Models

Strategy and the concept of the business model have been used as poorly defined terms due to the overlap (Seddon & Lewis, 2003). According to Porter (1996), '*Strategy is the creation of a unique and valuable position, involving a different set of activities. If there were only one ideal position, there would be no need for strategy. Companies would face a simple imperative – win the race to discover and preempt it. The essence of strategic positioning is to choose activities that are different from rivals*'. The goals of the strategy are to '*achieve a superior long-term return on investment*' (Porter, 2001). On the other hand, 'business models are stories that explain how enterprise works' (Magretta, 2002). It is the *architecture* and the representation of a *firm's underlying core logic*, or *the description of roles and relationship among a firm's consumers, customers, allies and suppliers and identifies the major flow of products, information and money, as well as major benefits to the participants* (Weill & Vitale, 2001). Thus, if the strategy is the set of activities to create a unique and valuable position, to achieve superior long term ROI, the business model concept is the description of the strategic choices for creating and capturing value and to earn profit in a competitive environment. Timmers (1998) has indicated like marketing strategy, the business model is also the part of the marketing model of the business or a firm. He has also suggested that technical implementation of the architecture of the business model and its commercial viability are two different aspects, so it should be treated on different levels.

Different researchers have used different approaches towards 'strategy' while constructing business model definitions. Shafer *et al*. (2005) described 'strategic choices' as a component of business model. They proposed four components (along with strategic choices) of business model by using a methodology of affinity diagram. On the contrary, they also argued that 'a business model is not a strategy' Lambart (2007) also proposed generic strategy as an element of business model. Her argument that the business model framework should incorporate strategy and organizational structure in order to ensure that traditional management concept are not discarded, is not strong enough to support this notion. Richardson (2005) proposed that the strength of firm's value proposition relies on its strategic positioning. If a firm plans to offer the same product (value proposition) to the same target market that is already well served by its competitors, it does not have a

strong value proposition. It will only have a strong value proposition if it offers its customers a greater value than its competitors. Thus, the value proposition serves as a generic strategy for the firm. Later on, Santos *et al*. (2009) suggested that albeit difference in these two terms, the use of these terms would only create confusion if they are treated interchangeably. They suggested that business strategy can be specified by three questions: *what* is the offer, *who* are the customers and *how* to deliver the value or offer to the customer?

According to Stähler (2002), a business model is not a strategy. Magretta (2002) also affirm the notion that '*a business model isn't the same thing as strategy*'. The business model is the translation of a company's strategy into a blueprint of the company's logic of earning money (Osterwalder, 2004) that can be interwoven with the strategy, processes and Information System in the form of a business model framework. The business model framework is composed of three layers i.e. the strategic layer, the business model layer and the process layer. Figure 2.9 represents three layers of the business model framework.

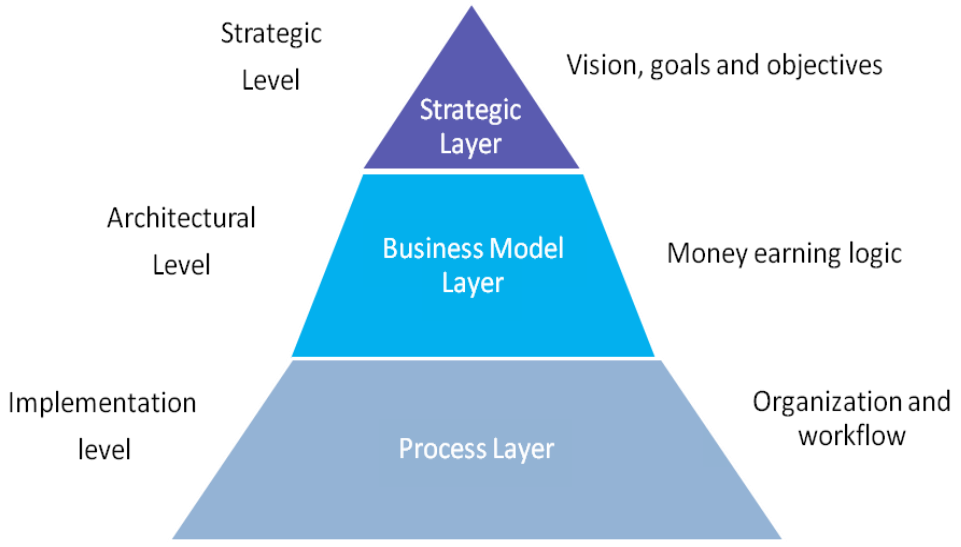


Figure 2.9: Business Layers

The strategic layer deals with the organization's vision, mission, goals and objectives. These goals and objectives that are basically elements of the company's strategy are then achieved through business model layer. The business models are the blue prints of company's strategy to earn money and are the important constituent of the

firm's strategy to bridge a gap between the planning and implementation layer. The strategic layer is related with the business model layer. The business model layer is placed in between strategic layer (planning layer) and the process layer (implementation layer) making a multilayer system. While business model layer is different from the business process layer, yet both are related due the fact that the business model has to be financed through internal or external funding (e.g., venture capital, cash flow), thus implemented into an actual business enterprise (Osterwalder, 2004).

Based on the three layer framework for business models certain frameworks have been built. The first example is from the BSopt project. Figure 2.10 shows different layers of BSopt project.

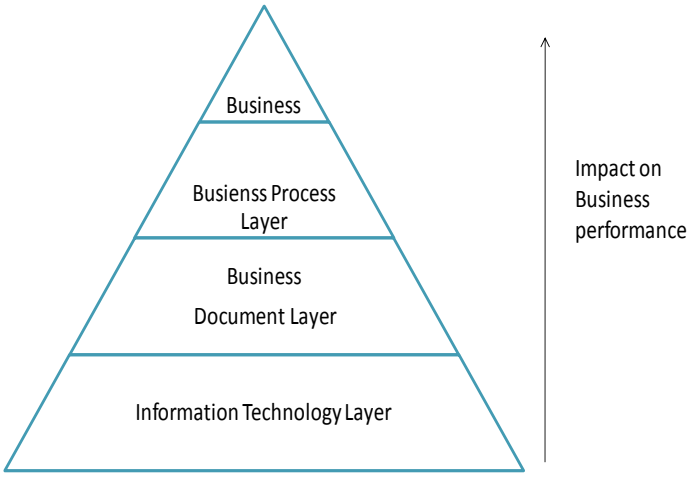


Figure 2.10: Hierarchical Layers of BSopt Project

The project has been designed at Vienna University of Technology with the help of industry and other academic partners. The concept consists of four layers, the business layer, the business process layer, the business document layer and the IT layer. Each layer at lower has an impact on the upper level layer in terms of business performance.

The second example I quote here is the Integrated Architecture Framework (IAF) (Macaulay, 2004). Figure 2.11 is the diagrammatic representation of the comparison between business model concept and IAF.

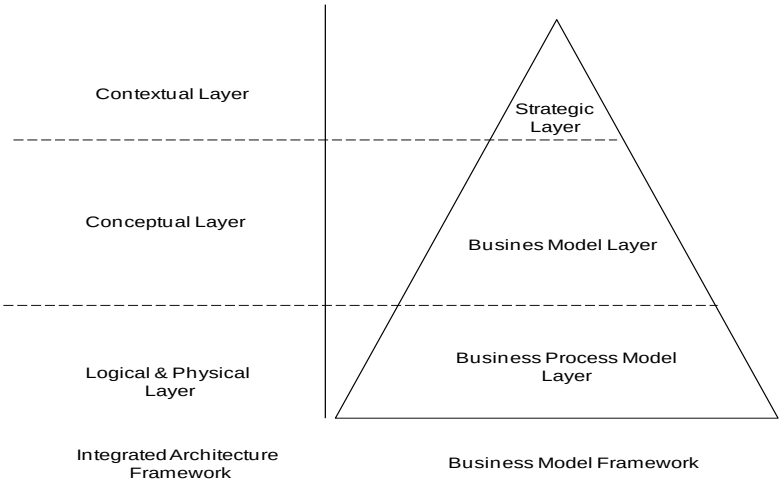


Figure 2.11: Comparison of the business model Framework and IAF

IAF has been designed commercially by Capgemini (a French company in the field of IT). Its main purpose is to analyze and develop enterprise and project level architecture and deliver market leading solutions. This model identifies how a firm can align its IT requirements with business requirements by integrating contextual layer (strategic layer) and logical & physical layer (Business Process Model Layer). Therefore, the business model performs the function of aligning IT with business requirements.

The above discussion clearly suggests that the business model concept is a different approach and should be treated separately from the strategy. Strategy deals with making decisions, setting priorities and vision and is influenced by market place derived strategies (Joyce & Winch, 2004). Table 2.17 represents how business model can be distinguished from the strategy.

Business Model	**Strategy**
A blue print of the strategy	***The strategic choices or a position within value chain decided to adapt by the company***
Products	Why to offer these products
	What should be the value proposition associated with this product
Value proposition	How this value proposition can be increased for the customers
Target Customers	What should be the characteristics of the target customers (who are the customers)

	How to target a particular customer segment
	How the target customers needs to be satisfied
The distribution channel to reach the targeted customers	Why the company use this distribution channel to reach the target customer
	What are the advantages to use this distribution channel
	What other distribution channels can be used to reach customers
Types of relationships/links established by the company to the customers	Why these relationships/links are necessary to establish by the company
	Which relationship mechanisms are important to link with the customers
The activities and resources necessary to create value for the customers	What are the most essential activities and resources required to create value
	How to perform these activities efficiently
	What are the critical resources a company needs to create value
The capability to create value for the customers	What are the core capabilities of the company to create value
	What are the outsourced capabilities a company need to create value
The partners who are part of value creation processes	Who are the partners
	What are the selection criteria of these partners
	Why to choose these partners to create value for the customers
The revenue sources	Why these sources generate revenue for the company
	How to increase revenue from a particular source
	How to retain these revenue generation sources for a long time
The cost structure	From where the high cost comes from
	How to reduce the cost of a particular process
	How to reduce the cost of maintaining a particular source

Table 2.17: Distinction between business model concept and strategy

The business model is the blue print of the company to earn profit; it is the conceptual implementation of the strategy that facilitates aligning IT, business process

and strategy. On the other hand, business process model layer is a combination of the logical and the physical layer, describing physical components and detailed implementation and deployment artifacts of the organization and this layer is influenced by technology driven strategies (Joyce & Winch, 2004).

2.6.2. Business Models and Change Models

Linder & Cantrell (2000) described business models as organization's core logic for creating value which can be represented in different ways, i.e., components of the business model, real operating model and the change model. A change model is core logic for how a firm will change over time to remain profitable. Therefore, the business models can be evolved over a period of time due to dynamic environment to remain sustainable. The firm's business model remains under pressure by various factors including innovation in technology, changes in government's economic policies, change consumer's preference pattern and competitors. One example is the Internet that is the dynamic environment causing organizations to change their business models frequently to remain profitable. Therefore, it seems necessary for organizations to continuously revisit their business models in the perspective of market and the technological driven strategies.

Conte (2008) argued that not only business models, but also strategy and the implementation are subject to external forces. Since all three layers, i.e., strategic layer, the business model layer and the business process model layer) are interdependent, the impact on any one layer should be responded by the other two layers as well. For example, the copyright laws against piracy and illegal downloads led many companies to change their business models. These companies, operating over Internet, had to evolve their business models by adapting copyright policies and implementing antipiracy tools.

2.6.3. Business models and Relationships among Actors

Weill & Vitale (2001) defined the business model concept as a description of the roles and relationships among a firm's consumers, customers, allies and suppliers and it identifies the major flow of products, information and money, as well as the major benefits to the participants. Their business model definition was inspired from Paul Timmers' B2B business model concept. In order to model an enterprise the way it does

business, identification of main actors and the values transferred between them has been recognized as an important issue (Andersson *et al*., 2006).

It is a well known phenomenon that organizations use various strategies to collaborate in a network (Baughn *et al*., 1997). Since the business model is the concept or a description of the various agents and their roles and protocols of interaction (Zimmermann, 2000), therefore, the organizations can define in the framework of the business model that who are the partners and actors and what are the protocols of interaction. This can enhance the organizational performance because more opportunities will be available to interact with right partners.

2.6.4. Business models and Business Modeling

Based on the concept of organization's interaction pattern and role of actors in a business model, the concept of business modeling has been developed. According to Osterwalder *et al*. (2005) "*a business model is a conceptual 'tool' containing a set of objects, concepts and their relationships with the objective to express the business logic of a specific firm. Therefore we must consider what concepts and relationships allow a simplified description and representation of the value that is provided to the customers, how this is done and what are the financial consequences*". Due to the environmental changes in the last few decades, the interaction patterns of organizations have changed from a strongly coupled network to a more loosely coupled configuration of independent firms (Conte, 2008). This has made organizations to systematically evolve their business model and make it more apparent to their partners, stakeholders and the customers. The business model is the simple representation of the complex reality of a particular organization, whereas, the business modeling is about to create a model that represents the reality of businesses (Bridgeland & Zahavi, 2008). The business model represents how business is organized and who interact with whom, whereas the business modeling helps organizations to communicate business aspects to partners, customers and stakeholders. Thus the business modeling is the visibility of how the organization is doing its business.

Three established ontologies: Resource Event Actor (REA) ontology, e³-value and Business Model Ontologoy (BMO) have been proposed so far to present the notion of business modeling. The main insight behind REA ontology (Geerts, 1999) is that every business transaction can be described as an even there two actors exchange resources. The e³-value (Gordijn, 2000) has the main objective to identify exchange of value objects between the actors in a business case. The BMO (Osterwalder, 2004) provides an ontology that describes the business model of a single firm with the perspective of focusing customer demands. All these three ontologies provide an insight about the actor-partner network. Thus, in terms of business model functions (Chesbrough, 2006) business models can: 1) define the structure of the value chain, 2) and describe the position of the firm within value network.

2.6.5. Business Models in Collaborating Environments

After half of the century to World War II, the business scenario was changed with the uprising of many international business ventures from different continents like Europe and Asia. The concept of innovation evolved in two dimensions: 1) the process innovation, 2) and the structure innovation (Tapscott *et al*., 2000). Process innovation included concepts like agile manufacturing, total quality management (TQM), supply chain management and business process reengineering (BPR). Structure innovation included the popular approaches of virtual organizations, outsourcing, business ecosystems concepts, etc. Development in the structure innovation dimension paved the way to evolve the idea of business webs or b-web. The concept lying behind b-web was to integrate the Internet in the business to interlink suppliers, manufacturers, distributers, service providers, customers, etc., who use the Internet for business communication and transactions.

Hagel III (1996) is assumed to be first scholar who wrote a comprehensive article on the evolution of b-webs (Conte, 2008). He described b-webs as *'a set of companies that use a common architecture to deliver independent elements of an overall value proposition that grows stronger as more companies join'*. Later on, Tapscott *et al*. (2000) introduced b-webs as a group of value contributors that use Internet for their primary business communications. They specified five types of b-webs, namely; agora, alliance,

aggregation, distributive network and value chain. They have proposed the idea of *Fast track Business Models* based on the b-web concept. The fast track business models quickly respond to the urgent needs of change, strategically developed by organizations, in order to be competitive. These fast track business models can scale quickly by utilizing resources present outside of their corporate boundaries. Outsourcing and offshore strategies are best employed by these kinds of the business models. These business models immediately respond to the stimuli of change in order to recreate value preposition, market share, earn revenues and (in some cases) also generate shareholder value. The organizational boundaries of the organization are more flexible as compared to other businesses as they tend to change and navigate with changes in the environments. Many forces affect the boundaries of these organizations including IT, economies of scale and scope, organizational inertia, market power leverages and supply chain best practices.

2.6.6. Open Business Models

The term 'open business model' has been coined in 2006 by Henry Chesbrough in his book 'Open Business Models'. The book is the continuation of a series of articles and books on Innovation and intellectual property (IP) management by the same author. In his original work, he has propagated the concept of the open business model that the technologies and innovations should either be licensed or shared with other companies in case these technologies do not fit well with the company's own business model. This concept targets problems arising due to stickiness of knowledge and creativity within the IP managed firms. The book provides a framework to change the business models based on IP. According to this concept, the successful business models allow companies to be effective and sustainable in markets when IP is allowed to move freely among interacting partners. Thus, in this book, the notion of the open business model mainly addresses problems associated with IP management and lack of innovation. According to this notion, it is the business model that can effectively manage the IP within and across the organization. This book also explains the concept of innovation intermediaries and knowledge brokers. The main logic behind the open business model is to enable the firms to create and transfer knowledge across organizational boundaries. As the most successful idea may lose its value when not effectively utilized, this book emphasizes the flow of

innovative ideas and IP in the form of organizational knowledge across organizational boundaries.

2.6.7. Knowledge based Business Models

The idea of the open business model is one aspect that has provided motivation to work on the conceptual relationship between the business model concept and knowledge management. Therefore, it also leads to propose the concept of knowledge based business models in this dissertation. Another motivation to propose the idea of the knowledge based business model is based on the fact that there are many organizations that are suffering from the unsustainable growth and instability in the markets over long period of time, although they possessed similar sources (Malone *et al*., 2006; Weill *et al*., 2005).

According to the resource based theory of the firm, organizations are bundles of different resources, e.g., financial, physical, know-how, human capital. These resources are converted into final goods or services by utilizing other assets. On the other hand, capabilities are the firm's capacity to deploy resources, usually in combination, using organizational processes to achieve a desired result. Capabilities are firm's specific, information based processes and are developed overtime through complex interactions among the firms' other resources. Thus, *capabilities are based on developing, carrying, and exchanging information through the firm's human capital* (Amit & Schoemaker, 1993). However, some of the resources and capabilities that are more influenced by certain factors, e.g., industry, suppliers, environmental forces, etc., can be defined as strategic assets. Thus resources and capabilities serve as foundations of strategy in two premises: first, internal resources and capabilities can provide basic direction for strategy, second, resources and capabilities are the primary source of profit for firm (Grant, 1991). In other words, resources and capabilities are the two important constituents of the money earning logic of the firm.

As stated above, the strategic resources are inputs to produce final output, i.e., goods and services by organizations and can be categorized in terms of technological resources (e.g., software, hardware, network infrastructure, laboratories, etc.), human capital (e.g., accumulated through learning and experiences) and know-how (e.g., patents,

licenses, etc.). These resources, when combined with other organizational capabilities, e.g., information, are turned into knowledge assets. For example, when information is added into technological sources like hardware, servers, storage devices, etc., this turns into knowledge repositories. Similarly, when information is provided to human sources, they interpret it and learn new skills, thus becoming knowledgeable sources for the organizations. Thus, knowledge can be described as a strategic resource that is difficult to imitate, replicate and scarce, therefore, it can be assumed as an important factor that can influenced firm's strategy to achieve competitive advantage. It is the firm's knowledge, created from within and acquired from outside, an intangible asset, which enables firms to add value to the incoming factors of productions in a relatively unique manner (Spender, 1996). As mentioned before, the business model is the conceptualization of the money earning logic of a firm and knowledge is an important strategic asset that can provide the direction for a firm's strategy. Therefore, knowledge can serve as competitive resource for designing business models for business organizations in a network environment. In this way, the diagram, proposed by Osterwalder (2004), can be modified by including another element, 'knowledge', within this 'triangle' which can be presented in a diagrammatic form through Figure 2.12).

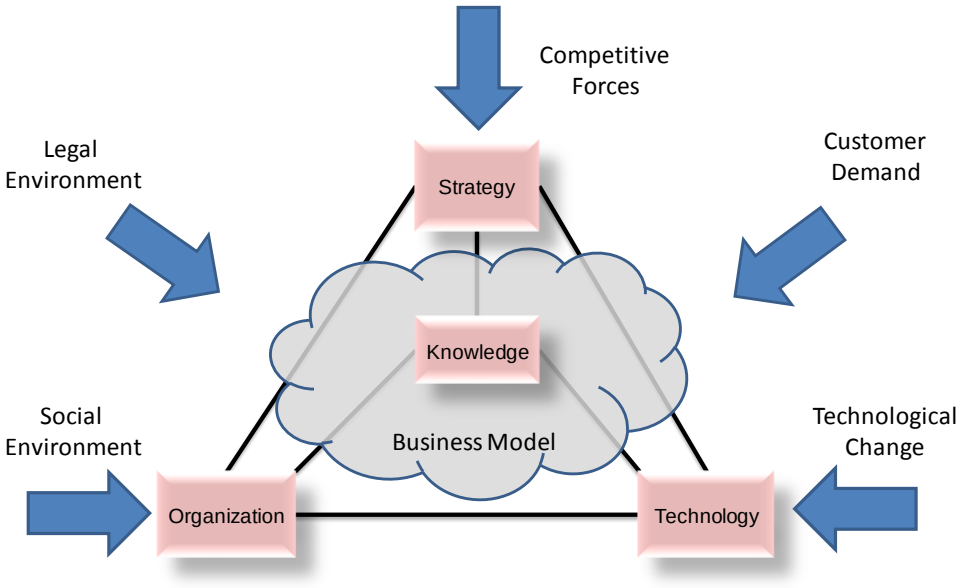


Figure 2.12: Relationship of Strategy, Organization, Technology and Knowledge - Federated by the business Model Concept

In the above figure, strategy is placed at the top of the quadrangle and is linked with the knowledge, technology and organization. All these four elements are further confederated by the business model concept. These different elements are influenced by various forces, e.g., social, legal, competitive, customer or technological, thus influencing business models through various dimensions. Organizations, being assumed as knowledge repository, possess knowledge as an asset that is available explicitly, i.e., embedded in technology, routines and practices of the organization, or tacitly, i.e., stored in the heads of the organizational members. Thus, utilizing knowledge as an asset to achieve competitive advantage can be treated in terms of strategic positioning within business organizations and can be related with the business model concept. The 'strategic positioning' is defined by Porter (1996) as doing things (value creation activities) in a relatively unique manner; therefore, one can agree with the statement that '*strategies are the nodes of imaginative leadership and influence in the complex of heterogeneous emotionally and politically charged knowledge systems which comprise our socially constructed reality*'.

The hypothesized knowledge based business model will be explained further in Chapter 4 that will mainly described the first contribution of this dissertation, i.e., the concept of business model explicitness.

2.7. Summary

In this chapter, a research proposition is presented that suggests extracting different core concepts from previous research studies and bringing them together. This chapter has provided an overview of the relevant literature on the concept of business models. It is discussed that the development of the concept of business model can yet be assumed in an early stage as different efforts are being made to define this concept. It is also discussed in this chapter that the business models and strategy are two different approaches and should be treated separately. Based on literature review, various characteristics of business models have been identified in this chapter. Business models have the capability to identify the interaction pattern of an organization with its suppliers, vendors, customers, competitors, etc. Similarly, business models can act as a conceptual tool to describe and represent the value a company wants to offer to its customers or

partners. Moreover, business models can also facilitate the flow of information and knowledge across organizational boundaries.

It has been observed during literature survey on business models that different researchers have repeatedly used the similar concepts in different business model definitions and frameworks. Although, various efforts have been made to extract similar terms (elements and attributes) from different business model frameworks, however, most of these efforts ended up into another business model classification or framework. During literature analysis, I have extracted those terms that are most commonly used in the different business model concepts. These extracted terms will used in the following chapters to propose the framework of BME.

3. Overview of the Core Concepts – *The innovative performance of an organization*

3.1. Introduction

This chapter provides an overview of the remaining theoretical constructs that include: the factors affecting inter-organizational knowledge transfer, collaboration and the innovative performance of the organization. As discussed in the previous chapter, the first step in the phase I of this doctoral research consists of reviewing and analyzing the existing academic literature related to the proposed theoretical constructs.

In this chapter, an overview of the current and the past research contributions regarding organizational performance will be provided. The first section provides an overview of different theories related to effectively measuring innovative performance of an organization. It includes discussion on the general concepts of innovation, the open innovation, the balance scorecard technique and social capital theory. The second part of chapter will describe two theories related to team performance through collaboration. The last section describes various factors related to inter-organizational knowledge transfer that can affect the innovative performance of an organization.

3.2. Organizational Performance

Organizational performance is one of the widely used variables in academic literature to determine how organizations perform in a multi-factor, dynamic and complex environment (Richard *et al*., 2008). Measuring the organizational performance is an open issue till today, however, various measures have regularly been used in management research, ranging from assorting operating ratios, net profit, market value and return on equity (ROE) to product or process innovation and intellectual property (IP) management.

There is not a uniquely set procedure to select methods of evaluating organizational performance. However, different methods for evaluating the organizational performance can be divided into four groups: financial measures, intellectual capital, tangible and intangible benefits, and the balanced scorecard (Choi, 2002). The intellectual capital and the balanced scorecard could be two methods that can be adapted for evaluating the innovative performance of the organization. Intellectual capital deals with the research teams working on

innovation projects. The balance scorecard concept is related with the operational measures including customer satisfaction, internal processes, and organization's innovation and improvement activities. Both these methods can be suggested to evaluate innovative performance of the organization.

In the following pages, the concept of innovation will be discussed in the light of the balance scorecard, open innovation and social capital theory.

3.2.1. Innovation

The concept of innovation can be defined in various perspectives like economic, organizational, technological development, social systems or policy development. Innovation has been used as a dependent variable for measuring performance of the organizations in large number of empirical studies. Many researchers have measured this variable by measuring 'capacity of the firm' (Vinding, 2005*)*, competencies (Munier, 2006) in their empirical studies to evaluate organizational performance.

The term 'innovation' is different from the invention which can be defined as the first occurrence of an idea, where as the innovation is the first commercialization of idea (Fagerberg, 2004). Innovation has two outcomes: 1) tangible and 2) intangible (Andrew *et al*., 2009). Tangible outcome includes new products, knowledge, formulas, design and expertise that are easily quantifiable and can be legally protected through patents or other IP laws. Intangible outcome includes new processes or way of doing business that lead to gain competitive advantage. They are not easily quantified but can have a major impact on quantifiable results, e.g., overall business performance, etc. Thus, the innovative performance of an organization can be measured both in terms of tangible or intangible outcomes.

It has been a long time now that innovation is discussed either in terms of higher order innovations, i.e., changing the entire order of industries, markets or products (Herbig, 1994; Meyer *et al*., 1990) or lower order innovations, i.e., making small rather the *disruptive* kinds of changes in the existing technologies. The main purpose of any kind of innovation, rather big or small is to improve the performance of the organization (Koberg *et al*., 2003). Higher order innovations are sometimes termed as the radical innovation, whereas lower order innovations are called the incremental innovation. For this dissertation, the main focus will be on the lower order innovation that can be evaluated at different perspectives like organizational and technological development.

The lower order innovation is of three types; the continuous type, the modified type and the process type. Since the organizations contacted for this dissertation as target respondents are small and medium sized, therefore, modified type and the process type of the incremental innovation will be focused more in this thesis. There are two reasons to focus these two types: *firstly*, the changes are made at slightly lower level but in a disruptive way to increase the efficiency of existing procedures of product or process development, *secondly*, such types of innovation processes require less physical resources as compared to big radical innovations.

In accordance with the work of Herbig (1994) and Koberg *et al*. (2003), the incremental innovation in terms of modified and process innovation can be distinguished into four different categories namely: 1) procedural innovation, i.e., related to the changes in rules, work procedures, work schedules, etc., 2) personal innovation, i.e., related to the innovation in human resource management (HRM), creative changes in the selection and training policies, etc., 3) process innovation, i.e., related to new methods of production or manufacturing, significant technology enhancement to produce products or services, etc., and 4) the last but not least, the structural innovation, i.e., related to new modifications in the equipment and facilities and innovative redesigns of the department or projects, etc.

Von Hipple (1990) suggested that innovation is a process, composed of value creating activities, either performed by one organization independently or by number of organizations as a group. When innovation activities are divided in a group, this is termed as "task partition". He also suggested that task partition can provide a possibility to solve problems and create new knowledge among team members of the innovation project. The innovation project aims either to solve a particular problem or create new knowledge, in both the situations, additional information is required to be incorporated into innovation processes. '*This information [….] is further extended into knowledge by a combination of framed experiences of human being, values, contextual information (of specific process) and expert insight providing a framework for evaluating and incorporating new experiences and information*'(Samaddar & Priestley, 2005). Thus, it leads to derive value for the recipient organization when information is converted into knowledge within these innovation processes.

Research has indicated that the term *knowledge integration* has been used in various contexts, e.g., cross functional integration, technology fusion, and knowledge fusion. These

concepts share a common understanding that *knowledge from diverse sources (external as well internal) is blended or mixed together in order to create a capability to develop new products or services* (Lin and Chen, 2006). Thus, the ability of the firm to blend knowledge from different sources to perform innovatively can be an important capability for the firm. It is important to mention here that in this dissertation, the concept of *innovative performance* of an organization has been used in the context as described by Lin and Chen (2006).

3.2.2. Open Innovation

Chesbrough (2006) posited that innovation is the core business necessity and the companies remain unsuccessful if they do not innovate. Innovation costs time and resources and many risks are associated with this phenomenon, however, innovation can be made effective if it is linked with the business model. He suggested that sharing of intellectual property (IP) within the value chain in captures the unutilized value present in unused ideas lying on the shelves of R&D departments of the organization.He further explained the notion of 'open innovation' that '*companies should make much greater use of external ideas and technologies in their own business, while letting their unused ideas to be used by other companies*'. This '*letting in and letting out of knowledge*' is the core idea behind open business model that I already have explained in the previous sections.

Open innovation is an emerging paradigm (Lee *et al*., 2010) (article in press) and a reality for many firms like *Hewlett Packard* (HP). Miguel Carrero (2009) argued that HP drives efficiency by instituting several critical practices, e.g., 'tapping into innovative strategies', 'fostering relationships' of HP Labs with other business groups, 'collaborating' with universities to accelerate their R&D and other partner groups to provide creative solutions to end users, and in house 'partnering'.

Enkel *et al*. (2009) argued that new developments in the concept development of open innovation can be discussed by using the firm's process perspective. They differentiated three processes that instate open innovation, namely: the *outside-in process*, which allows flow of external knowledge by integrating customers, suppliers and other external sources. This enhances the company's knowledge base, thus, increasing company's innovativeness. The second process is *inside-out*, which requires brining ideas to the market in order to earn profit. The third process is called coupled process that refers to co-create the new knowledge with partners through alliances, cooperation and joint ventures, etc.

3.2.3. Balanced Scorecard

In 1992, Kaplan & Norton have developed the balanced scorecard (BSC) technique to measure the organizational performance. The main purpose of this technique was to allow managers to look at a business from four different perspectives including customer's perspectives, internal business perspective, financial perspective and innovation and learning perspective. BSC has been used extensively by managers and business executives since its first introduction (Geuser *et al*., 2009). They have also concluded that the use of the BSC has a positive impact on organizational performance. Various studies have been conducted to measure effectiveness (Otley, 1999; Spechbacher *et al*., 2003; Davis and Albright, 2004) and diffusion rate of BSC (Rigby, 2005; 2007; Norreklit, 2003) that leads to evolve the typology. According to this typology, there are three types of BSCs based on the function they perform: 1) *Type I BSC* that provides a framework for strategic performance measurement including financial and non-financial measures, 2) *Type II BSC* that describes strategy by using cause-and-effect relationship, and 3) *Type III BSC* describes implementing strategy by defining objective, action plans and results, etc. The concept of balanced scorecard has been evolved to fulfill two roles within organization at strategic and operational level (Philips, 2007). At strategic level, the focus is on identifying and measuring what does organization want to achieve, whereas at operational level, the objective is to identify and monitor different organizational processes.

Two perspectives that can be observed both at strategic and operation level and are related with the organizational resources and capabilities as strategic assets are: 1) *internal business perspective*, and 2), *innovation and learning*. The '*internal business*' perspective includes measures related to different processes, decisions, and actions occurring throughout the organization that are also related with the organizational capabilities. This perspective brings manager's attention to the issues which are the most critical in nature including identifying core competencies, critical technologies required, etc. The '*innovation and learning*' perspective is also related with the organizational capability for improvement in products and services. According to Kaplan & Norton (1992), due to intense global competition, companies are required to make continual improvements in their products, services and processes. This perspective helps managers to closely observe innovative performance of the organization and acquire the ability to introduce entirely new product with expanded capabilities. Yeung *et al*. (2009) explored relationships among organizational learning, innovativeness and organizational performance by proposing a conceptual model

and then investigating it by conducting case studies in the manufacturing industry. They concluded that organizational learning leads to superior performance when it is valued by top management and when knowledge is shared in routines through appropriate infrastructure and a culture of learning. Thus, two important issues that can be dealt with different perspectives of balanced scorecard are: 1) the knowledge as a strategic asset, and 2) the technological resources.

The first important issue is concerned with the knowledge as a strategic asset. The knowledge based view of the firm provides validated perspectives to analyze the firm in terms of integrated processes for superior firm performance (Emery, 2002). Knowledge can be the strategic asset and is the 'primary resource underlying new value creation' (Felin & Herstely, 2007). Therefore, those organizations that are capable of manipulating internal and external knowledge can be considered to have this capability as the core competency. Core competencies are the firm's critical human, physical and technological assets which are important to deliver output. Companies lacking certain core competencies outsource their critical processes which may delineate their competitive advantage.

A second important issue is concerned with the technological resources which play a lead role in the organization's performance in the competitive environment. Organizations transfer knowledge within and across boundaries to develop certain capabilities. One such capability is to transfer and utilize the right type of knowledge at the right place (in an innovation process). The technology that is involved in knowledge transfer depends upon factors that are related to organization's cognition model, cultural environment and aim of transfer (Albino *et al*., 2004). Therefore, technology can affect the effectiveness and efficiency of knowledge transfer depending how well it fits the cognitive characteristics of individuals as well as environment and purpose of transfer. It has been proven empirically that technological tools, often referred as knowledge management tools, have the impact on organizational performance (Kasper & Kohlbacher, 2007). Therefore, depending upon knowledge management objectives, organizations use either codification or personalization strategies (Hansen *et al*., 1999) to transfer knowledge from different sources, especially the external ones.

3.2.4. Social Capital

Social capital is built up by collaboration and interaction among organizations where knowledge is shared and transferred in the environment of mutual trust, thus, enhancing

firms' performance, i.e., innovation (Mu *et al*., 2008) and inheres in the structure of relations between actors and among actors (Coleman; 1988). Just like human beings, purposive organizations can be actors, termed as 'corporate actors'. Relations among these corporate actors accumulate social capital, the best example being sharing certain information in an industry on issues related to common interest. Social capital has three inter-related dimensions: structural, cognitive and relational (Nahapiet & Ghoshal, 1998). The structural dimension includes network configuration (position of source and recipient organization in a network), describing patterns of linkages in terms of measures as density (number of contacts), connectivity (effectiveness of communication) and hierarchy while transferring knowledge formally or informally. The cognitive dimension includes shared languages and codes and shared narratives (existence of common knowledge base). The third dimension is relational, which concerns personal relationships people have developed with each other through a history of interactions (comprising trust, expectation and identification). The concept of social capital is central to the understanding of institutional dynamics, innovation and value creation (Nahapiet & Ghoshal, 1998).

Empirical studies have found that the notion of social capital has been an important measurement construct in various strategic management studies; however, the operationalization of this variable varies depending upon the context of each study. A careful observation of literature reveals that the study of social capital can be extended to multiple levels of analysis (Beugelsdijk & Schaik, 2005). Different authors provide insights (Alder & Kwon, 2000; Durlauf & Fafchamps, 2004) that at what level empirical studies were made. While some researchers studied social capital at the level of individual or firm level (Coleman, 1988; Gulati, 1995; Tsai & Ghoshal, 1998, Tsai, 2000, Yli-Renko, 2001), others have focused on the aggregate level of societies, nations and regions (Putnam, 1993; Putnam, 2000, Zak & Knack, 2001).

A recent survey (Cooke, 2009) in United Kingdom (UK), targeting small and medium size organizations (SME), has explored that for many SMEs, interaction and collaboration is the greater source of building social capital. Without social networks, most firms cannot function in markets. Therefore, those firms that make extensive use of social capital, performs higher than those relying less on social capital. It is a well established fact that firms establish a variety of inter-firm ties during business activities. These ties include buyer-supplier relation, strategic alliances, joint R&D, etc., (Koka & Presscot, 2002). These ties not only support the flow of knowledge and information among actors, but also establish a pattern of

expectations and obligations among interacting partners. Another exploratory study on social capital at firm and industry level (Waite and Williams, 2009) has shown that when the firms with higher level of social capital externalize their social capital to their industry cluster, it helps to develop long term relationships, common objectives and improve levels of trust among members.

3.3. Organizational Collaboration

Organizations use various 'cooperative strategies' as a design parameter for collaboration in a network (Baughn *et al*., 1997). These collaborative settings may be in the form of '*loosely coupled network*', or '*closely knitted network*' working at departmental levels. Hagedoorn (1990) has provided a great detail on different forms of collaborative modes between different organizations that are actively involved in technology transfer.

Various empirical studies have shown that these modes of collaboration affect the transfer of knowledge from source to recipient organizations (Gomes-Casseres *et al*., 2006; Schilling & Phelps, 2007). With growth, firms maintain alliances with other firms and they form a network of direct and indirect relationships. These relationships provide access to the information and know how about direct partners and other organizations (Gulati & Gargiulo, 1999) those are part of this network, thus, creating a kind of a channel from which the knowledge and information flows (Ahuja, 2000; Owen-Smith & Powell, 2004). The networks are conceptualized as 'pipes' that allow flow of resources and information among formal contractual alliances. Evidence suggests that direct alliance relationships facilitate knowledge transfer between partners and enhance innovative performance of organizations (Gomes-Casseres *et al*., 2006; Deeds & Hills, 1996; Stuart, 2000).

Mutual collaboration between the source and the recipient organization leads to produce more opportunities to increase the rate of innovation by a successful transfer of knowledge than by having just a contract based alliance (Mowery *et al*., 1996). In a networked environment, organizations are connected with other organizations based on their similarity of value proposition, market segmentation, strategic objectives, etc. Such organizations develop different governance modes, for example, strategic alliances, joint R&D ventures, technology exchange agreement or customer-supplier relation. Network is an important unit of analysis for explaining competitive advantage (Dyer & Nobeoka, 2000) and it is more effective than a single firm for describing the generation of knowledge. The support arguments provided by Dyer & Nobeoka (2000) for organizational collaboration are based on

three assumptions; 1) *motivate members to participate and openly share knowledge*, 2) *prevent members for free riding*, and 3) *efficiently transfer both explicit and (most importantly) tacit knowledge*. Thus, a successful knowledge transfer in a collaborative project depends on the motivation level of the participating members, their willingness to contribute desired knowledge and measures adopted to efficiently transfer knowledge.

In academic literature, two terms have continuously been reported: *the network of organizations* and the *network organization*. Möller *et al*. (2005) has provided a clear distinction between the two terms based on academic literature. The *network of organization* simply refers to any group of organizations or actors who are connected, directly or indirectly through exchange relationships. Achrol (1996) argued that *'a network organization is distinguished from a simple network of exchange linkages by density, multiplicity and reciprocity of ties and a shared value system defining membership role and responsibilities'*. An actor involved in the exchange relationship can adopt a specific role based on the quality and quantity of relationships.

Various factors may affect collaboration strategies among organizations in a network. With the advent of IT, technology is the most prominent factor. Based on this, organizations may adapt either the codification strategy or the personalization strategy. Technology has played an important role in inter-organization collaborative modes. It can affect the effectiveness and efficiency of knowledge transfer depending how well it fits the cognitive characteristics of individuals. Thus, technological tools, used by organizations to transfer knowledge between them have greater impacts on organizational performance (Kasper & Kohlbacher, 2007).

Various theories have addressed the notion of organizational collaboration in a great detail. Most of the theories that have been presented a couple of decades ago (Nahapiet & Ghoshal, 1998; Kaplan & Norton, 1992), suggest that organizational collaboration is linked with the organizational performance. Organizations transfer knowledge within and across boundaries to develop certain *competencies* in order to enhance their performance. One such *competency* is to transfer and utilize right type of knowledge at right place (in innovation process). Knowledge flow across companies or departments comprises events, processes, and activities to share and transfer data, information and knowledge from one entity to another. Thus, the innovation process is, broadly speaking, an interactive process that requires

scientists, technologists, marketing personnel, designers and end-users involved in an innovation project from different organizational bases (Cooke & Willis, 1999).

Organizational distance: Organizations use various cooperative strategies as a design parameter for collaboration in a network (Baughn *et al*., 1997). It may be in the form of loosely formed collaboration as alliance mode or closely knitted networks working at departmental levels (R&D partnerships). Researchers have found that this mode of collaboration affect transfer of knowledge from source to recipient organizations to some extent. Organizational distance is a difference or dissimilarity of business practices at a level of institutional heritage and organizational culture (Simonin, 1999) between the organizations involved in knowledge transfer (Gouza, 2007). It is based on the organizational mode of governance between source and recipient organizations (Cummings & Teng, 2003). Organizational governance mode refers to the '*organizing form'* through which the source and recipient organizations transfer knowledge. A large number of contribution on the topic of R&D partnership indicated high-tech industry especially IT has witnessed a continuous trend of growth in R&D partnerships (Hagedoorn, 2002). Figure 3.1 shows summary of the survey indicating increasing trends of growth in R&D partnership in IT industry from 1960- 1998.

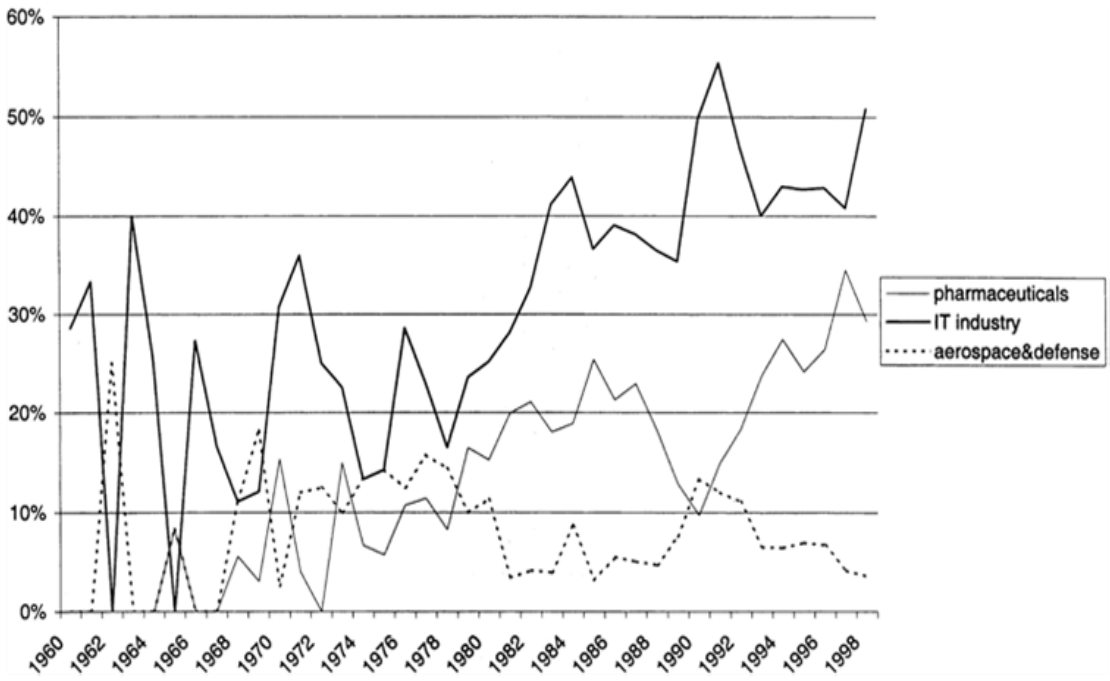


Figure 3.1: Share (%) of high tech industries in all newly established R&D partnerships (1960-1998) - Hagedoorn, 2002

From the above diagram, it is evident that with the passage of time, IT industry has seen a sharp rising trend in the growth of R&D partnerships as compared to other knowledge intensive industries like, pharmaceuticals and aerospace & defense.

Hagedoorn (1990) provides a great detail on different forms of collaboration modes between different organizations actively involved in technology transfer. These organizations interact in the form of strategic alliances. He assumes that essential features of these types of agreement include: technology transfer, technology sharing, R&D collaboration and more generally the innovation-motivated cooperation.

The strategic alliance can be categorized into different modes of cooperation modes like, joint venture, joint R&D and technology exchange agreements, customer-supplier relationship and collaborating in Open Source environment. The *first* mode of cooperation is the joint venture which is an entity formed between two or more parties to undertake joint economic activity. It includes various types like partnership (at R&D level as well, corporation, limited liability, etc.). The peculiarity of this type of cooperation is to work at equal levels.

The *second* mode of organizational collaboration, according to Hagedoorn (1990) is joint R&D and technology exchange agreements. This category covers agreements that regulate technology and R&D sharing and/or transfer between two or more companies. It includes;

a. R&D partnership: This type of partnership involves jointly performing research and development activities where existing technologies are shared to develop new products and services.

b. First sourcing: First sourcing is a mode of knowledge transfer where source organization with proprietary rights, gives recipient organization the right of use in return. It could be of two types, licensing for reciprocity (organizations exchange licenses to supplement their research with licensed technology) and cross licensing (an agreement where value of both licenses is calculated).

c. Second source: Second sourcing involves transfer of product technology which allows one firm to make an exact copy of another firm. Hagedoorn (1990) mentioned that second sourcing agreements are typical of industries involved

in information technology. Here we assume second source as a company who supply patented or licensed products to other companies.

The *third* form of organization collaboration is the Customer supplier relationship between source and recipient firms. It involves outsourcing external knowledge in the form of co-production, co-makership or research contracts (Hagedoorn 1990).

3.3.1. Heterogeneous Teams

Collaboration is a key element in various organizational capabilities like supply chain management (SCM), customer relationship management (CRM), etc., where the magnitude of partners is large. Various sectors like pharmaceutics, biotechnology and IT services have long been under observation by researchers to understand collaboration and network effects. A few examples of capabilities enhanced through collaboration in SCM scenario in IT service sector are open low cost connectivity, large and flexible data storage capabilities, systems integration, etc. (Hovarth, 2001).

Closely knitted networks like R&D partnerships, formed during collaboration, define work procedures, rules and routines in order to carry out innovation processes. However, such closely knitted networks can be in the form of an informal team between interacting organizations. These teams are composed of employees from source and recipient organizations who possess different capabilities. Since the major function of such teams is to collaborate and work together on innovation projects; these teams perform different functions which are composed of various activities. Von Hipple (1990) has suggested that innovations activities can either be performed independently by an organization or it could be the joint performance of many interacting organizations. There is a possibility that a heterogeneous team may divide innovation activities in order to find solution to a problem or create a new knowledge. In both the situations, the possibility to share existing knowledge and create new knowledge is increased. Such heterogeneous teams can serve as locus of innovation for interacting organizations.

Collaboration can be done at various levels within these teams; it can be done at the level of human-human interaction, machine-machine interaction or at the level of human-machine interaction. Collaboration at the level of machine-machine interaction requires too much technicalities and involved intensive IT infrastructure. On the other hand, interaction at the level of human-human also posed complexities in order to understand different cognitive

characteristics based on culture, trust, motivation and intentions. The third category of interaction at human-machine level shares complexities from both domains; however, it provides certain useful features for improvement as well. Ning *et al.* (2006) have worked out to establish the conceptual foundations for such architecture which incorporate human-machine interaction to share and reuse innovation information. They explained such inter-connected organizations as extended enterprises. Extended enterprise is a collection of independent, heterogeneous companies, working together to produce an integrated product or service.

Inter-organizational problem solving teams possess diversity of knowledge. Such teams, when *cooperate in a social community*, have much greater learning opportunities (Dyer & Nobeoka, 2000). This is due the reason that these teams possess stronger interpersonal relations that produce trust (social capital) which is necessary to facilitate the transfer of knowledge (especially tacit). In a study carried out by Dyer and Nobeoka (2000), it is revealed that Toyota has achieved a significant success by creating such teams with the suppliers in US automotive industry by average inventory reduction of 75 percent and average increase in productivity or output per labor hour of 124 percent.

Along with internal R&D, firms need to decide acquiring external knowledge through various modes, e.g., joint R&D, licensing, first and second sourcing, strategic alliances, co-operations and partnerships. The strategic decision to choose the mode of collaboration between source and recipient organizations depends on in-house R&D intensity, vertical integration, diversification and size of the organization (Nakamura & Odagiri, 2005).

3.3.2. Knowledge Suppliers as Sources of Innovation

According to Powell *et al*. (1996), the locus of innovation can be found in networks of inter-organizational relationships. The knowledge transfer from the source organization to the recipient organization in the environment of mutual trust enhances firm's innovative performance. These dyadic relations not only strengthen firm's ability to collaborate but also increase synergistic partnership by instantiation and refinement of organizational routines. Since innovation process is a functional relationship and can be predicted to be distributed among user, manufacturers, suppliers and others (Von Hipple, 1988), therefore, source of innovation varies according to the utilization of innovation for acquiring benefits. The source of innovation can be users, manufacturers or suppliers. Firms and individuals can be categorized according to the benefit they derive from a given product, service or process

innovation. When the user (the firm or an individual) gets benefits from manufacturing a product or service or a process innovation, they are the sources of innovation. Similarly, when suppliers derive benefits from supplying components and materials necessary for making innovations, the source of innovation is supplier. However, the relationship varies according to benefits derived from the innovation. When the manufacturer of innovation supplies innovative products to its consumers or users, then the manufacturer assumes the role of supplier. Similarly, when users use the innovative product or service and suggest innovative ideas back to manufacturers, the source of innovation is the user. Therefore, in case when one organization acts as supplier of knowledge and the other as recipient of knowledge, the source of innovation for recipient organizations would be suppliers.

The sectors like the ICT, biotechnology, pharmaceutics, etc., have long been assumed as knowledge intensive industries with immense clustering (Hovarth, 2000; Hagedorn & Schakenraad, 1990; Ahuja *et al*., 2000). It has been reported in the past that companies in various sectors tend to execute almost every step in producing, delivering and distributing products and services through some kind of external collaboration (Powell *et al*., 1996). This external collaboration facilitates transfer of knowledge from the source organization to the recipient organization, thus, enhancing innovative performance of the recipient organization. The collaboration among businesses or organizations can be done in many forms and at various levels. With a new regime of technological development, technology becomes a kind of stimulus as well as the main focus for a variety of cooperative efforts among organizations in order to reduce inherited uncertainties associated with new technology. These cooperative efforts have foundation on partners' capabilities and types of skills and resources available for exchange (Powell *et al*., 1996, Hennart, 1988, Parkhe, 1993). One can purport that inter-organizational collaboration is not only a means to compensate for lack of organization's internal skills or as a series of discrete transactions, but it strengthen the firm's ability as a collaborator to develop and strengthen internal capabilities (Powell *et al*., 1996).

Knowledge can be acquired from external sources in the form of products, tools, services and routines. It is the ability of the recipient organization to recognize the value of new knowledge and to assimilate and apply to a commercial end. The knowledge acquired from the source organization can be transferred through identified points known as interface points as contact points in alliances (Baughn *et al*., 1997) or gatekeepers or boundary spanners (Cohen & Levinthal 1989). Various studies confirmed that organizations working at partnership and alliance level can transfer more knowledge than those working independently

(Darr *et al*., 1995; Baum & Ingram, 1998; Ingram & Simons, 2002; Powell *et al*., 1996; Uzzi, 1996). Thus, the recipient organization can develop various forms of collaborative strategies in order to get connected with sources of innovations.

3.4. Knowledge Management

According to the strategic management literature, knowledge is central to the performance of an organization. The theory of a resource based view (RBV) of the firm considers *knowledge* as an important resource a firm can hold (e.g., Grant, 1996; Spender, 1996; Cole, 1998) and as a source of sustainable comparative advantage (Drucker, 1995). Increasing globalization has created intensive competitive environment that led organizations from around the world to compete rigorously across numerous diversified markets, and in a multitude of domains (Nissen, 2007). Effective global competition led firms to compete on the basis of knowledge resources. Strategic actions are based upon more on the tacit knowledge when the organization is embedded with a particular cultural context, e.g., how to compete in local market; how to perform in multicultural teams, etc. Similarly, other contexts, like, specialized system architecture, technology intensive markets, etc., led organizations to rely more on explicit type of knowledge. Knowledge is not distributed equally throughout the world and it is sticky, especially the tacit type (Von Hipple, 1994); therefore, it needs to be fluid (Nissen, 2006). The knowledge flow theory is an emerging theory with two key aspects: 1) *the organizational knowing* that involves the knowledge in action; 2) and *the organizational learning* involves the knowledge in motion. The knowledge in action is the key to the organizational performance, while the knowledge in motion focuses more on the exploration of new knowledge to increase knowledge stock (Nissen *et al.*, 2008).

Knowledge management (KM) has been defined by various authors under different perspectives. However, in order to summarize the concept, we can distinguish the terminology on two perspectives as Jennifer Rowley (2000) has identified, i.e., the *'project based KM analysis'* that defines objectives of KM and the *'process based KM analysis'*, which defines KM processes. The *first* perspective emphasizes the issue more on information management and knowledge processing perspective. This particular area in knowledge management has been propagated by major proponents of this concept like Davenport (1998), Dieter Fensel (2004) and colleagues who probed more deeply on semantic and ontological aspect of knowledge sharing and reuse which is the extreme end in this concept. The *second*

perspective emphasizes the social construction of knowledge. The major proponents in this area are Nonaka (1994), Nonaka & Tekuci (1995) and Poliyani (1966).

Furneaus & Nevo (2007) have declared that the following definition brings many researchers on certain level of agreement due to its varied nature and dimensions.

"Knowledge management is concerned with the exploitation and development of the knowledge assets of an organization with a view to furthering the organization's objectives. The knowledge to be managed includes both explicit, documented knowledge, and tacit, subjective knowledge".

Various researches have analyzed those organizational resources which can be supported by KM; have directly impact the organizational performance. Based upon survey of 113 firms in manufacturing industry, Wang *et al*. (2007) found a positive relationship between firm's knowledge based dynamic capabilities (knowledge absorption, creation, storage and application) and the firm's performance. They concluded that there was no significant direct relationship between IT support for KM and firm's performance but knowledge based dynamic capability acts as a full mediator between the two variables. Thus, information technology (IT) can be an important resource to implement organization's core strategies to enhance its performance.

3.4.1. Knowledge

According to Russel Ackoff, a system theorist, the content of human mind can be divided into five categories: *data*, *information*, *knowledge*, *understanding* and *wisdom*. In his classification, knowledge can be distinguished from information with the assumption that information is based on processed data that can be useful, while, knowledge is the application of information and data. Data and information can be available in the form of reports, documents, files, pictures, etc., that can be stored on devices like computers, etc. Knowledge on the other hand, can be available in the form of experiences, knowhow, awareness, skills, competencies, etc. To organizations, knowledge is defined as what people know about customers, processes, products (Bollinger & Smith, 2001) as well as database, organizational memories, research reports, product oriented material, etc., (Davenport & Prusak, 1998).

Knowledge is a critical factor that facilitates organizations to remain competitive in the dynamic and complex environment. Strategic management literature has emphasized various internal resources, capabilities and assets as the primary source of organizational

competitiveness (Styhre, 2004). Following Penrose's view of organization as bundle of resources, various authors (Nonaka & Takeushi, 1995; Spender, 1996) have debated resource view of the firm specifically in the context of intellectual resources, e.g., learning capability, intellectual capital and knowledge. Now days, the extended version of RBV is commonly referred as knowledge based view of the firm (KBV).

The theory of organizational learning (Fiol & Lyles, 1985) suggested that knowledge resides not only in human beings but also in the routines of the organization. Transformation of individual knowledge into organizational routine is one of the major challenging steps of this theory. Development of organizational knowledge is based on multiple levels. At individual level, learning focuses on assimilation of new information into past experiences while, at group level, learning process entails the transformation of individual experiences into group knowledge. However, it is also a fact that the organizational knowledge is not just accumulation of group knowledge; knowledge is synthesized through interaction among individuals, organizational resources and organizational routines. This makes knowledge resided in different elements with different context. This leads us to understand the concept of knowledge embeddedness in different elements, e.g., in products, in processes or task, in human beings, or in any combination (sub-networks) of these three elements (Argote & Ingram, 2000).

3.4.2. Knowledge Repository

The concept of knowledge repository has been used in different contexts defining organizations' abilities to store and retain organizational knowledge in the form of documents, databases, ontologies, expertise and experiences. The term 'knowledge repository' can be defined in two key aspects; 1) storing databases, ontologies and documents, and 2) storing experiences and knowhow. The first aspect deals with the 'hard' core part of organization, i.e., the explicit knowledge which can be available in the forms of documents, videos, demos, databases, etc. the second aspect analyze the concept of knowledge repository deals with the 'soft' core, i.e., experiences, routines, expertise and knowhow. Davenport & Prusak (1998) have proposed three categories of knowledge repositories; 1) External knowledge repository (consists of competitive intelligence); 2) structured internal knowledge repository (e.g., research reports, product oriented material); and 3) informal internal knowledge repository (e.g., learning a lesson and retained in employees heads, know how).

Based on the key aspects described above, the research literature on 'knowledge repository' can be divided into two groups. The first group of researchers includes those who describe the term in the context of '*artificial intelligence*'. The second group of researchers described the term in the perspective of '*human know how*'. Englebart (1992) has rigorously used the term 'knowledge repository' in the context of artificial intelligence. He defines knowledge repository as '*any evolving knowledge base falls under the category of a Dynamic Knowledge Repository (DKR)*'. For instance, an archived e-mail discussion list is a DKR. Any Web site where the content is constantly evolving is a DKR. For that matter, a library of books and magazines is also a 'DKR'. He has further categorized the term '*knowledge repository*' associated with: a) granularly addressable content (e.g., websites with hyperlinks, etc.); b) archived electronic discussions (e-mails and PurpleWiki); c) published papers and source codes; d) weekly summaries of discussions and papers; e) a topic map of all DKR content; and f) an ontology and a glossary for DKR.

Analogous to the term 'knowledge repository' is the term 'organizational memory' (OM) which is wider in its scope covering all organizational components from information systems to its employees. The term was introduced in 1981 by Hedberg (Guerrero, 2001) Organizational memories have the properties of learning, remembering and talking based on the domain of sociological as well as psychological perspectives (Bannon & Kuutti, 1996). These organizational memories are conceptualized on the basis of human computer interaction and 'cooperative work' for the computer supported cooperative work community. A broad definition of OM has been proposed by Kim (1993) in these words, "*organizational memory includes everything that is contained in an organization that is somehow retrievable. Thus, storage files of old invoices are part of that memory. So are copies of letters, spread sheet data stored in computers and the latest strategic plan, as well as what is in the minds of all organizational members*".

Liebowitz & Beckman (1998) have defined knowledge repository as an "*on-line computer-based store house of expertise, knowledge, experiences, and documentation about a particular domain of expertise. In creating a knowledge repository, knowledge is collected, summarized, and integrated across sources*". Dingsøyr & Røyrvik (2003) have explained this term as "experience bases" or "Corporate Memories". These knowledge repositories are the knowledge management tools that are available for employees in the organization. These tools are either used for generating knowledge or to transfer knowledge.

Among second group of proponents, Jennifer Rowley (2000) has expressed the concept of 'knowledge repositories' in the form of documented, explicit knowledge contained by academic institutes or universities and availability of this knowledge to associated business firms. She propagated that these universities participate in the wider knowledge creation process which leads to the creation of knowledge repositories that foster the future generation research by researchers. Since these higher education institutes are sometimes funded or strengthened by big companies to accelerate research and innovation in their particular field of interest (Chesbrough, 2006), these knowledge repositories have strong links with these organizations which impart a very important role in knowledge creation and transfer.

Alice Lam (2004) termed those organizations as 'repository of organized knowledge' which can act and think collectively. Social interaction and group dynamics within organization shapes collective intelligence, learning and knowledge creation that correspond to the 'micro-dynamics' of the innovative capability of organizations. Recent trends in web collaborating techniques and communities of interests, and ultimately knowledge societies, all have the foundations on these ground level theories presented during 80s and 90s of twentieth century.

Based on above arguments, the concept of knowledge repository can be defined as '*any kind of organization, entity, firm or enterprise which can store information and knowledge regardless of its storage methodology*'.

3.4.3. Knowledge Transfer

A major part of knowledge management literature suggested that the knowledge management in the organizations is composed of different knowledge processes. These knowledge processes are knowledge creation, capturing, transferring and using to enhance organizational performance (Barquin, 2001). There are different aspects of KM processes; however, in this dissertation only those KM processes are focused that are related with knowledge transfer. Table 3.1summarizes the stream of literature that explicitly stated transfer of knowledge as a knowledge management process.

Author	KM Processes
Wiig (1995)	Creation, Manifestation, Use, Transfer
Loenard-Barton (1995)	Problem solving, Implementing and Integrating, Experimenting, Importing (transfer)
Szulanski (1996)	Initiation, Implementation, Ramp-up, Integration
Ruggle (1997)	Generation, Codification, Transfer
Schupple et al. (1998)	Use and Multiplication, Development and Acquisition, Transfer, Institutionalization
Delphi (1998)	Capturing (transfer), Sharing, Leveraging, Feeding
Ernst & Young (1998)	Planning, Acquiring (transfer), Applying, Assessing
Yeung et al. (1999)	Generation, Generalization (transfer), Learning disabilities

Table 3.1: Summary of knowledge management processes

Wiig (1995) has proposed four KM processes, namely: *creation*, *manifestation*, *use* and *transfer*. Leonard-Barton (1995) has proposed *problem solving*, *implementing & integrating*, *experimenting* and *importing* as KM processes. Here *importing* refers to transferring knowledge from external sources to inside of the organization. Szulanski (1996) has proposed four stages of knowledge transfer, i.e., *initiation*, *implementation*, *ramp-up* and *integration*. Ruggles (1997) suggests three knowledge transfer processes which are *generation*, *codification* and *transfer*. Schupple *et al*. (1998) have proposed *use & multiplication*, *development & acquisition*, *transfer* and *institutionalization*. Delphi (1998) suggests four key KM processes namely: *capturing* that is related to obtain external knowledge and create knowledge by research or experience, *sharing*, *leveraging* and *feeding*. Ernst & Young (1998) have suggested *planning*, *acquiring* that stands for transferring external knowledge, *applying* and *assessing*. Yeung *et al.* (1999) have proposed three processes during learning namely: *generation* that is related to knowledge creation, *generalization* which is related to knowledge transfer and identifying *learning disabilities*.

All these authors have suggested that knowledge transfer is a core KM process that involves movement of knowledge from the source to the recipient and its subsequent absorption by the recipient. The subsequent absorption of knowledge by a recipient also

facilitates the creation of new knowledge. The essential elements of the theory of organizational knowledge creation and transfer have been presented by Ikujiro Nonaka in 1994. He debated that the issue of knowledge creation inside organization can be used for solving problem in the context of innovation. The knowledge can be created within two dimensions, i.e., the epistemological dimension, and the ontological dimension. The *epistemological* dimension includes the creation of tacit and explicit knowledge at an individual level. The *ontological* dimension creates new knowledge within 'communities of interaction' that requires social interaction between individuals.

As discussed above, organizations can be assumed as knowledge repositories, therefore, it can be suggested that knowledge transfer process is deeply rooted in a knowledge repository. In recent days, the knowledge exchange mediums, like the Internet, WIKIs, blogs, communities of practices, social networking, etc., facilitate the transfer and diffusion of knowledge among individuals in organizations. Thus, technology has greater impact on organizational development and productivity. Recent researchers are of the view that exchange of knowledge among people allows them to communicate complex ideas and to collaborate in order to create value (McAfee, 2006). Thus, collaboration can be defined as "*increasing richness of means by which objects (things, people and firms) can work together enhanced by the medium of internet*" (Tapscott, 2006).

Knowledge can be transferred from internal as well as external sources. Inter-organizational knowledge transfer in the perspective of innovation is an important dimension that needs special attention. Different research studies have shown that collaboration across organizational boundaries delivers external knowledge that can renew existing capabilities and build new ones among interacting organizations (Kogut, 1988, Hamel, 1991, Hamel & Prahalad, 1990). This is one of the potential benefits when knowledge is allowed to move among collaborating organizations in order to create value proposition (Tapscott, 2006). However, various factors affect the transfer of knowledge process in different contextual dimensions. In the following section I will describe those factors that are mostly used as variables to test the success of knowledge transfer process.

3.4.4. Factors Affecting Inter-Organizational Knowledge Transfer

Extant of literature suggests that different factors, e.g., information technology (IT), strategy and knowledge management processes, etc., are not only related with the organizational culture and structure but also affect transfer of knowledge from the source to

the recipient organization. These factors have been suggested as knowledge management (KM) enablers (Choi, 2002). Table 18 represents the list of knowledge management enablers proposed by different authors.

Author	KM Enablers
Anderson & APQC (1996)	Organizational culture, IT, Strategy, KM processes, Leadership, Evaluation
Arthur D. Little (1998)	Organizational culture, IT, Strategy, KM processes, Content
Szulanski (1996)	Knowledge content, Source and recipient, Context
Ernst & Young (1998)	Organizational culture, IT, Strategy, KM processes, Knowledge content
Delphi (1998)	Organizational culture, IT, Strategy, KM processes
KPMG (1998)	Organizational culture, IT, Strategy, KM processes
Lee & Kim (2001)	Knowledge worker, Content, IT, KM processes

Table 3.2: Summary of Knowledge Management (KM) Enablers

Knowledge management (KM) enablers (or influencing factors) are organizational mechanisms for intentionally and consistently fostering knowledge among and within organizations (Ichijo *et al*., 1998). They can also stimulate knowledge creation, protect knowledge, and facilitate the sharing of knowledge in an organization (Stonehouse & Pemberton, 1999). Most prominent KM enablers in the above table are IT, strategy, and KM processes. These KM enablers are, in fact, the contextual factors affecting knowledge transfer from the source to the recipient organization. Cummings (2001) has categorized these enablers into four contextual factors which can influence knowledge transfer processes and outcomes. These are *knowledge context* (articulability and embeddedness), *relational context* (organizational distance, physical location, institutional settings, knowledge competence and relationship), *activity context* (transfer mechanism) and r*ecipient context* (recipient's motivation and its learning culture). Based on these contextual domains, five factors have been identified in this dissertation that affect successful transfer of knowledge from the source to the recipient organization. These include:

1. Knowledge embeddedness

2. Physical distance
3. Absorptive capacity
4. Knowledge distance
5. Activity Context

1. Knowledge embeddedness: Hansen *et al*. (1999) suggested that knowledge management systems (KMS) may be centered around two approaches; the technological infrastructure or the personal communication and contacts. Through the technological infrastructure, companies follow *codification strategies* and attempt to codify and store knowledge in databases and explicit form. The KMS based on personal communication approach led companies pursuing 'personalization strategies' to pool their strategic resources around employees to communicate within and outside organization (Kasper *et al*., 2007). Since knowledge is resided in these companies either in a tangible or intangible form, therefore, these organizations can be studied in terms of knowledge embeddedness.

The notion of knowledge embeddedness was first described by Karl Polyani in 1944 in his book 'The Great Transformation' in the context of economic integration. According to Poliyani, the dominant forms of economic integration are bound to certain structural and institutional conditions and are mostly embedded in noneconomic relations, e.g., networks (religious, cultural or political, moral or judicial sanctions) and interpersonal relations (Nielsen, 2005). Organizations are often referred as social economic entities, acting as corporate actors (Coleman, 1988) and members of these corporate actors develop relationships with each other both within and outside the organizational boundaries.

The knowledge embeddedness can be defined as 'an extent to which organizational knowledge has been codified and stored within the knowledge platform (Purvis *et al*., 2001). Another description for knowledge embeddedness is *the extent to which the knowledge is situated in (idiosyncratic) contexts of (local) environment* (Hong & Nguyen, 2009). Arogte & Ingram (2000) have proposed that an organization has different elements where knowledge can be resided or embedded, it includes: its *members*; the *tools*; the *tasks*; and the *sub-networks* formed by combining these elements. The concept of knowledge embeddedness has been used in strategic and knowledge management literature for quite some time (Contractor & Ra, 2002, Cummings, 2001) as a variable to determine effectiveness of knowledge transfer process. Figure 3.2 is the diagrammatic representation of Argote and Ingram's proposed subsets for knowledge embeddedness within organization settings.

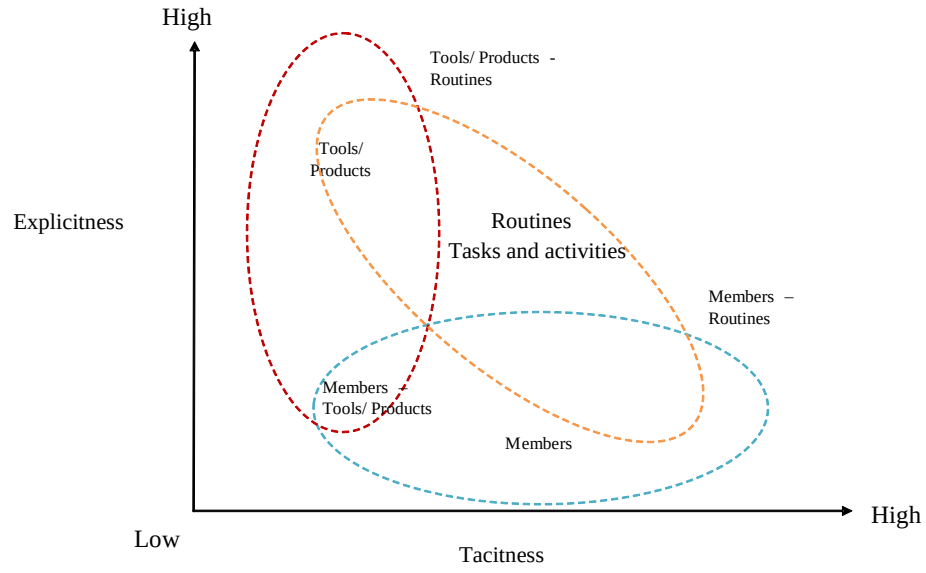


Figure 3.2: Sub-networks of knowledge embedded in Tools/Products, Routines and Members and their level of tacit and the explicitness – Adapted from Argote and Ingram, 2000

The *first* important dimension of acquiring external knowledge is embedded in its *members*. The members are the human resources of the organization possessing different capabilities and skills, (Argote & Ingram, 2000).It can be brought in the form of learning and training by hiring experts or professionals or by sending employees for training and learning at knowledge vendor's premises. It includes processes like brainstorming, job training, learning, WIKI, etc.

The *second* important dimension of knowledge acquired from external sources is in the form of *products or tools*. Probst (1998) has mentioned that knowledge which comes in as a *product* like, patents, CDs or software from other sources, cannot be realized and commercialized unless treated by human beings. Research on technology transfer between different organizations (e.g., Mowery *et al.*, 1996; Bresman *et al.*, 1999) has acknowledged that knowledge can be traded as a patent, software or any other tangible form. *Tools* include hardware and software that can be treated as technological resources. Tools can also be in the form of a patent, software or a technology. Mostly used tools in IT service sector are teleconferencing, Skype, web based data exchange, groupware and other team collaboration tools.

The *third* important dimension of knowledge embeddedness is the *task or activity* that can be defined as *forms, rules, procedures, conventions, strategies, and (soft) technologies*

around which organizations are constructed and through which they operate (Levitt & March, 1988). Heterogeneous research teams working on innovation projects establish certain routines and processes which include expertise, values and norms of the participant organizations. Although scope of such teams is limited to a specific research project, however, competencies acquired by team members from these projects can be utilized in other research projects as well.

2. Physical distance: Physical distance refers to the difficulty, time requirement and expense of communicating and getting together face-to-face (Cummings, 2001). As pointed out by Coccia (2007), the first important contribution related to the spatial proximity of the source and recipient organization for transfer of information was made by Hägerstrand (1967) who stated that user adaption rate of information decreases as physical distance between source and recipient organization increases. Further research showed that transfer of knowledge decreases substantially as physical distance increases among source and recipient organizations (Coccia, 2007). The geographical (and technological) proximity of source and recipient organizations have been studied widely by economists since long time related to innovation and technology transfer (Feldman, 1996; Audretsch & Feldman, 1996) and learning capabilities of organizations(Boschma, 2005). It was pointed out that due to resultant time zone differences and larger physical distances of collaboration efforts across the globe, virtual teams for developing new products have gained greater importance (Cummings & Teng, 2003).

Audretsch & Dohse (2007) in their recent research have debated empirically that '*regions abundant in knowledge resources appear to provide a particularly fertile soil for the growth of young technology oriented firm'*. This implies that small and medium size firms in technology sector are sensitive to their location with respect to knowledge vendors. Dutton & Starbuck (1979) found that face-to-face meetings and conferences were more effective in transferring computer simulation technology than exchanges of documents, manuals, and correspondences. Although personal can interact through telephone and other communication mechanisms, the cost and labor of such communication can increase significantly.

3. Absorptive capacity: Absorptive capacity is the characteristics of the organization (Easterby-Smith *et al*., 2008) to *recognize value of new knowledge* and to *assimilate* and *apply to the commercial end critical to innovative capabilities* (Cohen & Levinthal 1990). Absorptive capacity fosters the issue of knowledge transfer at two fronts. It

serves as a foundation for communication across the boundary and it also explains the issue of knowledge integration. Research has shown that the communication and knowledge integration serve as the mediating factors to enhance product innovation performance (Lin and Chen, 2006). In order to understand the source of absorptive capacity of organization, Cohen & Levinthal (1990) focused on the structure of communication between external source of knowledge and the recipient organization, among subunits of the organization and also on the character and distribution of expertise within organization. The firm's absorptive capacity depends on the individual who stands at the interface of organization and external knowledge (also at interface between organization's subunits). However they argued that the firm's absorptive capacity should not be dependent on a single or few 'gatekeepers' or 'receptors' of knowledge from external environment. It should be the group as a whole with relevant background knowledge and relevant expertise that is essential for effective communication. Cummings (2001) argued that it is the relative absorptive capacity of the recipient with respect to the source's knowledge that is important. The firm's absorptive capacity is not the appropriate concept to address the issue of the ability of a firm to absorb knowledge.

Muscio (2007) has conducted a survey analysis of 276 face-to-face interviews with entrepreneurs and R&D representatives from different manufacturing industries, e.g., electrical and electronic products, machinery, metal products, plastics, textile, chemical products, etc., located in Lombardy, Italy. He concluded that absorptive capacity has a profound impact on firm's capability to network with other organizations and access new knowledge from external sources through hiring employees at R&D department.

Cohen & Levinthal (1989) argued that R&D department of the firm assumes dual roles, i.e., *innovation* (producing new knowledge) and *learning* (increasing absorptive capacity of the organization). Here the role of R&D is associated with the spending or investment; however, probing into investment portfolio is not the objective of this dissertation. Therefore, the notion of absorptive capacity is emphasized in the context of learning which involves understanding of external knowledge based on the existing or prior knowledge of the recipient firm.

4. Knowledge distance: Knowledge distance is the degree of knowledge and information diversity within organizations (Liyanage & Barnard 2003). Other definitions described knowledge distance as a gap between the source and the recipient organization

involved in a learning process (Hamel 1991) or it refers to how large a gap exists between the source and the recipient in terms of their knowledge bases (Cummings & Teng 2003). Knowledge distance is the respective overlapping of knowledge between two organizations that are engaged in the transfer of knowledge. As described in the previous section related to absorptive capacity, the organizational tradeoff between diversity of knowledge and specialization of knowledge possessed by its members is an important factor for decisions regarding transfer of external knowledge (Cohen & Levinthal 1990). Developing absorptive capacity that is based on the prior existing knowledge is an important fact that determines the level of knowledge distance between the source and the recipient organization. Most of the academic literature on knowledge distance in the context of inter-organizational knowledge transfer (Cummings & Teng, 2003; Lane & Lubatikin, 1998; Hamel, 1990; Liyanage & Barnard, 2003) suggests that a balanced knowledge distance is required to successfully transfer knowledge in the context of an inter-organizational collaboration.

Based on the perspective of absorptive capacity suggested by Cohen & Levinthal (1990), Lane & Lubatkin (1998) developed and empirically tested the model of inter-organizational learning and found a positive relationship between inter-organizational learning and similarity in knowledge processing of source and recipient organization. Hamel (1991) found that knowledge distance or gap between the two parties should not be too great. Inkpen *et al*. (1998) have also suggested that in order to facilitate knowledge transfer, the two parties (recipient and source organization) should have some alignment in terms of their knowledge as well.

The alignment of knowledge level between the source and the recipient organization adjust the knowledge gap at appropriate level. The ability to evaluate and utilize outside knowledge is the function of previously retained knowledge (knowledge base) within the recipient organization. This previously retained knowledge (sometimes referred as organizational memory) may include basic skills, shared language or knowledge of recent scientific or technological developments, etc. It can also be influenced by the organizations past experiences, culture and knowledge retention capability (Lane & Lubatkin, 1998). It is arugued by Cohen & Levinthal (1990), that there should be an organizational tradeoff between diversified and commonality of knowledge across individuals within organizations. For example, if all employees of the recipient organization share the special common language, they would effectively communicate within the organization, however, they will not be able to communicate with the diverse external knowledge sources. Although common

knowledge among employees improves communication, however this commonality should not be carried so far that the diversity of knowledge among employees in the organization is substantially diminished. The reason is that when there is too much gap between the common and the diversified knowledge, recipient organization will be unable to understand knowledge acquired from source organization as it will require too many learning steps (Hamel, 1991). Thus, the absorptive capacity (learning) of the recipient organization also depends on the knowledge gap between common and diversified knowledge of the recipient organization. Too much inappropriate knowledge distance will affect the organizational learning process, thus, reducing chances of successful knowledge transfer that can affect the output (productivity) of the organization.

5. ***Activity Context***: The transfer of knowledge occurs between the source and the recipient organization when the specific personnel and tools are identified as interaction points. Organizations are interested to exchange either tacit or explicit knowledge depending upon the absorptive capacity and the specific requirements. This exchange of knowledge (both tacit and explicit) can be achieved by defining activity context of the source and the recipient organization. Activity context measures the extent of operational interfaces for the transfer of knowledge from the source to the recipient organization. It includes transfer of documents, on job trainings, job rotation, groupware and other team collaboration tools, access to knowledge repositories, etc. Various researchers have defined these exchange mechanisms in various terminologies. Some have proposed these interface points as contact points in alliances (Baughn *et al*., 1997) while others as gatekeepers or boundary spanners (Cohen & Levinthal, 1989).

3.5. Summary

This chapter has presented the overview of the remaining theoretical constructs that include the factors affecting inter-organizational knowledge transfer, collaboration and the innovative performance of the organization. It has been suggested in the research proposition that innovative performance of an organization can be measured through different aspects, like, effectiveness of business models, innovation management and knowledge management. In this chapter, the importance of knowledge management and collaboration is highlighted in the context of innovative performance of an organization. The chapter also provided a comprehensive overview of different theories supporting the proposed theoretical constructs. It is discussed that organizations can be assumed as knowledge repositories where transfer of

knowledge is deeply embedded within different processes, technologies and employees. It has been observed during literature survey that transfer of knowledge among collaborating organizations in different forms is related with the organizational resources and capabilities. The analysis of the literature has suggested that innovative performance of these organizations depends upon these resources and capabilities. At the end, six factors have been identified that are supposed as possible mediators for the causal relationships between the business model and the innovative performance of an organization.

The next chapter will provide an overview of the third step of the phase I, i.e., opinion of different academic experts on the research proposition.

4. Experts' Interviews

4.1. Introduction

This chapter focuses on second step of phase I research methodology and its results that are pertinent to the ***Hypothesis I***. The hypothesis I states that the organization can become effective when its business model is evident not only to itself but to its partners also. Thus, in order to develop such a framework, phase I of this doctoral research consists of an analysis of the available literature on business models and other theoretical constructs, i.e., factors affecting transfer of knowledge and innovative performance. Figure 4.1 is the overview of different research steps of phase I in this dissertation

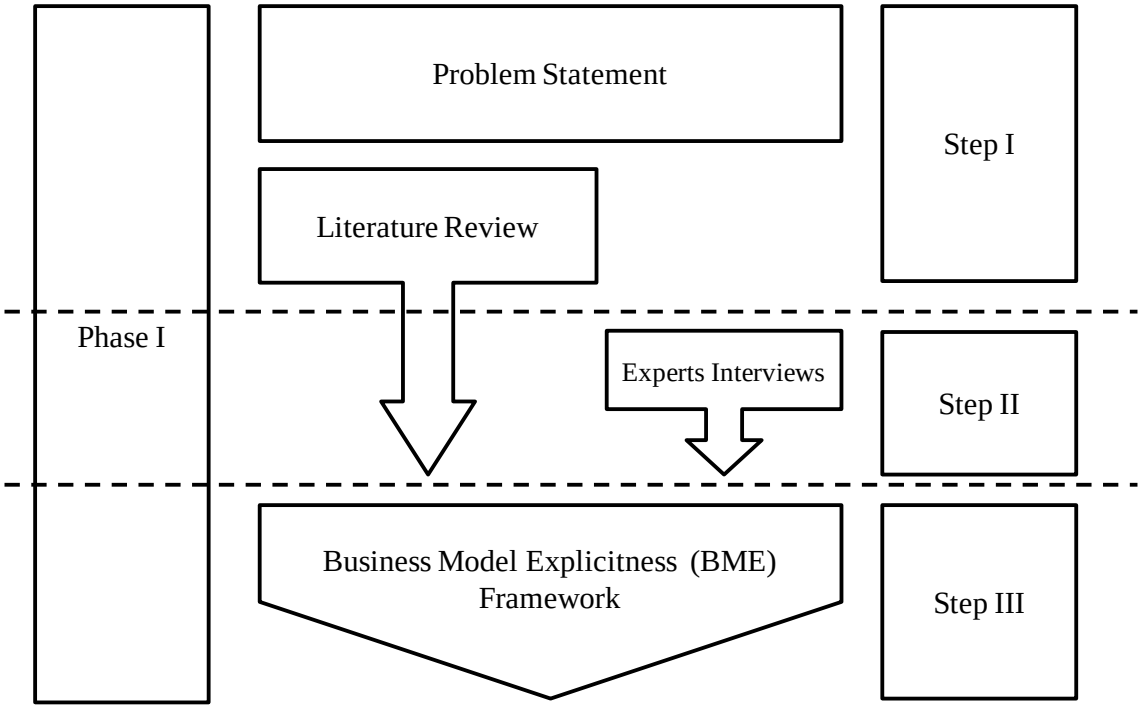


Figure 4.1: Overview of different research steps in Phase I

According to the research model, this chapter describes the second step of this phase, i.e., the discussion with the academic experts. The initial propositions made through literature survey and analyses have been discussed during these discussions. The purpose of the interviews is to support the insight gained through analysis of the existing academic literature. The outcome of these discussions has led to improve the research design as well as the refinement of the hypotheses.

The first part of the chapter provides the summary of the academic literature analysis and research proposition from previous chapters. The second part of the chapter then provides an overview of the personal interviews conducted with different academic experts from the relevant domains. In the last part of the chapter, summary of the feedback will be discussed.

4.2. The Research Proposition and Proposed Hypotheses

According to the research proposition, financial and non-financial performance of an organization in a network environment can be measured by combining different theoretical constructs and analyzing how affect each other and also the organizational performance. For this purpose, three research hypotheses have been proposed. The ***hypothesis I*** is related with the proposed framework of business model explicitness (BME) and states that an organization can be effective if its business model is evident not only to itself but to its partners also. This hypothesis has two parts, first part is related with the BME framework and the second part is related with the effectiveness of an organization. Further, it is proposed in ***hypothesis II*** that the effectiveness of an organization can be measured by analyzing how explicit is the business model of that organization. Finally, it is proposed in ***hypothesis III*** that in order to be effective (in terms of innovative performance), it is important for these organizations to successfully transfer knowledge from their partners. There are different success factors that affect transfer of knowledge from the source to the recipient organizations. These success factors include: organizational distance, knowledge embeddedness, physical distance, absorptive capacity, knowledge distance, activity context and collaboration.

Different sub-hypotheses which are related to the hypothesis II & III, have also been proposed in this dissertation. As discussed above, hypothesis II and III are proposed to describe the effect of different theoretical constructs on each other. Figure 4.2 represents the basic path diagram representing these effects.

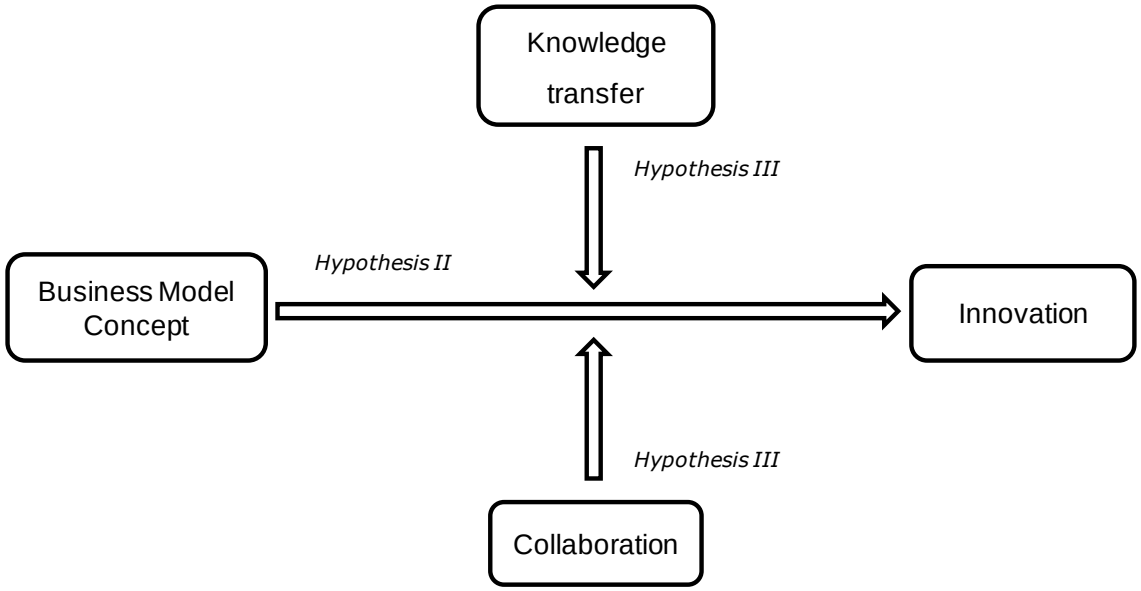


Figure 4.2: Causal link diagram depicting causal relationships among different theoretical constructs

According to diagram, for an organization in a network environment, the innovative performance can be affected by a business model that is explicit. This impact is further influenced by certain factors that also affect successful transfer of knowledge. These factors include inter-organizational knowledge transfer and collaboration.

Previous researches have supported the idea of linking the business models with the organizational performance (Rajgopal et al., 2003; Malone et al., 2006; Zott & Amit 2006). However, the affect of other factors that affect the transfer of knowledge from the source to the recipient organization has not yet reported.

4.3. Interview Procedure

In order gain feedback on the analysis of the academic literature and the proposed hypotheses, various academic experts were contacted for the interview. The academic experts were chosen from the personal network of the main supervisor of this dissertation. To ensure the validity and purposefulness of these discussions, only those academic experts were contacted that have made major contributions in the field of business models, knowledge management, strategy, information technology and electronic commerce. Table 4.1 is the list of selected academic experts contacted for interviews.

Name	Country	Interview date
Alexander Osterwalder, *Author, Speaker and Advisor on Business Model Innovation*	Switzerland	8th of May 2009
Yves Pigneur *Director, Prof. Dept. Of Information Systems, University of Lausance*	Switzerland	19th & 23rd of June 2009
Christopher Zott *Prof. Of Entrepreneurship, IESE Business School, University of Navarra, Barcelona*	Spain	15th of June 2009
George M. Giaglis *Assoc. Prof. E-Business, Dept. of Management Sciences and Technology, Athens University of Economics and Business, Athens*	Greece	18th of June 2009
Paul Timmers *Head of Unit: ICT addressing Societal Challanges, European Commission, Brussels*	Belgium	3rd of April 2009
Stefan Klein *Director, European Research Center for Informations Systems, Dept. of Information System, Münster University*	Germany	4th of May 2009
Halmut Kasper *Chairman, Department of Management, Vienna University of Economics and Business*	Austria	13th of May 2009
Henry Chesbrough *Executive Director, Center for Open Innovation, Haas Business School, University of California*	USA	Interview was not done
Ziv Baida *Managing Consultant Technology Strategy at the Strategy & Change , IBM Global Business Services, Amsterdam*	Netherlands	Interview was not done

Table 4.1: List of academic experts contacted for the interviews during Phase I

The academic experts were contacted from April to June in 2009. These interviews were mainly focused on:

1) Gaining feedback on the initial analysis of the academic literature and proposed hypotheses
2) Discussing the viability of the research model

Most of the interviews were conducted over telephone, however, some face to face discussions were also held. Two of the experts were not available for interviews in the proposed time span; however, they suggested reviewing some of their research contributions on the related topics. For these interviews, semi-structured questionnaire was prepared with the open-ended questions. These questions were mainly related with measuring the rationality of the research proposition, feasibility of the research model and significance of the expected outcome of the research.

Although semi-structured interviews were planned initially, however, the sequence of the questions was not strictly followed. Most of the interviews were recorded and transcribed into a text document. Each interview transcription was then analyzed on the basis of the interview questionnaire.

4.4. Overview of Each Interview

This section provides the summary of each interview, - introduction of each interviewee, discussion and suggestions.

4.4.1. Paul Timmers

Paul Timmers is Head of Unit of ICT for Inclusion in the European Commission, Directorate-General Information Society & Media. He has widely published, including a book, on electronic commerce strategies and business models and has been a visiting professor, research fellow and lecturer at several universities and business schools. At the time of the interview, he was on EU research fellowship at the University of North Carolina/Chapel Hill, USA, was very kind to accept the request for telephonic discussion. The telephonic interview lasted for about an hour. Following are the main points discussed with Dr. Timmers during this interview.

Discussion: During interview, the first point of discussion was about the relationship of a business model with the customer's requirements that is related with the ***hypothesis II***, i.e., explicitness of business model. He was of the opinion that for a successful business model, it is important to gain customer insights. A company may has different relationships with customers and the company adopts the business model that leads to change in knowledge transfer means, i.e., type of knowledge, amount of knowledge or efficiency of knowledge. It leads to improve company's performance, in particular the innovation rate. Companies should focus on what they have learned from the customers and particularly from consumers. Companies try to interact very closely with the consumers and to gain as much as possible an insight from interaction with consumers, i.e., they also analyze not only the consumer behaviors but also ask their opinions etc. There is a possibility that similar is happening in a business to business relationship and in that case it is the customer, not consumer. If this can be identified it would be very interesting aspect. This type of hypothesis should be validated implicitly when the center of gravity is knowledge transfer.

The second point of discussion was about the proposed ***hypothesis III*** which is related to the impact of collaboration, inter-organizational knowledge transfer and the possible impact on organizational performance. His observation was that the relationship structure between collaborating organizations can influence the way a business model functions, the knowledge transfer happens or the innovation is made. These business relations are built upon trust, reputation, etc. These relations are either the contractual relationships that are described in detailed, i.e., they specify about products/services or they are much more open. These contracts or relations are made flexible because of the nature of products and services. Transfer of knowledge can play a role in these relations, and it can be predicted that the firms that have collaborative relations, transfer of knowledge can be higher.

Recommendation: He suggested that the transaction cost economics (TCE) and the contract theory should be addresses in this conceptual model in order to explore different types of relationships the customers and company might have.

He also suggested that in order to target a particular industry for the exploratory survey, health and pharmaceutical sector can be appropriate since a lot of research is going on in this sector. He specifically mentioned the HER (Electronic Health Record) system that is highly information based. The business model of HER is built around the network of doctors, pharmacists, nursing staff, etc., building health profile of individual patients. The first example he quoted is the hospital information system works on the notion that if a system starts aggregating information, one can get certain values, e.g., the patterns of use of medication related to certain medical conditions, patient health improvement patterns, etc. The value generated by such system can be useful for different stakeholders. Second example he quoted is from pharmaceutical companies. Pharmaceutical companies that are part of such business models, may want to give targeted training packages to doctors, e.g., how medication works out in order to prevent increased risk of falling of elderly people. In this case, one can observe the proposed relationship between the business models, partners (stakeholders), knowledge transfer and innovation process that lead to create new products and services, e.g., targeted training etc.

4.4.2. Stefan Klein

Stefan Klein is Professor for Inter-organizational Systems, Associate Dean for International Affairs and a Director of the European Research Center for Information Systems (ERCIS) at the Department of Information Systems, Muenster University. His main research

areas are Electronic Business policies and strategies, development paths of inter-organizational information systems, real time communication and virtual organizations. Face to face interview session was held with Dr. Klein at Münster University. The summary of the discussion and suggestion by Dr. Klein is as following.

Discussion: The discussion mainly revolved around differences between business models and strategy. His was of the opinion that business model is related with doing everything, i.e., from generating an idea for business to do business with partners, however, strategy is different from the business model concept. The business model is an idea to do a business; it can be in the form of modeling different components for doing business. Developing the business model starts very much with the start of the company. Value proposition, customers, partners, revenue generation sources, resources and capabilities, etc., are various pieces and an entrepreneur should know put together various pieces to run his business. An entrepreneur should consider them before he starts writing his business plan.

On the other hand, strategy is related with the questions that may ask what the value proposition is; who the customers are; what are the resources, capabilities, etc., that are required to a business. He was of the opinion that there are different perceptions of the strategy. Some people use it as tool to earn money without considering about the business model. For many organizations, strategy is embedded within their culture.

Recommendation: He mainly suggested differentiating the concept of business model from the strategy. He also suggested choosing a particular type of business model from a particular industry for analyzing the proposed relationships between business models and organizational performance. Since every organization has a different business model or the combination of business models, he suggested making it clear the particular type of business that can be used as a unit of analysis in this research. An important point was highlighted by Dr. Klein that many organizations have different kinds of business models, e.g., an organization may have a general business model as well as an e-business model and their execution can be different. Therefore, it is important to mention in the research the particular domain or area in which the business operates.

While suggesting a particular industry for the proposed survey, he suggested that the factors which affect companies' relationships (collaboration and inter-organizational knowledge transfer) should be carefully selected for a particular industry. For example, different sets of factors may affect a company's performance when it is operating in the health

care industry, while a different set of factors are effective on organizational performance when a company operates in information, communication and technology (ICT) sector. In both these sectors, different business models operate. Therefore, selection of industry for a analyzing the business model concept is very important and it should be dealt with care.

4.4.3. Alexander Osterwalder

Alexander Osterwalder is an author, speaker, workshop facilitator and adviser on the topic of the business model design and innovation. He has established himself as a global thought leader in this area, based on a systematic and practical methodology to achieve the business model innovation. He was contacted for telephonic discussion and interview was held via Skype Voice. The summary of the discussion and suggestions is as following.

Discussion: The discussion was mainly on the issue of a particular business model selected as a unit of analysis in the proposed hypotheses. While discussion on ***hypothesis I,*** a question was raised about defining explicitness of business model. According to Dr. Osterwalder, the definition of explicitness of a business model varies from organization to organization. Some organizations use common language for defining their business models throughout the organizations, while others are not consistent. In reality, every organization can discuss about their business models, but very few companies are explicit (clear) on how to manage their business models. It is also a fact that, sometimes, companies do not use the term 'business model' for their business, but they still manage a very successful business model. However, when companies do have a specific business models, they have developed a language to describe their business models, e.g., Telenor has explicitly adapted the 9-building block approach of the business model developed at HEC, Lausanne. During the process of defining the business model, they gathered all their departmental teams and started describing new and the existing business models. The important point in this example is that they have explicitly used a similar approach throughout the company to describe the business model.

The second point of the discussion was about differentiating business models from strategy. He was of the opinion that the term 'business model' is very close to the term 'strategy' and it is difficult to draw a line between the two terms. On a question about the different between strategy and the business model concept, he stated that a company can have a very innovative business model without having a strategy to manage. For example, Innocentive, a platform that connects companies with researchers, is a very innovative business model, but has no apparent strategy to attract more researchers. Another case could

be that sometimes a company has innovative business model but does not have a process to manage it. For example, Nestle, have couple of innovative business models like, Dolce Guto, Espresso, Decaff, etc. They have a business model but do not have any explicit process to innovate their business model.

Recommendation: Dr. Osterwalder suggested choosing a particular business model concept for defining the causal relationship of a company's innovative performance with its business model. He also suggested differentiating between the business model concept and strategy. Another suggestion was evaluating the term 'inter-organizational knowledge transfer'. The concept of inter-organizational knowledge transfer has been used quite extensively in previous research; therefore the concept should be pinned down either as factors affecting knowledge transfer or knowledge transfer mechanisms.

4.4.4. Helmut Kasper

Helmut Kasper is the director of the Institute for Change Management and Management Development (CMMD), at the Vienna University of Business and Economics. His main areas of expertise are change management, strategy, learning organization and knowledge management. Face to face interview session was held with at his institute's office. The summary of the comments and suggestions is as following.

Discussion: With the progression of the discussion sessions with academic experts the research proposition and research model refined simultaneously. While discussing the hypotheses and refined research proposition, Prof. Kasper provided positive recommendation. He commented that the proposed hypotheses are relevant according to the recent research trends and the proposed research model is also rational.

Recommendation: Dr. Kasper suggested elaborating the concept of the business model as it is very vague term and different respondents may not understand the exact nature of questions created for evaluating the concept of the business model. He also suggested preparing the survey questionnaire in German that can increase the coverage of target respondents. He also suggested adding a framework of knowledge transfer tools in the questionnaire. On his suggestion, questions related to codification tools and personalization tools (Kasper & Kohlbacher, 2007; Kasper et al., 2007) have been added in the final questionnaire.

4.4.5. Christoph Zott

Christoph Zott is professor in the Department of Entrepreneurship, IESE Business School, University of Navarra, Spain. His research interest centers on resource management in entrepreneurial firms, including areas such as the design of business models that combine the resources of entrepreneurial firms with those of suppliers, customers, and partners; the acquisition and mobilization of resources through entrepreneurs' symbolic management and affective influence actions; and the deployment of resources through dynamic capabilities. He was contacted for telephonic discussion. The summary of the discussion and suggestions is as following

Discussion: He also commented that the theoretical model is very interesting and motivating. However, strong debates are expected from experts of various fields like strategy, business model and knowledge management. Thus a strong support in the form of extensive literature review is required.

Recommendation: During discussion on the proposed ***hypothesis II*** & ***III***, Prof. Zott suggested using the terminology 'resource architecture' instead of business model. He was of the opinion that organization's economic models revolve around the critical resource for competitive advantage, i.e., knowledge. Therefore, the term resource architecture can better describe inter-organizational knowledge transfer. He suggested identifying 'knowledge' as a critical resource for the research proposition. He also recommended reviewing recent research on stickiness of knowledge and also on intra-organizational knowledge transfer (Szulanski, 2006).

He also suggested that the business model concept needs extensive elaboration. The elaborated concept should be based on extensive literature review. Various business model frameworks, taxonomies, components and definitions should be properly evaluated before proposing any new concept regarding business models.

4.4.6. George M. Giaglis

George M. Giaglis is Associate Professor of e-business at the Department of Management Science and Technology of the Athens University of Economics and Business, Greece. His main teaching and research interests are related to e-business (emphasizing on mobile and wireless applications and services), pervasive and ubiquitous information systems, technology-enabled business process redesign, business process modeling and re-engineering,

information management, and information systems evaluation. He was approached for telephonic discussion. Following is the summary the discussion and his suggestions.

Discussion: Prof. Giaglis commented that the overall research model was rational and interesting results can be expected after data analysis. He suggested revising the hypotheses statements to measure the relationships among different theoretical constructs through quantitative analysis. He suggested that since the proposed research proposition and hypotheses suggest intervening effects of inter-organizational knowledge transfer and collaboration on the relationship of business models and innovating, however, the proposed causal link diagram did not predict their intervening behavior. He suggested representing the links of collaboration and inter-organizational knowledge transfer as 'mediation'.

He raised a concern on the issue that the business model concept and rate of innovation are the measurement variables at intra-organizational level where as the other two latent variables, i.e., knowledge transfer and interaction pattern (networked enterprise) are the measurement variables at inter-organizational level. He suggested finding a way to address both the variables at a single unit of analysis.

Recommendation: Prof. Giaglis suggested that the survey analysis can be done either as a single sector analysis, or a multi-sector analysis. Although he suggested single sector analysis, however, he was of the opinion that multi sector analysis can produce interesting results regarding; attitudes of different industries; explicitness of the business model and its scope; and effectiveness of the business models on organizational performance. As discussed above, he suggested proposing mediating effects of inter-organizational knowledge transfer and collaboration on the relationship between business models and innovation. Figure 4.3 represents the causal link diagram of the proposed hypotheses.

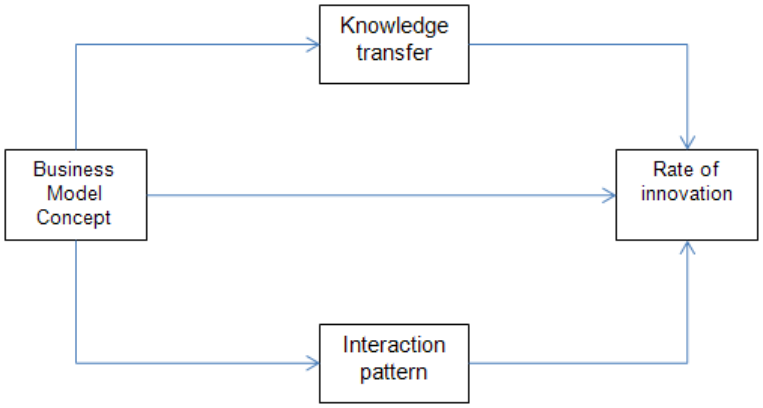


Figure 4.3: Modification in the causal link diagram - Proposed Goerge M. Giaglis

4.4.7. Yves Pigneur

Yves Pigneur is head of the Information Systems Institute of the University of Lausanne, Switzerland. He is actively involved with teaching and research in the areas of the business model innovation, information system design, requirements engineering, information technology management, innovation, and e-business. In summer 2009, he visited TU Wien as a visiting professor. A couple of face to face discussion sessions were held with Prof. Pignuer. The summary of the comments and suggestions is as following.

Discussion: The proposed research proposition was discussed with Prof. Pigneur. He was of the opinion that the proposed research proposition was an interesting idea. However, he was of the opinion that handling more than two theoretical constructs can be difficult during data analysis.

Recommendation: Prof. Pigneur suggested implementing the theoretical model in a single industry target frame. According to his recommendation, single industry as a unit of analysis can produce concrete results on the proposed relationships among different theoretical constructs in this research proposition.

4.5. Summary of Recommendations

From the above discussion, the major recommendations from each academic expert can be summarized in the following table 4.2.

Academic Expert	Recommendations
Alexander Osterwalder, *Author, Speaker and Advisor on Business Model Innovation*	1. Recommended selecting a particular business model concept for proposed research model. 2. Recommended differentiating business models and strategy. 3. Recommended distinguishing the term ´inter-organizational knowledge tranfer´ from ´knowledge tranfer mechanisms´.
Yves Pigneur *Director, Prof. Dept. Of Information Systems, University of Lausance*	1. Recommended performing single sector analysis for the proposed research hypotheses.
Christopher Zott *Prof. Of Entrepreneurship, IESE Business School, University of Navarra, Barcelona*	1. Recommended identifying knowledge as a critical resource within the model. 2. Recommended to use `resource architecture´ instead of `business model´ 3. Recommended evaluating various business model components & elements from different business model classifications and frameworks.
George M. Giaglis *Assoc. Prof. E-Business, Dept. Of Management Sciences and Technology, Athens University of Economics and Business, Athens*	1. Recommended performing multi-sector analysis for proposed hypotheses. 2. Recommended modifying causal link diagram.
Paul Timmers *Head of Unit: ICT addressing Societal Challanges, Brussels*	1. Provided positive recommendations on the proposed hypotheses II & III. 2. Recommended TCE and contract theories for review. 3. Suggested health and pharmaceutical industry for survey anaylsis.
Stefan Klein *Director, European Research Center for Informations Systems, Dept. of Information System, Münster University*	1. Recommended differentiating busienss mdoels and strategy. 2. Recommended selecting an industry specific particular type business model as unit of analysis.
Halmut Kasper *Chairman, Department of Management, Vienna University of Economics and Business*	1. Recommended specifying a particular type of business model. 2. Recommended measuring effectiveness of inter-organizational knowledge tranfer through knowledge tranfer mechanism tools.

Table 4.2: Summary of recommendation from the experts' interviews

Based on these recommendations, following revisions were made in the proposed research proposition and hypotheses.

1) A specific framework was proposed to evaluate different business model classifications and frameworks. The proposed framework is termed as a business model explicitness (BME) framework. The foundations of the framework are based on the extensive review and analysis of existing business model classifications and frameworks. One objective of developing such framework was to handle the issue of using a particular business model that should be specific to a firm as well as its industry. The proposed framework can be useful to evaluate different types of business models if existed simultaneously for a single

organization. This framework can also be useful to measure the effectiveness of business models of interacting organizations in multi-sector analysis.

2) As discussed by various academic experts, business models and business strategy are two separate concepts and should be identified adequately. In order to address this issue, detailed discussion is provided in Chapter 2 of this dissertation, which distinguishes the concept of business model, used in this dissertation, from the concept of strategy.

3) As suggested by Prof. Giaglis, the causal link diagram has been revised that has clearly depicted intervening effects of collaboration and inter-organizational knowledge the effectiveness (innovative performance) of an organization through its business model

Few other changes that have been made on the basis of above recommendations include: revision of hypotheses statements and proposing related sub-hypotheses to define different relationships for quantitative and qualitative measurement, revision of a questionnaire for quantitative and qualitative survey analysis of the research proposition,

4.6. Summary

This chapter has provided overview of the research method used in the second step of the phase I. A total of seven interviews were conducted with different academic experts from various countries. The recommendations for these academic experts have provided useful inputs regarding various issues like, distinguishing business models and strategy, BME framework, application of research model, etc. In the following chapter, the concept of BME framework is discussed in detail that is the third step of the phase I. The outcome of the Phase I and the research model is also discussed in the next chapter.

5. What is the Business Model Explicitness (BME)?

This chapter discusses the first contribution from Phase I of this research, i.e., the framework of business model explicitness (BME). The framework of BME can be defined in three simple terms: a description of '*WHAT*' (value object) an organization or company may offers to its potential customers, a description of '*HOW*' an organization offers or delivers value objects to its customers, and a description of '*WHY*' a company offers or delivers value objects to its customers. Thus, the framework of BME, as pertinent to the ***Hypothesis I***, states that the organization can become effective in terms of productivity when its business model is evident not only to itself, but also to its partners. The conclusion of this research phase is that it is the BME framework that can support organizations to evaluate the effectiveness of their business model. It is also discussed in this chapter that this framework can help managers not only to innovate their existing business models, but also provides an opportunity to invent new business models.

The chapter is divided into three sections. The first section defines the framework of BME. The definitions of the terms *explicitness*, *content*, *context* and *structure* and their relevant use in this dissertation is also explained in the first section. The second section then evaluates existing concepts of business models (e-business models as well as ordinary business models) in the framework of BME. The last section describes the research model that provides justification for the use of methodological triangulation concept in this dissertation.

5.1. Explicitness of the Business Model

Mark Johnson and his colleagues from Innosight ® have recently argued that the better we understand the structure of business models, the better we will be at creating them (Johnson *et al*., 2010). They propose a new definition of a business model that it consists of four interlocking, interdependent elements, namely: Customer Value Proposition, Profit Model, Key Resources and Key Processes. According to this definition, all these four elements are linked with each other to make business model explicit for internal as well as external stakeholders. Most of the existing academic literature, related to the concept of the business model, is silent about the notion of *'explicitness'*. Numerous taxonomies, frameworks and classifications, found in the literature, represent different opinions on the

business model concept. However, not a single framework has been found that can provide the foundations to establish the framework of BME in this dissertation.

The term *'Business Model Explicitness'* has been refined in this Phase during discussions with the academic experts. When the issue of *'identifying a particular business model concept'*, pertinent to this research, was discussed with experts, it was decided to develop a formal framework for evaluating different business models that can present a unified overview of different business model concepts, taxonomies and frameworks.

The notion of *'explicitness'* has been defined in literature as '*clarity as a consequence of being explicit*' (WordNet search 3.0). When the term 'explicit' was search randomly, various definitions highlighted the meaning of *'being explicit'*, e.g., precisely and clearly expressed, readily observable, very specific, clear or detailed, explicate (a Latin verb means *'to unfold'*). Therefore, on the basis of these definitions, the term was found suitable to describe a business model in the perspective of different classifications or taxonomies.

5.1.1. Revisiting the *'Internal'* Value Chain

As stated earlier, the term *'business model'* has always been associated with the business as a commercial activity; therefore, I will make this notion as the foundation of the elaborated discussion of the term 'business model'. This lead us to conclude that, as a matter of fact, a business model concept can be answered through these questions raised by Peter F Drucker: Who is the customer and what does the customer value? What is the underlying economic logic of that explains how we can deliver value to the customer [at appropriate cost]? How do we make money in this business (Magretta, 2002)? The search for answers to these questions can lead us to analyze the *'internal'* value chain of a company. In the following pages, a detailed discussion on internal value chain provides justification to revisit this concept in the perspective of BME framework.

A value chain is a tool that can be used for examining different activities of the firm and analyzing sources of competitive advantage (Porter, 1998). It can be defined into two aspects that are related to the organizational boundaries, the external value chain and the internal value chain. An e *external* value chain explains how a firm establishes contacts with its partners, customers and consumers to create value. The *internal* value chain of a company provides an overall picture of how a firm creates value by incorporating different partners at various stages and delivering it to its customers through different processes. The processes of

value configuration and delivery are composed of different types of value activities. These value activities are further composed of primary activities, support activities and the margin. The activities mainly focus to deliver value to the customer at an appropriate cost so that at the end the firm can earn profit. The primary and support activities are related with the value creation, value delivery, value proposition, customers and partners, and the margin. Thus, a generic value chain can also be divided into three sections (Figure 5.1).

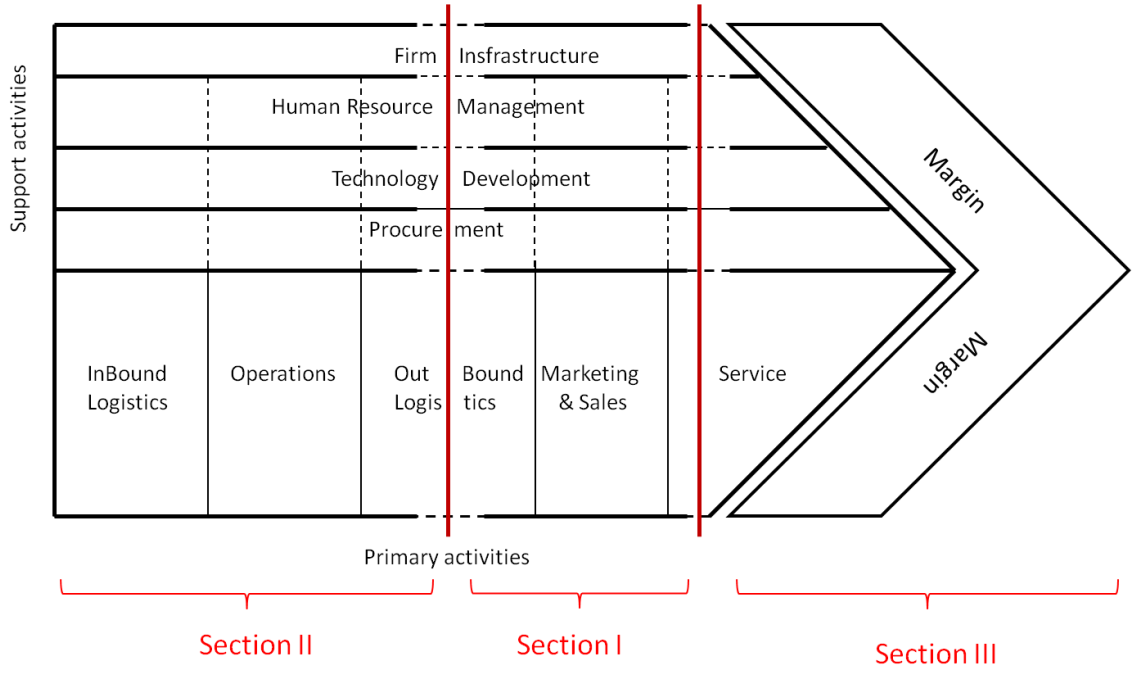


Figure 5.1: The Generic Value Chain

The section I consists of primary and support activities that are related with the value proposition and customers. As defined in the previous chapter, value proposition is the totality of the company's offerings that fulfil customer needs. It includes *outbound logistic*, *marketing and sales* and *services*. Companies use several strategies to offer products and value propositions to their targeted customers. These strategies answers many question, e.g., why to offer these products, what value proposition should be associated with the product offering, how to target a particular customer segment, etc. The main focus of all activities and efforts is delivering value to the customer.

The section II of the generic value chain consists of those primary and support activities that are mainly focusing on creating value, viz., *inbound logistics, operations*, and *outbound logistics*. Some of the activities and functions related to this section are establishing external linkages to acquire required resources for creating value, organizational infrastructure related to products and delivery and choice of distribution channel, etc. Companies pursue

various strategies to answer few questions, e.g., why a company uses specific distribution channel, how to perform production related activities efficiently, what are core competencies of the company to create value and who are the partners and why they are selected, etc. the main focus of these activities is value configuration.

The section III includes *margin* that is the primary logic behind every business activity. Porter (1998) defined margin as a difference between total value and the collective cost of performing the value activities that can be measured in many ways. It can be described in terms of the cost structure and the revenue model.

A critical review of different business model definitions and frameworks reveals that most of the authors have tried to address different parts of the generic value chain, simultaneously. However, there is a large inconsistency of defining the business model concept in terms of a generic value chain. For example, many definitions revealed that a business model is a '*statement*' or '*an architecture*' to explain '*firms' core logic*' or '*products and services flow*' to '*earn profit*' or '*create value*'. All these terms that are derived from different definitions depict that a business model concept revolves around the generic value chain. This implies that the business model concept describes about the products and services that a firm offers to its targeted customers; it also describes about the partners or allies who take part in operations, outbound logistics, resource management, etc.; it also describes about the cost and revenue models of the firm, etc.; the efficient methods to deliver the offerings and the potential revenues and sources of profits. In other words, the description or definition of business model should be consistent with the generic value chain concept.

5.1.2. Elements of the BME Framework

The framework of BME can be defined by three elements; the *'content'*, i.e., a description of products and services an organization offers to its customers; the *'structure'*, i.e., the description of value configuration and resource management; and the *'context'*, i.e., the description of cost and revenue models of the firm. These elements of the BME framework have been derived by reviewing and analysing different business model concepts. In order to distinguish and highlight these elements, it is suggested to use capital letters surrounded by square brackets '[ ]'. Table 5.1 represents the proposed elements of the BME framework and their important constituents.

Element	Constituent	Element	Constituent	Element	Constituent
Content	**Product or service**	**Structure**	**Value Confirguration** •Distribution channel •Communication channel •Customer interface •Customer intergration	**Context**	**Cost Structure**
	Value Proposition		**Resources** •Information Techology •Hardware/software •Intellectual Property •Finanical resources •Physical resources •Human resources		**Revenu Model**
	Customer **•Individual consumers** **•Businesses**		**Partnership** •Suppliers •Complementors •Customers •Competitors •Other stakeholders		

Table 5.1: Elements of Business Model Explicitness (BME)

In the following section, each of these elements is discussed with the relevant references from the academic literature on the business models concept.

a [CONTENT]

Businesses are often defined by companies in terms of products, services, value propositions and customer dimensions (Kotler and Keller, 2006). For example, Ikea's vision is to create a better everyday life for the many people. Their business idea supports this vision by offering a wide range of well-designed, functional home furnishing products at prices so low that as many people as possible will be able to afford them. Thus Ikea's main business is to offer home furnishing products at low and affordable prices. eBay is the online market place that serves online buyers and sellers since 1995. eBay sustenance is based on extensive business infrastructure that consists of hardware, software and large number of partners, e.g., Skype, MercadoLibre , Craigslist, ChannelAdvisor, etc. Thus products, services and customers are important constituents for any company to establish a successful business. Almost every business model definition (including various frameworks and taxonomies) entails description about organization's products, services, value proposition, or value offering model and target customers (Petrovic *et al*., 2001; Stähler, 2002; Osterwalder, 2004). Chesbrough (2006) also propagated that the function of the business model is to articulate value proposition and identify target market.

Thus, in order to summarize the concepts of value proposition, value model, value offering model and customer model as discussed by others, I propose the term [CONTENT]. Literature survey on this term provides loads of information on its vocabulary. The word 'content', used here as [CONTENT], is a widely used word in everyday life which means 'Everything' that is included in a collection and that is held or included in something (WorldNet Search 3.0). Another definition describes the content as 'That which is contained; the thing or things held by a receptacle or included within specified limits (Webster Dictionary). Here I use the term [CONTENT] due the reason that products, services and value propositions are the main content of the business transaction that are mostly required to serve customers needs.

Timmers (1998) has provided a proper definition on the business model concept describing it as architecture for product, service and information flow. Weill & Vitale (2001) have also described *the flow of products, information and money* as the function of the business model. According to Osterwalder & Pigneur (2005), *'business model describes the value a company offers to one or several segments of customers'*. Wirtz (2001) stated that *business model comprises flow of materials and information both within the organization and between the organizations*. Bieger *et al*. (2002) have described the business model as a value offering concept. Stähler (2002) defines it as *'description comprises the value proposition'*. Still, there are numerous other definitions of business models that explain the concept in terms of the organization's value offerings to its customers. This value offering includes products, services and information that are the main contents of any business transaction. Different authors have proposed products, value proposition, offerings, target customers, strategies and value partners as important elements of business models. Therefore, the main constituents proposed for the [CONTENT] element of BME framework are ***product or service***, ***value proposition*** and ***customers' speciality***.

b [STRUCTURE]

According to Magretta (2002) business model represents a *'system'* of a business that describes how different pieces of a business fit together. Ostewalder (2004) suggested that one of the four important pillars that should be addressed by the business model is the infrastructure management that explains how the company performs infrastructural or logistical activities with partners and customers in a form of networked enterprise. The major component of a generic value chain is composed of value activities that are also part of total value of the company. The analysis of the generic value chain, in the previous sections,

identifies that the value chain also consists of activities and efforts are related to value configuration and delivery (Porter, 1985). Based on these evidences, it can be appropriate to propose the second element of BME as the [STRUCTURE]. As the term depicts itself, it can be defined as to how to deliver product or service to the customers, how to create value, what are the value creation activities, who are the partners, what type of resources can be used in value configuration, etc. Thus, in other words, the [STRUCTURE] element of BME can described as value configuration model, partnership and resources of the organization.

The review of different business model definitions, taxonomies and classifications also provide insight on this element of the BME framework. For example, Timmers (1998) explained that the business model can describe various actors and roles performed by them. Similarly, Bieger *et al*. (2002) defined the business model as *communication concept, configuration of competencies, organizational form, cooperation concept and coordination concept*. On the other hand, Dubosson-Tobay *et al*. (2002) described the business model concept as *'the architecture of the firm and its network of partners for creating, marketing and delivering value and relationship capital to one or several segments of customers'*. Similarly, Slywotsky (1996) stated that the business model is *'the totality of how a company selects its customers, defines and differentiates its offerings, defines the tasks that would either, be performed itself, or to be outsourced, configure its resources, goes to market, creates utility for customers and captures profits'*. Chesbrough (2006) also enunciated that it is the function of the business model to define structure of the value chain, position of the firm within value network and formulate competitive strategy to deliver value objects to customers.

Therefore, based on these existing business model concepts, it can be proposed that the business model may describe the business architecture that deals with the concept of producing and delivering products and services to partners, customers and consumers. Thus, I propose ***value configuration, resources*** and ***partnership*** as the main constituents for the [STRUCTURE] element of the BME framework.

c [CONTEXT]

A business model is nothing else than a representation of how an organization makes (or intend to make) money. This simple definition was quoted by Mark W. Johnson (2010) from Peter Drucker on Harvard Business Review blog, to define business models. This suggests that a good business model should also provide answers to a fundamental question,

i.e., how to earn money from a particular business or what is the economic logic to deliver value to customers (Magretta, 2002). The 'internal' generic value chain also represents the margin or the profit that is the overall gain to perform value activities (Porter, 1998). The margin, as described in the context of finance and economics, can be expressed in terms of sales, costs and returns on sales. Thus, the margin that represents the relationship between profits, revenues and costs, is an important aspect that can be properly explained by the business model concept. I, hereby, propose the third element of the BME framework, i.e., the [CONTEXT]. The term 'context' can be defined as *'the set of facts or circumstances that surround a situation or form the setting for an event, statement, or idea'* (WordNet Search 3.0). The term [CONTEXT] is used here with the reference that every business transaction *'is a commercial activity involving financial, commercial and industrial aspects'* (WordNet Search 3.0). Thus, the idea of a business activity or transaction revolves around certain objectives that are most often economic in nature.

The review of different business model definitions, classifications and taxonomies also revealed that the financial aspect of business organizations has caught due attention by many researchers in organizational studies. For example, Timmers (1998) suggested that the business model can provide description about sources of revenue, whereas Osterwalder & Pigneur (2005) described the business model as the conceptual tool that describes how the organization generates profitable and sustainable revenue stream. The business model ontology (BMO) framework suggested that the business model should also reflect the cost and the profit model for the organization. Other researchers exclusively related the concept of the business model with the profit generation. For example, Picken & Dess (1998) described the business model as *'a set of assumptions about how company earns a profit in a competitive environment*', whereas, Stewart & Zhao (2000) declared that it is *'a statement of how a firm will make money and sustain its profit stream over time'*. Slywotsky & Morrison (1997) proclaimed that the business model is the description about patterns and strategies that enable the firm to make profits. Chesbrough & Rosenbloom (2002) truncated the concept of the business model in terms of *'a mediating construct between technology and economic value with different functions'*. Later on, Chesbrough (2006) declared that specifying the revenue generation mechanism is also the function of the business model. Thus, the ***Cost*** and ***Revenue Models*** are proposed as the main constituents for the [CONTEXT] element of the BME framework.

5.2. Evaluation of Existing Business Models in the Framework of BME

At this point, the discussion on the BME framework can be summarized in the following two points: 1) The concept of the business model can be defined through explicitness business model, and 2) The explicitness can be defined in terms of three elements, i.e., the [CONTENT], the [STRUCTURE] and the [CONTEXT]. In order to elaborate this concept further, I will take few examples from the exiting frameworks and taxonomies and distinguish the elements of the business model explicitness in each framework and taxonomy.

Business Model Taxonomies by Paul Timmers: Paul Timmers has proposed various business model taxonomies to categories businesses over the Internet. For example, the simplest business model classification is the electronic shop. E-shop is the representation of the company's offerings over the Internet. The core elements of this type of models are the brand specific products or services that can have different assortments based on market segmentation. These products are targeted to specific customers, e.g., the Fisher-price (www.fisher-price.com) offers different products assorted on the basis of different market segments. A combination of different e-shops constitutes e-mall (Electronic mall). The description for e-shop or e-mall in terms of the BME framework is described in Table 5.2.

Content	Brand specific Product/s (with different products)	**Structure**	Online presence through website	**Context**	Price model for partners i.e. displays product catalogues including product prices, advertisement fee etc.
	Brand specific Service/s		Website describes customization or non-customization of the product, i.e. which product is for which customer		
	Specific about customers i.e. market segmentation		Online presence for 24 hours		Sources of revenue are reduced cost of marketing, increase in sales, membership fee and advertisement fee.
	Offer additional information, e.g. where to buy, delivery, product selection, product discounts etc (Value proposition)		Physical store sells product to the customers		
			Partners can be identified e.g. the company itself, the end consumer, the website visitor, the ISP provider, the domain owner, Advertisers, Bank etc		

Table 5.2: Evaluation of E-Shop & E-Mall (Paul Timmers) in terms of BME Framework

More complex examples from Timmers classifications are the virtual community and the collaboration platforms. Each of these classifications can also be evaluated in the framework of BME. Table 5.3 represents the evaluation of Virtual community and collaboration platform in the framework of BME.

<table>
<tr><td rowspan="5">Content</td><td rowspan="2">Information is the main product</td><td rowspan="5">Structure</td><td>Online presence through website</td><td rowspan="5">Context</td><td>Price model i.e. membership fee, consultancy fee, advertisement charges etc.</td></tr>
<tr><td>Website specifies information according to visitors interests</td><td rowspan="4">Sources of revenue are membership fee, advertisement fee, counseling fee etc.</td></tr>
<tr><td>Indentify types of potential customer based on market segmentation</td><td>Website offers online opportunity for discussions, counseling, consulting, etc.</td></tr>
<tr><td rowspan="3">Offer additional information, e.g. how to become members, special interests, different forms of memberships etc (Value proposition).</td><td>Website offers online opportunity for becoming member of the VC</td></tr>
<tr><td>Possible to maintain personal profiles of members</td></tr>
<tr><td>Partners are identified as the company itself, the experts or members of the VC, the website visitors, the ISP provider, the domain owner, advertisers, banks etc</td></tr>
</table>

Table 5.3: Evaluation of the Virtual Community & Collaboration Platform (Paul Timmers) in terms of BME Framework

In the above table, the element [CONTENT] can be described in terms of the product, customer and value proposition models. These models depicts that information is the main product the focal company offers to its potential customers. The target market is segmented to focus particular customer needs. The [STRUCTURE] element includes a web portal, the online opportunity for collaboration or discussion, and partners and their role identification. The website of the company specifies information according to the customers' interests. For example, Fisher-price offer parenting advice for grandparents to spend quality time with their grandparents or Amazon offers its customers to join various communities according to their interests, e.g., computer & internet, family & home, hobbies & crafts, literature, arts & science and so on (www.amazon.com/communities). More detailed analysis of these websites reveals that these businesses offer online opportunities for the members to participate in discussions, counseling or consulting. from these websites, the presence of the partners can also be identified, e.g., on Amazon's virtual communities, the partners are: Amazon itself, the customers who purchased the products, the customers who sell the products, third-party service providers, e.g., postal services, telecom operators, financial institutions, banks, etc. on

these websites, the [CONTEXT] element of the business model includes identification of sources of revenue such as membership fee, advertisement fee or counseling fee, etc.

Business Model Taxonomies by Michael Rappa*:* Michael Rappa (2001) has presented nine categories of business models over the Internet. He defined business models as doing business to generate profit. Thus Rappa's exclusive attention is to identify the sources of revenues for different types of business models. An important aspect he has described about business models is *'the constant evolution of different types of business models due the evolving nature of the internet'*. It is also interesting to note that Timmers and Rappa, both have described the similar types of business models and secondly, both have stated that an organization doing business over the Internet can adapt various business model taxonomies. The example I discuss here from Rappas' classification is the commonly found 'advertising model' over the Internet. When evaluated in within the framework of BME, one can identify all three elements in this model (Table 5.4).

Content	List items for sales or purchases (**Classifieds**)	Structure	Online presence through website or web portal (**Portal**).	Context	Price model include transaction fee, service fee, advertisements etc
			Offer favorable link position or advertising keyed to particular search term (**query based paid placements**)		
	Advertisements (**Intromercials, Ultramercials and content targeted advertising**)		Provide content specific and user behavior sensitive freewares, pop-ups etc. (**Contextual advertising/behavioral marketing**)		
	Market segmentation as B2B, B2C, or C2C		Provide virtual market place like e-mall or a hosting service for online merchants		
			Provide user registration facilities for customized information (**user registration**)		Sources of revenues are banner ads, advertisements, sponsored links etc.
	bringing large number of visitors as potential buyers/sellers (Value proposition)		Offer online services e.g., transaction processes, market assessment, e-bidding, e-auction etc)		
			Partners are identified as visitors (potential buyers or sellers) , ISP providers/service operators, broadcasters (owner or distributer of the content, advertisers, transaction brokers,		

Table 5.4: Evaluation of Advertising model (Michael Rappa) in terms of BME Framework

The [CONTENT] element can be identified by observing a list of items for sale or purchase (classified) provided by the website owner or broadcaster. Let's take an example of Amazon that presents listings of different products ranging from antiques to video games to everything else from different sellers. Intromercials and ultramcercials are third party 'advertisements' that lead visitors to their websites along with browsing the desired content. Since such advertisements are content specific, thus they offer new information on the hot topics or issues that are related to the main site where they are placed. These models describe that customers are identified as buyers, sellers, traders (market segmentation), etc. Such models provide description of value proposition to bring visitors to the website as potential buyers or sellers. The [STRUCTURE] element of the BME can also be observed when the advertising model of the website is analyzed. The web presence is necessary for them; these models may offer virtual market place opportunities for buying, selling or auctions. These websites may also provide user registration facility to assist search facilities. These search facilities are often associated with temporarily or permanent gathering of personal information about customers in order to perform contextual advertising or behavioral marketing. For example, Amazon stores previous browsing history of the customer and made recommendation about his/her future buying from the Amazon website. Identifying sources of revenue is an important constituent of the [CONTEXT] element of the explicitness. The sources of revenue for advertisement model are banner ads, advertisements (intromercials, ultramercials and content targeted advertisement) and sponsored links, etc.

Business Model Ontology by Osterwalder: Another example can be taken from the of business model ontology (BMO), as proposed by Osterwalder and Pigneur (2004). The BME consists of four pillars. Each pillar is then further divided into nine building blocks. Table 5.5 shows the evaluation of nine building blocks of BME in the framework of BME.

CONTENT	Value proposition	**STRUCTURE**	Distribution channel	**CONTEXT**	Cost structure
	Target Customer		Relationship		Revenue model
			Value configuration		
			Capability		
			Partnership		

Table 5.5: Evaluation of BMO (Alexander Osterwalder) in terms of BME Framework

The BMO is self-descriptive when evaluated in the framework of BME. The product and the customer related building blocks, i.e., target customer, can be placed under the heading of the [CONTENT] element of BME framework. The building blocks related with the customer interface and infrastructure managements can be categorized as the [STRUCTURE] element of the BME framework, whereas, financial aspects of BMO can be categorized as the [CONTEXT] element of the BME framework.

The above examples have revealed that the business model taxonomy or framework can be explained in terms of the business model explicitness. Different components of each framework or taxonomy describe different areas of a generic value chain. These areas have been proposed in terms of three elements of the business model explicitness and a business model can be successful if it depicts all these three elements. In other words, we can say that that by defining its business model explicitly, the organization can achieves competitive advantage and its business model can creates a strong competitive advantage.

5.3. Hypothesis I - The Framework of BME

As stated in the first chapter, the hypothesis I is related with the framework of the BME. The ***hypothesis I*** states that the organization can become effective when its business model is evident not only to itself but to its partners, also. This statement has two parts; one part is related with the evidence of the business model, i.e., the framework of BME and the

other part is related with the effectiveness of the organization, i.e., productivity. In the previous sections of this chapter, the first part of the statement has already been discussed in terms of BME framework. The second part of the statement has been dealt in the Phase III of this research and will be discussed in detail in chapter 9. However, it is also important to discuss whether this framework has any implication in terms of theory and practice. In this section, the theoretical and the practical implications of the BME framework are discussed.

5.3.1. The Theoretical Implication of the BME Framework

Although, the business model concept is still in its infancy stage, a large number of explorative and empirical studies have contributed heavily in terms of business model definitions, classifications and frameworks. Still today, no common theory has been agreed upon to bring all those definitions, classifications and frameworks under one umbrella that provides the core description of the term business model. The first major contribution of the BME framework is in the field of business models. The BME concept provides a framework that is based on a common vocabulary to explicitly describe a business model. Various business models can be evaluated simultaneously through this framework, thus, diminishing the chances to ignore or overlook those business models that have yet to be discovered.

The second major contribution of this framework is in the domain of strategic management literature. As discussed in chapter 2, quite often, the concept of business models and strategy are intermingled by researchers, consultants and business managers. The framework discussed here also makes this phenomenon distinguished from the concept of strategy. The business strategy that can be specified by three questions, i.e., *what* is the offer, *who* are the customers and *how* to deliver the value or offer to the customer? (Santos *et al*., 2009), can be translated through a business model concept as a blue print of the company's logic of earning money (Osterwalder, 2004). Therefore, the BME framework has the capability to define the company's business models in the light of its business strategies.

5.3.2. The Practical Implication of the BME Framework

Along with theoretical contributions, the BME framework may also contribute towards practical implications. It has been discussed in the previous sections that a common vocabulary for describing business models is required when an organization have several business models at a time. The lack of shared vocabulary poses more problems to today's businesses as they are unable to explicitly articulate value creation and delivery, both for the customer and the company (Johnson, 2010). The BME framework facilitates managers with

the common vocabulary to describe their company's various business models in an explicit way. Thus, the true structures of business models are clear both for the company as well as its customers.

Similarly, for a company that may has different business models, a particular type of business model can be important for some of its partners and customers, while for others, some other business model can be of prime importance. It is, thus, essential for an organization to continuously innovate and reinvent whole or different parts of business models existing simultaneously. The framework of BME can provide an opportunity to business managers to regularly update their business models according to the needs and requirements of their partners and customers. Thus, the BME framework facilitates business model innovation and invention, a much needed phenomenon in today's business world (Johnson *et al*., 2010).

5.4. The Research Model

As discussed previously, the basic question that has been probed in this dissertation is mainly related with the importance of business models and their effectiveness for organizational performances. This dissertation aims to provide fulfill the three objectives, namely: 1) highlight the importance of the explicitness of the business model, 2) evaluate the proposed relationship between the BME framework and the innovative performance of an organization, and 3) Impact of factors affecting inter-organizational knowledge transfer on the effectiveness of business models. Until now, the first research objective has been achieved by defining and describing the BME framework. It has been observed that various business model concepts (taxonomies, classifications and frameworks) can be evaluated in terms of the BME framework. The discussion about theoretical and practical implications of the proposed framework has also highlighted the importance of the framework. However, still, it is needed to strengthen the concept further by utilizing various research methodologies. In order to reduce the uncertainty of interpretation of the proposition, the idea of triangulation is strongly recommended by experts in social and behavioral research (Bryman, 1988). Although, the research presented in this thesis is exploratory in nature, however, the concept of methodological triangulation has been applied in this research. Four different research methods have been used in this dissertation to investigate the problem (Figure 5.2).

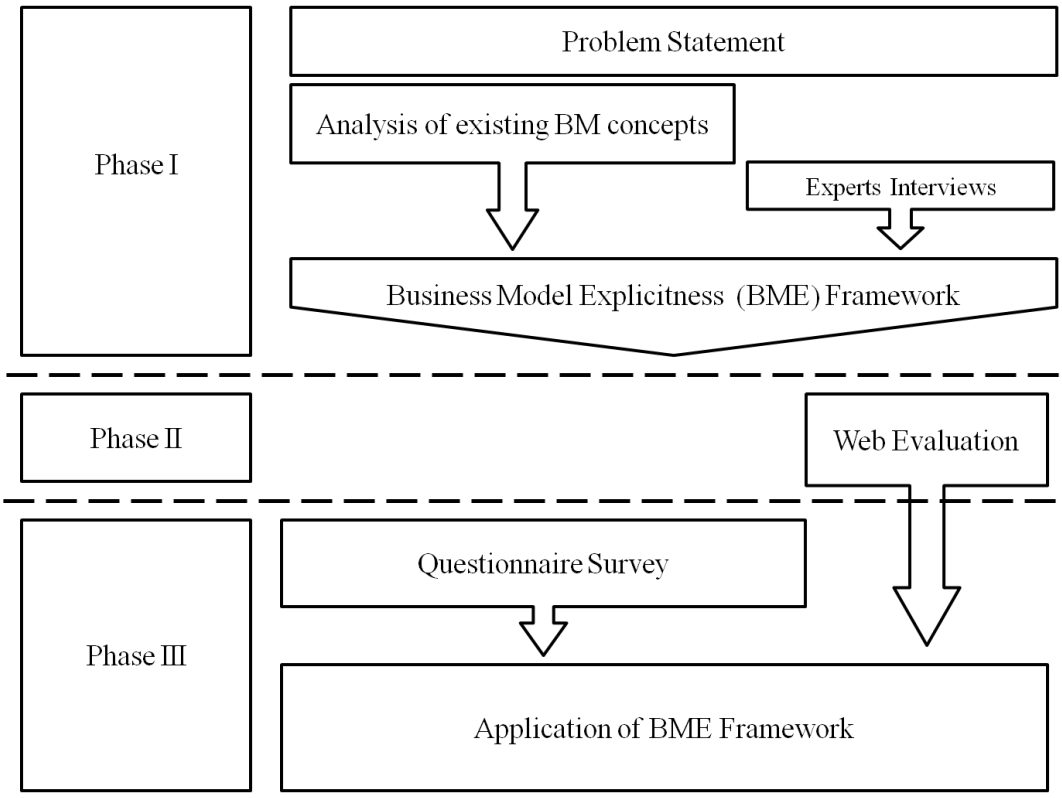


Figure 5.2: The Research Model

The first methodology that has been used in this dissertation is the literature review and analysis of the existing concepts and theories in order to propose the BME framework. The proposed frameworks for the BME and as well as research model were then discussed with the domain experts. The discussions with the experts from the related domain about the findings through literature review and analysis was the second method applied in this dissertation. Based on the feedback from the interviews, the third research method was used that included evaluating different websites of companies doing business over the Internet. The fourth research methodology is the questionnaire survey. Based on these different research methodologies, the research presented in this thesis has been divided into three distinct phases. In order to propose the concept of the BME framework, the analysis of existing business model concepts and interviews with the domain experts constitutes Phase I for this doctoral research. The proposed framework of BME is then evaluated for business models existed in the real world by a 'websites evaluation technique'. This constitutes the Phase II for this dissertation. Finally, a questionnaire survey is conducted in the Phase III to confirm the existence of the proposed framework of BME in SMEs of the ICT sector. In the following sections, a detailed review of Phase II and III is provided.

5.4.1. The Websites Evaluation

According to the research model, the phase II of the research consists of evaluating websites of companies doing business over the Internet within various sectors. When a company offers its products and services to its customers over the Internet, different organizational aspects and related issues are described in terms of e-business model. It is therefore, proposed that different aspects of an e-business model can also be addressed by the BME framework. Phase II of this research dissertation is based on this proposition. Websites of various companies in different sectors, like, Shopping, Consumer goods and Services, Telecommunications, etc., have been evaluated within the framework of BME. It is, thus, proposed that the company's e-business model can be described in the framework of BME. More detail about the research methodology applied in research Phase II is provided in the following chapter. The outcomes from the second phase research methodology are proposed to be consistent with the ***Hypothesis I*** statement. It is further proposed that the results from the Phase II research methodology can provide evidence for the applicability of the BME framework for the business models over the Internet.

5.4.2. The Questionnaire Survey

The Phase III of the research model consists of questionnaire survey. But before starting the discussion about the Phase III, it is commendable to propose a scenario or a use case from a specific industry in B2B domain in order to investigate the hypothesis II & III. For this purpose, the ICT sector has been chosen for the investigation. It is assumed that in a value chain of B2B domain, one organization acts as a *'source'* and other as a *'recipient'*. The recipient organization creates (innovates) new products or services and it requires input from its source organization. This input can be in the form of, either a product or service, or a combination of both. In these circumstances, the recipient organization is the customer and the source organization can be assumed as the supplier or the vendor. In this scenario, the products or services are often comprised as software, technology, skills, expertise or consultation. Thus, the software or the technology can be categorized as products, whereas, skills, expertise or consultation can be categorized as services. As stated previously, in order to innovate, different forms of knowledge (i.e., information, database, product, service, tool or human expertise) are required by the recipient organization. Similarly, certain value propositions can also be associated with the knowledge products and services. It may include mutual trust and understanding among the source and the recipient organizations, feedback, acknowledgement. On the other hand, in order to deliver the innovation products to the target

customers, it is important for the recipient organization to understand the customized requirements of the target customers. Therefore, in order to create customized products for the customers, the recipient organization acquires the desired knowledge from the source organization. Thus, based on the customer's specialized requirements, knowledge is transferred from the source to the recipient organization. Thus, the value propositions and the customer's speciality can be described in terms of the [CONTENT] element of BME.

Transfer of knowledge, which can be embedded in products and services, from the source to the recipient organization is based upon various value creating activities, processes and requires certain resources. These value creating activities can be further categorized as transfer of products from the source organization as a product, technology or service (through meetings, seminars, software, videos, documents, manuals, etc.), establish communication channels for exchange of information during transfer, utilize incoming product or service into innovation projects, design knowledge transfer activities (meetings, seminars, physical delivery, etc.), perform innovation activities, etc. These value creating activities also requires certain resources, e.g., databases, IT infrastructure, employees, financial resources, etc. The transfer of knowledge from external sources, which is embedded into products and services, cannot be completed without the involvement of its real owners. Thus, the recipient organization may have different types of organizational relationships with the external source of knowledge, e.g., partnership, the supplier, or even the customer. Therefore, all these aspects that are related to value creating activities can be described by the [STRUCTURE] element of the BME framework.

The main objective of the transfer of 'knowledge embedded products and services' is to carry out innovation within the recipient organization, therefore, the cost structure and the revenue model of such an organization depends on its innovation projects. Since organizational performance can also be measured in terms of innovation, thus I will use the term 'innovative performance' in the rest of the thesis. The innovative performance involves both financial and non-financial resources, inputs and activities, thus, increase in innovation depends on both types of resources and activities. Thus, when the recipient organization utilizes knowledge embedded products and services into its innovation related activities, the main objective is to enhance its innovative performance. This also involves consumption of these resources and inputs. Thus the enhanced innovative performance can directly be related with the cost and revenue model of the organization. Thus, an innovation project of an organization can be assumed as the revenue model that also involves some cost. As discussed

above, the innovation projects can exhibit the cost structure and the revenue model for the recipient organization; it can be described by the [CONTEXT] element of BME.

Therefore, in the above use case, all three elements of the BME framework have been identified in the perspective of an SME from the ICT sector. It can be summarized that the innovative performance of recipient organization may depend upon how explicit the business model is. The performance can also be dependent upon various factors, e.g., successful transfer of knowledge from the source organization and the collaboration. Thus, one can predict a link among different elements of the BME framework, innovative performance of the organization and the factors affecting successful transfer of knowledge from the source to the recipient organization. In the context of the BME framework, the above discussion can be summarized as the following:

1) The explicitness of a business model can be defined in terms of three elements of BME framework, i.e., the [CONTENT], the [STRUCTURE] and the [CONTEXT]. This has been described as ***hypothesis I*** in the previous chapters (Chapter 1).

2) When business models are made explicit, they can reflect how innovatively an organization can perform. Similarly, successful transfer of knowledge is also related with innovative performance of the organization. Thus, the relationship between the innovative performance of the organization and the transfer of knowledge can be described in the framework of BME. This has been described as ***hypothesis II*** in the previous chapters (Chapter 1).

3) Organizations have been assumed as knowledge repositories. The transfer of knowledge is deeply rooted within these knowledge repositories. It has already been suggested in the previous chapters that various factors affect the successful transfer of knowledge from the source to the recipient organization. Therefore, those factors that affect the transfer of knowledge among these organizations can also be addressed within the scope of organization's business model. In other words, the transfer of knowledge can be described in terms of the BME framework as well. Thus, the framework of BME can address the effectiveness of the organization for innovative performance. This has been described as ***hypothesis III*** in the previous chapters (Chapter 1).

Based on these points, the ***Hypothesis I***, ***II*** and ***III*** can be visualized as a causal link diagram. The causal link diagram represents the causal linkages among different theoretical

constructs that have already been discussed in this thesis. Figure 5.3 represents the simple causal link diagram.

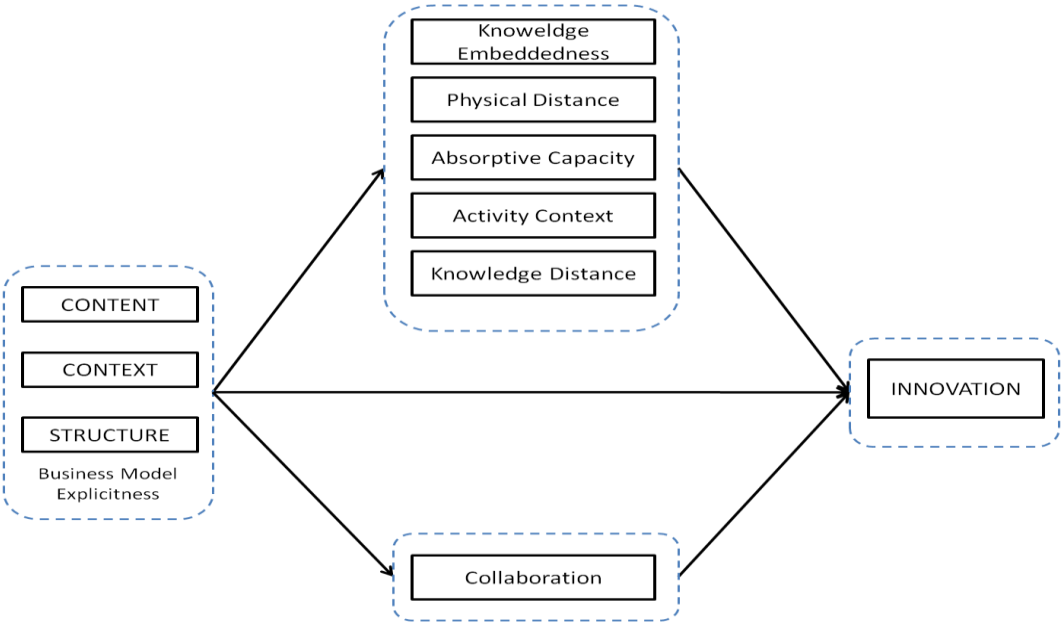


Figure 5.3: A simple causal link diagram

In the above diagram, the business model explicitness represent the BME framework, whereas, the innovation represents the innovative performance of the source organization. The two square blocks between BME framework and innovation are the factors that affect the successful transfer of knowledge. The horizontal arrow represents the direct link between the BME framework and the innovation and proposes that the explicitness of business model directly affects the innovative performance of the organization. This is the direct link that has been described as a ***Hypothesis II***. The diagonal arrows represent the indirect links between the BME framework and the innovative performance. This proposes that the explicitness of business model can indirectly affect the innovative performance if factors affecting transfer of knowledge are also considered within the BME framework. The indirect links have been described as a ***Hypothesis III***. Based on these hypotheses, an extended causal link diagram will be discussed in Chapter 7.

Most of organizations in e-commerce domain are concerned about enhancing non-financial performance. In the following chapters, the two research methods will discussed in detail that were used to determine the viability of the BME framework. The first method that is used to determine the existence of the BME concept is the evaluation of websites of different companies doing business over the Internet in the context of the BME framework. The second method that is used to address the causal link model is the questionnaire survey.

The questionnaire survey has been conducted to determine the validity of the BME framework as well as the proposed causal link model.

5.5. Summary

This chapter constitutes an important contribution for this research. It has been discussed that the foundations of the BME framework is based on the existing business model concepts. The BME framework can be defined in terms of three distinct elements that can also be visualized through the *'internal'* value chain of a company. Examples from different business models taxonomies and frameworks have also been evaluated in the framework of BME that also provide support to the proposed concept from theoretical point of view. This evaluation has further suggested further that there is a possibility of evaluating real time business models in the framework of BME. Core contributions of the proposed framework have also been discussed in this chapter from theoretical as well as practical aspects. The research model is discussed that provides justification for the use of methodological triangulation concept in this dissertation. It is discussed that based on this concept, different research methodologies, i.e., personal interviews with the domain experts, website evaluation and questionnaire survey, were employed to provide ample evidences for the existence of the proposed concept of BME framework. The last part of the chapter describes the proposed use case for the questionnaire survey which will be discussed in the preceding chapters.

6. The Website Evaluation - Application of BME Framework

This chapter describes the Phase II of the research methodology. The discussion in this chapter is also related with the ***hypothesis I***. In the previous chapters, a framework of Business Model Explicitness (BME) has been proposed. In order to evaluate the applicability of this framework, various research methods have been applied in this dissertation. The first method is the evaluation of the websites of companies doing business over the Internet in different sectors, e.g., Shopping, Consumer goods and Services, Telecommunications, etc. This methodology is based on evaluating the websites to identify different elements of the BME framework. In other words, e-business models of different companies are evaluated in the framework of BME. In this chapter, details of this method are discussed along with real life examples.

The first part of the chapter provides a general introduction about the commercial websites and their importance for creating value. It also describes how a website can describe a company's e-business model. An example from the Fisher-Price is provided to support this discussion. The second part of the chapter discusses the research methodology that has been applied to select, scan and evaluate websites of different business organizations operating via the Internet.

6.1. Introduction

According to Kalakota and Whinston (1996) electronic commerce refers to conduct business electronically including buying and selling of information, products and services via computer network. Thus e-commerce can be defined through different perspectives, e.g., communication perspective, service perspective and business perspective, i.e., application of technology towards the automation of business processes/transactions, etc. Keeping in view of these perspectives, the method of website evaluation is used in this dissertation to identify the existence of the explicitness of the business model by scanning web-sites of companies operating online. The website of the company represents what the company is doing and how it earns the profit, i.e., portraying its business model. Recalling the example from previous chapters, the website of Amazon offers wide range of products and services to its visitors and potential customers. It includes books, music, video, electronics toys and games, etc. these

major product categories can be further extended vertically into related products. For example, books include bestsellers, computer books, kids, management and business, fiction, etc. It was also discussed that with the passage of time, the business model of Amazon evolved, so did its website. It was concluded that the development of Amazon's business model can be clearly reflected by its websites captured at different span of time. Therefore, a website can be a good indicator to understand a company`s business model.

The website evaluation has been a popular topic especially in tourism and hospitality management domains. However, despite being millions spent on the website developments, websites are often not as effective as they are supposed to be (Morrison *et al*., 2005). The web has been used to accomplish complex tasks, e.g., learning, retrieving information, interaction and collaboration (Nikolaos *et al*., 2003). The website should present the company's information, the product and services the company offers to its customers, the online facility to buy or sell product, the information regarding buying and selling methods, the list of potential market segments, etc. Another benefit for the company by maintaining the website is the static or dynamic information available to its visitors 24 x 7. For many companies, the website is the first interface or the front office where the future customers can interact with the company. Therefore the content and the design of the website are the most important elements for designing websites for businesses. The question whether the contents and design also represent a company's business model will be addressed and answered in the following pages.

6.2. E-business Models

According to Hamel (2002), the business model of a company is composed of four components; 1) the core strategy; 2) the customer interface; 3) strategic resources; and 4) the value network. The customer interface can be further categorized into four elements; a) the *fulfillment and support*, b) the *information and insight*, c) *relationship dynamics*, d) and the *pricing structure*. With the evolution of e-commerce, there have been radical changes how companies can reach to their customers. The customer interface is important when the organization uses the website as the first interface or the front office. The *fulfillment and support* element addresses this issue. A website can be a tool the company may use as the channel of communication with the customer, to provide support and the method of service provisioning. Another important aspect of this component is the *information and insight*, the company provides to its visitors about the products, services, value proposition,

supplementary products and services and so on. It also includes knowledge that is collected from and utilized on behalf of customers, e.g., Amazon.com tracks users' preferences and then provides further recommendations based on these clicks. The most important aspect of the customer interface is the *relationship dynamics*. There would be hardly any company in the world that does not want to establish and maintain the genuine relationships with its customers. For many companies, it's the life line, e.g., Google is a web application, delivered as a service, based on specialized web based database (O'Reilly, 2005). It is ranked number one for traffic rank among many search engines. Although, it has hardly few products to offer, e.g., the Google search engine and the advertised products for users (Pynnönen *et al*., 2008), but it is the most accessed website throughout the world. The reason behind this large customer base is the relationship the Google has developed with its customers. Its powerful search engine provides whatever a user wants to know in the simplest yet manageable way. An easy and cheaper access to product and its related information is the fourth important element of the customer interface. The *pricing structure* of the products and services led the customers to make on the spot decisions to buy products and services. Online pricing structure also facilitates customers to make comparisons among different products and buy the most economical one.

6.2.1. The Example - Fisher-Price®

An example is provided here from the list of websites selected for evaluation in the context of BME. The website of the Fisher-Price is the customer interface (Figure 6.1) that offers different products and services, e.g., toys, games, parental guides, etc., for all age groups of children.

Figure 6.1: Product breadth and depth at www.fisher-price.com

The company offers various products lines. Each product line is then further extended by specific product assortment based on age and type, product tips, parental guides, etc. Fisher-Price offers different options to its visitors, e.g., the visitors can navigate between different pages and read detailed description of a particular product. Similarly, the website also mentions different value propositions that are offered by the company to its customers. For example, in the 'SHOP' section, there is a special section for 'special offers' that provides information regarding latest bargains and savings on different items. These bargains are available when a customer buys some products through other online stores (e.g., Amazon, eToys, Kmart, toysrus, etc.). Additional information related to product hazards and misuse is also available to customers on the website. This section includes different product recalls and advisory notes from government departments related to identified hazardous features of different products. Furthermore, Fisher-Price also offers free catalogues through mail order within specific territories (e.g., USA and Canada) as well. In addition to this, Fisher-Price also sends email updates and other related information to its customers email boxes who also become members via email subscription.

The Fisher-price also mentions its business partners on its website. These business partners are involved in different business activities with Fisher-Price. For example, these business partners offer display places for Fisher-Price products. Among them are airports, zoos, cruises and ships, hotels and fitness centers (Figure 6.2). Other business partners, e.g., Amazon, eToys, Kmart are also listed on the website under the category of 'where to buy'.

Figure 6.2: List of major business partners at www.fisher-price.com

These companies provide online buying facilities to the Fisher-Price customers. A link is provided on the Fisher-Price website to redirect its customers to its partners' websites. As Fisher-Price is a consumer oriented website that aims at selling its product via the Internet, therefore, the company offers each product's price model on its website. When the customer proceeds with the online shopping through shopping cart, the price including sales tax and shipping and processing fee is available for customer's review. Other costs including

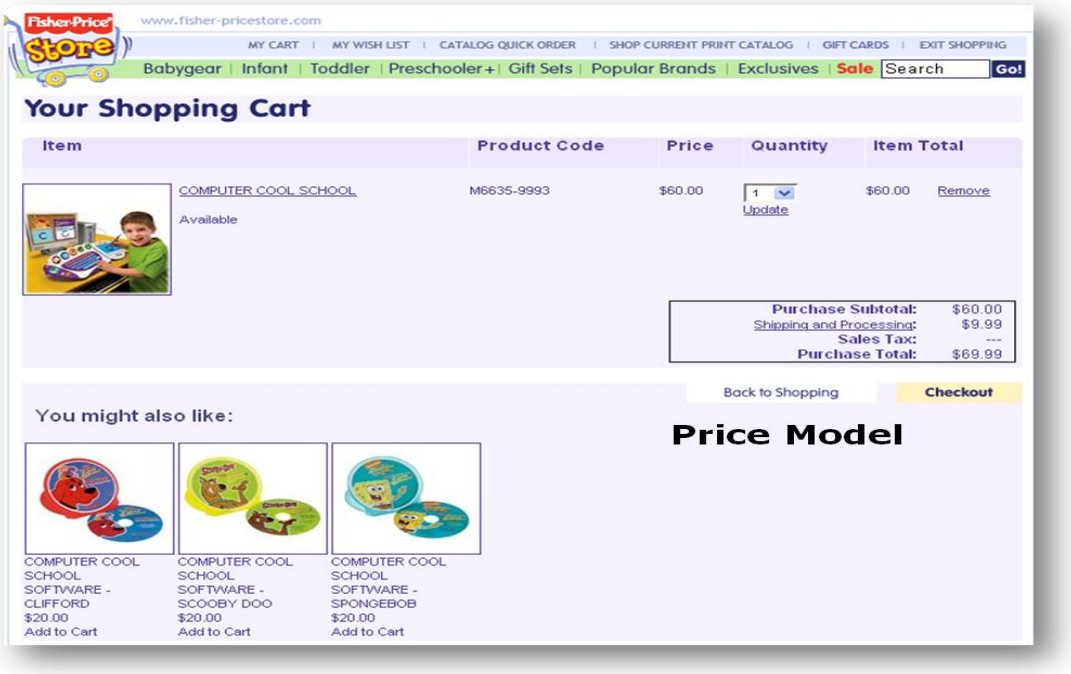


Figure 6.3: The price model of a product at www.fisher-price.com

shipment, handling and delivery are also mentioned on the website. Standard shipping rates based on order total are also available at the website (Figure 6.3).

6.3. Methodology

The main purpose of website evaluation is to investigate whether the business model of a company can be made explicit through its website. The idea is based on the fact that at one point of time, a company can have different types of e-business models, for example, it can has an e-shop that can provide e-procurement or e-auction facility to its customers. The company can also offer collaboration platform for discussions and sharing experience of its products by different users and customers. The company may offers third party market place to other vendors as it was discussed in the case study of Fisher-Price. These are different types of business model taxonomies proposed by Paul Timmers. Evaluation of different business

model taxonomies has already been discussed in detail previous chapters. However, in this chapter, the discussion is supported with some empirical investigations that provide support to the idea of BME. For this purpose, the special seminar have been designed and conducted, particularly on the issue of the business model explicitness and generally about e-commerce.

This seminar is the one from the series of KFK e-commerce lectures of TU Wien comprising four modules. Students from computer science or business informatics can participate in this course. This seminar is related to "case studies and current development" (Fallstudien und aktuelle Entwicklungen) module. In the first part of the seminar, the participants have taught about the concept of the business model explicitness. They were then assigned website evaluation forms to evaluate different websites of companies operating in the B2B and B2C scenario.

6.3.1. Evaluation form

For this exploratory study, a website evaluation form has been designed (Annex-I). The evaluation form is divided into three major sections based on each element of the BME framework. Questions in each section are designed to measure the specific element of the BME framework in the perspective of different attributes of websites, e.g., company information, function, product information and promotion, buy/sell–transaction, customer services, ease of use, innovation in services, etc. The questions have been proposed after reviewing websites of different companies operating via the Internet. Each question is started with either '*The website provides*' or '*The website offers*'. Two values have been assigned to indentify the presence of absence of each aspect. Answers with value '1' have identified the presence of the particular attribute whereas answers with value '0' have represented absence of an attribute. The sum of each response shows how strongly the element of explicitness of the business model can be identified through this evaluation form.

In the following paragraphs, three sections of the evaluation form are discussed in terms of the business model explicitness.

a. [CONTENT]

The first section of the evaluation form gathers information about products, services, and the value proposition offered by the company. This section evaluates the existence of BME framework by asking questions like, if the company identifies the potential users of the products or services, offer value proposition, e.g., after sale services, order status, delivery

schedule, etc., provide information about services related to the core products of the company, e.g., user manuals, FAQs, training, etc., predict consumer behavior by retaining navigation history for future recommendation, provide facilities to build personal profile at company's website, other benefits related to the use of a particular product, and information on supplementary products, etc.

b. [STRUCTURE]

The second section of the website evaluation form gathers information regarding the [STRUCTURE] element of the business model explicitness. The measurement for this particular element can be made by identifying if the company's website provides: description about the partners and the customers in the value chain; the description of controlling measures for maintaining product quality; description about the functionalities of different departments, e.g., production, delivery, marketing, etc.; description about resources used in the manufacturing or delivery of the products; online buying and selling facility for the customers; systematic sales assistance during online transaction; synchronizing online payment procedures; operational facilities, e.g., order tracking system for buyers and sellers; information about various standards (government or non-government).

c. [CONTEXT]

The third section of the evaluation form explicates items related to the [CONTEXT] element of the business model explicitness. The items included to verify the presence of this element are; disclosing full transaction cost to the customer for buying products/services online; the company provide investment opportunity to its customers by placing advertisements on its domain or providing publishing space for self created contents by customers; providing selling or auction opportunity to its customers via company's web portal (e.g., amazon.com); offer paid membership schemes to the subscribes, visitors with premium benefits; identify other business possibilities with the company, e.g., pay per click, facility to upload larger volume of data, etc.

6.3.2. Results

As discussed in the start, the results acquired through website evaluation are related to the ***Hypothesis I*** that states that organization can become effective when its business model is evident not only to itself but to its partners (and customers) also.

In order to address this hypothesis, the research has been designed to evaluate the concept of business models in the domain of e-commerce. Further categories were selected randomly from www.alexa.com to evaluate websites of different companies from this sector. These categories are; 1) *Biotechnology and Pharmaceuticals*; 2) *Business Services*; 3) *Consumer goods and Services*; 4) *Information Technology*; 5) *Telecommunication*; 6) *Financial Services*; 7) *Shopping*; and 8) *Beauty*. Different companies are selected randomly within these categories. Table 6.1 displays the summary of statistics for different websites that are evaluated for BME Framework.

Sr. No.	Category	Company Name	www	Number of evaluations
1	Beauty	Bath & bodyworks	www.bathandbodyworks.com	1
2	Biotechnology & Pharmaceuticals	Merial	www.merial.com	1
3	Business Services	PriceWaterhouseCoopers	www.pwc.com	1
4	Consumer Goods & Services	Chinavasion	www.chinavasion.com	1
5	Consumer Goods & Services	Fisher-Price	www.fisher-price.com/us/default.aspx	1
6	Consumer Goods & Services	sansha	http://www.sansha.com/	1
7	Consumer Goods & Services	Swarovski	www.swarovski.com	1
8	Consumer Goods & Services	Whirpool	www.whirpool.com	1
9	Consumer Goods & Services	Hasbro	http://www.hasbro.com	1
10	Consumer Goods & Services	Lego	http://www.lego.com/en-us/default.aspx	1
11	Information Technology	Rila Solutions	http://www.rila.com/	1
12	Retail Trade	Play It Again Sports	www.playitagainsports.com	1
13	Shopping	Amazon	www.amazon.com	1
14	Shopping	game Stop	http://www.gamestop.com/	1
15	Shopping	Gap	http://www.gap.com/	1
16	Shopping	H&M	http://www.hm.com	1
17	Shopping	Ikea	www.ikea.com	4
18	Shopping	eBay	http://www.ebay.com	2
19	Telecommunications	Nokia	www.nokia.com	1
20	Telecommunications	Nokia europe	http://europe.nokia.com/	1
21	Telecommunications	T-Mobile	http://www.t-mobile.com/	1
Total				25

Table 6.1: List of websites evaluated for identifying BME elements

A total of 25 evaluation forms were received from the students which provided data within 8 categories. It can be observed that most of the evaluations are made for *Shopping* category. The second commonly chosen category is *Consumer Goods & Services.*

Each section of the evaluation form is designed to measure the specific element of BME framework. Therefore, it is useful to analyze the number of positive responses from each section. Responses for the presence and absence of each item in the form were summed and at the end, the average was calculated for non-zero responses. The main summary of the results in terms of categories and BME is given in the table 6.2.

Category	Elements of BME Framework					
	[CONTENT] *(15)*		[CONTEXT] *(10)*		[STRUCTURE] *(11)*	
	Sum	Average	Sum	Average	Sum	Average
Shopping *(10)*	103	68,67%	39	39,00%	82	74,55%
Consumer Goods & Services *(7)*	80	76,19%	14	20,00%	55	71,43%
Telecommunications *(3)*	40	88,89%	10	33,33%	28	84,85%
Beauty *(1)*	10	66,67%	2	20,00%	10	90,91%
Biotechnology & Pharmaceuticals *(1)*	9	60,00%	1	10,00%	2	18,18%
Business Services *(1)*	9	60,00%	1	10,00%	1	9,09%
Information Technology *(1)*	7	46,67%	2	20,00%	5	45,45%
Retail Trade *(1)*	6	40,00%	2	20,00%	2	18,18%
Total	264	70,40%	71	28,40%	185	67,27%

Table 6.2: Summary of the results of BME framework evaluation for websites in various categories

The *numbers* in the parenthesis, in the top row, represent the maximum number of questions in each section of the evaluation form for different elements of BME framework, i.e., 15 questions were designed to measure the [COTENT] element of BME framework and so on. On the other hand, the *numbers* in the first column on the left side of the table represent the total evaluations in each category, i.e., 10 evaluations were made for *Shopping* category and so on. For different elements of BME framework, the values in columns represent the sum and the percentage of positive responses received for different categories. For example,

from 10 evaluations in *Shopping* category: out of 150, 103 responses were positive for the [CONTENT] element; out of 100, 39 responses were positive for the [CONTEXT] element; and out of 110, 82 responses were positive for the [STRUCTURE] element. In the above table next to the column for sum, there is the column for simple arithmetic average. It is, thus, identified that in *Shopping* category, companies emphasize mostly on the [STRUCTURE] element of the BME framework. It can be identified through this evaluation that these companies design user friendly websites and provide facilities for online transactions. Many of them also provide acknowledgements to their partners, suppliers and customers through their websites. Along with providing product related information and knowledge, these websites are also the source of delivering products and services to their customers. For example, many companies in different categories like, shopping, entertainment and communication, provide online access to their customers for different products and services, e.g., online books, songs, videos, software, etc.

From the above table, it is also clear that in shopping category, the [CONTENT] element of business models is also of great importance. The percentage of positive response shows that companies in this sector also give importance to their customers, products, services and associated value propositions. Many websites offer *information and insight* to their companies' products, services and processes. These websites act as advertisement models to target selected market segments. Some companies not only advertise their own products through their websites, but also provide related product information on the same page to provide value proposition. For example, many airline companies offer online booking facilities for flights, hotels and cars through their websites. In such cases, they offer economical packages so that their customers may buy the complementary products as well.

By taking the sum of average of positive responses for each element of BME framework for all these evaluation, it is indicated that for most of the companies in the e-business sector, the concept of the [CONTENT] and the [STRUCTIRE] element of BME framework are the most developed. One can observe that companies like Amazon, Gap, GameStop, H&M, and especially eBay have large number of online visitors. Most of these companies are traders, suppliers, and even manufacturers. Because of large number of online visitors, they create highly attractive and interactive websites. These companies differentiate their products and services based on different market segments. Their market segmentation is often based on geographic, demographic or psychographic patterns. In order to attract visitors

and retain them as customers, these companies implement different strategies for product distribution, communication channels, customer interfaces, and customer integration. They create value by providing systematic sales assistance, online transaction facility, home delivery services and other operational facilities. In order to create brand image and customer loyalty, these companies often acknowledge their partners and suppliers' presence within the value chain through their websites.

The evaluation results have revealed that most of the companies in different sectors emphasize less on the [CONTEXT] element of the business model. For example, in *Shopping* category, out of 100, only 39 responses were indicated positive for the presence of this element on these websites. Similar results from other categories reveal the same story. It appears that the most of these randomly selected companies overlook this aspect while designing their websites for e-business models over the Internet. This particular element of BME framework identifies the revenue and the cost model of the organization. Although most of these companies do own their own brand products but still they provide advertisement and third party market place to other sellers on their web portals. These companies not only act as virtual marketplaces, but also provide collaboration platforms for buyers and sellers. They offer advertisement and banner ad places on their websites and charge domain space fee. Their online collaboration tools are used by advertisers and sellers to connect with their customers and in return pay small proportion out of membership fee to these retailing companies. Most of these retailing companies offer online transaction services to the customers of these sellers and auctioneers, thus charge service fee from the parties involved. Although many companies offer business opportunities by offering spaces on their websites for advertisements, but still, this particular aspect of business models is not found fully developed in the selected companies during this evaluation.

6.4. Summary

This chapter provides an overview of the Phase II for this doctoral research. The websites for different businesses in e-commerce sector were selected randomly for evaluation. For this purpose a research methodology was designed that is based on the fact that a website can be a good indicator to understand a company`s business model. The first part of the chapter provided a general introduction about the e-business models. The discussion was further enhanced by an example from a real life e-business model of the Fisher-Price®.

The second part of the chapter explained the research methodology that has been used in Phase II. An evaluation form has been designed that was then filled out by a group of students from Vienna University of Technology. Different websites of companies from e-commerce domain have been evaluation through the evaluation form by the students. The results of this evaluation revealed that for most of the companies, the [CONTENT] and the [STRUCTIRE] element of BME framework are well developed, whereas, these companies apparently emphasize less on the [CONTEXT] element of the BME framework. The results of these evaluations confirmed that the framework of BME can be used to evaluate different e-business models from real life examples. This evaluation also supports the ***hypothesis I*** that states that for effectiveness of a company, an explicit business model is very important. A business model is explicit when it is visible '*publicly*' to it partners. Thus, '*explicitness*' is a concept which can be found on websites, making the way of doing their businesses '*open*' and '*apparent*' to the outer world.

7. Data collection – The Questionnaire

7.1. Introduction

The third phase of this research consists of three steps, i.e., data collection, processing and analysis. Data collection can be divided into two steps, viz., pre- and post data collection. Pre-data collection step consists of creating theoretical constructs by primary and secondary sources, developing hypotheses to describe each theoretical construct into respective variables. Table 7.1 represents different research steps used in phase III for this dissertation.

Step	Technique	Prupose
Pre-data collection	Literature review, etc.	Prepare theoretical constructs
	Hypothesis development	Translating theoretical constructs into variables
		Transcribe variables into measurement items
Data Collection	Questionnaires,	To collect raw data through measurement items (i.e., questionnaires, etc.)
	Interviews, etc.	

Table 7.1: Different steps of Pre-data and Data Collection steps during Phase III

As discussed in this chapter, data collection steps mainly consist of explaining the sample chosen to study these proposed relationships, design and administration of the questionnaire and different variables used in this survey. Data collection steps include sampling methodology, identifying different types of variables like, dependent, independent and intervening variables, etc. The chapter also provides discussion on causal link diagrams.

7.2. Sampling Methodology

In order to select the sample for this survey, technique of non-probability sampling was adapted. There are different reasons to use non-probability sampling, e.g., 1) due to very small response rate in previous studies carried on business models, it was not possible to use probably or random sampling for this doctoral research, 2) since, this is an exploratory research, therefore, prior to collect data in large quantity, it is better to test the proposed hypotheses in a pilot study. For this purpose, a group of survey respondents was identified from the list created with the help of the supervisor that include selected IT experts mainly

involved in different research projects with e-commerce group at the Institute of Software Technology and Interactive Systems, Vienna University of Technology.

A total of 29 target companies were selected to be contacted for filing out the questionnaire. These are small and medium sized companies having employees ranging from 15-200 and are doing business in the doming of IT (information technology) sector and TL (Telecommunication) sector. Since both these sectors have already been studied together in some research studies, therefore, they may also be treated as a single sector that can be called as *ICT sector* (Hallikas *et al*., 2008).

7.2.1. Respondents Interviews

Due to very small sample size and the exploratory nature of the study, target respondents were requested to become interview partner in order to fill out this questionnaire. Appointments were requested through emails and telephone to set timings and meeting place. With 33% response rate, only 10 target respondents agreed to take part in this survey. Managers from top and middle tier of these organizations have participated in this survey. During these face to face meeting sessions, different items included in the questionnaire were discussed and refined subsequently.

7.2.2. Questionnaire Design

The questionnaire template was created to provide answers to the last two main ***hypotheses II*** & ***III*** (Annex-II). In ***hypothesis II***, it is proposed that direct relationship may exist between BME and the innovative performance of an organization. ***Hypothesis III*** proposes indirect relationship between BME and innovative performance through successful transfer of knowledge and collaboration. This questionnaire also addresses various objectives of survey analysis for this thesis, e.g., 1) to provide answers to various hypotheses stating direct relationship between the business model explicitness and the innovative performance of the organization, 2) to provide answers to various hypotheses stating indirect relationships between the business model explicitness and the innovative performance of the organization, 3) to identify direct and indirect relationships, between BME and the innovative performance through successful knowledge transfer and collaboration, by evaluating qualitative data from the questionnaire.

The questionnaire consists of five main sections. The first four sections were categorized as A, B, C and D. The first section (A) contains items related to the control

variables. The second, third and fourth section mainly consists of multi-response questions that were created in the framework of the theoretical model discussed previously. The last section includes three questions that require respondents to use their own words to describe explicitly about their organizations' business model and its relationship with the transfer of knowledge and collaboration.

The questions were proposed and borrowed from other empirical studies on the relevant concepts. Most of the questions were developed to rate the item on the Likert scale. The Likert scale consists of seven response options ranging from '0 = not applicable', '1 = to a very small extent' to '6 = to the very large extent', based on ordinal data. Other scales used to collect data were nominal and quantitative scales. The last part of the questionnaire consists of three open ended questions and was used to gather descriptive information in text form on the core elements of the questionnaire.

The items included in the questionnaires were designed mainly in the framework of the business model explicitness. Three elements of the BME framework were operationalized through various questionnaire items. A schematic representation the relationship of different questionnaire is presented in Figure 7.1. At least two questions were created to measure different theoretical constructs. However, for measuring each element of BME framework, only one question was designed. In this way, each question that was designed for each element of BME framework, it was also used to measure other theoretical construct.

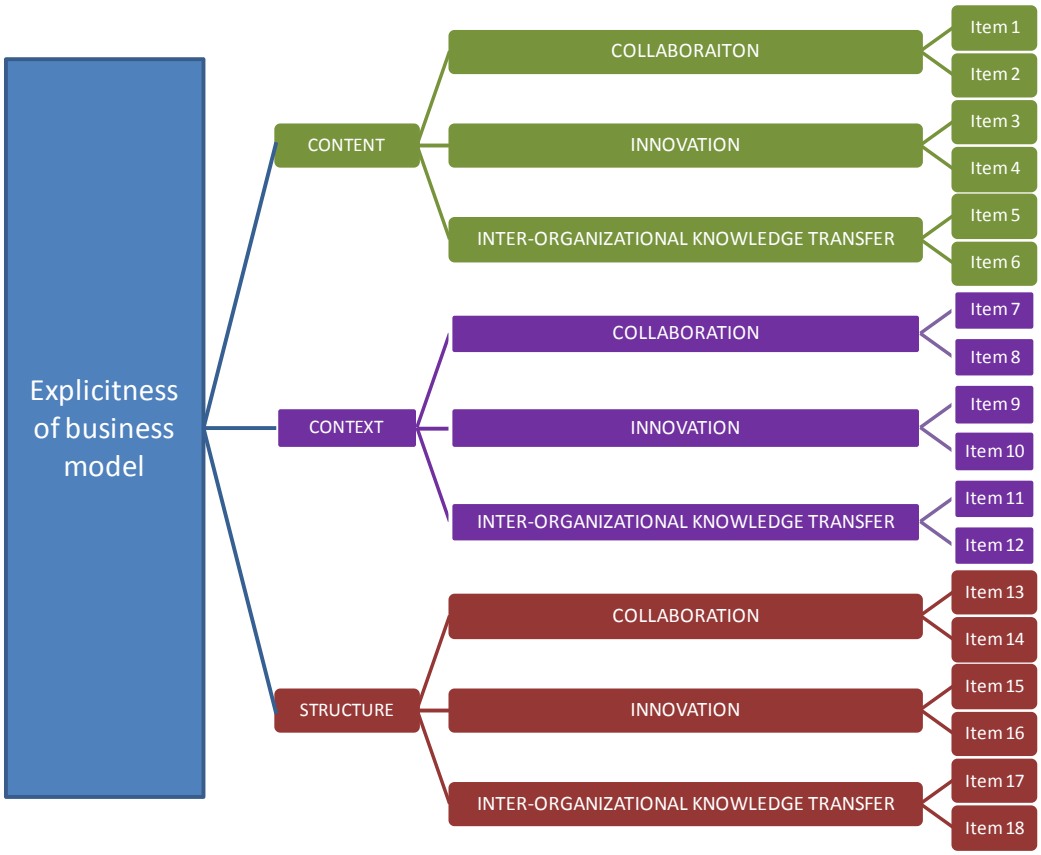


Figure 7.1: Relationship of different theoretical constructs in the questionnaire

Since the concept of the BME framework has been defined in terms of 'what', 'how', and 'why', therefore, various items were used to measure two concepts at the same time. For example, the question '*research team members have identified channels of communications (telephone, personal contacts, groupware and other team collaborating tools, chatting, messengers, video conferences, etc.) to contact other members during innovation projects*' measures two theoretical constructs. On one hand, it measures the existence of the [STRUCTURE] element of the BME framework (i.e., in terms of using communication channels for value configuration), while on the other hand it also measure the *Absorptive Capacity* of the recipient organization (i.e., how effectively the knowledge is disseminated within the respondent organization).

7.3. Independent variables

One of the main theoretical construct defined for this thesis is BME. The three independent variables indentified for this thesis are the three elements of BME, namely, the [CONTENT], the [CONTEXT] and the [STRUCTURE]. In the following pages, I will present detailed discussion on these three elements in the perspective of the business model for a small organization in ICT sector.

7.3.1. [CONTENT]

The [CONTENT] element of the BME Framework has been defined in terms of products/services, value proposition and the end consumers. Products and services are the final outputs a company can deliver to its customers. Certain value propositions can also be associated with the products and services. Customers, also called as end consumers, can be either individual customers or other business organizations for which value configuration has been designed in conjugation with resources and partners.

Value proposition: In the perspective of SMEs in IT service sector, knowledge is the primary resource that can be exchanged in order to create value. This exchange of knowledge can be assumed as a business transaction that can be based on certain value propositions by the recipient organization and special characteristic related to the source organization. One of the most important factors that are associated with transfer of knowledge from the partner is the level of trust between the source and the recipient organization. The *competence-based trust* is especially important for the receipt of knowledge from knowledge sources (Levin *et al*., 2002). Thus, in order to enhance organizational performance, level of mutual trust for performing knowledge transfer activities is an important factor and can be assumed as a value proposition for the source as well as recipient organization.

The correct feedback (Albino *et al.*, 1999; Lahti & Beyerlein, 2000), acknowledgement (Lahti & Beyerlein, 2000) and '*unlimited*' access to gain knowledge (Mowery *et al*., 1996) from tangible and non-tangible resources can also increase transfer of knowledge and collaboration among interacting firms, hence, enhancing the chances of higher innovative performance. Thus, such characteristics can be assumed as value proposition for those companies who are actively engaged in knowledge transfer as partners for delivering value to the final consumers. These are the perceived benefits when two organizations exchange knowledge as a critical resource for value configuration.

Customer Speciality: The specialization of customers for delivering innovation in terms of R&D focus, technology and market provide justifications for recipient firms to contact those specialist firms that can provide them with the type of knowledge they require for value configuration. The inter-firm collaboration among such firms can be developed based on prior knowledge distance existed between the

source and the recipient. When appropriate knowledge distance is present in such collaborations, it can also be assumed as value proposition for recipient firms that can facilitate the transfer of knowledge from the source to the recipient firm.

Based on the above paragraphs, a correlating relationship can be proposed through three ***sub-hypotheses*** among the [CONTENT] element of business model and three other variables, i.e., *Activity Context*, *Knowledge Distance* and *Innovation*. The explicitness of business model enhances the organization's innovative performance; however this performance can be positively affected by the presence of variables related to inter-organizational knowledge transfer. These relationships can be stated through the following sub-hypotheses:

Sub-hypothesis 1a: there is a positive correlation between the [CONTENT] element of the business model explicitness and the innovative performance of the organization (innovation).

Sub-hypothesis 1b*:* the positive correlation between the [CONTENT] element of the business model explicitness can be enhanced by mediating effect of *Knowledge Distance* between the source and the recipient organization.

Sub-hypothesis 1c*:* the positive correlation between the [CONTENT] element of the business model explicitness can be enhanced by mediating effect of *Activity Context* between the source and the recipient organization.

The proposed relationships between these variables can be defined by the following diagram (Figure 7.2).

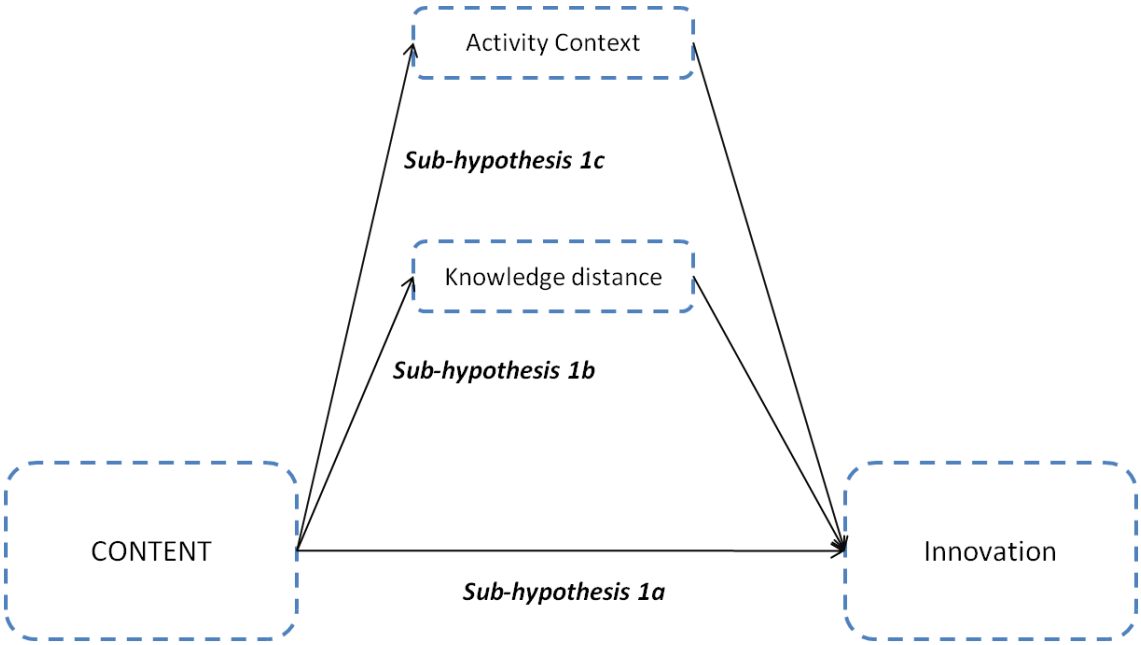


Figure 7.2: Proposed causal links among [CONTENT], Knowledge Distance, Activity Context and Innovation

From the above diagram, it is proposed that total effect of the [CONTENT] element of the business model explicitness along with knowledge distance and activity context on innovation will be greater than the total direct effect of [CONTENT] element on innovative performance. It means that the success of knowledge transfer will higher with the factors, like, the source has the special technology and the complete knowledge of the market, there exists a high level of mutual trust, correct feedback and acknowledgment for knowledge transfer activities among interacting organizations. Therefore, a successful transfer of knowledge facilitates innovation process at the recipient end. Thus a direct relationship is proposed among certain value propositions, customers' speciality and the innovative performance through mutual research teams of the source and the recipient organization. It is also proposed that this direct relationship may be enhanced when the recipient organization has prior knowledge about the technology and other knowledge related inputs received from the source organization.

7.3.2. [CONTEXT]

Innovation is one of the perspectives which lead organizations to earn revenue (Jana, 2009). Therefore, as the indirect measures for earning revenues, innovative performance of the organization is used as the core concept in this thesis. The [CONTEXT] element of the business model explicitness has been proposed to be expressed by identifying sources of revenue and cost. The questionnaire included various items related to the revenue and cost models of the SMEs in IT service sector.

Revenue Model: As knowledge is the key source for value creation processes within organization, therefore, transfer of knowledge from the source to the recipient organization and then its subsequent application can yield numerous benefits, particularly an increase in revenues by increasing rate of innovation. While collaborating on certain innovation projects, the interacting organizations may create research teams that can be composed of employees from the source organizations and the members of the recipient organizations. Such teams are supposed to share their expertise with other team members, thus enhancing innovative performances of other members too. Major objectives of creating such teams are to enhance creativity and group synergy. Mutual collaboration among members of these teams may not only enhance the rate of innovation for that particular project, but can also increase general performance of the organization. Since, the knowledge received from external sources may not become obsolete in these organizations; therefore, it is also possible that this knowledge may also enhance performance of other functional departments of the organization.

Cost Model: The R&D department of an organization performs two roles, *firstly*; producing new knowledge, and *secondly;* increasing absorptive capacity. In certain situations, it is possible that the mutual research teams may create new knowledge that is not aligned with the core product/service focus of the recipient organization, thus incurring costs to the organization. Thus, the cost model of an organization may also depend upon the outputs of those research teams that are specially created for innovation projects among the source and the recipient organizations during transfer of knowledge.

Based on the above paragraph, a correlating relationship can be proposed among different variables, i.e., the [CONTEXT] element of the business model, innovation and the absorptive capacity. Explicitly identifying sources of revenues and cost may enhance innovative performance of the organization, however the performance can be further enhanced if absorptive capacity of the organization is enhanced by aligning innovation projects along with the product/service focus of the recipient organization. The relationships can be hypothesized as following:

Sub-hypothesis 2a*:* There is a positive correlation between the [CONTEXT] element of the business model and the innovative performance of the organization.

***Sub-hypothesis 2b**:* the positive correlation between the [CONTEXT] element of the business and the innovative performance of the organization can be enhanced if *Absorptive Capacity* is increased.

The positive relationship among these variables can be defined by the Figure 7.3.

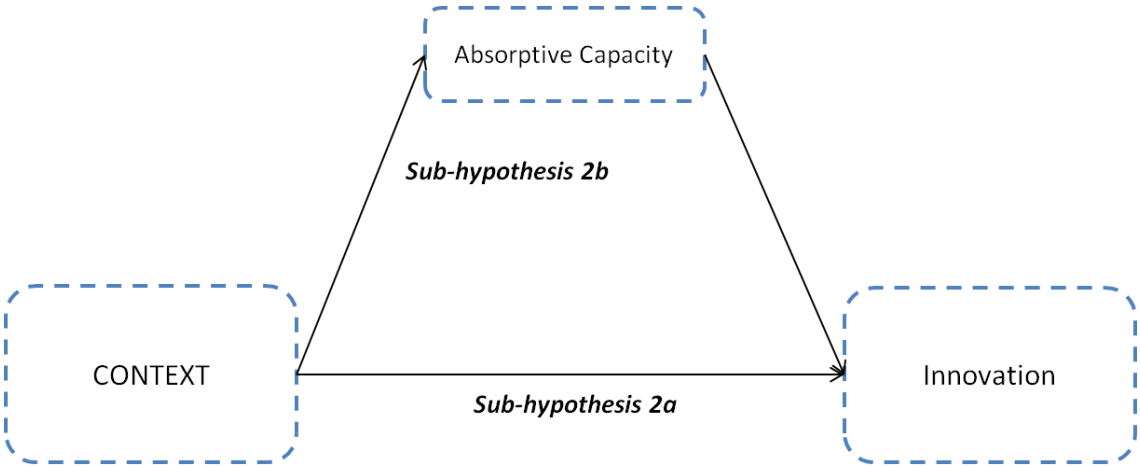


Figure 7.3: Proposed causal links among [CONTEXT], Absorptive Capacity and Innovation

It is proposed that the total effect of Cost and Revenue models through successful acquisition, dissemination and application of knowledge is greater as compared to total direct effect of the cost and revenue models on the innovative performance. It means that when the employees of the recipient organization learn new knowledge from the experts of external source by interacting in a mutual research team, then these employees can use this knowledge in their innovation projects more to increase rate of innovation.

7.3.3. [STRUCTURE]

The [STRUCTURE] is the element of the business model explicitness that has been taken as independent variable for this model. The [STRUCTURE] element has been defined in terms of value configuration, resources and partnership. According to resource based theory, organizations are the bundles of different resources. These resources are shared with their partners in order to create value for their customers. These partners may include suppliers, complementors, customers, competitors or other stake holders.

Value configuration: In the perspective of mutual research teams, where the knowledge embedded into members is the primary resource for creating value, value configuration means mutual collaboration for transfer of knowledge. This collaboration can be done by establishing virtual teams source of knowledge is abroad.

The members of mutual research teams can identify and assigning research tasks for performing different activities related to innovation projects. It includes, designing knowledge transfer mechanisms with mutual understanding with the partners, channels of communication, etc. It is suggested that the more the innovative activities are distributed among different members of the source and the recipient organization, the more are the chances to successfully transfer knowledge from the source to the recipient organization and the higher would be the chances to innovate better

Resources: Expertise and skill are the critical resources that are valuable for performing innovations within organizations. It is suggested that the human resources and the IT resources are core elements to enhance innovation capabilities. Thus, the more these resources are shared by the source organizations in mutual research teams, the more are the chances for recipient organizations to learn new skills and enhance their expertise. Thus, by sharing human and IT resources within mutual research teams facilitates successful transfer of knowledge from source organization to the recipient organization that will enhance innovative performance of the recipient organization.

Partnership: It is suggested that frequent and more established interaction pattern facilitate transfer of knowledge that further enhances innovative performance of the organization. Thus, transfer of knowledge and collaboration with suppliers and customers is more fruitful for the recipient organization as there already exist a mutual understanding between the partners.

Based on above arguments, it is proposed that the [STRUCTURE] element of BME is directly related with the innovative performance of the recipient organization. However, the relationship can be further enhanced when it is mediated by other factors that affect successful transfer of knowledge from the source to the recipient organization. Among these factors are: absorptive capacity, activity context, knowledge embeddedness, physical distance and collaboration (organizational distance). The formally stated sub-hypotheses are:

Sub-hypothesis 3a*:* there is a positive correlation between the [STRUCTURE] element of the business model explicitness and the innovative performance of the recipient organization.

***Sub-hypothesis 3b**:* the positive correlation between the [STRUCTURE] element of the business and the innovative performance of the organization can be enhanced if *Activity Context* is higher.

***Sub-hypothesis 3c**:* the positive correlation between the [STRUCTURE] element of the business and the innovative performance of the organization can be enhanced if *Physical Distance* is decreased.

***Sub-hypothesis 3d**:* the positive correlation between the [STRUCTURE] element of the business and the innovative performance of the organization can be enhanced if *Knowledge Embeddedness* is decreased.

***Sub-hypothesis 3e**:* the positive correlation between the [STRUCTURE] element of the business and the innovative performance of the organization can be enhanced if *Absorptive Capacity* is increased.

***Sub-hypothesis 3f**:* the positive correlation between the [STRUCTURE] element of the business and the innovative performance of the organization can be enhanced if *Collaboration* is increased.

The Figure 7.5 shows these relationships.

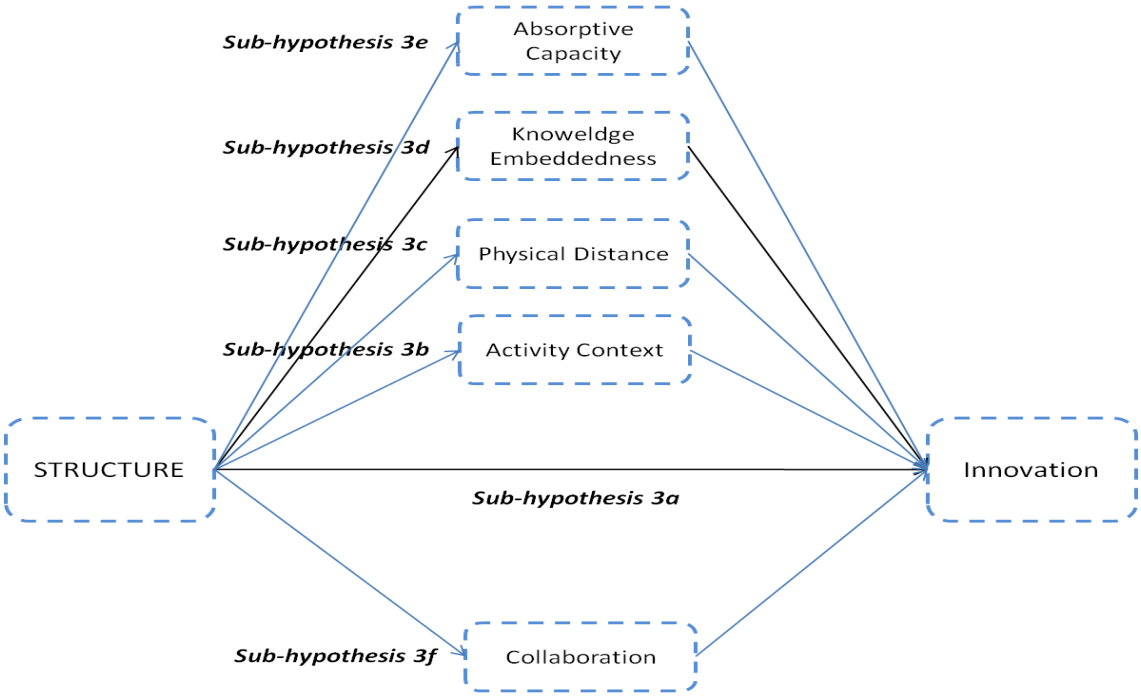


Figure 7.4: Proposed causal links among [STRUCTURE], Activity Context, Physical Distance, Knowledge Embeddedness, Absorptive Capacity and Innovation

It is proposed that the total effect of Value Configuration, Resources and Partnerships through successful transfer of knowledge is greater as compared to total direct effect of the Value Configuration, Resources and Partnerships on the innovative performance. It means that when the employees of the recipient organization share different innovation tasks, communicate regularly and effectively utilized the technological resources from the source organization in a mutual research team, they can better utilized new knowledge in their innovation projects to increase rate of innovation.

All independent variables are hypothesized to have linear association with the dependent variable. Most of the intervening variables are also been hypothesized to have linear association with independent and dependent variables; however two intervening variables, *Knowledge Embeddedness* and *Physical Distance* are proposed to have curvilinear relationships, i.e., there is a negative relationship of these variables with other interacting variables.

Based on these causal links, an extended causal link diagram can be created. Figure 7.5 represents the causal link diagram.

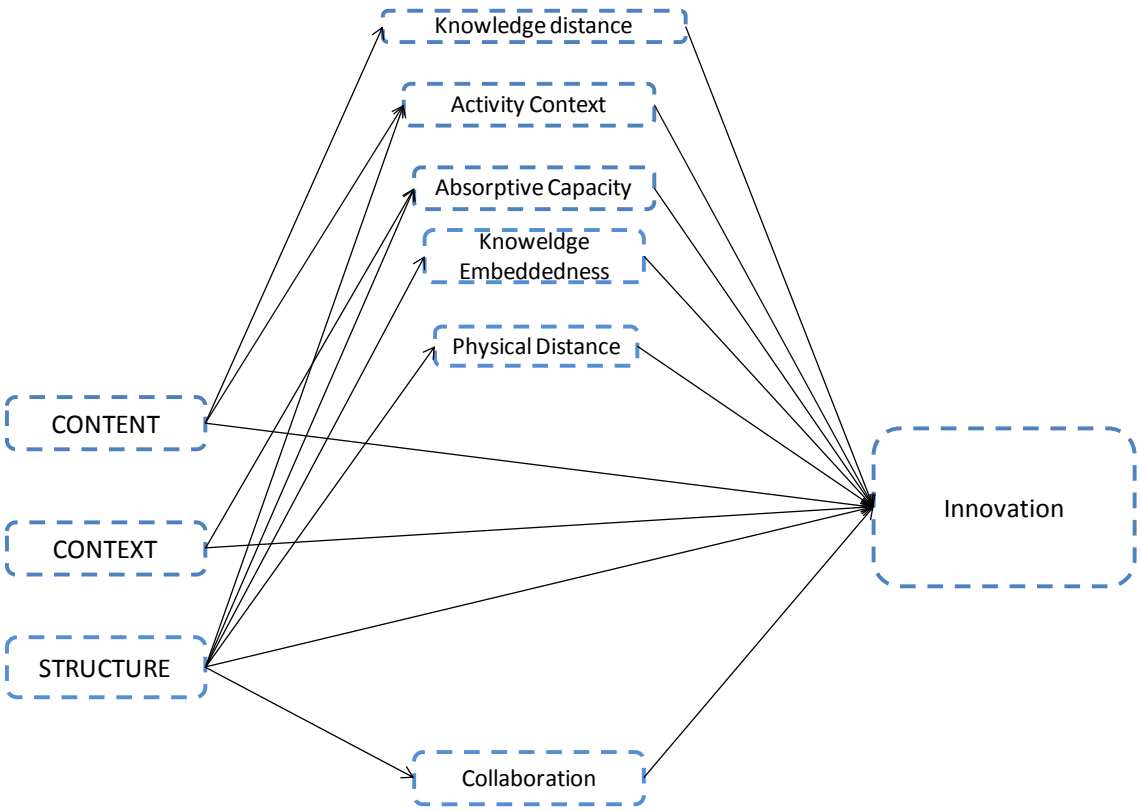


Figure 7.5: An extended causal link diagram

7.4. Dependent variable

7.4.1. Innovation

Innovative performance is the second important theoretical construct that is proposed in this thesis. It is thus proposed that the innovative performance can be measured in two ways, i.e., either by performance of mutual research teams or by individual performance of the employees of the recipient organization. In both these situations, it is assumed that knowledge received the external source is utilized in a particular innovation project. When employees are working in the mutual research teams, they have a regular contact with the experts from the external sources and thus, the skills and expertise acquired is more stable and long lasting due to continuous interaction. Thus, there is less need to learn additional skills or other ways to apply the received knowledge within the innovation project. On the other hand, when employees of the recipient organization work independently on the innovation project, they have more independence to further improve their skills and expertise. Thus, they can also use other sources to further enhance their skills and learn new things. In both the cases, there can be an equal possibility of increasing rate of innovation after acquiring new skills and learning new things.

7.5. Intervening variables

7.5.1. Absorptive capacity

Absorptive capacity can be defined as a characteristic of the organization to recognize the value of new knowledge, to assimilate it and apply to the commercial end. Thus, the absorptive capacity of the recipient organization has three aspects; 1) Acquire knowledge from the external source, it may depends upon existing knowledge and it constitute transfer of knowledge from external source, 2) disseminate that knowledge within the organization and 3) apply that knowledge towards commercial end. In the questionnaire designed for survey analysis, various items were included to measure the absorptive capacity of the recipient organization. The respondents were asked whether their organizations have common knowledge base for their innovation projects and if it is true, then whether knowledge acquired from external sources is used to update existing knowledge within the common knowledge base. The respondents were also asked to rate the use of different communication channels to disseminate and share new knowledge received from external sources. Finally, the respondents were asked to identify whether the knowledge received from external sources can

directly be applied within their innovation projects or it needs to be reworked before applying to commercial ends.

7.5.2. Activity Context

The survey also contains items related to measuring effectiveness and efficiency of knowledge transfer activities. The respondents were asked to rate how frequently, their companies use different methods to acquire tacit and explicit knowledge from external sources. They were also asked to verify if the knowledge transfer mechanisms are designed through mutual understanding with the external sources of knowledge and whether trust is the prime factor to design such mechanisms.

7.5.3. Knowledge Embeddedness

The measurement to observe type of knowledge acquired from external sources was based on identifying various combinations of knowledge (sub-networks as proposed by Argote and Ingram, 2000) by respondents. *Firstly,* respondents were asked to identify type of external knowledge acquired for their innovation projects. For this, the questionnaire contains an item that give different options to be selected by respondents, e.g., product, process, service, any of these, none of these. *Secondly,* respondents were asked to rate how extensively, their organizations use IT and human resources to transfer external knowledge within their organizational boundaries.

7.5.4. Collaboration

Collaboration and organizational distance are two different yet similar concepts. Various items were included in the questionnaire to measure these two aspects for respondent organizations. The respondents were asked that up to what extent, their employees are willing to collaborate with external sources of knowledge. Another item was added in the questionnaire identify if respondent organizations have identify the need to acquire knowledge from external sources in advance. The respondents were then asked that up to what extent their company wants to create mutual research teams for dividing tasks related to innovation projects. They were asked to rate that up to what extent, the success of their innovation projects depends on task identification for members of such research teams. Finally they were asked to identify type and strength of relationship with external source of knowledge either as a partner or as a customer. They were also asked to identify number of these relationships as well.

7.5.5. Physical Distance

Items in the questionnaire related to measuring physical distance between the respondent organizations and their external sources of knowledge included identifying presence of creating mutual research teams virtually, i.e., contact through internet related technology, etc. The respondents were asked to mention if the external sources of knowledge are present locally, i.e., within their country or globally. Since using different channels of communications, e.g., telephone, personal contacts, video conferencing, etc., can increase physical proximity of different organizations (Audretsch & Feldman, 1996) and increase learning capabilities (Boschma, 2005), therefore the respondents were asked to rate up to what extent their organizations have identified channels of communications to contact these sources on routine basis.

7.5.6. Knowledge Distance

The knowledge gap between respondent organizations and their external sources of knowledge is also a factor that is included in the theoretical model as a mediating variable. The distance between expertise level of the respondent organizations and their external sources of knowledge was measured by asking respondents if their organizations need external knowledge from those organizations which have particular market and research focus. In this way, it was measured if these respondent organizations assume their external sources as specialists that can indicate the presence of knowledge gap between the respondent organizations and external sources. The respondents were also asked to rate that up to what extent, their organizations acquire knowledge from external sources that are technologically distinct. This item also measures the speciality of the external sources in terms of technology.

7.6. Control Variables

In order to rule out the presence of factors other than those mentioned above, control variables were used systematically. For physical and technological proximity, two variables were used, i.e., *country* and *industry*. In order to rule out the presence of using standards related to quality management, a question was included in the survey that measured whether the respondent company has implemented *ISO9000*. For measuring the quotient of innovation, the item related to *patent registry* was also included in the survey. In order to make sure that the target respondents belong to SMEs, an item was added to measure the *size of the firm*. For measuring if the respondent organizations have good established history, the item related to *firm's age* was also included. In order to analyze the financial position of the

target respondents, the item related to the annual revenue was included in the survey. Finally, to measure the rate of knowledge spill over, the *annual rate of employee turnover* was also added in the questionnaire.

7.7. Summary

This chapter explained the third phase of the exploratory research methodology adapted for this dissertation. The research methodology phase included: the implementation of non-probability sampling; designating different theoretical constructs as independent, dependent and intervening variables; stating particular hypothesis statements; and prognosis of underlying causal relationships among various theoretical constructs. This chapter also identified the target respondents and the data collection method and provided detailed information on the questionnaire designed for this particular phase. The data acquired from personal interviews by filling up of questionnaires were then treated further by applying different statistical techniques. The next chapter will provide a detailed description of data processing and analysis techniques used in this dissertation.

8. Data Processing and Analysis

8.1. Introduction

The Phase III of this research consists of three steps, i.e., data collection, processing and analysis. Data collection can be divided into two steps, viz., pre- and post data collection. Pre-data collection step consists of creating theoretical constructs by primary and secondary sources, developing hypotheses to describe each theoretical construct into respective variables. Pre-data collection steps have already been described in Chapter 7. In this chapter, the data processing and analysis steps will be mainly discussed. Table 8.1 represents different research steps used in Phase III for this dissertation.

Step	Technique	Prupose	Chapter
Pre-data collection	Literature review, etc.	Prepare theoretical constructs	Chapter 7
	Hypothesis development	Translating theoretical constructs into variables	
		Transcribe variables into measurement items	
Data Collection	Questionnaires,	To collect raw data through measurement items (i.e., questionnaires, etc.)	Chapter 7
	Interviews, etc.		
Data Processing	Cronbach Alpha	Reliability of Measurement Items (questionnaire)	Chapter 8
	Factor Anaylsis	Reliability of Theoretical Constructs	
Data Analysis	Pearson Correlation	Measuring dependence of different variables	
	Regression (OLS)	Analyzing relationships among several variables	
	Bootstrapping	Resampling method for testing proposed hypothesis	
	Hypothesis testing	Making decisions about proposed hypotheses using data	
	Discussion	Discussion of the results acquired through different techniques	Chapter 9

Table 8.1: Use of different techniques and their purpose at pre- and post data collection stages

In this chapter discussion will be provided about data processing and collection by using different techniques. The first part of the chapter consists of data processing techniques that include reliability measurements (of measurement items and theoretical constructs). The second part consists of data analyses that include techniques like, Pearson Correlation, Ordinary Least Square (OLS) and bootstrapping. As stated in previously (Chapter 7), one of the main objectives of survey analysis (questionnaire) is to identify direct and indirect

relationships, between BME and the innovative performance through successful knowledge transfer and collaboration, by evaluating qualitative data from the questionnaire. Therefore, the data processing and analysis can be divided into two main sections, the qualitative and the quantitative analysis. Therefore, an analysis of qualitative data will also be provided in the second part of this chapter. The last part of the chapter consists of hypothesis testing that includes discussion and decision about individual hypothesis.

8.2. Data Processing

The data collected from the partner organizations has been prepared by using SPSS 17.0 for further processing and analysis. It is important to mention here that not all the data was entered into the statistical analysis. Only those questions were extracted from the dataset that were relevant to the three main variables, i.e., the dependent, the independent and the intervening variables and they also were categorical in nature. The data processing and analysis procedure described in this chapter fulfils three important objectives of the exploratory research methodology, i.e., 1) to identify the causal relationship between the business model explicitness and the innovative performance of the organization, 2) to identify the mediating effects of different factors on this causal relationships, 3) to identify direct and indirect relationships, between BME and the innovative performance through successful knowledge transfer and collaboration, by evaluating qualitative data from the questionnaire.

8.2.1. Reliability Measures

The first step in the data processing is to measure the reliability of measurement items and theoretical constructs. List of measurement items is provided in Annex- III. For this, different reliability measures were employed to treat small dataset. Two methods for determining the reliability of the data collected have been used in this dissertation, namely, the Cronbach's Alpha for measuring reliability of the questionnaire items, and Factor Analysis for measuring reliability of the theoretical construct. Both the techniques will be discussed in great detail in the following sections.

8.2.2. Cronbach's Alpha

The reliability of the measurement items can be evaluated by calculating Cronbach's alpha (α) for each variable, however, the recommended value of 0.7 (Cummings, 2001) was used as a *cut off* estimate of scale's reliability in this thesis. From questionnaire items that are specific to individual variable, the items with low item to total correlation can be deleted.

While calculating α value for individual variable, a few variables were identified as less reliable because of α value less than 0.7. Although such variables can be removed from the analysis at this stage, however it was decided to retain these variables at this data processing stage and subject to deletion at the advanced stages of data processing (e.g., Factor Analysis). The results of the 'α' for individual variables before and after deleting 'low item to total correlations' are shown in the table 8.2.

Theoretical Construct / Variable	Questionnaire Items/Question No.	Mean	Std. Deviation	N	Prior to dropping items	Items retained for analysis	After retaining selected items
Absorptive Capacity	q10b	2,40	1,713	10		√	
	q10d	4,60	1,350	10		√	
	q11d	4,10	2,331	10		√	
	q14b	5,10	1,912	10		√	
	q15b	3,20	1,687	10		√	
	q8b	3,70	2,312	10		√	
	q9d	4,30	1,494	10		√	
	Reliability (Chronbach Alpha)				**0,649**		**0,649**
Activity Context	q10c	2,40	1,265	10		√	
	q18c	5,60	0,966	10		√	
	q3d	4,40	0,843	10		√	
	Reliability (Chronbach Alpha)				**-0,159**		**-0,159**
Collaboration	q1d	4,70	1,252	10			
	q2b	4,10	1,595	10		√	
	q2d	4,70	1,252	10		√	
	q4b	4,10	1,663	10		√	
	q4c	4,70	1,829	10		√	
	q5b	3,50	1,716	10		√	
	q7b	3,50	1,716	10		√	
	Reliability (Chronbach Alpha)				**0,878**		**0,895**
[CONTENT]	q17c	4,90	1,524	10		√	
	q11c	2,60	2,119	10			
	q15c	2,80	2,201	10		√	
	q16c	2,40	2,413	10		√	
	q18c	5,60	0,966	10		√	
	q19c	5,10	0,876	10		√	
	q9c	3,30	1,636	10			
	Reliability (Chronbach Alpha)				**0,636**		**0,572**
[CONTEXT]	q10b	2,40	1,713	10			
	q11b	4,10	2,025	10		√	
	q12b	4,00	1,700	10		√	
	q12d	3,90	1,449	10		√	
	q13b	3,30	1,703	10		√	
	q13d	3,80	1,135	10		√	
	q14c	3,10	2,234	10			
	q16b	3,20	1,814	10		√	
	q4b	4,10	1,663	10			
	q9b	2,40	1,578	10			
	Reliability (Chronbach Alpha)				**0,879**		**0,842**
Innovation	q17c	4,90	1,524	10			
	q11b	4,10	2,025	10		√	
	q12b	4,00	1,700	10		√	
	q12d	3,90	1,449	10			
	q13b	3,30	1,703	10		√	
	q13d	3,80	1,135	10			
	q14c	3,10	2,234	10		√	
	q16b	3,20	1,814	10		√	
	q19c	5,10	0,876	10			
	q9b	2,40	1,578	10			
	q11c	2,60	2,119	10			
	Reliability (Chronbach Alpha)				**0,809**		**0,828**
Knowledge Embeddedness	q5d	4,50	1,650	10		√	
	q6b	4,30	1,829	10		√	
	q6d	5,20	0,919	10		√	
	q7d	5,30	0,823	10		√	
	q8d	5,60	0,516	10		√	
	Reliability (Chronbach Alpha)				**0,640**		**0,640**
Knowledge Distance	q15c	2,80	2,201	10		√	
	q16c	2,40	2,413	10		√	
	q9c	3,30	1,636	10		√	
	Reliability (Chronbach Alpha)				**0,619**		**0,619**

Physical Distance	q12c	4,50	1,780	10		√	
	q8c	3,80	2,201	10		√	
	Reliability (Chronbach Alpha)				**0,105**		**0,105**
[STRUCTURE]	q10c	2,40	1,265	10			
	q10d	4,60	1,350	10			
	q11d	4,10	2,331	10			
	q12c	4,50	1,780	10		√	
	q14b	5,10	1,912	10		√	
	q15b	3,20	1,687	10			
	q1d	4,70	1,252	10			
	q2b	4,10	1,595	10		√	
	q2d	4,70	1,252	10			
	q3d	4,40	0,843	10			
	q4c	4,70	1,829	10		√	
	q5b	3,50	1,716	10		√	
	q5d	4,50	1,650	10		√	
	q6b	4,30	1,829	10			
	q6d	5,20	0,919	10			
	q7b	3,50	1,716	10		√	
	q7d	5,30	0,823	10		√	
	q8b	3,70	2,312	10			
	q8c	3,80	2,201	10			
	q8d	5,60	0,516	10		√	
	q9d	4,30	1,494	10			
	Reliability (Chronbach Alpha)				**0,873**		**0,807**

Table 8.2: Measurement Items Reliability Analysis for Multi-item Scales

It can be observed from the above table that variables like, [CONTENT], *Activity Context*, *Knowledge Embeddedness*, *Knowledge Distance*, and *Physical Distance* produced lower values of α. However two variables, namely, Activity *Context* and *Physical Distance* were identified with very low values of α, hence they were removed from the analysis at this stage. The remaining variables were retained for advance level of data processing, i.e., Factor Analysis. Thus, at the first stage of reliability analysis, the following variables were retained for next steps of data processing (Table 8.3)

	Reliability (Chronbach Alpha)	
Theoretical Construct	Prior to dropping items	After retaining selected items
[CONTENT]	0,636	0,572
[CONTEXT]	0,879	0,842
[STRUCTURE]	0,873	0,807
Absorptive Capacity	0,649	0,649
Collaboration	0,878	0,895
Innovation	0,809	0,828
Knowledge Embedded	0,64	0,64
Knowledge Distance	0,619	0,619

Table 8.3: List of Variables retained after Cronbach's Alpha measurement

8.2.3. Factor Analysis

With respect to the theoretical construct model, the reliability of individual variable was further tested by applying Factor Analysis (FA) procedure as second reliability

measurement technique during data processing. The FA can be performed in two ways, 1) the *Exploratory Factor Analysis* (EFA), and 2) the *Confirmatory Factor Analysis* (CFA). EFA is used to determine the number of common factors influencing a set of measures. It also determines the strength of relationship between each factor and each observed measure. CFA is used to determine the ability of the predefined factor model to fit an observed set of data. I have adapted the first approach, i.e., EFA.

FA techniques are based on the common factor model which means that each observed response is influenced partially by underlying common factors. However the strength of this influence between each factor and each measure varies. In those cases where the factor analysis is used for data reduction procedure, researchers use more traditional method, i.e., *Principal Component Analysis* (PCA) technique (StatSoft, Inc., 2010). EFA is often confused with PCA, however both are different in terms of results generated after performing these procedures. The *first* difference is that the direction of influence is different in both techniques; in the EFA, it is assumed that measured responses are based on the underlying factors whereas in PCA, the components are based on measured response. The *second* difference is that PCA is used to simply define the linear combinations of the measurement, thus contains both common and the unique variance, while EFA assumes that the variance in the measured variable can be decomposed into one accounted for by common factor and one accounted for by unique factors (DeCoster, 1998).

There are few basic steps to perform factor analysis that were also employed in this thesis:

1. Collect the measured response
2. Obtaining correlations
3. Measuring sampling adequacy
4. Select number of factors for inclusion (first stage of data reduction)
5. Extraction of initial set of factors (second stage in data reduction)
6. Factor rotation to obtain final solution (third stage in data reduction)
7. Interpret factor structure (last stage in data reduction)
8. Naming extracted factors

Out of 56 questionnaire items (questions) in the questionnaire, the measurement level for 3 items was ‘descriptive’ in nature, the measurement level for 11 items was ‘nominal’

(e.g., firm size, firm age, industry type, country, etc.), the measurement level for 1 item was 'scale' (i.e., annual revenue), whereas, for remaining 41 items, the measurement level was 'ordinal' in nature.

All items in the questionnaire except those control variables were constructed within the framework of theoretical constructs or variables like BME framework, Absorptive Capacity, etc. For this purpose, each questionnaire item was designed to represent two theoretical constructs or variables. For example, the item '*12d*' in the dataset was designed to measure '*Innovation*' as well as the '[CONTEXT]' element of the BME framework. Based on this approach, all items (except for control variables) were entered into dataset twice, *first*, to measure the respective element of BME framework and *second*, to measure the relevant intervening or independent variable. For example, item labelled as '*8d*' in the questionnaire was labelled as '*k.embed-q8d*' for measuring the effectiveness of *Knowledge Embeddedness* and it was also labelled as '*structure-q8d*' to measure the [STRUCTURE] element of BME framework. In order to avoid the issue of biasness, it was ascertained that each item used for measuring the BME was not repeated twice. In the following pages, Table 8.4 & 8.5 show the list of questionnaire items grouped under different theoretical constructs.

	Independent Variables			Dependent Variable	Intervening Variables					
	[CONTENT]	[STRUCTURE]	[CONTEXT]	Innovation	Collaboration + organizational distance	knowledge distance	physical distance	knowledge embeddedness	Absorptive capacity	Activity context
Item Labels		1b						1b		
		2b			2b					
		3b			3b					
			4b		4b					
		5b			5b					
		6b						6b		
		7b			7b					
		8b							8b	
			9b	9b						
			10b						10b	
			11b	11b						
			12b	12b						
			13b	13b						
		14b						14b		
		15b							15b	
			16b	16b						
		4c			4c					
		5c			5c					
		6c					6c			
		7c					7c			
		8c					8c			
	9c					9c				
		10c								10c

Table 8.4: A-List of items grouped under different variables

	Independent Variables			Dependent Variable	Intervening Variables					
	[CONTENT]	[STRUCTURE]	[CONTEXT]	Innovation	Collaboration + organizational distance	knowledge distance	physical distance	knowledge embeddedness	Absorptive capacity	Activity context
Item Labels	11c			11c						
		12c					12c			
		13c							13c	
			14c	14c						
	15c					15c				
	16c					16c				
	17c			17c						
	18c									18c
	19c			19c						
		1d			1d					
		2d			2d					
		3d								3d
		4d								4d
		5d						5d		
		6d						6d		
		7d						7d		
		8d						8d		
		9d							9d	
		10d							10d	
		11d							11d	
			12d	12d						
			13d	13d						

Table 8.5: B-List of items grouped under different variables

Step1- Collect the measured response: The first step in data analysis was the collection of measurement response. Dataset from questionnaires, filled by respondents, was exported to statistical software SPSS 17.0 as valid responses. For confirmatory factor analysis, there is no specific limit on the number of variables as an input, however for exploratory factor analysis, it is usually recommended to have at least three variables per factor (Garson, 2010).

Step 2 – Obtaining correlations: Second step in FA was to obtain a correlation matrix for the items selected for factor analysis. I used 'Principal Components' as an extraction method to acquire the correlation matrix for different sets of selected items. The correlation matrix obtained by this method also displayed one-tailed significance for each correlation. The results showed that most of the correlations were quite significant. The inverse and reproduced correlations were also requested as an output along with the correlation matrix.

Step 3 - Select number of factors for inclusion: From list of items for each identified variable, different items were selected to perform correlation and covariance analysis. Purpose of selecting few items among the list for an individual variable was to process only those items that account for the maximum covariance with as few factors as possible. For this purpose, different parameters were included to proceed with FA ahead. Those parameters included: *firstly*, the magnitude of correlation among different factors, i.e., the *cut-off* level for resulting correlations. One rule of thumb for diagnosing factorability of the given data is to look whether the resulting correlations among different factors is greater than ±0.3 or not (Costello & Osborne, 2005). *Secondly*, the value of anti-image matrix diagonals should be greater than 0.5, however, few exceptions were made with some items in different variables, e.g., [CONTEXT], *Innovation,* [STRUCTURE], [CONTENT] and *Knowledge Embeddedness*. The purpose was to relax the limit to retain important items in the analysis that observed a good level of inter-item covariance. *Thirdly*, the Kaiser criterion that requires retaining those factors that posses eigenvalues greater than 1. The Kaiser criterion was proposed by Kaiser (1960) and is the most widely used technique to determine the number of common factors. Alternate method to locate a *cut off* point of eigenvalue is plotting eigenvalues on a graph. A cut off point that, sometimes, can be identified as an elbow in the graph represents the number of factors to be retained.

Step 4 - Measuring sampling adequacy: Another important diagnostic parameter was the measurement of sampling adequacy of selected items. It can be implemented by observing values of the *Kaiser-Mayer Olkin* (KMO) and *significance of Bartlett's test of spherecity.*

Although the *KMO* and *Barteltt's test of spherecity* are less reliable measures, however, it provided some indication for proceeding ahead with FA. Sampling adequacy predicts if data are likely to factor well or not. It is based on correlation and partial correlation between factors used for FA. KMO varies from 0.0 to 1.0. There are two types of KMO, 1) KMO statistic for individual variable and 2) the sum of all variables, i.e., KMO overall statistic. Most often, KMO overall is set at 0.6 or higher, however, some researchers also use 0.50 as the cut off point (Garson, 2010). In the current thesis, the cut off point was set at 0.50 because of limited amount of samples available. The larger values of KMO measure indicate that factor analysis of the variables is a good idea. The Bartlett's test of sphericity is used to test the null hypothesis that the variables in the population correlation matrix are uncorrelated. It consists of Chi-square (χ^2), degree of freedom (*df*) and statistical significance (*sig)*. The observed significance level determines either to reject the null hypothesis or not. A significance value of 0.000 suggests that it is good enough to reject the null hypothesis (Field, 2005).

Table 8.6 shows the results of MSA and determinants of correlation. Except for two variables, namely, *Activity Context* and *Physical Distance*, the KMO values suggested that the selected items were suitable for factoring. Similarly, lower values of correlation determinant also indicated the presence of correlation among selected items, although it is not a very good indicator.

Theoretical Construct	Kaiser-Meyer-Olkin Measure of Sampling Adequacy.	Bartlett's Test of Sphericity			Correlation Matrix Determinant
		Chi-Sqr	df	Sig	
[CONTENT]	,521	40,453	10	,000	0,002
[CONTEXT]	,688	30,609	15	,010	0,007
[STRUCTURE] (Value Configuration)	,708	8,808	3	,032	0,293
[STRUCTURE] (Resources - Technology)	,611	13,517	3	,004	0,041
[STRUCTURE] (Partners)	,426	19,241	3	,000	0,068
Absorptive Capacity	,569	30,410	21	,084	0,005
Knowledge Distance	,500	9,780	1	,002	0,271
Knowledge Embeddedness	,611	13,517	3	,004	0,152
Activity Context	0,475	0,425	3	0,835	0,942
Collaboration	,614	30,936	6	,000	0,004
Physical Distance	0,5	0,024	1	0,876	0,997
Innovation	,760	21,781	6	,001	0,041

Table 8.6: Measurement of Sampling Adequacy (MSA) for proposed variables

It can be observed from the above table that few theoretical constructs are less reliable, hence can be dropped from data processing. Among those that produced low MSA and determinant values are the *Knowledge Distance*, *Knowledge Embeddedness*, *Activity Context*, *Physical Distance* and [CONTENT]. It is important to mention that these identified variables also proved less reliable during Cronbach's Alpha calculation. However, they were retained for higher level analysis because of the small size of available data. Based on very low values of MSA and determinants, two variables, namely, *Activity Context* and *Physical Distance* can be dropped after FA. Two more variables, *namely*, *Knowledge Distance* and *Knowledge Embeddedness* are identified suspicious for further treatment because larger values of correlation determinant. Since this parameter alone is not sufficient enough to drop variables from analysis; therefore, they can be retained for data analysis.

The sample size is a crucial issue that should be taken into consideration as correlations are not resistant and hence can severely affect the reliability of factor analysis procedure (Field, 2000; Habing, 2003). As discussed earlier, one major limitation of this exploratory study is the small size of the available samples for data analysis. Therefore, few measures were taken to rectify the effects of this issue. The *first* step was to control for the magnitude of factor size. Research studies have shown that appropriate sample size can partly be determined by nature of data (Costello & Osborne, 2005). The absolute sample size and the absolute magnitude of factor loadings are important factors in determining the reliability of the factor solution (Field, 2000). The *second* step was to control the size of the communalities that were calculated during the FA. Item communalities are assumed 'high' if they are 0.8 above (Costello & Osborne, 2005). It has been reported that size of the communalities can balance the effect of sample size (MacCallum *et al.*, 1999; Field, 2000). The higher the higher the communality of a variable is, the extracted factors account for a big proportion of variable's variance (Leohlin, 2004). However, if factor are extracted with lower communalities, then sample size should have to accommodate for this. The results from the FA showed that most of the communalities of the resultant factors were greater than 0.8. However, fewer exceptions were made in those cases where a small number of items were used for the FA. Table 8.7 shows the list of commonalities extracted for different theoretical constructs.

Theoretical Construct	Item Label	Initial	Extraction
Absorptive Capacity	abs.-q10d	1,000	0,951
	abs.-q14b	1,000	0,807
	abs.-q15b	1,000	0,852
	abs.-q8b	1,000	0,819
	abs.-q9d	1,000	0,950
	abs.-q10b	1,000	0,951
	abs.-q11d	1,000	0,877
[CONTEXT]	context-q12d	1,000	0,589
	context-q13d	1,000	0,863
	context-q16b	1,000	0,786
	context-q12b	1,000	0,889
	context-q11b	1,000	0,946
	context-q13b	1,000	0,649
Innovation	innovation-q12b	1,000	0,923
	innovation-q13b	1,000	0,697
	innovation-q14c	1,000	0,907
	innovation-q11b	1,000	0,878
	innovation-q16b	1,000	0,904
Knowledge Distance	know.dist-q15c	1,000	0,938
	know.dist-q16c	1,000	0,937
	know.dist-q9c	1,000	0,997
Knowledge Embeddedness	k.embed-q5d	1,000	0,716
	k.embed-q6b	1,000	0,816
	k.embed-q6d	1,000	0,812
	k.embed-q7d	1,000	0,937
	k.embed-q8d	1,000	0,758

Table 8.7: List of extracted commonalities for different theoretical constructs

Step 5 – Extraction of initial set of factors: After processing those items that produced KMO overall statistic above 0.50 and retaining factors having eigenvalues ≥1.0, the first matrix obtained was the component matrix (unrotated). Each column in this matrix represented factor (component) loading on each item and each row represents crossloading of an item on all factors (components). Different factor extraction methods are used depending upon the objective of the factor analysis. Factor analysis can be used for two purposes; 1) the *Data Reduction* and 2) the *Theory Development* (i.e. detect structure in the relationships between variables). The most common method used for *Data Reduction* is the principal components, whereas, for theory development, it is recommended to use principal axis

factoring (PAF). In this thesis, I employed only the principal component method to extract the most relevant factors.

Step 6 – Factor Rotation to obtain final solution: Initial set of factors generated through PCA (unrotated factor solution) does not depict the true structure of common factors. Rotation serves to make the output more understandable and is an essential step to facilitate the interpretation of factors (Garson, 2010). There are several methods available to create rotated factor solution; however, the most commonly used method is the Verimax rotation method. In any factor analysis procedure, the total variance explained by each factor remains the same before and after the rotation, however, the rotation results show that some factors explain less variances while other explain more variances. Factor model obtained after rotation method explains this phenomenon with more clarity. Variance explained by each factor is represented by factor loading. In a rotation model, there are different rows representing items included in rotation model and columns representing extracted factors, whereas each cell represents the loading. The magnitude of variance explained by each factor on each item is called factor loading whereas magnitude of variance represented by each item under all factors is called crossloading. Magnitude of each loading (factor loading and crossloadings) is used to determine the number of items included in each extracted factors. As a general rule, value of factor loading ≥ 0.60 is the minimum limit to include an item in a common factor and for crossloading, a magnitude of ≤0.30 is the minimum limit to dropout certain items from the common factor (Costello & Osborne, 2005). However, there is no strict rule to follow this criterion. The minimum limit for factor loading to include an item within the common factor was set at a magnitude of 0.60. The minimum limit for crossloading to drop item from the common factor was set at a magnitude of 0.30.

Step 7 – Interpret factor structure: Once the rotated factor model was obtained, the next important step was interpreting the factor structure. SPSS procedure provides option to save standardized factor scores as variables in working data file. Standardized factor scores are the outputs generated by SPSS 17.0 that represent the actual values of individual cases (observations/items) for factors extracted. Their values ranges from +1.0 to -1.0 which can be interpreted in a same manner as different items are interpreted in a correlation matrix. According to the α value generated by SPSS, a standardized factor score weighted near to zero interprets that the variable is not at all related to a given pattern. On the other hand, score weighted near to 1 interprets that the variable is highly related to the given pattern.

Step 8 – Naming extracted factors: Last but not the least step in the factor analysis was assigning names to the latent variables that were used for further analysis. As described previously, factor analysis procedure can be used for many purposes, e.g., identifying interdependencies among various factors (interdependency and pattern delineation), reducing large number of factors to few but significantly related factors (parsimony or data reduction), hypothesis testing, or exploring complex interrelations of phenomena with little systematic investigation in a new domain of scientific interests (Rummel, 1967). In this dissertation, various latent variables (LV) were identified by using the FA. These LV were assigned names according to the related the theoretical constructs and the underlying concepts. A total of 18 LV were identified through the FA for different theoretical constructs. Table 8.8 shows the list of the extracted components as LVs for all theoretical constructs.

Theoretical variable	Latent variable identified	Acronym
CONTENT	Value proposition	(LVCTN1)
	Customer speciality	(LVCTN2)
STRUCTURE	Partners	(LVSTR1)
	Resources (Technology)	(LVSTR2)
	Value configuration	(LVSTR3)
CONTEXT	Revenue through team performance	(LVCTX1)
	Revenue through general performance	(LVCTX2)
ABSORPTIVE CAPACITY	Knowledge application	(LVABS1)
	Common knowledgebase (existing knowledge)	(LVABS2)
	Knowledge dissemination	(LVABS3)
COLLABORATION	Collaborate with partners	(LVCOL1)
	Distribute tasks for sharing research activities	(LVCOL2)
KNOWLEDGE EMBEDDEDNESS	Knowledge embedded in technology	(LVKEMB1)
	Knowledge embedded in humans	(LVKEMB2)
KNOWLEDGE DISTANCE	External source has special research domain	(LVKDIST1)
	External source has special technology	(LVKDIST2)
INNOVATION	Increase in innovation by sharing expertise among team members	(LVINV1)
	Increase in innovation by applying external knowledge after alteration	(LVINV2)

Table 8.8: Latent variables identified through Factor Analysis

It can be observed from the above table that for each observed variable or the theoretical construct, at least two components were extracted as latent variables. For simplicity, each LV can be mentioned as an acronym; therefore, from now onward, each LV will be mentioned throughout the thesis by its acronym as listed in the above table.

8.2.4. The Causal Link Diagram

The causal link diagram, as discussed previously, consisted of different direct and indirect relations among various theoretical constructs or observed variables (OV). The observed variables that were included in the causal link diagram previously are related with the BME framework, factors affecting successful transfer of knowledge and innovative performance. However, during data processing (i.e., reliability analysis of measurement items and theoretical constructs) some theoretical constructs were identified proposed to be dropped for data analysis because of poor reliability measurement. Figure 8.1 represents the final causal link diagram after data processing.

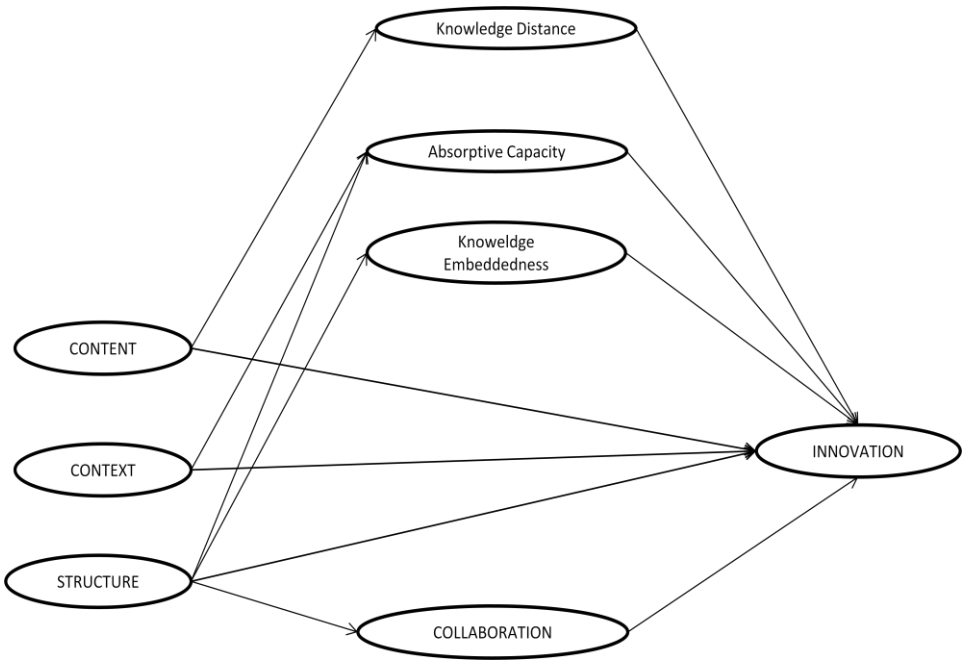


Figure 8.1: Causal link diagram after data processing

The reliability measurements suggested that all the theoretical constructs identified for measuring the BME framework were suitable to retain for further data analysis. Similarly, the theoretical constructs that were identified for measuring the innovative performance were also suitable. The results of Chronbach's Alpha and FA suggested for dropping some of the theoretical constructs that were identified as factors affecting successful transfer of knowledge. Therefore, finally only 8 theoretical constructs were retained for data analysis.

8.3. Data Analysis

An important research step for Phase III of this research dissertation is the Data analysis that includes application of three techniques, namely, the Pearson correlation, the OLS regression analysis and the bootstrapping. As stated in previously (Chapter 7), one of the

main objectives of survey analysis was to analyze the qualitative data as well as quantitative data for identifying the existence of the proposed relationships. Since the proposed hypotheses represented both the direct and indirect relationships among these observed variables, therefore, correlation and regression analysis were important tools to explore the validity of the proposed hypotheses. Prior to discuss the analysis of quantitative data, a discussion on the qualitative contributions of the questionnaire is also provided in the following section. Later on, different techniques used to analyze quantitative data will be discussed individually.

8.3.1. Qualitative Contributions

The qualitative data was collected through three open ended questions in at the end of the questionnaire. The respondents were requested to comment, based on their understanding and experience, about the probable relationship among three main theoretical constructs, namely; the business model, inter-organization knowledge transfer and collaboration. The first question was defining company's business model. The second and third questions were asked to comment on the relationships between business model, collaboration and inter-organizational knowledge transfer.

In response to the first question, most of the respondents provided information about their main products and services. Since the questionnaire respondents were mainly from ICT industry, so they stated that their companies offer software related products and services. Some of them exclusively stated their core products and services (Telecoms services), while most of the respondents have provided the generic description of their products and services. Some of the respondents have exclusively stated their value configuration processes (e.g., customization, assembling, consulting) and also mentioned about their partners in value creation processes. Only one of the respondents has mentioned innovation as a revenue model in the definition of business model. The following table represents the all statements extracted from dataset related to question 1(Figure 8.2).

1.	SW & Consulting for complex decision in planning & Scheduling
2.	Software as a service for conferences, congresses with a very high level of support based on management of people and management of scientific content.
3.	License based software products and partnership in R&D projects on European scale.
4.	Standardized products are the basis for customer contact. Customization of the product is more or less means of generating revenues
5.	We offer development and testing services on an hourly basis, and we offer fixed price development projects. We offer high quality hi-tech and valuable services by being technological early adaptors and by focusing on people.
6.	Software as service. Innovation through smart assembling of own and 3rd party solutions.

7.	Learn from our customers and partners what in the world of online communication is needed and find internally based on our core concept a solution for need. Then we cell via partners.
8.	T-Mobile Austria offers telecom services to end consumers and telecom is a product, technology and service.
9.	Our business model is selling software products, its installation and maintenance, customization of software products, training and introductory courses related to these customized software and last but not least specialized consulting services in some area e.g., Risk management in a longer run.
10.	Consulting and Development, Application Service Providing, Project management for customers.

Figure 8.2: Excerpt of dataset retrieved from questionnaire for Question 1

Content evaluation of the text in Figure 8.2 reveals that most of the words used in the above statements can be related semantically with the different elements of BME. For example, software, standardized products, services, products, SW, end consumers, customers, conferences, congresses, telecom, project management, etc., can be categorized under the [CONTENT] element of BME. Similarly, words, like, consulting, customization, solution, installation, maintenance, training, development, communication, can be categorized as subcategory *Value Configuration* of [STRUCTURE] element of BME. Further observation reveals that terms, like, partners, partnerships, 3rd party, etc., can be categorized as subcategory *Partners* of [STRUCTURE] element of BME. Few terms, like fixed prices development projects, generating revenues, innovation, selling, etc., can be categorized under the [CONTEXT] element of BME. A quick overview of these terms reveals that most of the definitions focused on the [CONTENT] element of BME. They mainly describe what the core products and services their companies offer to their consumers. It can also be observed from the above text that these companies mainly offer a wide variety of software related services. It can be further analyzed that most of these respondents emphasized two major subcategories of the [STRUCTURE] element, i.e., the *Value Configuration* and *Partners*. Finally it can be observed that the [CONTEXT] element of BME has been found least emphasized in the above text. Following is the bar chart representing percentage of each element revealed from these statements (Figure 8.3).

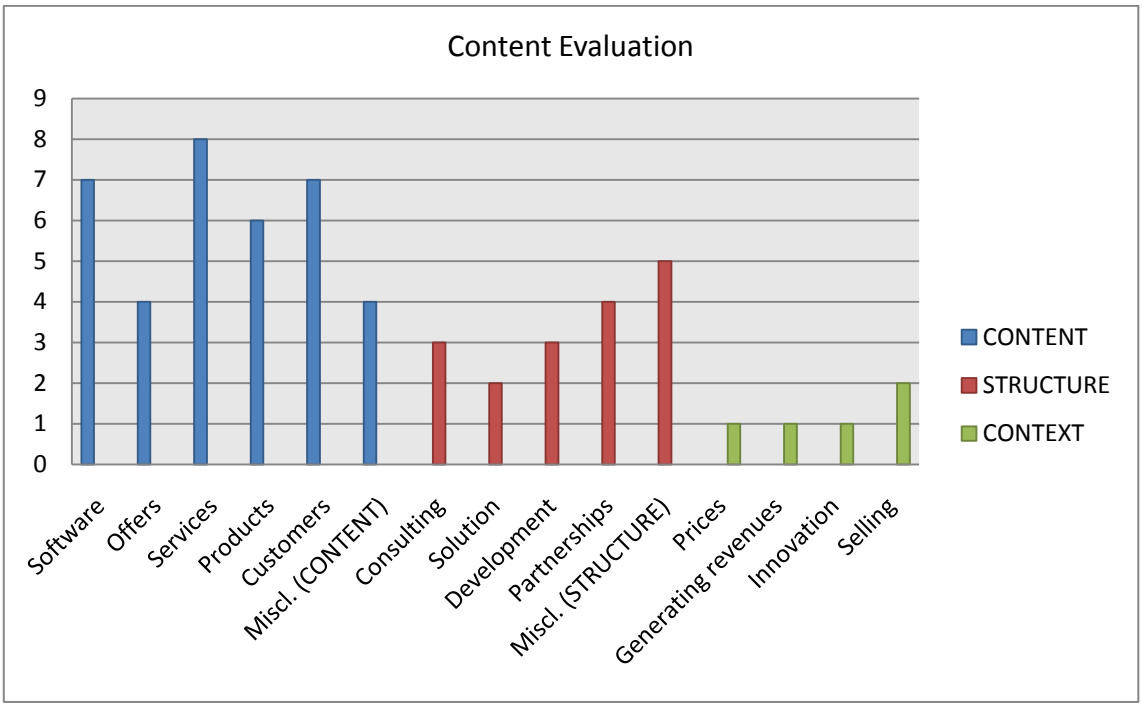


Figure 8.3: Frequency of BME related Terms used by different respondents within questionnaire responses

It is evident from Figure 8.3 that a company's business model can be described through simple statements. However, the more the statement is clear about business model, the better it can be to detect certain elements of BME. Secondly, since the questionnaire respondents have provided general statements about their company's business, therefore, these cannot be assumed as formal business model definitions. However, still, it shows that at least some of the respondents may have a correct understanding of the term 'business model'.

The second question was asked to state whether there could be a relationship among their company's business model and transfer of knowledge from external sources. Figure 8.4 is the set of all responses extracted from the dataset generated from questionnaires.

1.	It depends on transfer. We understand ourselves as center of excellence. This involves development of know ledge by us and transfers from others.
2.	Not applicable.
3.	Improve product and offer special knowledge (niche know how).
4.	Customer requirements are the most powerful, knowledge transfer from external source (learn most from cu stomer requirements).
5.	Yes, we need to be up to date in technological developments in our field.
6.	We are depending on it, since we integrate them into our services.
7.	Learn from our customers and partners what in the world of online communication is needed and find intern ally based on our core concept a solution for need. Then we sell via partners.
8.	Yes, it can be affected by innovation done by other partners e.g. iPhone and T- Mobile are sharing revenues from the same customers who use product and subscription. So iPhone helps T-Mobile to innovate in line with their products.

9. Yes, it affects our business model; e.g. Increasing functional aspects of tools and create new consulting servi ces out of this process. We have collaboration with universities on R&D projects from where we get new kn owledge.
10. Yes, Improvement of skills and know how of our employees which are one of our biggest assets. Trainings, coaching to stay up to date in all areas of our business.

Figure 8.4: Excerpt of dataset retrieved from questionnaire for Question 2

It is clear from the Figure 8.4 that most of the questionnaire respondents vividly said YES in response to this question. the overall objectives to transfer knowledge from external sources, as stated by these respondents, include: to achieve excellence in their field, to improve their products and services, to perform innovation, to create new knowledge, to learn from their customers, to earn revenues, to enhance skills and know how, and most importantly, to stay up-to-date about technological developments. It can also be deduced from the sample text in Figure 8.4 that these organizations acquire knowledge from external sources that include: their partners, customers, universities and their R&D departments and other external sources. When probed that what type of knowledge these companies acquire from external sources, it was identified that they acquire it through know how, training, couching, consulting services, technology and more precisely, the information (about customer requirements).

The third question was asked to state whether there could be a relationship among their company's business model and with external sources. Figure 8.5 is the set of all responses extracted from the dataset generated from questionnaires.

1. It depends on trust and the search for win - win situations.
2. Not applicable.
3. Improve product and offer special knowledge (niche know how), may be more effective.
4. Not so important for the business model. As tools used for collaboration are standardized.
5. Yes, by collaborating with external sources of knowledge we can complete our service portfolio in useful ways for our customers.
6. We are depending on it, since we integrate them into our services.
7. It is essential to establish a constant stream of knowledge transfer and to make it possible to establish a common understanding.
8. Yes, i can be in a way described in previous case. It depends upon type of consumers and suppliers.
9. Yes. We have collaboration with alliance consulting companies. These consulting companies are mainly the competitors. We also have R&D projects with consumers. It is beneficial for the company in terms of increa sing profits and collaboration.
10. I guess this depends on the partner and the respective projects at all

Figure 8.5: Excerpt of dataset retrieved from questionnaire for Question 3

While responding this question, most of these respondents provided affirmative responses. It is evident from the Figure 8.5 that these organizations collaborate with their

external partners on these bases: trust level, mutual understanding, and dependency of recipient organization for product development, common R&D projects and most interestingly, the competition among their partners. Most of these organizations have collaborations with their consumers, suppliers, alliances (consulting companies), and partners. When probed that for the perceived benefits indicated by these respondents, it was deduced that they collaborate with their partners: to achieve a win-win situation, to improve their products and services (offerings), to enhance their service portfolio, to integrate external knowledge into their products and services (i.e., innovation), to establish a constant flow of knowledge from their partners/collaborators, to earn revenues and to increase cooperation.

8.3.2. Quantitative Contributions

Based on Reliability measurements, this section deals with the quantitative analysis of the data collected through questionnaire. It consists of different analytical techniques like, correlation and regression analysis, multiple mediation analysis, bootstrapping and the Preacher and Hayes approach. Detail is provided in the following pages for each of these techniques.

8.3.3. Correlation Analysis

By using Pearson correlation techniques, it was can be observed that almost all theoretical constructs are significantly related with each other. Table 8.9 represents the pair-wise correlation (Pearson correlation) and descriptive statistics of the latent variables. It can be observed that some variables are highly correlated at a significance level of $p < 0.001$. The table also represents the means, median and standard deviation calculated for these LVs. The ‘minimum’ and ‘maximum’ represents the level of emphasis for each LV. The ‘maximum’ value represents the greater emphasis for a particular variable, while the ‘minimum’ value represents the smaller emphasis of the respective variable. The ‘valid’ number represents the total cases available and treated for identifying the correlations, while ‘missing’ value represents the missing cases from the dataset.

Acronyms	LVCNT1	LVCNT2	LVSTR1	LVSTR2	LVSTR3	LVCTX1	LVCTX2	LVABS1	LVABS2	LVABS3	LVCOL1	LVCOL2	LVKDIST 1	LVKDIST 2	LVKEMB 1	LVKEMB 2	LVINV1	LVINV2
Independent Var.																		
LVCTN1	1,00																	
LVCTN2	-,116	1,00																
LVSTR1	,895***	,102	1,00															
LVSTR2	,528	-,363	,274	1,00														
LVSTR3	,884***	-,123	,929***	,359	1,00													
LVCTX1	,675*	,343	,807**	,137	,588*	1,00												
LVCTX2	,395	-,101	,251	,139	,462	,067	1,00											
Intervening Var.																		
LVABS1	,800**	-,138	,845***	,433	,846***	,688*	,453	1,00										
LVABS2	-,043	-,687*	-,034	,316	,221	-,462	-,007	,132	1,00									
LVABS3	,253	,219	,560*	-,054	,641*	,293	,305	,556*	,336	1,00								
LVCOL1	,934***	,017	,965***	,460	,908***	,799**	,301	,912***	-,027	,480	1,00							
LVCOL2	,457	,247	,733**	-,293	,713*	,475	,102	,405	,056	,717**	,551*	1,00						
LVKDIST1	-,116	1,000***	,102	-,363	-,123	,343	-,101	-,138	-,687*	,219	,017	,247	1,00					
LVKDIST2	,523	,021	,242	,604*	,328	,033	,455	,292	-,119	-,039	,399	-,146	,021	1,00				
LVKEMB1	,528	-,363	,274	1,000**	,359	,137	,139	,433	,316	-,054	,460	-,293	-,363	,604*	1,00			
LVKEMB2	,731**	-,112	,794**	,219	,850***	,653*	,437	,777**	,025	,574*	,811**	,616*	-,112	,262	,219	1,00		
Dependent Var.																		
LVINV1	**,773****	**,210**	**,871****	**,130**	**,692***	**,966*****	**,156**	**,751****	**-,385**	**,305**	**,858*****	**,549**	**,210**	**,094**	**,130**	**,737****	**1,00**	
LVINV2	**,113**	**,804****	**,451**	**-,230**	**,205**	**,603***	**-,279**	**,184**	**-,393**	**,481**	**,337**	**,533**	**,804****	**-,203**	**-,230**	**,155**	**,458**	**1,00**
Mean	5,20	2,60	4,10	5,13	4,37	3,70	3,80	3,57	4,45	3,90	4,30	3,90	2,60	3,30	5,13	4,75	3,80	3,15
Median	5,33	2,75	4,33	5,17	4,83	4,30	3,50	3,67	4,50	3,25	4,67	4,17	2,75	3,00	5,17	5,00	4,50	4,00
Std. Deviation	1,091	2,221	1,508	,892	1,567	1,458	1,135	1,540	1,343	1,220	1,606	1,406	2,221	1,636	,892	1,230	1,635	1,827
Minimum	2	0	0	4	0	1	2	0	2	3	0	1	0	1	4	2	0	1
Maximum	6	6	5	6	6	5	5	5	6	6	6	5	6	6	6	6	5	6
Valid	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Missing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

***$p \leq 0.001$, **$p \leq 0.01$, *$p \leq 0.05$

The minimum and maximum values represent the coding for each variable, where a high value represents a high emphasis, and a low value represents the low emphasis on the respective BME element, factors affecting Knowledge transfer and measures of innovative performance.

Note: For acronyms, please see Table 4.

Table 8.9: Pearson Correlations and Descriptive Statistics of Latent Variables

It can be observed that different LVs are correlated with each other where few relationships are highly significant. For example, LVCTN1 is highly and significantly correlated with LVSTR1, LVSTR3 and LVCOL1. Similarly, LVSTR1 is significantly related with LVCOL1 and LVINV1. A few cases of perfect correlations can also be observed in the above table, LVKEMB1 is perfectly correlated with LVSTR2. Another example is a highly significant correlation of LVCTN2 with LVKDIST1. In the presence of such cases, the problem of multicollinearity can be identified and, hence it is suggested to perform additional tests to rule out the chances of multicollinearity. For this, regression analysis is suggested that can provide with various tests to identify the problem of multicollinearity.

8.3.4. Regression Analysis

Because of the presence of many linear and curvilinear relationships, it is proposed to use the multiple regression analysis, although the technique is suitable for analysing large amount of data. Regression is an appropriate analysis through which one can determine '*the relative importance of each independent variable in the prediction of the dependent measure*' (Hair *et al.*, 1996). It facilitates researchers to assess the nature of the relationships between the independent and the dependent variable in case of both the linear and curvilinear relationships. Another advantage of using regression analysis is that it can provide "insight into the relationships among independent variables in their prediction of the dependent measure" (Cummings, 2001). Therefore, the regression analysis can be used as an appropriate statistical analytical procedure for the causal models proposing multiple relationships. The simple linear model equation used in this thesis to identify linear relationships among different variables is:

Equation (1)

Where, is the dependent variable, is the independent variable, is the magnitude of the estimator and is the unobserved error estimate. The multiple regression model equation used in this thesis to determine the effect of independent variable on dependent variables is:

Equation (2)

Where, is the constant or the intercept, and $i = 1$. Here represents the amount of unknown error present when change in X1 and X2 induces a change in y.

In this thesis, I used linear regression analysis to achieve three objectives: a) to address the problems of mulitcollinearity, b) hypothesis testing to reject *null hypothesis* and c) to determine magnitudes and strengths of proposed correlations. The following sections describe each step in detail.

a. Collinearity Statistics

In order to identify the multicollinearity problem, linear regression models were obtained. Since multiple variables were included in the hypotheses, therefore, the suitable method was linear regression or ordinary least square (OLS). Table 8.10 shows the collinearity Statistics for LVs of different theoretical constructs.

Model		Innovation by Sharing Expertise among team members (LVINV1)		Innovation by applying external knowledge after alteration (LVINV2)	
		Tolerance	VIF	Tolerance	VIF
CONTENT	Value proposition (LVCTN1)	0,987	1,014	0,987	1,014
	Customer Speciality (LVCTN2)	0,987	1,014	0,987	1,014
STRUCTURE	Partners (LVSTR1)	0,134	7,486	0,134	7,486
	Resources (LVSTR2)	0,846	1,183	0,846	1,183
	Value configuration (LVSTR3)	0,126	7,948	0,126	7,948
CONTEXT	Revenue through team performance (LVCTX1)	0,995	1,005	0,995	1,005
	Revenue through general performance (LVCTX2)	0,995	1,005	0,995	1,005
Absorptive Capacity	Knowledge application (LVABS1)	0,688	1,454	0,688	1,454
	Common knowledgebase (LVABS2)	0,883	1,133	0,883	1,133
	Knowledge disseminatoin (LVABS3)	0,621	1,610	0,621	1,610
Collaboration	Collaborate with partners (LVCOL1)	0,697	1,435	0,697	1,435
	Distribute tasks for sharing research activities (LVCOL2)	0,697	1,435	0,697	1,435
Knoweldge Embeddedness	knowledge embedded in Humans (LVKEMB1)	0,952	1,051	0,952	1,051
	Knowledge embedded in technology (LVKEMB2)	0,952	1,051	0,952	1,051
Knowledge Distance	External source has special research domain (LVKDIST1)	1,000	1,000	1,000	1,000
	External source has special technology (LVKDIST2)	1,000	1,000	1,000	1,000

Table 8.10: Collinearity statistics for LVs of different theoretical constructs

It was noted that although some correlations among latent variables were significant and relatively high, however, they did not pose a multicollinearity problem as Variance Inflation Factors (VIF) were low for almost all latent variables. Generally, there is not strict cut-off level for VIF; however, many suggest the range between 5 and 10 (Kunter *et al.*, 2004). The highest VIF identified during collinearity diagnosis was around 8.0; however, it is still within the range. Therefore, the model specifications proved robust to multicollinearity.

b. Hypothesis Testing

The second objective for using regression analysis is hypothesis testing. In this dissertation, various sub-hypotheses are defined to test direct and indirect relationships among different theoretical constructs. ***Hypothesis II*** states the direct relationship of different elements of BME framework with the innovation, whereas, ***hypothesis III*** states the indirect relationships through a third variable. However, at this stage, alternate hypothesis for hypothesis II will be discussed. For each main hypothesis, different sub-hypotheses were created that describe the relevant relationships among particular theoretical constructs. Thus, an *alternate hypothesis* for ***hypothesis II*** states that there is a perfect linear relationship between the BME framework and the innovation. On the contrary, the *null hypothesis* can be formulated stating no linear relationship between the BME framework and the innovation. In order to reject the null hypothesis or to accept the alternate hypothesis, the method of ordinary least square (OLS) can be used that, not only can detect the magnitude of variance among different theoretical constructs, but can also measure the existing relationships between the BME framework and the innovation in terms of magnitude and significance.

In order to accept the alternate hypothesis, results for ANOVA tests can be observed. Table 8.11 represents the Model Summary of (ANOVA) performed by OLS regression Analysis. Each observed variable (theoretical construct) can be regressed on dependent variables, separately. Table 8.11a represents the regression of observed variables with the dependent variable LVINV1, whereas, table 8.11b represents the regression of observed variables with the dependent variable LVINV2.

Based on the output from the sample, it was observed that the *null hypothesis* can be rejected in those cases where the F statistic is higher than 4.47 (critical value of F statistic having alpha = 0.05). Thus, it can be safely stated that independent variables [CONTENT], [CONTEXT] and [STRUCTURE] have a significant relationships with LVINV1, whereas,

only the [CONTENT] element has a significant relationship with LVINV2 (Sub-Table 8.11-a).

Sub-Table 8.11a

OBSERVED VARIABLES	Increase in innovation by sharing expertise among team members (LVINV1)								
					Change Statistics				
	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change
[CONTENT]	0,830[a]	0,688	0,599	1,035	0,688	7,725	2	7	0,017
[STRUCTURE]	0,926[a]	0,857	0,786	0,757	0,857	12,002	3	6	0,006
[CONTEXT]	0,971[a]	0,942	0,926	0,445	0,942	57,222	2	7	0,000
Absorptive Capacity	0,896[a]	0,803	0,705	0,888	0,803	8,158	3	6	0,015
Collaboration	0,863[a]	0,744	0,671	0,937	0,744	10,193	2	7	0,008
Knowledge Embeddedness	0,737[a]	0,544	0,413	1,252	0,544	4,170	2	7	0,064
Knowledge Distance	0,228[a]	0,052	-0,219	1,804	0,052	0,193	2	7	0,829

a. Dependent variable: Increase in innovation by sharing expertise among members of the research team

Sub-Table 8.11b

OBSERVED VARIABLES	Increase in innovation by applying external knowledge after alteration (LVINV2)								
					Change Statistics				
	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change
[CONTENT]	0,830[b]	0,690	0,601	1,154	0,690	7,773	2	7	0,017
[STRUCTURE]	0,761[a]	0,579	0,369	1,451	0,579	2,752	3	6	0,135
[CONTEXT]	0,682[b]	0,466	0,313	1,514	0,466	3,050	2	7	0,112
Absorptive Capacity	0,774[b]	0,598	0,397	1,418	0,598	2,979	3	6	0,118
Collaboration	0,535[b]	0,287	0,083	1,749	0,287	1,407	2	7	0,307
Knowledge Embeddedness	0,311[b]	0,097	-0,161	1,968	0,097	0,375	2	7	0,700
Knowledge Distance	0,833[b]	0,695	0,607	1,145	0,695	7,957	2	7	0,016

b. Dependent Variable: Increase in innovation by applying external knowledge after alteration

Table 8.11: Model Summary (ANOVA) for regression of independent and intervening variables on dependent variables

Similarly, the F statistics was also used for identifying significant relationships among intervening and the dependent variables. Sub-table 8.11-b represents the F statistic for intervening variables. Only two observed variables, *viz.*, *Absorptive Capacity* and *Collaboration*, were identified that can have significant relationship with LVINV1, whereas only one variable (knowledge distance) was identified that can have some effects on

LVINV2. It is important to mention here that the F Statistics was used to measure the relative strength of the proposed causal model. Some researchers have recommended F statistics for measuring the fitness of good when handling samples of smaller size, i.e., N < 20 (Choudhury, 2009; Bentler and Yuan, 1999).

c. Magnitudes and Strengths of Correlations

Based on the results of ANOVA statistics, the next task is to determine the strength and magnitude of the linear and other relationships between the observed and the dependent variables. Table 8.12 represents the summary of relationships the BME framework and the innovation through OLS regression analysis.

Sr. No.	Latent Variables	Increase in innovation by sharing expertise among team members (LVINV1)					Increase in innovation by applying external knowledge after alteration (LVINV2)				
		Unstd. Coeff.		Std Coeff.			Unstd. Coeff.		Std Coeff.		
		B	Std. Error	Beta	t	Sig.	B	Std. Error	Beta	t	Sig.
1	Value proposition (LVCTN1)	**1,211**	**,318**	**,808**	**3,803**	**,007**	,351	,355	,210	,988	,356
2	Customer Speciality (LVCTN2)	,224	,156	,304	1,431	,196	**,681**	**,174**	**,828**	**3,906**	**,006**
3	Partners (LVSTR1)	**1,785**	**,458**	**1,646**	**3,900**	**,008**	**2,178**	**,878**	**1,797**	**2,480**	**,048**
4	Resources (Technology) (LVSTR2)	-,042	,308	-,023	-,137	,896	-,462	,590	-,225	-,783	,464
5	Value configuration (LVSTR3)	-,864	,454	-,829	-1,905	,105	-1,612	,870	-1,383	-1,852	,113
6	Revenue through team performance (LVCTX1)	**1,076**	**,102**	**,960**	**10,559**	**,000**	**,782**	**,347**	**,624**	**2,254**	**,059**
7	Revenue through general performance (LVCTX2)	,131	,131	,091	1,003	,349	-,516	,446	-,321	-1,157	,285
8	Knowledge application (LVABS1)	**,852**	**,232**	**,803**	**3,674**	**,010**	-,204	,370	-,172	-,550	,602
9	Common knowledgebase (existing knowledge) (LVABS2)	**-,608**	**,235**	**-,499**	**-2,589**	**,041**	**-,865**	**,375**	**-,636**	**-2,308**	**,060**
10	Knowledge dissemination (LVABS3)	,035	,308	,026	,113	,914	**1,182**	**,492**	**,790**	**2,406**	**,053**
11	Collaborate with partners (LVCOL1)	**,811**	**,233**	**,797**	**3,483**	**,010**	,070	,435	,062	,162	,876
12	Distribute tasks for sharing research activities (LVCOL2)	,128	,266	,110	,481	,645	,648	,497	,499	1,305	,233
13	Knowledge embedded in Human (LVKEMB2)	**,988**	**,348**	**,744**	**2,842**	**,025**	-,567	,754	-,277	-,752	,476
14	Knowledge embedded in technology (LVKEMB1)	-,060	,480	-,033	-,125	,904	,320	,547	,215	,585	,577
15	External source has special research domain (LVKDIST1)	,153	,271	,208	,566	,589	**,665**	**,172**	**,809**	**3,870**	**,006**
16	External source has special technology (LVKDIST2)	,090	,368	,090	,244	,814	-,245	,233	-,220	-1,052	,328

Table 8.12: Summary of coefficients of independent variables regressed on dependent variables through OLS regression affirming direct relationship among latent variables

While performing OLS, different LVs for independent and intervening variables were regressed on latent variables for innovation, namely, LVINV1 and LVINV2 respectively. It

was noted that various LVs of independent and intervening variables have significant (at $p \leq 0.01$) relationships with LVs of dependent variables. The significant relationships that were identified through OLS provided indication that alternate hypotheses can be accepted and it is safe to reject the null hypothesis. From the above table, it can be observed that LVCTN1 and LVCTN2 are significantly related with LVINV1 and LVINV2, respectively. Similarly, the two other LVs related to the BME framework are also significantly related with the LVINV1 and LVINV2. Beta values represent the standardized coefficients which provide information about the magnitude of the relationship, while significance is the strength of the relationship.

From the above table, it can also be observed that there exist some significant relationships between intervening and dependent variables. For example, a significant relationship of LVABS2 can be found with LVINV1 and LVINV2. Similarly, other LVs that can be used to measure factors related to transfer of knowledge can also be observed as significantly related with the innovation. Based on these observations, one can think to test the existence of linear or other relationships among independent and intervening variables.

Table 8.13 represents the summary of the OLS results for different observed variables. Many significant relations can be observed among different independent and intervening variables at a significant level ($p \leq 0.05$).

Independent Variable	Dependent Variable	R	R^2	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
						R^2 Change	F Change	df1	df2	Sig. F Change
[CONTENT]	*KNOWLEDGE DISTANCE*	1,000[a]	1,000	1,000	,000	1,000	.	2	7	.
		0,529[b]	0,280	0,075	1,574	0,280	1,362	2	7	0,316
[CONTEXT]	*ABSORPTIVE CAPACITY*	0,800[c]	0,639	0,536	1,048	0,639	6,208	2	7	0,028
		0,463[d]	0,214	-0,010	1,349	0,214	0,956	2	7	0,430
		0,410[e]	0,168	-0,070	1,262	0,168	0,706	2	7	0,526
[STRUCTURE]	*ABSORPTIVE CAPACITY*	0,877[f]	0,770	0,655	0,905	0,770	6,683	3	6	0,024
		0,696[g]	0,485	0,227	1,180	0,485	1,882	3	6	0,234
		0,726[h]	0,527	0,290	1,028	0,527	2,225	3	6	0,186
	KNOWLEDGE EMBEDDED	1,000[i]	1,000	1,000	0,000	1,000	.	3	6	.
		0,855[j]	0,731	0,596	0,782	0,731	5,433	3	6	0,038
	COLLABORATION	0,987[k]	0,974	0,961	0,316	0,974	75,711	3	6	0,000
		0,929[l]	0,864	0,795	0,636	0,864	12,668	3	6	0,005

Dependent variables: [a]. External source has special research domain (LVKDIST1), [b]. external source has special technology (LVKDIST2), [c]. Knowledge application (LVKABS1), [d]. Common knowledgebase (LVABS2), [e. h.] Knowledge dissemination (LVABS) [f]. Knowledge application (LVABS1), [g]. Common knowledgebase (LVABS2), [i]. knowledge embedded in technology (LVKEMB1), [j.] knowledge embedded in Humans (LVKEMB2), [k]. Collaborate with partners (LVCOL1), [l.] distribute tasks for sharing research activities (LVCOL2)

Table 8.13: Model Summary (ANOVA) for regression of independent on intervening variables

Based on ***hypothesis III*** (for details of the relevant sub-hypotheses and proposed relationship, see Annex II), intervening variables can be treated as dependent variables and correlations can be determined for these proposed relationships. In the above table, 'R' is simply a relationship between two observed variables and R^2 is the sum of the relationships. A positive value of R at $p \leq 0.05$ suggests that the relationship among the two variables is significant, hence, one can reject the *null hypothesis* that there exist NO relationship among dependent (y) and independent (x) variable. The value of standard errors of the estimate (SEE) is simply a difference of means between and the (i.e., the means of x and y). The positive non-zero value of SEE suggests rejecting *null hypothesis* when an SEE value is greater than zero at some confidence interval (CI). From the above table, it is apparent that the [CONTEXT] element of BME framework has a significant relationship with the *Absorptive Capacity*, while the [STRUCTURE] element of BME has significant relations with *Absorptive Capacity*, *Knowledge Embeddedness* and *Collaboration*.

It can be concluded from the results of various steps of regression analysis that there are certain direct and indirect relationships between different elements of BME framework and innovation. These results support ***hypotheses II*** that proposes a direct and linear relationship between the BME framework and innovation. In order to test indirect effects for ***hypothesis III***, correlations between the independent variables (i.e., different elements of BME framework) and intervening variables (i.e., factors affecting successful transfer of knowledge) were also evaluated. These evaluations also provide support for ***hypothesis III*** that proposes causal relationships among different theoretical constructs. However, in order to identify the exact nature of direct and indirect effects, mediation analysis is necessary to be performed. Since the hypothesized causal model suggest more than one intervening variables, therefore, the multiple mediation analysis was performed through bootstrapping procedure. Because of extremely small size of the dataset, it is also suggested to use bootstrapping procedure to indentify the direct and indirect effects on dependent variable.

Since the sample size was extremely small, therefore, the results achieved cannot predict the true value of estimators. However, the results have identified that some significant relationships may exist among different variables that can be tested empirically. The detailed description and the implementation of multiple mediation analysis by bootstrapping will be now discussed in the next section.

8.3.5. Multiple Mediation Analysis

The proposed hypotheses suggested many mediation hypotheses; therefore, several approaches are used to assess the impact of total and specific indirect effects in this multiple mediator model. Simple mediation analysis measures how or by what means, an independent variable (**X**) affects a dependent (**Y**) variable through one intervening or mediating variable (**M**). In order to determine the role of proposed intervening variables in the previous sections of this chapter, I applied multiple mediation analysis. Multiple mediation analysis is recommended when more than one intervening variables are present within the hypothesized causal model. Figure 8.6 is a diagrammatic representation of a simple mediation model.

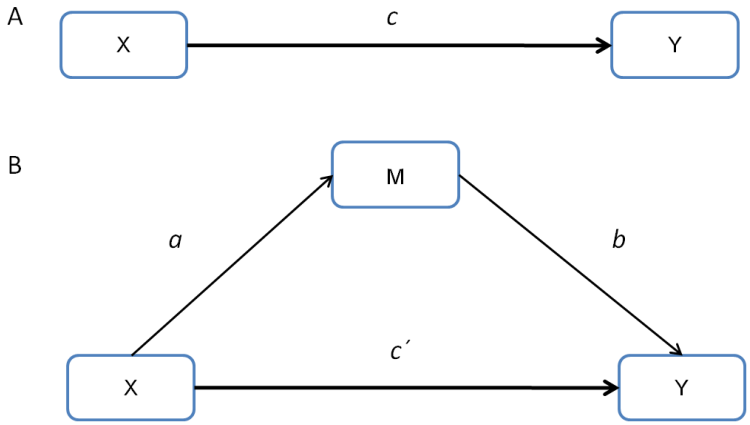


Figure 8.6: (A) Direct effect of X on Y. (B) Indirect effect of X on Y. X is proposed to affect Y through M

In the above figure (Figure 8.6A) when X affects Y, it is called direct effect and it can be represented as *c*. A third variable can be entered into this relation that is represented here as M, i.e., the mediator. in the second part of the diagram (Figure 8.6B), *a* represents the effect of X on M, *b* represents effect of M on Y and *c´* is the difference between the total effect of X on Y and indirect effect of X on Y through M. Various researchers have argued to describe criteria for a mediator variable (MacKinnon, *et al.,* 2002, Little *et al.,* 2007). Thus, a variable functions as a mediator when it meets three essential conditions:

1) Significant variation in the presumed intervening variable by variation in independent variable (i.e., path *a*)
2) Significant variation in the dependent variable by variation in the intervening variable (i.e., path *b*)
3) When path *a* and path *b* are controlled, the previous significant relationship between the dependent and independent variable (i.e., path *c*) is no longer significant (Baron and Kenny, 1986). In the perspective of the third

condition, the impact of a single of multiple intervening variables can be computed by analysing the value of path *c*. When path *c* is absolute zero; it strongly demonstrates the presence of a single mediating variable. However, if the value of path *c* is not zero, it is an indication of the presence of multiple mediating variables.

Different approaches have been recommended to test multiple mediation hypotheses. Among those are, *causal step strategy* (Baron & Kenny, 1986), *product-of-coefficient* approach (Sobel, 1982), *distribution of the product* approach (MacKinnon *et al.,* 2002; MacKinnon *et al.,* 2004) and *bootstrapping approach* (Preacher and Hayes, 2004; 2008). So far, *causal step strategy* is the most commonly used approached that was popularized by Baron and Kenny (1986). This approach allows researchers to investigate the paths (*a* and *b*) by using OLS regression techniques, thus focusing on the significance of paths *a* and *b*. However, most other approaches for testing mediation analysis focus on the product term *ab*, i.e., the product of paths '*a'* and '*b'*. The approach was first introduced by Sobel and is known as the *product-of-coefficients* approach (also known as Sobel test). Sobel described the general procedure to determine the indirect effects in mediation models, however, several extensions have been proposed later on and the most popular approach among those extensions is the *distribution of the product* approach. The approached was presented by Mackinnon *et al*. (2002) where they presented comparison of 14 methods of mediation estimation (Preacher & Hayes, 2004). Rather than imposing the assumption of normality of distribution of *ab*, their approach acknowledges the skewness of the distribution of the products (i.e., *ab*).

So far the approaches discussed above have one common assumption that the sample size should be fairly large. However, in this dissertation, the sample size was very small, i.e., only 10 cases were processed after completing the interview session, thus the assumption of normality is not possible. Therefore, other traditional methods of multiple regressions were not suitable for processing with such a small sample. For this purpose, *bootstrapping* method was used that facilitated to simulate the given data in order to perform power calculations with small samples that can also served as a pilot sample.

8.3.6. Bootstrapping

The bootstrapping is a modern approach in statistics that is based on computer intensive approaches to statistical inference. Bootstrap method is preferred in those cases

where conditions regarding normality or sample size are not met. The term bootstrapping was first adapted by Efron (1979) to use sample data as a population from which repeated samples are drawn (Fox, 2002). Bootstrapping method has several abilities that make this methodology robust for power calculations even for small samples (Horowitz, 2000). A bootstrap is more accurate in finite samples than first order asymptotic approximation, thus refining biasness in the estimator. The method is also used to test hypothesis based on parametric assumptions that are not clear, in other words, the hypothesis testing can be performed with nonparametric assumptions. Bootstrap can also be used to obtain confidence intervals (CI) for test statistics with reduce errors in probabilities.

There were three reasons that provided the basis to use the bootstrapping methodology in this dissertation. These three reasons have also been quoted as three situations by Ader, *et al.* (2008).

1) **Unknown or complicated theoretical distribution of a statistic:** for those samples where estimated statistics other mean, e.g., standard deviation or median, are not known or difficult to interpret accurately, bootstrapping is used to obtain more accurate statistic. As it was observed previously, the standard errors of estimates for observed variables that were obtained through regression analysis, were greater than zero (e.g., see tables 8.1 & 8.2), however, solely based on these observation, the relevant hypotheses could be affirmed.
2) **Insufficient sample size:** for sample sizes that are extremely small (e.g., N = 7), estimated standard errors might be greater than zero by using standard statistical procedures, however, in order to test hypothesis, this could be an insignificant result, one that could be easily arise by chance (Efron & Tibshirani, 1993). However, bootstrap method creates large number of bootstrap samples by sampling *with replacement n* times from the original dataset. Since the original dataset for this thesis consisted only of N = 10, therefore, bootstrap was the most suitable methodology to perform re-sampling of the original dataset into bootstrap sample.
3) **Perform power calculations with small pilot sample:** the power of a statistical test is the probability that the test can reject a false null hypothesis, (i.e., chances to commit Type II errors are zero). A larger sample size increases the precision in the estimates for various properties of

the population, e.g., the standard deviation or mean. Thus, the power and sample size heavily rely on these estimates. Therefore, it is suggested to conduct bootstrapping experiments prior to perform power calculations with full dataset. Since, I have proposed in the future work for large scale data collection to perform empirical analysis (cf. Chapter 10), therefore, bootstrap methodology can help to get the impression that either the proposed hypotheses can further be tested empirically or not.

8.3.7. The 'Preacher and Hayes' Approach

In order to test the multiple mediation model (the hypothetical model), I adapted the bootstrapping approach of Preacher and Hayes (2008). According to this approach, the *product-of-coefficients* approach that assumes a large sample can be used to conduct hypothesis testing and construct confidence intervals (CIs) for indirect effects in both simple and multiple mediator models. However, procedures to perform this statistical procedure are quite tedious and lengthy without a computer aid. Therefore, a Structural Equation Modelling (SEM) program (here, SPSS) can be used with the aid of different macros to perform these statistical procedures. Preacher and Hayes (2008) have developed macros for SPSS and SAS that are downloadable freely from www.quantspy.org along with documentation. A script developed to run this macro makes the procedure quite useful to perform the statistics in less than no time. A following illustration of the script shows the simplicity of performing a complex method (Figure 8.7)

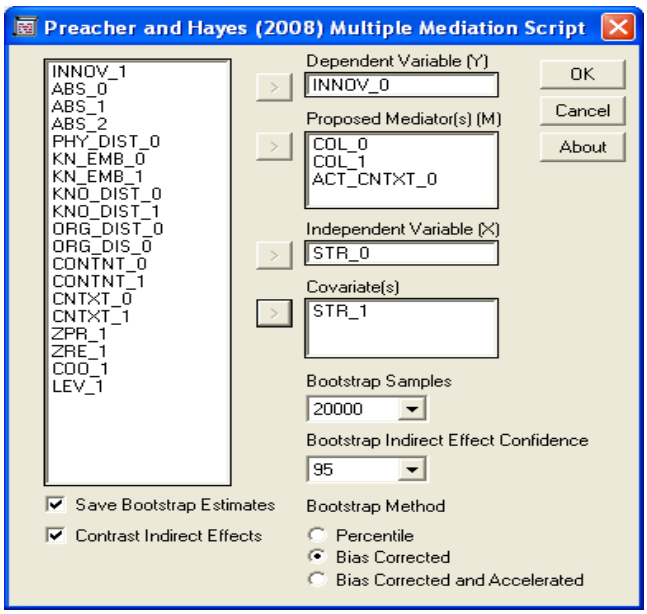


Figure 8.7: An SPSS script for running multiple mediation macro - Preachers & Hayes (2008)

In order to use this script, one only needs to give inputs for different variables and can set different parameters according to the requirements. The resulting CIs can be generated either as the percentile, the bias corrected (BC) or the bias corrected and accelerated (BCa) confidence intervals. The main output generated by this macro are the estimates of the total, direct and single step indirect effects of the causal variables (X_i) on outcome variable (Y_j) through a (list of) proposed mediator/s (M).

According to Preachers and Hayes (2008), an intervening variable can be justified as a mediator when the difference between the total and the direct effect of independent variable on dependent variable is different from zero. They also stated that the 95% CI should not contain zero. However, during individual analysis of the bootstrapping results, several CIs were found near to non-zero value, therefore, they were treated as non-zero for description of the results.

Based on recommendations from different researchers (Baron & Kenny, 1986; Little *et al.*, 2004; Preacher & Hayes, 2008), following criteria have been adapted in this dissertation to analyze the indirect effects of X on Y through M. 1) highly significant path *a*, 2) highly significant path *b*, and 3) path *c* should be greater than path *c´* (i.e., $c > c'$). In other words, path *c* should be significant whereas path *c´* should be smaller than *c* by a nontrivial amount (Preacher and Hayes, 2008). The total effect of X on Y can be expressed as the sum of the direct and indirect effects, $c = c' + ab$. Equivalently, an indirect effect of X on Y through M can be also be calculated by $c' = c - ab$. Based on these three criteria, hypothesis testing can be performed in order to observe to observe the validity of the proposed paths.

8.4. Hypotheses testing

Based on the above discussion, the proposed sub-hypotheses now can be discussed individually. Since, the hypotheses represents two types of relationships, i.e., the direct and the indirect, among different theoretical constructs, therefore, different statistical techniques have been mentioned in the previous sections of this chapter to test the proposed relationships. In the following pages, ***hypothesis II*** and ***III*** will be discussed in a great detail with the description of the results from the respective statistical techniques.

The hypothesis II & III proposes direct and indirect effects of the BME framework on firm's innovative performance. The ***hypothesis II*** stated that *when business models of organizations are explicitly stated, they can perform better in terms of financial as well as non-financial performance*. On the other hand, the ***hypothesis III*** states that *in order to build*

up capability for creating new products and services (innovation), it is important for organizations to acquire inputs from suppliers and customers. As discussed in the previous sections, it can be inferred from OLS and bootstrapping results that many direct and indirect links have existed among different theoretical constructs. Since, the small sample size was the major limitation in this research; therefore, it was not possible to determine the exact magnitude of these relationships through these statistical analyses. The results of data processing and analysis revealed that the different element, of the BME framework, are not only directly related with innovative performance of an organization, but also indirectly related through effective transfer of knowledge and collaboration among source and recipient organizations.

In order to test direct and indirect effects of explicitness of business models on innovative performance, several hypotheses were proposed. A list of proposed ***hypotheses II*** & ***III*** and the corresponding ***sub-hypotheses*** along with the criteria for perfect mediation is provided below (Table 8.14)

Sr. No	Sub-hypothesis statement	a *(p)*	b *(p)*	c (*p*) > c´ (*p*)
1a	There is a positive correlation between the [CONTENT] element of the business model explicitness and the innovative performance of the organization (innovation).	*sig*	*sig*	TRUE
2a	There is a positive correlation between the [CONTEXT] element of the business model and the innovative performance of the organization.	*sig*	*sig*	TRUE
3a	There is a positive correlation between the [STRUCTURE] element of the business model explicitness and the innovative performance of the recipient organization.	*sig*	*sig*	TRUE

Hypothesis III (Mediating relationship)

Sr. No	Sub-hypothesis statement	a *(p)*	b *(p)*	c (*p*) > c´ (*p*)
1b	The positive correlation between the [CONTENT] element of the business model explicitness can be enhanced by mediating effect of *knowledge distance* between the source and the recipient	*sig*	*sig*	TRUE
1c	The positive correlation between the [CONTENT] element of the business model explicitness can be enhanced by mediating effect of *activity context* between the source and the recipient organization.	*sig*	*sig*	TRUE
2b	The positive correlation between the [CONTEXT] element of the business and the innovative performance of the organization can be enhanced if *absorptive capacity* (learning) is increased.	*sig*	*sig*	TRUE
3b	The positive correlation between the [STRUCTURE] element of the business and the innovative performance of the organization can be enhanced if *activity context* is higher.	*sig*	*sig*	TRUE
3c	The positive correlation between the [STRUCTURE] element of the business and the innovative performance of the organization can be enhanced if physical distance is decreased.	*sig*	*sig*	TRUE
3d	The positive correlation between the [STRUCTURE] element of the business and the innovative performance of the organization can be enhanced if knowledge embeddedness is decreased.	*sig*	*sig*	TRUE
3e	The positive correlation between the [STRUCTURE] element of the business and the innovative performance of the organization can be enhanced if absorptive capacity is increased.	*sig*	*sig*	TRUE
3f	The positive correlation between the [STRUCTURE] element of the business and the innovative performance of the organization can be enhanced if collaboration is increased.	*sig*	*sig*	TRUE

Table 8.14: List of Table for Hypothesis II & III with sub-hypotheses and mediation criteria

A total of 11 ***sub-hypotheses*** have been proposed, 3 of which describe direct relationship of BME framework with innovation, while 8 ***sub-hypotheses*** describe indirect relationship through mediators. During data processing (reliability measurements) and analysis, it was found that the reliability of the data collected for ***sub-hypothesis 1c***, ***3b***, ***3c*** and ***3d*** was not suitable. The three theoretical constructs which did not perform well during reliability analysis were *Knowledge Embeddedness*, *Activity Context* and *Physical Distance.* Based on poor measure of sampling adequacy (MSA), variables, namely, *Activity Context, Physical Distance* were dropped after Factor Analysis (FA), while, *Knowledge Embeddedness*

was retained until bootstrapping application. However, bootstrapping method did not produce any significant result for *Knowledge Embeddedness*. Therefore, sub-hypothesis describing *Knowledge Embeddedness* was also dropped from the final list. Finally, only 4 sub-hypotheses, i.e., ***sub-hypothesis 1b***, ***2b***, ***3e*** and ***3f*** are retained and discussed further in this chapter.

It is important to mention here that though, some hypotheses have been found unsuitable for further analysis in this thesis, but theoretically they could be correct for studies with large sample sizes. These hypotheses were proposed after careful literature review; however, the data collected for hypothesis testing was not sufficient for reliable results.

8.4.1. Hypothesis II

This hypothesis proposes the direct effects of BME on the innovative performance. It states that when business models of organizations are explicitly stated, they can perform better in terms of financial as well as non-financial performance. Three sub-hypotheses that indicate direct relationship among the BME framework and the innovative performance of an organization are listed in the following table 8.15.

Sub-hypthesis	Hypothesis statement	a *(p)*	b *(p)*	(c) (p)	(c´) (p)
1a	There is a positive correlation between the [CONTENT] element of the business model explicitness and the innovative performance of the organization (innovation).	0.9981 *(0.000)*	-14.966 *(0.000)*	(0,0912) *(0,8)*	(15,0347) *(0,006)*
2a	There is a positive correlation between the [CONTEXT] element of the business model and the innovative performance of the organization.	0.6503 *(0.04)*	-0.7931 *(0.01)*	(0,858) *(0,001)*	(-,0261) *(0,9)*
3a	There is a positive correlation between the [STRUCTURE] element of the business model explicitness and the innovative performance of the recipient organization.	0.6503 *(0.04)*	-0.7931 *(0.01)*	(0,858) *(0,001)*	(-,0261) *(0,9)*

Table 8.15: Summary of results for hypotheses II from bootstrapping analysis

It was identified through OLS and bootstrapping analysis that all three elements of the BME framework are significantly related with the innovative performance of the organization. It was not possible to determine the exact magnitude of impact that each element of BME has on innovative performance due to small number of samples. However, the significant relationships were found through correlation analysis among the [CONTEXT]

& the [STRUCTURE] element of BME framework and the *Innovation performance* of the organization. Individual description of each hypothesis is provided in following sections.

Sub-hypothesis 1a stated that the [CONTENT] of BME framework is positively related with the innovative performance of the organization. The results from Pearson's correlation also provided information about hypotheses stating direct relationships. Results from correlation and regression analysis provide information on the significant relationship among these two variables. It was found through Pearson Correlation analysis (Table 8.9) that *Value Proposition* that is part of the [CONTENT] of BME was significantly related with the increase in *Rate of Innovation* when team members of mutual research teams share their expertise to increase creativity (0.77, $p \leq 0.01$). Further analysis through OLS regression (Table 8.10) also provided similar results when it was observed that *Value Proposition* was significantly related with *Increase in Rate of Innovation through Mutual Research Teams* (0.808, $p \leq 0.01$). Although, the sample size was extremely small, even then, the estimates were significant with small amount of standard errors. The similar results were acquired through bootstrap application and it was observed that path *c* for *Value Proposition* was highly significant (i.e., 0.8705, $p \leq 0.01$). Thus, there is ample evidence that the proposed ***hypothesis 1a*** can be true and a significantly positive relationship can be acclaimed when large sample size is available for further testing.

Sub-hypothesis 2a stated that a positive relationship exists between the [CONTEXT] element of BME and the innovative performance. Pearson correlation (Table 8.9) suggested that a highly significant relationship can be existed between the mutual research teams that are created to increase the creativity of the team members by sharing expertise (0.966, $p \leq 0.001$). Since the objective of such teams is to increase in rate of innovation, thus, it can enhance the recipient organization revenue as well. Another significant relationship was found between rate of innovation through external knowledge application by mutual research teams that are created to enhance creativity of the employees of partner organizations (0603, $p \leq 0.05$). OLS regression produced similar results when the latent variables of [CONTEXT] were regressed on the innovative performance (Table 8.10). It was found out that when the partner organizations create mutual teams to increase creativity, it not only increases rate of innovation by sharing expertise among team members (0.960, $p \leq 0.001$), but the innovation rate can also be aided by applying knowledge received from outside the mutual research teams (0.624, $p \leq 0.05$). Bootstrap application also produced similar results for this proposed hypothesis. It was observed that path *c*, i.e., total effect of revenue models by team

performance were significantly related with the increase in rate of innovation by sharing expertise among members of mutual research teams (0.858, $p \leq 0.01$).

Sub-hypothesis 3a stated that a positive relationship exists between the [STRUCTURE] element of BME and the innovative performance. For this hypothesis, significant results were also found for a positive correlation between the [STRUCTURE] element of BME and innovative performance of the organization. Pearson correlation (Table 8.9) revealed that there was a significant relationship between interacting partners for increasing rate of innovation by creating mutual research teams for sharing expertise (0.871, $p \leq 0.01$). OLS regression produced similar results (Table 8.10). It was identified that when the recipient organizations acquire knowledge from external sources, especially the partners, i.e., suppliers, vendors, or customers, it can significantly enhance the rate of innovation (1.646, $p \leq 0.01$) within mutual research teams. Although, it was not possible to identify the actual magnitude of regression coefficient with small sample size, however, the small amount of standard error revealed that this relationship can be a stronger one. Results of bootstrap application also affirmed the results derived from pair-wise correlation and regression analysis. It was found out that path *c* for total direct effects of *Partners* on innovative performance through sharing expertise among members of mutual research teams was highly significant (0.8705, $p \leq 0.001$)

8.4.2. Hypothesis III

Hypothesis III proposes indirect (mediating) effect of BME on innovative performance of an organization. Results from correlation and regression analyses presented significant relationships among the BME framework, factors affecting transfer of knowledge from the source to the recipient organization and the innovative performance of the recipient organization. Table 8.16 represents the bootstrapping results summary for the sub-hypotheses for the ***hypothesis III***.

Hypothesis 3 for Indirect (Mediating) relationships

Sub-hypthesis	Hypothesis statement	a *(p)*	b *(p)*	(c) *(p)*	(c`) *(p)*
1b	The positive correlation between the [CONTENT] element of the business model explicitness can be enhanced by mediating effect of *Knowledge Distance* between the source and the recipient organization.	0,9981 *(0,000)*	-14.967 *(0.006)*	0 ,0912 *(0,8)*	*15,03 (0,006)*

2b	The positive correlation between the [CONTEXT] element of the business and the innovative performance of the organization can be enhanced if *Absorptive Capacity* (learning) is increased.	0,0650 *(0,04)*	0,793 *(0,01)*	0,853 *(0,001)*	-0,0261 *(0,9)*
3e	The positive correlation between the [STRUCTURE] element of the business and the innovative performance of the organization can be enhanced if *Absorptive Capacity* is increased.	0,85 *(0,001)*	0,84 *(0,04)*	0,87 *(0,001)*	-0,077 *(0,8)*
3f	The positive correlation between the [STRUCTURE] element of the business and the innovative performance of the organization can be enhanced if *Collaboration* is increased.	0,84 *(0,002)*	1,28 *(0,03)*	0,733 *(0,01)*	-0,49 *(0,3)*

Table 8.16: Summary of Results for Hypotheses III from bootstrapping analysis

In order to determine the indirect effects of proposed mediators by using indirect matrix, I have taken the standardized values of latent variables (LVs) that were saved during FA. I ran the matrix without specifying control variables (covariates) that actually had improved the CIs. Without specifying any covariate in the model, the macro conducts Sobel tests, thus generating products-of-coefficients *ab* (the magnitude of effect), standard errors (SE), and a *p*-value. The estimates of all paths are calculated using OLS regression. The bootstrap estimates presented here are based on 1000 bootstrap samples. The estimates and 95% CIs (Bias Corrected and Accelerated) that were identified significant for description of the results will be discussed during discussion on individual ***sub-hypothesis***. Relevant summaries for these estimates and CIs are given at the end (Annex III). It is worth to mention here that these casual models were significantly fitted within the available sample.

It was identified through bootstrapping that different elements of the BME framework are related significantly related with the innovative performance indirectly. Individual description of bootstrapping results for each sub-hypothesis is provided in following sections.

Sub-hypothesis 1b proposed that a positive correlation between the [CONTENT] element of the BME framework can be enhanced by mediating effect *Knowledge Distance* between the source and the recipient organization. The result of Pearson correlation (Table 8.9) showed significant relationships among different LVs. For example, latent variable for knowledge distance was found significantly related with the latent variables of the BME framework as well as the innovative performance. On one hand, the speciality of the external source of knowledge (LVKDIST1) was found significantly related with the *Customer Speciality* (LVCNT2) (0.999, $p \leq 0.001$), while on the other the hand, it was found

significantly related with innovative performance of the recipient organization (LVINV2) (0.804, $p \leq 0.01$). Similar results were acquired through OLS regression (Table 8.10).

Although, the results from correlation and regression analysis depicted a significant relationship of two latent variables, viz., the LVKDIST1 and LVINV2, however, the direction of relationship was not evidence. Therefore, the bootstrapping method was proved helpful to identify the direction of the relationship. Table 8.17 represents the bootstrap results for the mediation effects of BME framework on innovation through knowledge distance between the source and the recipient organization.

	Point estimates	Product of coefficients			Bootstrapping BCa 95% CI	
		SE	Z	p	Lower	Upper
	Indirect Effects					
TOTAL	-14,9435	2,9919	-4,9946	,0000	-178,9735	-4,2515
Special research domain (LVKDIST1)	-14,9380	2,9922	-4,9924	,0000	-127,1249	-1,7541
special technology (LVKDIST2)	-,0055	,0708	-,0781	,9378	-,8909	,1074
LV KDIST1 VS LVKDIST2	-14,9325	2,9930	-4,9891	,0000	-71,0555	7,4683

Table 8.17: Mediation of the effect of Customer Specialty (LVCTN2) on Increase in rate of innovation by sharing expertise among team members (LVINV1) through Special Research Domain (LVKDIST1) of the source organization

It can be observed in the above table that the total indirect effect of LVCTN2 on LVINV2 through LVKDIST1 has a negative quotient (i.e., the point estimates are -14.943, $p \leq 0.000$ with UL and LL of BCa 95% CIs between -178.983 and -4.251). From the bootstrap output (Annex-IV), the directions of path *a* and *b* are also consistent with the interpretation that the more the customers need specialized products, the higher level of knowledge is required from the source organization from a special research domain (path $a = 0.998$, $p \leq 0.001$). If recipient organizations are not well versed with the customer's specialized requirements, they cannot acquire the right knowledge input from the external sources with higher level of domain knowledge, thus, it can hamper their innovative capability (path $b = -14.966$, $p \leq 0.001$). Based on the above discussion, the direct and indirect relationships for sub-***hypotheses 1a*** & ***1b*** can be summarized as the following causal links diagram (Figure 8.9).

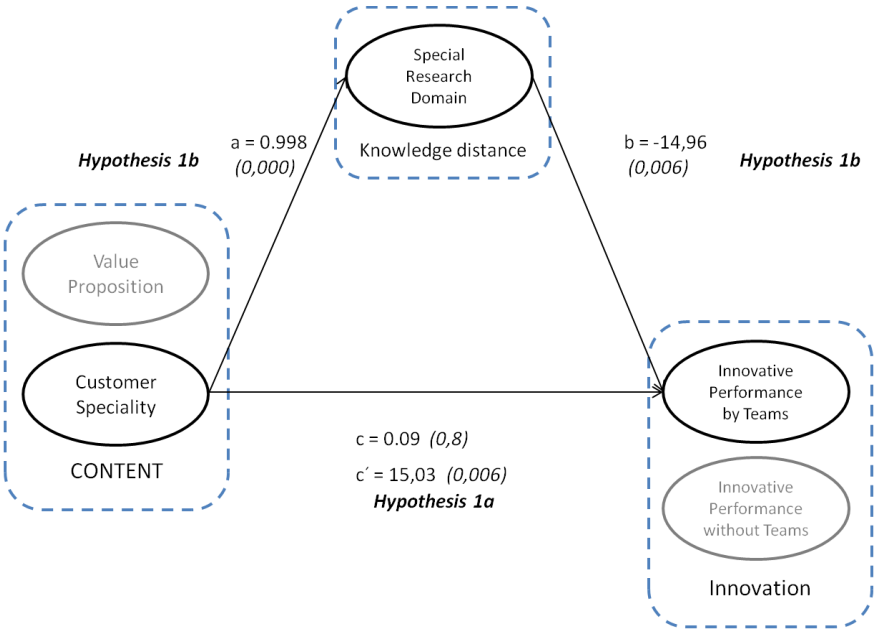


Figure 8.8: Path diagram of mediating relationship of Knowledge Distance with the [CONTEN] element of BME Framework and Innovation

The ***sub-hypothesis 1a*** represents the direct relationship between the BME framework (independent variable) and the innovation (dependent variable). Path *c* and *c´* indicates the direct relationships between the customer speciality (LVCNT2) and the innovative performance of the recipient organization through mutual research teams (LVINV1). The ***sub-hypothesis 1b*** represents the indirect relationship between the independent and dependent variables through a third variable called mediating variable. In the above diagram, path *a* represent a link between the customer speciality (LVCNT2) and *Special Research domain* (LVKDIST2), while path *b* represents a link between *Special Research domain* (LVKDIST2) and the innovative performance of the recipient organization through mutual research teams (LVINV1).

Sub-hypothesis 2b proposed a positive correlation between the [CONTEXT] element of the business and the innovative performance of the organization through absorptive capacity. The result of Pearson correlation (Table 8.9) showed significant relationships among different LVs. For example, on the one hand, *Knowledge Application*, that is the latent variable for absorptive capacity (LVABS1), was found significantly related with the latent variable of the BME framework, i.e., *Revenue through team performance* (LVCTX1) (0.688, $p \leq 0.05$), while on the other hand, it was also significantly related with the increase of innovation by sharing expertise among team members (LVINV1) (0.751, $p \leq 0.01$). Similar results were acquired through OLS regression (Table 8.10).

Although, the results from correlation and regression analysis depicted a significant relationship among the *Absorptive Capacity* of the recipient and the source organization and the innovative performance of the recipient organization; however, it was not evident from these measurements that is it the learning capability of the recipient organization or the disseminating ability of the source organization that matters the most. Therefore, the results from the bootstrap application have provided this distinction. Table 8.18 represents the bootstrap results for the mediating effect of Absorptive capacity.

	Point estimates	Product of coefficients			Bootstrapping BCa 95% CI	
		SE	Z	p	Lower	Upper
			Indirect Effects			
TOTAL	,8846	,2394	3,6948	,0002	-2,3745	6,9875
Knowledge Application (LVABS1)	,5158	,2247	2,2954	,0217	-,6114	9,0588
Common Knowledge Base (LVABS2)	,1112	,0926	1,2003	,2300	-1,0949	,7957
Knowledge Dissemination (LVABS3)	,2576	,1695	1,5195	,1286	-,4291	2,8716
LVABS1 vs LVABS2	,4045	,2446	1,6538	,0982	-1,3611	11,0792
LVABS1 vs LVABS3	,2582	,3074	,8398	,4010	-,6696	10,1849
LVABS2 vs LVABS3	-,1464	,1930	-,7584	,4482	-3,7951	,6108

Table 8.18: Mediation of the effect of Revenue through Team Performance (LVCTX1) on Increase in innovation by sharing expertise among team members (LVINV1) through Knowledge Application (LVABS1) of the recipient organization

It can be observed in the above table that the total indirect effect of the [CONTEXT] element of BME on innovative performance has positive quotient (i.e., the point estimates are 0.8846, $p \leq 0.001$ with UL and LL for BCa 95% CIs between -2.3745 and 6.9875). The specific indirect effect of *knowledge application* by learning new skills and expertise on rate of increase in rate of innovation is having a point estimate of 0.516, $p \leq 0.05$ and a 95% BCa bootstrap CI of -0.6114 to 9.0588. The values of the upper and the lower limit of the confidence intervals for total indirect effect revealed a greater distance from zero with negative and positive signs. Whereas, for a specific indirect effect, the lower limit for 95% BCa has a smaller distance from zero with a negative sign that can be considered as non-zero. Thus, it is learning capability of the recipient organization that matters the most for the sources of the revenue, i.e., the mutual research teams.

From the bootstrap output (Annex-V), the directions of paths *a* and *b* are also consistent with the interpretation that the greater the *Absorptive capacity* in terms of learning new skills and expertise within mutual research teams (path $a = 0.6503$, $p \leq 0.05$), the greater

will be the chances to apply those skills and expertise in innovation projects to increase creativity (path $b = 0.7931$, $p \leq 0.01$). Thus, team performances can be considered as sources of revenue for the recipient organization. By learning new skills and expertise from members of mutual research teams, employees from the recipient organization can increase their creativity to increase rate of innovation for their innovation projects. Thus, the proposed ***hypothesis 2b*** can be proved correct and it can be validated through studies having large sample sizes.

The following path diagram for ***hypotheses 2a & 2b*** represents the resulting paths through bootstrapping application.

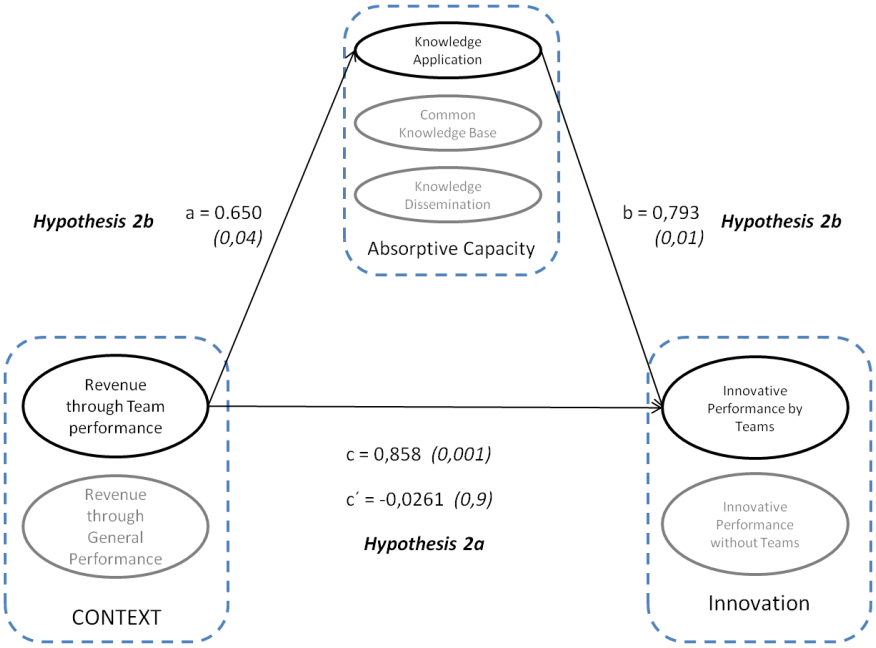


Figure 8.9: Path diagram of mediating relationship of Absorptive Capacity with the [CONTEXT] element of BME Framework and Innovation

The ***sub-hypothesis 2a*** represents the direct relationship between the BME framework (independent variable) and the innovation (dependent variable). Path *c* and *c´* indicates the direct relationships between the team performances as sources of revenue (LVCXT1) and the innovative performance of the recipient organization through mutual research teams (LVINV1). The ***sub-hypothesis 2b*** represents the indirect relationship between the independent and dependent variables through a third variable called mediating variable. In the above diagram, path *a* represent a link between the team performances as sources of revenue (LVCXT1) and *Knowledge Application* (LVABS1), while path *b* represents a link between *Knowledge Application* (LVABS1) and the innovative performance of the recipient organization through mutual research teams (LVINV1).

Sub-hypothesis 3e proposes that relationship between the innovative performance and the [STRUCTURE] element of the BME framework can be mediated by the absorptive capacity. It states that the positive correlation between the business and the innovative performance of the organization can be enhanced if absorptive capacity is increased. The result of Pearson correlation (Table 8.9) showed significant relationships among different LVs. On the one hand, the *Knowledge Application* (LVABS1) was found significantly related with the presence of *Partners* (LVSTR1) (0.845, $p \leq 0.001$), while on the other hand, it was also found significantly related with the *Innovative Performance* of the recipient organization through mutual research teams (LVINV1). Another significant relationship of *Knowledge Application* (LVABS1) was found with the *Value Configuration* (LVSTR3) (0.846, $p \leq 0.001$) as well as with the *Innovative Performance* (LVINV1) (0.692, $p \leq 0.05$). Similar results were obtained from OLS with significant relationship between absorptive capacity, the [STRUCTURE] element of BME and innovative performance of the organization (Table 8.10). Therefore, in order to determine whether both the LVs of the BME framework affect innovation indirectly through absorptive capacity, the bootstrap methodology was applied (Annex-VI). Table 8.19 represents the bootstrapping results for this the mediating effect of absorptive capacity.

	Point estimates	Product of coefficients			Bootstrapping Bca 95% CI	
		SE	Z	p	Lower	Upper
			Indirect Effects			
TOTAL	,9479	,2783	3,4056	,0007	-,3348	32,1906
Knowledge Application (LVABS1)	,7165	,2445	2,9302	,0034	-,0263	32,3488
Common Knowledge Base (LVABS2)	-,0020	,0809	-,0243	,9806	-,7872	,3048
Knowledge Dissemination (LVABS3)	,2333	,1786	1,3061	,1915	-,1029	5,6987
LABS1 vs LVABS2	,7185	,2569	2,7965	,0052	-,0977	32,1928
LVABS1 vs LVABS3	,4832	,3165	1,5270	,1268	-,9554	11,3300
LVABS2 vs LVABS3	-,2353	,1958	-1,2015	,2296	-4,4076	,2962

Table 8.19: Mediation of the effect of the presence of Partners (LVSTR1) on Increase in rate of innovation by sharing expertise among team members (LVINV1) through Knowledge Application (LVABS1) of the recipient organization

Results from bootstrapping indicate that total indirect effect of the presence of *Partners* on the innovative performance through *Knowledge Application* was having positive quotient (i.e., the point estimate are 0.9479, $p \leq 0.001$ and a 95% BCa bootstrap CI of -0.3348 to 32.1906. The specific indirect effect of *Knowledge Application* on this causal relationship was having point estimates of 0.7165, $p \leq 0.005$ and a 95% BCa bootstrap CI of -0.0263 to

32.3488. The smaller values of LL for BCa CI are near to non-zero, thus, indicating *Absorptive Capacity* as the mediating variable.

The *Knowledge Application* (LVABS1) also mediates the relationship between the *Value Configuration* (LVSTR3) and the innovative performance (LVINV1); therefore, bootstrapping was again used to identify its mediating effect. Table 8.20 represents the bootstrapping results for another mediating effect of absorptive capacity.

	Point estimates	Product of coefficients			Bootstrapping Bca 95% CI	
		SE	Z	p	Lower	Upper
			Indirect Effects			
TOTAL	,8727	,2954	2,9541	,0031	-1,3273	3,3099
Knowledge Application (LVABS1)	,7452	,2340	3,1842	,0015	-,5736	2,7844
Common Knowledge Base (LVABS2)	-,0551	,0712	-,7734	,4393	-,6539	1,5257
Knowledge Dissemination (LVABS3)	,1826	,1841	,9913	,3215	-,6972	,9399
LVABS1 vs LVABS2	,8003	,2050	3,9041	,0001	-8,1540	2,5717
LVABS1 vs LVABS3	,5627	,3265	1,7236	,0848	-3,4295	2,3117
LVABS2 vs LVABS3	-,2376	,1884	-1,2616	,2071	-,8582	3,6237

Table 8.20: Mediation of the effect of the Value Configuration (LVSTR3) on Increase in Innovation by sharing expertise among team members (LVINV1) through the Knowledge Application (LVABS1) of the recipient organization

The total indirect effect of the Value configuration (LVSTR3) on innovative performance (LVINV1) through the *Knowledge Application* (LVABS1) was having point estimates of 0.7452, $p \leq 0.005$ and a 95% BCa bootstrap CI of -0.5736 to 2.7844. Since the smaller values of LL for BCa CI are not very near to non-zero, thus, it cannot be concluded that the *Knowledge Application* (LVABS1) can act as a mediator for a relationship for the total indirect effect of the Value configuration (LVSTR3) on innovative performance (LVINV1). Therefore, the *Knowledge Application* (LVABS1) can act as a mediator in the presence of the *Partners* on the innovative performance of the recipient organization.

From the bootstrap output (Annex-VII), the directions of paths *a* and *b* were also consistent with the interpretation that the greater the *Absorptive Capacity* in terms of learning new skills and expertise within mutual research teams (path $a = 0.8348$, $p \leq 0.01$), the greater will be the chances to apply those skills and expertise in innovation projects to increase creativity (path $b = 0.8928$, $p \leq 0.05$). Thus it shows that by learning new skills and expertise from members of the mutual research teams, rate of innovation can be increased when these skills and expertise are used to create value during value configuration processes. Thus, the

proposed ***sub-hypothesis 3e*** was proved correct and it can be validated through studies having large sample sizes. The resultant paths *a*, *b*, *c* and *c´* for sub-***hypotheses 3a & 3e*** are represented in the figure 8.11.

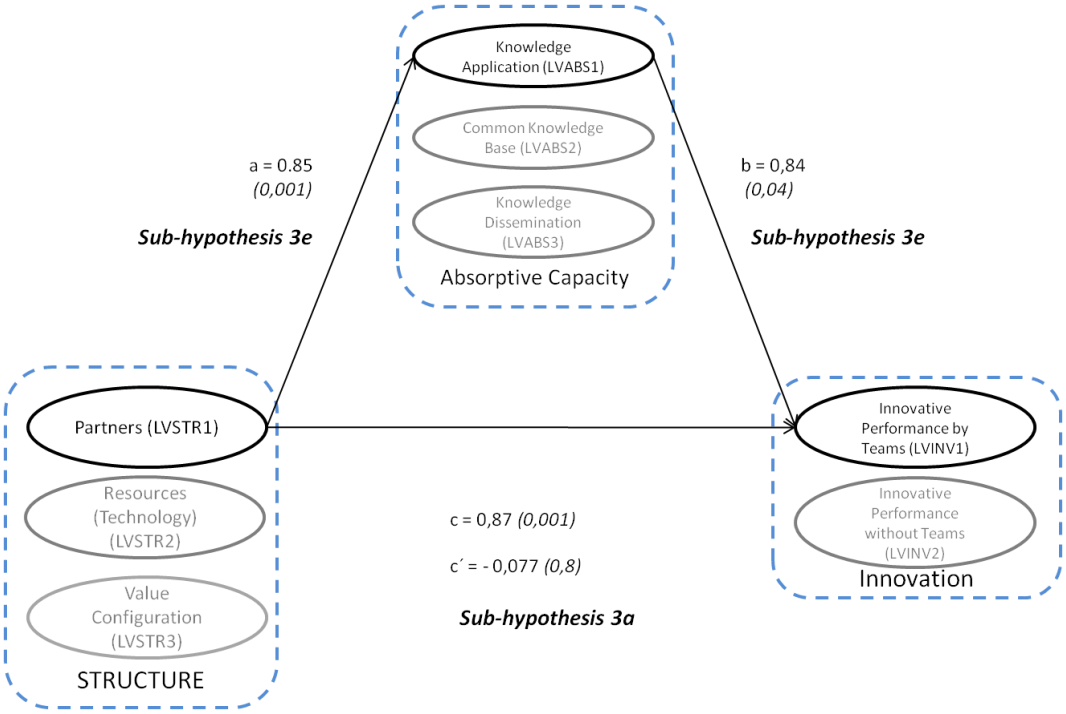


Figure 8.10: Path diagram of mediating relationship of Absorptive capacity with the [STRUCTURE] element of BME Framework and Innovation

The ***sub-hypothesis 3a*** represents the direct relationship between the BME framework (independent variable) and the innovation (dependent variable). Path *c* and *c´* indicates the direct relationships between the presence of the *Partners* (LVSTR1) and the innovative performance of the recipient organization through mutual research teams (LVINV1). The ***sub-hypothesis 3e*** represents the indirect relationship between the independent and dependent variables through a third variable called mediating variable. In the above diagram, path *a* represent a link between the presence of the Partners (LVSTR1) and the *Knowledge Application* (LVABS1), while path *b* represents a link between the *Knowledge Application* (LVABS1) and the *Innovative Performance* of the recipient organization through mutual research teams (LVINV1).

Hypothesis 3.3f states that the positive correlation between the [STRUCTURE] element of BME framework and the innovative performance of the organization can be enhanced if collaboration is increased. The result of Pearson correlation (Table 8.9) showed significant relationships among different LVs. It is indicated from the table that *Collaborate with Partners* (LVCOL1) is not only significantly related with the presence of the *Partners*

(LVSTR1) (0.965, $p \leq 0.001$), but is also significantly related with the *Value Configuration* (LVSTR3) (0.908, $p \leq 0.001$). It is also apparent from the table that *Collaborate with Partners* (LVCOL1) is significantly related with the *Innovative Performance* (LVINV1) by mutual team performance (0.858, $p \leq 0.001$). The OLS regression produced significant results for *Collaboration with Partners* (LVCOL1) when regressed on *Innovative Performance* (LVINV1) (0.797, $p \leq 0.01$). However, no significant relationship was found when *Value Configuration* (LVSTR3) was regressed on the LVs of *Innovative Performance* of the recipient organization (LVINV1 & LVINV2) (Table 8.10). Thus, in order to clear these confusing results, bootstrap methodology was employed that produced results similar to Pearson correlation (Annex-VIII & X). Table 8.21 & 8.22 represents the results of the bootstrapping methodology.

	Point estimates	Product of coefficients			Bootstrapping Bca 95% CI	
		SE	Z	p	Lower	Upper
			Indirect Effects			
TOTAL	,8777	,3731	2,3522	,0187	-,0954	2,2558
Collaborate with partners (LVCOL1)	,7251	,3486	2,0799	,0375	,0923	2,2952
Distribute tasks for research activities (LVCOL2)	,1526	,1488	1,0257	,3050	-,3809	,8285
LVCOL1 vs LVCOL2	,5724	,3715	1,5408	,1234	-,3154	1,7007

Table 8.21: Mediation of the effect of 'Technological Resources (LVSTR2) on Increase in innovation (LVINV1) by sharing expertise among team members through Collaborate with Partners (LVCOL1) and Distribute tasks for research activities (LVCOL2) among team members

	Point estimates	Product of coefficients			Bootstrapping Bca 95% CI	
		SE	Z	p	Lower	Upper
			Indirect Effects			
TOTAL	1,2293	,4225	2,9096	,0036	-,1509	3,3826
Collaborate with partners (LVCOL1)	1,0882	,3925	2,7727	,0056	-,0955	6,0167
Distribute tasks for research activities (LVCOL2)	,1410	,1389	1,0156	,3098	-,2516	,9168
LVCOL1 vs LVCOL2	,9472	,3854	2,4579	,0140	-,1492	8,6507

Table 8.22: Mediation of the effect of Value Configuration (LVSTR3) on Increase in Innovation by sharing expertise among team members (LVINV1) through Collaborate with Partners (LVCOL1) and Distribute tasks for research activities (LVCOL2) among team members

It was found out that total indirect effects of *Technological Resources* (LVSTR2) (Table 8.21) and *Value Configuration* (LVSTR3) (Table 8.22) on *Innovative Performance* through *Collaboration* were having positive quotients, i.e., with the point estimates of 0.877,

$p \leq 0.01$ and 1.229, $p \leq 0.01$, respectively. The respective 95% BCa bootstrap CIs were 0.0923 (LL) to 2.2952 (UL) and -0.0955 (LL) to 6.0167 (UL). The lower limit of 95% BCa bootstrap CI for the Value Configuration (LVSTR3) is near to zero. Thus it can be concluded that *Collaboration among Partners* (LVCOL1) acts as a mediator for the indirect effect of *Value Configuration* (LVSTR3) on the *Innovative Performance* through teams (LVINV1). Based on the above discussion, the direct and indirect relationships for ***sub-hypotheses 3a*** & ***3f*** can be summarized as the following causal links diagram (Figure 8.12).

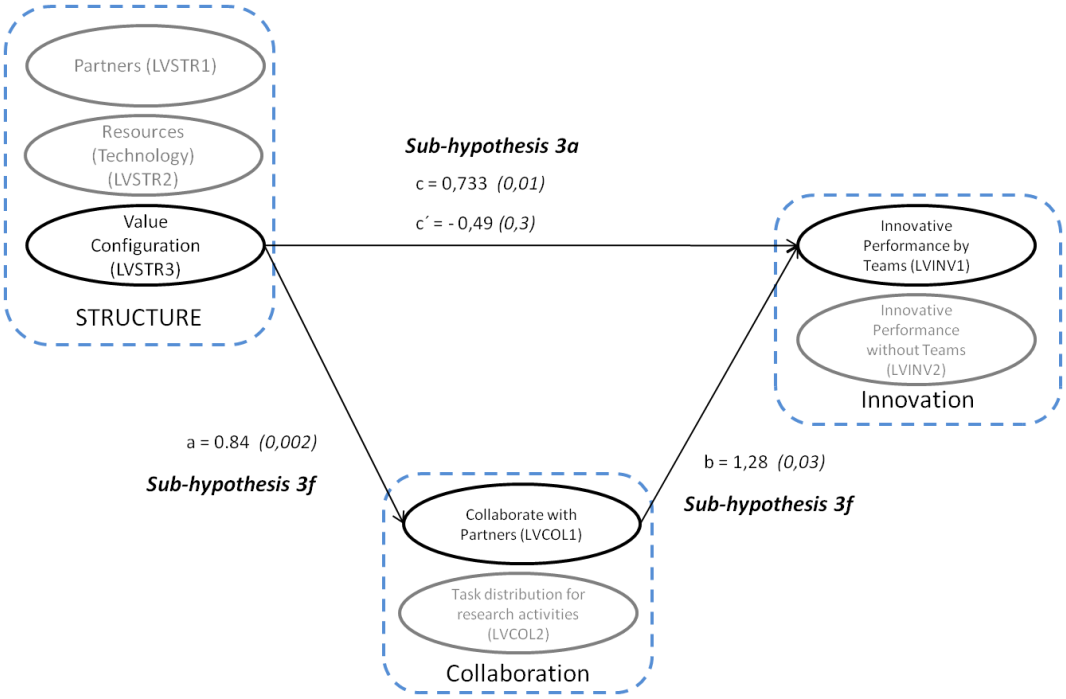


Figure 8.11: Path diagram for mediating relationships of Collaboration with the (STRUCTURE) element of BME Framework and Innovation.

The ***sub-hypothesis 3a*** represents the direct relationship between the BME framework (independent variable) and the innovation (dependent variable). Path *c* and *c´* indicates the direct relationships between the *Value Configuration* (LVSTR3) and the *Innovative Performance* of the recipient organization through mutual research teams (LVINV1). The ***sub-hypothesis 3f*** represents the indirect relationship between the independent and dependent variables through *Collaboration among Partners* (LVCOL1) as a mediating variable. In the above diagram, path *a* represent a link between the *Value Configuration* (LVSTR3) and *Collaboration among Partners* (LVCOL1), while path *b* represents a link between *Collaboration among Partners* (LVCOL1) and the innovative performance of the recipient organization through mutual research teams (LVINV1).

Based on the above discussion, it can be concluded that various mediating relationships exist in the multiple mediator model. It was discussed in the start that a variable can function as a mediator if it fulfils three essential conditions. Table 8.23 is the list of final ***hypotheses II*** & ***III*** and their corresponding ***sub-hypotheses*** along with the criteria for perfect mediation. It can be observed that most of intervening variables in different sub-hypotheses have fulfilled the criteria for being perfect mediator. Only one variable, i.e., *Knowledge Distance* did not fulfill these criteria. In order to trace the reasons, it is needed to review discussions in section 2 and 3 of this chapter.

Hypothesis II (Direct relationship)				
Sr. No	**Sub-hypothesis statement**	**a *(p)***	**b *(p)***	**c (*p*) > c´ (*p*)**
1a	There is a positive correlation between the [CONTENT] element of the business model explicitness and the innovative performance of the organization (innovation).	*sig*	*sig*	na
2a	There is a positive correlation between the [CONTEXT] element of the business model and the innovative performance of the organization.	*sig*	*sig*	TRUE
3a	There is a positive correlation between the [STRUCTURE] element of the business model explicitness and the innovative performance of the recipient organization.	*sig*	*sig*	TRUE
Hypothesis III (Mediating relationship)				
Sr. No	**Sub-hypothesis statement**	**a *(p)***	**b *(p)***	**c (*p*) > c´ (*p*)**
1b	The positive correlation between the [CONTENT] element of the business model explicitness can be enhanced by mediating effect of *knowledge distance* between the source and the recipient	*sig*	*sig*	na
2b	The positive correlation between the [CONTEXT] element of the business and the innovative performance of the organization can be enhanced if *absorptive capacity* (learning) is increased.	*sig*	*sig*	TRUE
3e	The positive correlation between the [STRUCTURE] element of the business and the innovative performance of the organization can be enhanced if absorptive capacity is increased.	*sig*	*sig*	TRUE
3f	The positive correlation between the [STRUCTURE] element of the business and the innovative performance of the organization can be enhanced if collaboration is increased.	*sig*	*sig*	TRUE

Table 8.23: Summary of Results for Hypotheses II & III from bootstrapping analysis

It was observed during data processing that *Knowledge Distance* and the [CONTENT] element did not perform well in terms of reliability and measurement of sampling adequacy (i.e., Cronbach's Alpha and Factor Analysis). However, the remaining theoretical constructs that did perform well during reliability analysis have also provided satisfactory results after bootstrapping application. The path diagram for Hypothesis II & III identifies the final hypothesis in the following diagram (Figure 8.13).

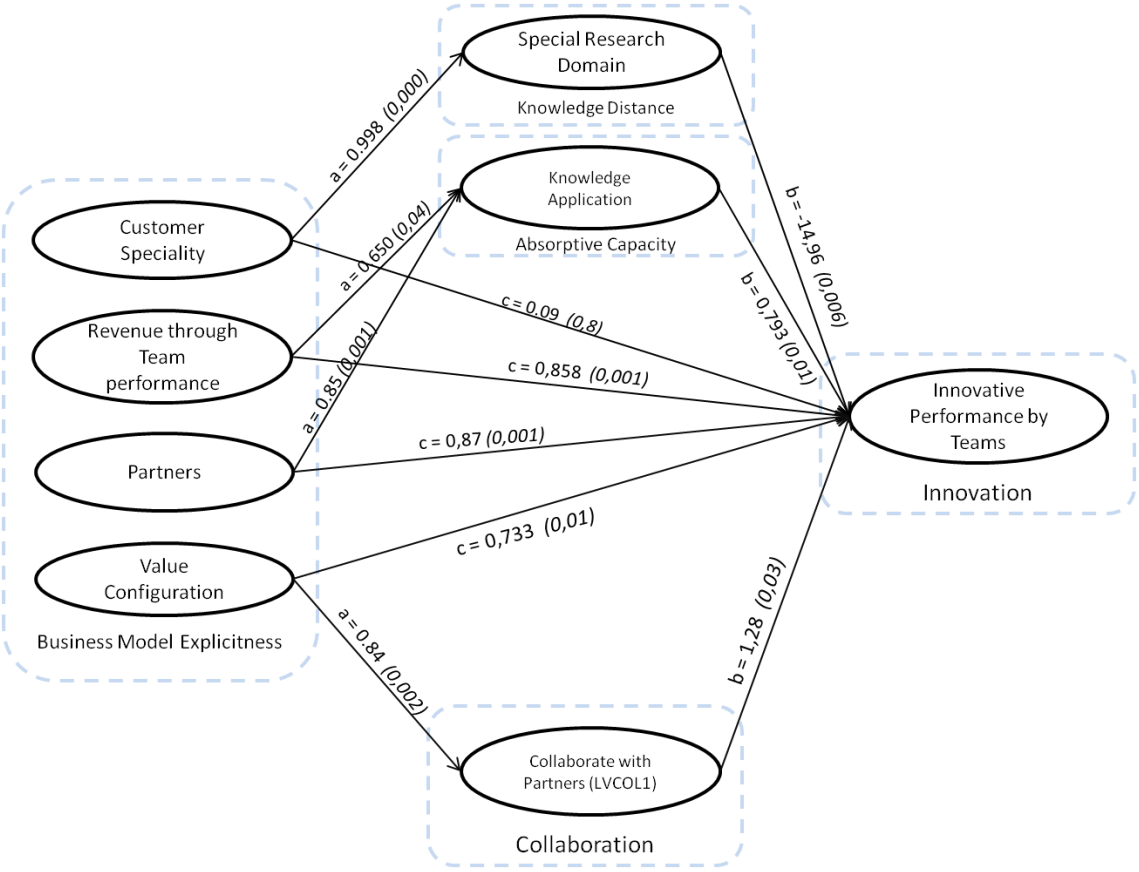


Figure 8.12: Path diagram for Hypothesis II & III - Final Causal Link Diagram

In the above diagram, it is concluded that the proposed links between different theoretical constructs are significant. Thus the hypotheses II & III can be through further studies with larger sample size. It can also be concluded that organizations can become effective when their business models are evident not only to themselves but to their partners also. Similarly, it can also be concluded from the above discussion that when business models of organizations are explicitly stated, they can perform better in terms of financial as well as non-financial performance. A detailed discussion on these results will be now provided in the next chapter.

8.5. Summary

This chapter explains a post-data collection step that includes the data processing and analysis. The data collected from the interviews through questionnaire was, *first*, processed for reliability analysis by calculating Cronbach's Alpha. A minimum of 0.5 cut off point was set as the standard alpha value for each variable to be included into the analysis. However, some of the variables were removed because of extremely low Alpha value. *Secondly*, the

reliability of the theoretical construct was performed through Factor Analysis. The results of FA provided the structure of latent variables that were found relevant according to the background theory for each theoretical construct. During data analysis correlations among various latent variables were calculated that were further used to determine the magnitude and strengths of direct and indirect effects between the BME framework and the innovation. Further in the data analysis step, bootstrapping was performed to indentify the underlying causal relationships among various theoretical constructs as proposed in different ***hypotheses*** and the corresponding ***sub-hypotheses***. The results generated from the Pearson Correlation, OLS and bootstrapping methodology supported these ***hypotheses*** that state different causal relationships among various theoretical constructs. The result discussion and interpretation will be explained in the next chapter.

9. Key Findings

In this chapter, the key findings of different research phases are discussed. As discussed earlier in this dissertation, the research model of this doctoral thesis has been designed into three distinct phases. Phase I consists of identifying shortcomings in different aspects of the business model concepts related theoretical and practical implementation. Phase II of the research methodology consists of evaluating different e-business models for companies in e-commerce domain. The objective of this methodology is to apply the framework on business models from real life examples. The Phase III consists of a survey analysis that was aimed to identify the causal relationships between the BME framework and innovative performance of an organization.

This chapter can be divided into two parts. In the first part, discussion is provided about key findings of each research phase, whereas in the second part, discussion is provided on the limitations for this doctoral research. The discussion on the key findings of the three research phases also includes conclusions from the qualitative and quantitative data analysis.

9.1. Different Research Phases

The main problem addressed in this thesis is related with measuring the effectiveness of business models in terms of organizational performances. In order to evaluate the effectiveness of business models, three main hypotheses have been proposed and investigated in this dissertation. To investigate these hypotheses, the research model for doctoral research has been designed in three distinct phases that are based on four different research methods. ***Hypothesis I*** states that *the organization can become effective when its business model is evident not only to itself but to its partners also.* In order to identify the importance of business models for an organization, the BME framework is proposed. **Phase I** consists of review and analyzing existing concepts (*first methodology*) in the domain of business models to develop this framework. The proposed framework was, then, discussed with the experts from related fields. Thus, interviewing domain experts is the *second methodology* that has been used in this thesis. The proposed framework of BME was then evaluated for its conformance with examples from real life e-business models through website evaluation method during **Phase II** of this research. It has been indicated from the results that the e-

business models of the companies doing business over the Internet can be described in terms of BME framework.

Hypothesis II & ***III*** are related with evaluating the effectiveness of the BME framework for organizational performances. The ***hypothesis II*** stated that *when business models of organizations are explicitly stated, they can perform better in terms of financial as well as non-financial performance*. On the other hand, the ***hypothesis III*** states that *in order to build up capability for creating new products and services (innovation), it is important for organizations to acquire inputs from suppliers and customers*. In order to address these two hypotheses, **Phase III** has been designed that consists of survey analysis. In the following section, detail discussion is provided about key findings from different phases of this research model.

9.1.1. Key Findings from Phase I

The main objective of this thesis is to probe the causal relationship of a company's business model with its innovative performance being mediated by inter-organizational knowledge transfer. The main problem that is identified in this thesis is 'to measure the effectiveness of creating new products and services within an IT company when it operates in a networked environment and it acquires knowledge from external sources in the form of expertise, new processes, and new technology'. Thus, creating value or earning profit is the core logic behind every organizational process. Although the problem statement does not mention the notion of business model directly, however, it is quite clear that the business model explains the organization's core logic to create value or earn profit. The main objective of innovative performance (i.e., capability of creating new products and services) is to generate profits and this may depend upon certain factors like, inter-organizational knowledge transfer, collaborative strategies, etc. Thus, it has been proposed that there exists a causal relationship among the core logic of a firm in terms of generating revenues and its innovative performance.

In the past, many studies have provided a substantial proof for the existing relationships between the business model and the organizational performance (Rajgopal et al., 2003; Malone et al., 2006; Zott & Amit 2006). Similarly, various empirical researches conducted in the past have provided significant contributions into several areas, e.g., inter-organizational knowledge transfer, collaborative strategies and innovative performance, etc. However the main focus of all these empirical studies was providing recommendations on

organizational performance. Therefore, based on the previous researches in the related areas of the theoretical constructs discussed in this thesis, a proposition has been proposed (cf. Chapter 2). It is proposed that from the past research studies, mainstream research areas should be identified that are related with each other. Based on this proposition, different theoretical constructs have been identified. These include, the BME framework, factors affecting successful transfer of knowledge from source to the recipient organization and the innovative performance of the recipient organization. These theoretical constructs are the underlying core contents of the problem statement. It has been proposed that causal relationships may exist among these theoretical constructs. Detailed overview of each theoretical construct has been provided to explore the probable existence of these causal linkages.

The first contribution from the phase-I is the framework for evaluating explicitness of the business model. It has been proposed in the ***hypothesis I*** that a framework should be explored to evaluate the distinctness of business models. This framework shall also answer the decades' old Peter Drucker's question that who is the customer and what does he value? A generic definition from any business model framework explains that how an organization makes money and what is the underlying economic logic to deliver value to its customer. However, by extending this statement further, one can propose that the business model is a description of '*WHAT*' (value object) an organization may offers to its potential customers, '*HOW*' an organization offers or delivers value objects to its customers, and '*WHY*' a company offers or delivers value objects to its customers. These three questions have been termed as three elements of BME framework, namely; [CONTENT], [STUCTURE] and [CONTEXT]. Thus, through these elements, the framework can evaluates how vivid or explicit is the business model an organization and for its outer world as well.

The following table represents the framework of BME for evaluating different business models.

Element	Constituent	Element	Constituent	Element	Constituent
Content	**Product or service**	**Structure**	**Value Confirguration** •Distribution channel •Communication channel •Customer interface •Customer intergration	**Context**	**Cost Structure**
	Value Proposition		**Resources** •Information Techology •Hardware/software •Intellectual Property •Finanical resources •Physical resources •Human resources		**Revenu Model**
	Customer **•Individual consumers** **•Businesses**		**Partnership** •Suppliers •Complementors •Customers •Competitors •Other stakeholders		

Table 9.1: Framework of BME for evaluating other business models

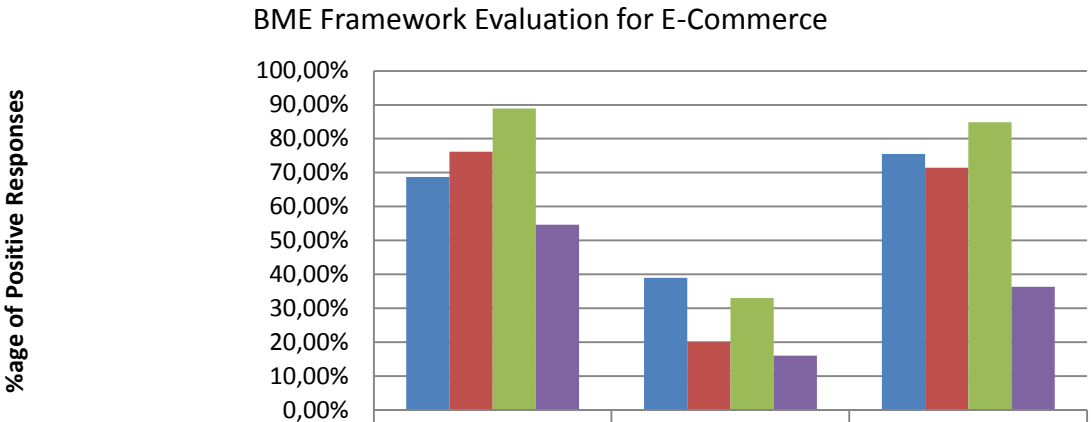
Thus, based on problem statement and the proposed framework of BME, further research methodologies have been implemented. The next step of research in the Phase I was the personal interviews with academic experts from the domains like, e-commerce, entrepreneurship, knowledge management and strategy, and business models. The recommendations from the interviews have helped to improve the concept of BME framework and also provide general guidelines on different research methods. Main recommendations provided from these interviewers are: 1) the proposed framework of business model should be defined explicitly in the context of existing business model literature, 2) the business model and business strategy are two separate concepts and should identified adequately, 3) causal links among different theoretical constructs should be defined clearly and explicitly.

9.1.2. Key Findings from Phase II

Based on the contributions from Phase-I, application of BME framework was done in the Phase II of this doctoral research. This phase provides recommendations for ***hypothesis I***. Different companies' websites have been selected and evaluated in the framework of BME. The core idea behind this evaluation is that many companies in the e-commerce domain are based on e-business models; therefore, it is possible to evaluate e-business of these companies

in the framework of BME. It is also a fact that the development of business model concept has been related with the development of businesses on the Internet (Osterwalder et al., 2005). Thus, the Internet can be a good source to identify the existence of the BME framework. Since a website can be the initial interface for potential customers, thus, a well designed website can replace the front office or a physical location of the company that wants to offer its products/services via the Internet.

It can be concluded from Phase II that the concept of BME can be found within existing business model taxonomies and frameworks. The framework of BME not only entertains a single business model concept for a company, but several business models can be evaluated through this framework. It can be concluded from the results of this website evaluation that the e-business model is evident to these companies if evaluated in the framework of BME. A company's website can be a good indicator to identify how explicitly a company can design its business models. Business models of the companies like Amazon, H&M, and especially eBay, which have large number of online visitors, are well developed in terms of the [CONTENT] and [STRUCTURE] elements of BME framework. However, it is also observed that companies in different sectors of e-business model do not possess business models that clearly identify potential revenue resources. The results of the website evaluation revealed that the [COTNEXT] element of the BME framework is not well developed for business models of these companies. Thus, the framework of BME can help companies to identify weak areas in their business models. A company can innovate or invent a new business model with the help of this framework. The figure 9.1 represents the percentage of positive responses extracted from the evaluation of websites from different business categories in the domain of e-commerce. It can be concluded from the following figure that in *Telecom* sector, the two elements the BME framework are more apparent through the websites, namely, [CONTENT] and [STRUCTURE] elements, whereas, from websites survey, it can also be concluded that the [CONTEXT] element is not much apparent on most of the websites that have been surveyed during websites evaluation for different companies in different sectors.



	CONTENT	CONTEXT	STRUCTURE
Shopping	68,68%	39,00%	75,55%
Consumer Goods and Services	76,19%	20,00%	71,43%
Telecom	88,89%	33,00%	84,85%
Miscl	54,67%	16,00%	36,36%

Figure 9.1: Percentage of Positive responses for different elements of BME framework in various business categories

It is thus concluded that the framework of BME can be used to evaluate e-business models from different real life examples. Overall conclusion is that for most of the companies in e-commerce sector, the [CONTENT] and the [STRUCTURE] elements of BME framework are found well developed, whereas, the [CONTEXT] element of BME framework needs further attention by these companies. Results of this evaluation reveal that companies in different sectors, particularly *Shopping, Consumer goods & Services and Telecom*, emphasize mostly the [CONTENT] and the [STRUCTURE] element of BME framework. Whereas, the [CONTEXT] related aspect is not very well developed in e-commerce sector. Although, these conclusions do not reflect the reality due to small sample size, however, it can be concluded the framework of BME can be helpful to evaluate the explicitness of e-business models in these companies. As stated earlier, the BME is not a new type of business model, but it provides a general framework to evaluate different business models on some common parameters. As it was discussed that a company may have different business models, quite often, these business models are not distinguishable. Therefore, through the framework of BME, a company can identify how explicit are the different elements of these business models.

9.1.3. Key Findings from Phase III

The Phase III of this research consists of different steps, e.g., collection of data, processing and analysis of qualitative as well as quantitative data and hypothesis testing, etc.

In the following section, discussion of the results for quantitative and qualitative analysis is provided separately.

a. Quantitative contributions

The third phase of the research provides answers for ***hypotheses II & III*** through survey analysis. This phase has been designed to explore the existence of different causal relationships among various theoretical constructs. The first objective of the survey analysis was to identify whether BME framework does has any impact on organization's performance. The second objective of the survey analysis was to evaluate whether organizational intangible strategic asset, i.e., knowledge that can be embedded into human beings or technological resources, does have an impact on the causal relationship of BME and the innovative performance. A small research study has been designed to achieve these objectives. For this purpose, 21 small and medium size enterprises (SMEs) from ICT sector in Austria were contacted for personnel interviews. The interview partners were requested to fill out a specially designed questionnaire. The information collection through the questionnaires was then converted into dataset that was, processed and analyzed through statistical software. However, the small sample size has been the major concern during data processing and analysis. During data processing phase, a few of the theoretical constructs were removed from the study because of low reliability of the data collected.

Based on the final data refined through data processing, hypothesis testing has been performed in the Phase III. As stated earlier, three main hypotheses statements have been developed for this dissertation. ***Hypothesis I*** is related with the development of BME framework that has been discussed in the previous sections (Key findings of Phase I & II). ***Hypothesis II*** & ***III*** describe the effectiveness of an organization when its business model is explicit. In the following section, key findings related to these two hypotheses will be discussed.

Hypothesis II: states that an explicit business model can reflect how effectively an organization can perform. The three ***sub-hypotheses*** (***1a***, ***2a*** and ***3a***) that are related to hypothesis II describe that different elements of BME framework are positively related with the innovative performance. The [CONTENT] element is related with the products, services, customers' requirements (speciality) and value proposition. The [STRUCTURE] element is related with value configuration, resources and partners that are part of value creation process. The [CONTEXT] element is related with the revenue models and the cost structure of the

organization. An internal value chain consists of value configuration through resources and partners, value offerings (products and services) through delivery mechanisms and profits and margins (cost and revenue models). Thus, all three elements of BME framework address different aspects of the organization's internal value chain.

The organization's capability to create value for its customers can be defined in terms of its performance. When organizations produce new products and services (innovation) and earn profits, this performance can be termed as innovative performance. Thus, the organization's innovative performance is related with the creating value through value configuration, resources and partners, delivering value to its customers in order to fulfil their requirements and earn revenues.

In the previous chapter, it has been observed that the [CONTENT], [CONTEXT] and (STRUCTURE] elements of BME framework are significantly related with the innovative performance of the organization. This significant correlation reveals that when SMEs are working in a networked environment, they are likely to cooperate with their partners for value configuration. The interaction among partners for value creation is based on the various characteristics like, trust, mutual understanding and positive feedback. In order to learn right skills and acquire right knowledge for the innovation projects, these characteristics are necessary. Thus, a team that consist of the employees from source and recipient organization should have these characteristics for collaboration.

The collaboration is performed through mutual teams that consist of employees of the source as well as recipient organizations. These mutual research teams can be the potential sources of revenues. The employees of the source organization share their expertise, skills and knowledge with the employees of the recipient organization. This shared knowledge, refined skills and capabilities, of the employees from recipient organization, are then utilized in different innovation projects, thus, increasing the rate of innovation. The increase in rate of innovation can be the potential source of revenue for the recipient organization. In this way, mutual research teams can be considered as sources of revenue for the recipient organizations that are directly related with the innovative performance of the organization.

The results of different statistical tests also provide an evidence for the existing collaboration among the source and the recipient organizations in order to create value through innovation. A significant correlation between the presence of the partners in the value chain and increase in innovation also affirms the partners' importance for value creation.

These results are also in line with numerous previous studies that also suggest that locus of innovation can be found in the network of inter-organizational relationships (Powell et al., 1996). The performance can be significant when team members of the mutual research teams share their expertise among each other.

The above discussion reveals that explicitness of business models can be significantly related with the organization's performance. This affirms that the BME framework provides answers to different questions related to the *internal* value chain of an organization, i.e., 'What' value object can be offered to the customers and what is the value proposition, 'How' this value object and value proposition can be delivered to customers, and what should be the source of revenue for the organization (Why). This discussion also supports the fact that when business models are made explicit in the framework of BME, the organization can performs better. Finally, it can be stated that the BME framework provide answers to the decade old questions raised by Peter Drucker that who is the customer and what does he value (Magretta, 2002).

Hypothesis III: states that in order to build up the capability of creating new products and services (innovation) it is important for organizations to acquire input from suppliers and customers. The organizations can be effective in terms of creativity and innovation when they acquire knowledge from other sources. 8 related sub-hypotheses (***1b***, ***1c***, ***2b***, ***2c***, ***3c***, ***3d***, ***3e***, and ***3f***) have been propose causal relationships of organization's effectiveness through inter-organizational knowledge transfer in the framework of BME. During data processing and analysis, four sub-hypotheses (***1c***, ***3b, 3***c and ***3d***) have been dropped due to data reliability issues. Therefore, results for only 4 sub-hypotheses are discussed in the following sections.

Sub-hypothesis 1b: describes the positive correlation among the BME framework, innovative performance and the *Knowledge Distance* between the source and the recipient organization. Results from different statistical tests (correlation, regression and path analysis) it is evident that in the presence of an appropriate knowledge distance, the recipient organization can innovate more if it knows what type of products and services are required by its customers. Knowledge about the specialized customers needs enable organizations to request the required knowledge from the experts of the source organization in mutual research teams that ultimately increases rate of innovation at the recipient organization. However, it was found during data analysis that the speciality of the experts from external source is negatively related with the recipient organization's innovative performance. One possible

explanation for this analysis is that when the external source (partner) has some specialized knowledge like, latest technology, it is necessary for the recipient organization to be well aware of this latest technology in its innovation projects. Thus, on the one side, sufficient knowledge about customer's specialized needs, e.g., application based on latest technology, is necessary for value creation, while on the other side, recipient organization's knowledge about that technology is also essential before acquiring it from the external source. Thus, the appropriate knowledge gap between the source and the recipient organization is necessary for successfully implementing knowledge in the form of new technology within innovation projects.

Sub-hypothesis 2b: states the positive correlation the BME framework, innovative performance and the *Absorptive Capacity* of the recipient organization. The interpretation of the results from correlation and regression analysis is that if the recipient organization knows what type of knowledge or expertise will be required from external sources for its innovation projects, there will be greater chances to perform better in terms of innovation. There could be many perspectives of absorptive capacity, but the important one I have chosen here for defining this relationship is to apply knowledge to achieve commercial benefits. Therefore, mutual research teams can be assumed as potential source of revenue, as stated in the previous section. Thus on the one side, the employees of the recipient organization learn new skills and expertise when experts from the external source share their expertise in a mutual research team; while, on the other side, they employees use these newly learned skills and expertise in their innovation projects to increase rate of innovation.

It can be concluded from data analysis that (bootstrapping) that it is the learning capability of the recipient organization that is necessary for successful transfer and implementation of external knowledge within innovation projects. The objective of the analysis was to measure the effectiveness of external knowledge for implementation within innovation projects of the recipient organizations. Here, implementation of external knowledge means applying skills and expertise within innovation projects at recipient organizations. Thus, the learning capability of the recipient organizations can be important for enhancing rate of innovation in their innovation projects. Therefore, the absorptive capacity of the recipient organization plays an important role during innovation.

Sub-hypothesis 3e: also states a positive correlation among the BME framework, innovative performance, and the *Absorptive Capacity* through value creation (Partners and

value configuration. learning capability of the recipient organization (absorptive capacity) affects value configuration and interaction with the partners in mutual research teams. significant relationships among absorptive capacity, value configuration and presence of partners were found in correlation and regression analysis.

It can be concluded from the results that the greater the *Absorptive Capacity* of the recipient organization, in terms of learning new skills and expertise within mutual research teams, the greater are the chances to apply these skills and expertise in innovation projects to increase creativity. Thus it shows that by learning new skills and expertise from partners through mutual research teams, rate of innovation can be increased when these skills and expertise are used to create value during value configuration processes.

Sub-hypothesis 3f: states that the positive correlation among the BME framework, the innovative performance and collaboration. Results from correlation and regression analysis support the notion that by creating mutual research teams, there can be increase in innovation rate when skills and expertise are shared among team members. However, sharing of skills and expertise can be enhanced when members of the mutual teams are from suppliers and partners. Results from Pearson correlation also supported this notion as a strong and significant correlation was observed between the *Value Proposition* and *Collaboration*.

It can be concluded from the bootstrapping results that the rate of innovation can be further enhanced when the source and the recipient organization collaborate through technological resources and distribute innovation activities among team members. It means that use of technological resources facilitate members to quickly learn the required skills and expertise. Thus, the advents of technological developments are proved fruitful in terms of transferring skills and expertise for creativity.

b. Qualitative Contributions

As stated in previously (Chapter 7), one of the main objectives of survey analysis was to evaluate qualitative data from the questionnaire. The qualitative contributions from the questionnaire responses have affirmed the results inferred from statistical analysis of the remaining dataset. It was inferred from the qualitative contribution that a business model may have some causal relationships with inter-organizational knowledge transfer and collaboration. When statements, extracted from the questionnaire responses, were analyzed, it was deduced that in order to earn profit and to increase revenues, organizations from ICT

sector create innovative services and products by acquiring new skills and increasing their existing know-how. These skills and know-how are acquired from various external sources, e.g., partners, customers, consumers, universities and other external sources alike through collaboration. The bases of such collaborations are mutual trust, mutual understanding, firm's requirements for product developments and even competition among other partners. These skills and know-how are then effectively utilized within innovation projects to create new products, enhance service portfolios and fulfill customer demands. Since, a business model concept can be defined as core logic of earning revenues, thus this core logic somehow depends upon inter-organizational knowledge transfer and collaboration. Thus, one can easily inferred from the above discussion that relationship between business models and earning revenues are likely to be affected by inter-organizational knowledge transfer and collaboration among partner firms.

9.2. Limitations

Several shortcomings or limitations have been faced during this doctoral research. The first major limitation was the non-availability of the research literature relevant to the business model explicitness concept. The second limitation was the scarcity of the research literature on the research proposition as identified in Chapter 2. It has been discussed that previous research studies, which have been done in disparity, are inter-related with each other. However, very few efforts have been made to bring areas like, knowledge management, open business models, open innovation, in a single research proposition.

The second major limitation faced in this doctoral research is the scarcity of resources and time to implement the proposed research model on large scale. Because of this limitation, the exploratory research design has been implemented in this dissertation. Therefore, the results derived in this dissertation would not be acclaimed statistically significant. The results of the analysis cannot provide any support to develop a theory of business model explicitness. However, these results can be helpful to affirm that the proposed research model can be implemented further with large number of samples in order to identify viability of the proposed hypotheses.

9.3. Summary

In this chapter, the key findings from different research phases have been discussed. The first part of the chapter presented the key findings from these phases, while the second

part discusses the shortcoming or limitations faced in this doctoral research. It has been concluded in this chapter the proposed framework BME is suitable for evaluating business models. It is also concluded that through the framework of BME, a company can identify how explicit are the different elements of these business models. The quantitative contributions of the Phase III of this doctoral dissertation affirm that business models are effective in terms of innovation. It is also concluded that this effectiveness can be enhanced when recipient organizations acquire skills and expertise from their partners. The relationship between the BME framework and the innovative performance depends on various factors like, collaboration, inter-organizational knowledge transfer, etc. The qualitative contribution of Phase III also recommends the conclusions from quantitative data analysis. Interview partners during survey analysis have affirmed that the organization's performance is dependent upon the company's business model as well as inter-organizational knowledge transfer and collaboration.

10. Conclusions and Open Research Issues

10.1. Conclusion

In this thesis, I address the importance of business models for organizations when they interact with their partners in a value network. Various approaches of defining and proposing business models for these organizations have addressed some basic questions related to business models for these organizations. The questions that can be addressed by the business model concept are: *what* products and services a company can offer to its customers; *who* are the target customers; what is the value proposition; who are the partners (suppliers, developers, affiliates, etc); what distribution channels a company may use to deliver its products to the target customers; what are the specific sources of revenue; what are the price model for a particular business model?

The research presented in this dissertation, can be divided into three phase that are based on three distinct research methodologies. The phase I is the evaluation of the framework of BME through comparison with the existing frameworks and taxonomies. It is the first exploratory research methodology to affirm that the framework is deeply rooted within the existing literature. The phase II is the application of the BME framework through website evaluation. It is the second exploratory research methodology that provides the affirmation to the notion that the framework is capable of defining e-business models. The phase III is the qualitative and quantitative analysis of a questionnaire. It is the third methodological step that is used to explore the viability of the framework for general business models. Corresponding to each research phase, different research hypotheses have also been tested through these research methodologies. ***Hypothesis I*** has been tested within phase I that provides affirmation that BME framework enables organizations to make their business models evident not only to themselves but to their partners as well. ***Hypothesis II*** has been tested within phase II that affirms that effective organizations do exhibit their business models explicitly to the outer world. ***Hypothesis III*** has been tested within phase III that affirms that organizations with an explicit business models acquire knowledge from their partners in order to perform innovatively.

During literature review of business models, it has been observed that the development of the concept of business model can yet be assumed in an early stage as different efforts are being made to define this concept. Different researchers have repeatedly

used the similar concepts in different perspectives for business model definitions and frameworks. Despite these efforts, still there is a need to provide a common framework that can help managers to explicitly identify and describe their organization's business models. Therefore, the framework of Business Model Explicitness (BME) can help managers to use a common vocabulary to define their organizations' business models.

The concept of BME is based on a framework through which the explicitness of a business model can be evaluated. The framework consists of three main elements, *viz*., the [CONTENT], the [CONTEXT] and the [STRUCTURE]. This framework can provide answers to the questions: 'WHAT' to offer to its customers, 'HOW' value is created by different distribution, communication and customer integration strategies, who are the partners, suppliers and what is their role, and 'WHY' the company wants to offer value to its customers, i.e., what are the revenue sources and where to cut different costs. However, it is also important to conclude here that the concept of business models is different from strategy. Strategy deals with making decisions, setting priorities and vision, while business model is the conceptual implementation of the strategy that facilitates aligning IT, business process and strategy.

Based on the detailed survey and analysis of existing approaches for the business model concept, it can be concluded that the framework of BME enables organizations to enhance their performance by identifying their products and services for the right type of customers, by implementing different strategies in the framework of their business models, and to identify potential sources of revenues.

The Internet has been proved an efficient medium to exchange value objects with the partners and customers with fewer resources. It is also the fact that the recent developments in the business model concepts also have its roots into the development of the Internet. The first comprehensive definition business model classification that has been provided by Paul Timmers is also based on the illustrations of various businesses over the Internet. Therefore, based on this fact, the application of the BME framework through website evaluation has been performed in this doctoral research. The results of this application supported the fact that a company's website can be a good indicator of how explicitly a company can design its business models. If a company wants to deliver products as a trader via the Internet, The website can be the main source to interact and communicate with the potential customers.

It is a is also discussed that different organizations possess different assets and resources (tangible and intangible), produce different products that make them to look at opportunities differently (Chesbrough, 2006), and face external environmental factors, like, economic, legal and competition, etc., in different contexts. Therefore, their business models should be sufficient to address these facts. In knowledge intensive industries like, information technology, biotechnology, pharmaceutical industry, telecommunications, etc., the role of business model becomes more critical because companies rely mostly on knowledge as a strategic asset.

The framework of BME, which evaluates that how effective a business model is, can support organizations to address successful transfer of knowledge through their business models. In order to build up capability for creating new products and services (innovation), it is important for recipient organizations to acquire tangible and intangible resources from their partners. Thus, *collaboration* among source and recipient organization is important for successful transfer of resources. Knowledge can be an intangible resource that consists of skills, know-how and expertise. Organizations should know what type of products and services are required by their consumers and how do they fulfil their consumers' requirements by configuring value through their own resources and also through partners. Thus, an appropriate *knowledge gap* is essential for the source and recipient organization to successfully transfer the required skills, know-how and capabilities. Acquiring new skills, know-how and capabilities depends upon the *absorptive capacity* of the recipient organization. The higher the absorptive capacity, the more the recipient organizations acquire new skills and increase their innovative capabilities. Thus, innovation can be affected by collaboration, knowledge gap and the absorptive capacity.

Thus, addressing consumers requirements can be explained in terms of the [CONTENT] element of the BME framework. Value configuration by incorporating different partners is the second aspect that the BME framework can address. Organizations should know what types of skills, know-how and expertise are required from their partners for creating new products and services. Thus, in terms of the [STRUCTURE] element, this framework describes that different types of resources and partners are part of value configuration process. It is also discussed in this dissertation that if organizations acquire intangible resources for innovation projects from their partners, they can enhance their capabilities to innovate, thus, increasing the rate of innovation. Applying external knowledge in an innovation project can be the potential source of revenue for companies operating in

industries, like, ICT, therefore, this can be addressed by the [CONTEXT] element of the BME framework. Therefore, it can be concluded that different elements of the BME framework have the capability to address transfer of knowledge within a value chain to earn profits in the perspective of business models.

10.2. Contributions

From the above discussion, it can be concluded that the proposed framework of BME has many implications in terms of theory and practice. As discussed above, the framework facilitates to distinguish strategy and business models. It provides a framework that is based on a common vocabulary to explicitly describe a business model. Since many organizations may have different business models, simultaneously; this framework provides a common language to describe different types of business models. By explicitly describing company's business models, the true structures of business models are clear both for the company as well as its customers. Similarly, for a company that has different business models, a particular type of business model can be important for some of its partners and customers, while for others, some other business model can be of prime importance. The framework facilitates managers to address a particular aspect of different business models, thus, diminishing the chances to ignore or overlook those business models that have yet to be discovered.

Business model innovation is an important aspect that can be addressed by this framework. It is essential for an organization to continuously innovate and reinvent whole or different parts of business models that exist simultaneously. The framework can provide assistance to identify weak areas in business models that can either be improved or abandoned. The framework can provide an opportunity to business managers to regularly update their business models according to the needs and requirements of their partners and customers. Thus, the BME framework facilitates business model innovation and invention, a much needed phenomenon in today's business world (Johnson et al., 2010).

10.3. Open Research Issues

This thesis provides contributions mainly to the field of business models related to the innovative performance of an organization particularly in ITC sector. However, there are several open research issues that can be addressed by future researchers.

In this thesis, the presentation of the BME framework is based on the analysis of few business model concepts available through academic literature. It is also discussed that most

often, the concept of business models and strategies are used inter-changeably by many researchers and practitioners. Therefore, *first*, efforts should be made to analyze this framework in the perspective of strategy as well, s*econd*, it is also recommended to take into account the approaches related to ontological modelling, e.g., e^3 value, REA or other ontological models. It is thus proposed to perform mapping of BME elements with elements of these business model ontologies. Thus, a comparative analysis can be done to explore further applications and more deeply rooted foundations for this framework.

Another major open research area in this thesis is the survey analysis. The data gather for the survey analysis is small to conduct empirical studies. Therefore, it is recommended to perform empirical investigation for generalization of the proposed framework. The results acquired through this thesis can be used as basis for further future researches, thus the present study can be used as a pilot study for conducting future research on the stated issues.

The application of the BME framework presented in this thesis also provides another open research issue to the readers. The evaluation of websites in the perspective of the BME framework is done only for a small number of online businesses in very limited categories, e.g., Shopping, Consumer goods, Telecommunication, etc. It is, therefore, recommended to include other fields, like, Information Technology, Retail Trade, Biotechnology, etc., so that the concept of the BME framework can be generalized.

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Evaluation form for evaluating websites

Explicitness of business model *Website Evaluation form: 01*

Source: Biotechnology & Pharmaceuticals: _____ ; Business Services:_____;
Consumer Goods & Services: ____; Information Technology:____; Retail Trade: _____;
Financial Services: ____; Shopping: X; Beauty: _____; Telecommunications:____;

URL: _____

Note: The 'Website' mentioned in this form is referred to the online presence of the 'Company'.			
Sr. No	**Criteria**	**Yes (1)**	**No (0)**
	CONTENT		
1	The website provides description about main products of the company.		
2	The website provides information on related products and services from other companies.		
3	The website provides description about main products based on different market segments (e.g. B2B, B2C, individual users, enterprise users etc).		
4	The website provides description about after sale services related to product return, repair, exchange etc (creating value for customers).		
5	The website provides description about help (product selection etc), order status, flexibility in delivery schedule, inventory updates (creating value for suppliers).		
6	The website provides information about other services related to main product e.g. FAQ, user manuals, downloads, updates, community news etc).		
7	The website provides description about product related services (training, warranty, maintenance etc).		
8	The website retains search histories of visitors (related to products and services) and provide future recommendations.		
9	The website provides customer login and profile building facilities.		
10	The website provides description about user/buyer content's privacy (profile, email address).		
11	The website provides description about customized services for different types of buyers (e.g. Shipping services (products) for customers from abroad, special handling of fragile equipment etc).		
12	The website provides facility to customers for search and view product information according to their requirements.		
13	The website provides description about location of target market (e.g. Country, city, region etc) for any product category.		
14	The website provides description about benefits to its customers by using products/services (i.e. describing value proposition).		
15	The website provides additional information to its visitors about supplementary products e.g. An airline company provides information regarding renting apartments, hire a car/taxi, booking hotel etc.		
	STRUCTURE		
1	The website provides description about main suppliers and vendors involved in value creation process (i.e. manufacturing goods, delivering different services e.g. logistics, delivery, packaging, shipping etc).		
2	The website provides description about measures taken to ensure product/service quality assurance during manufacturing/delivery.		
3	The website provides description about internal processes of production, operation, selling, marketing, quality control etc.		
4	The website provides description about resources utilized in production/delivery of product/service e.g. Intellectual capital, physical assets, financial resources etc.		
5	The website offers online buying or selling facility to its customers.		
6	The website provides systematic sales assistance to buyers (e.g. FAQ, description of different online/offline buying steps etc).		
7	The website provides order confirmation after completing online buying procedure.		
8	The website provides description about payment procedure (via credit card, bank transfers, PayPal etc).		
9	The website provides information about time required to deliver product to the customers.		
10	The website provides order tracking facility to its customers (e.g. Dell, DHL,		

	UPS, Amazon etc)		
11	The website provides information about different governmental/non-governmental regulations applied on its products, business processes etc (e.g. Standards, certificates etc).		
CONTEXT			
1	The website provides detail info about full transaction cost for a particular transaction (VAT, shipping and handling cost etc).		
2	The website offers advertising opportunity on a domain to the customers i.e. Classifieds, listings, search engines etc.		
3	The website provides publishing space in a domain to customers for self created content (e.g. Google, or Yahoo).		
4	The website provides storage facility to customers for uploading larger volume of data (e.g. XLS dataloader by SAP).		
5	The website provides investment opportunity to customers in the business.		
6	The website provides selling opportunity to customers via webportal (e.g.amazon.com).		
7	The website provides auction facilities to customers via webportal (e.g. E-bay).		
8	The website provides paid membership (subscription) facilities to its subscribers (visitors/customers) with premium benefits.		
9	The website provides pay per click business opportunity for its customers.		
10	The website mentions other sources of revenue e.g. Training, consulting, business solution etc to its customers.		

Annex-II

Questionnaire for Survey Analysis

Business Models and Inter-organizational knowledge transfer: An impact on rate of innovation

Academic Survey

By

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Institute of Software technology and Interactive Systems

The survey in front of you is purely for the purpose of academics and a part of PhD dissertation. Therefore, your participation on the issue of enhancing rate of innovations in IT service organization is kindly requested. This survey is about a company which innovates (in terms of new products, services or processes) after receiving knowledge from external sources. Each question may be answered keeping in view your past experiences or current assignments related to innovation projects involving inter-organizational knowledge transfer. At the back of questionnaire, you will find glossary for important terms used in this survey. Kindly review this glossary before you start answering questions. Estimated time to complete the survey is approx 45 minutes. It is assured to keep the confidentiality of the response provided in this survey. Survey response will be concluded and presented as a conclusion in the 'results and recommendation' section of the thesis. A copy of the concluded result will also be circulated among respondents after publishing the thesis. Your kind cooperation will be much valuable for this academic survey.

Section A

Please write your answers in the space given below. Answers should be given in concrete figures. Kindly use digits wherever possible. Answering this section is mandatory.

i. Firm size - No of employees: _____

ii. Number of patents registered per year: _____

iii. Annual revenue: _____

iv. Annual turnover (employee) rate: _____

v. Does your company have implemented ISO 9000 QMS? Yes ☐ No ☐

vi. Firm age: _____

vii. Industry: _____

viii. Country (headquarters): _____

Section B

This section relates to your relationship with external source of knowledge. it is created for a situation when the recipient company acquire knowledge from external source without buying in. the relationship could be based on partnership or mutual collaboration between source and recipient organization. If such situation does not prevails within your company, kindly leave the section and move to section C.

1b) Your Company has identified transfer of knowledge from external source of knowledge mainly as.

6	5	4	3	2	1
Product	Process	Service	tool	any combo of previous	none of previous

2b) Your Company collaborates with other organizations for transfer of knowledge at partnership level and it is identified as external source of knowledge.

6	5	4	3	2	1	0
To a very large extent					To a very small extent	Not applicable

3b) If Yes, then what is the relationship of your organization with external source of knowledge:

5	4	3	2	1
Strategic alliance	R&D Partnership	Joint venture	Use open source	supplier-customer relation **(if you choose ONLY this option, kindly go to section C)**

4b) Your employees are willing to collaborate with other (external source of knowledge) partners' R&D department on routine basis to work on innovation projects.

6 5 4 3 2 1 0
To a very large extent — To a very small extent — Not applicable

---

5b) For performing different tasks for innovation, your Company wants to create research teams which includes employees from your organization and employees from external source of knowledge.

6 5 4 3 2 1 0
To a very large extent — To a very small extent — Not applicable

---

6b) In doing so, your Company can identify expert personnel that will be part of research teams for innovation projects.

6 5 4 3 2 1 0
To a very large extent — To a very small extent — Not applicable

---

7b) Each research team member has been assigned with different research activities to be performed during ongoing innovation project.

6 5 4 3 2 1 0
To a very large extent — To a very small extent — Not applicable

---

8b) Your Company always has clearly defined research objectives for the research team members.

6 5 4 3 2 1 0
To a very large extent — To a very small extent — Not applicable

---

9b) Most of the time, innovation projects assigned to these research teams is not aligned with the core research objectives of R&D Teams.

6 5 4 3 2 1 0
To a very large extent — To a very small extent — Not applicable

---

10b) At times these research teams have research findings that are beyond the product/service focus of your company

6 5 4 3 2 1 0
To a very large extent — To a very small extent — Not applicable

---

11b) The main objective of creating research teams with external source of knowledge provider is to enhance rate of innovation at your company.

6 5 4 3 2 1 0
To a very large extent — To a very small extent — Not applicable

---

12b) The objective of research teams' members is to share knowledge and expertise in order to increase creativity.

6 5 4 3 2 1 0
To a very large extent — To a very small extent — Not applicable

---

13b) The objective of sharing knowledge and expertise among research team members is to increase group synergy.

6 5 4 3 2 1 0
To a very large extent — To a very small extent — Not applicable

---

14b) Research team members have identified channels of communication *(telephone, personal contacts, groupware and other team collaborating tools, chatting messengers, video conferences etc)* to contact other members during innovation projects.

6 5 4 3 2 1 0
To a very large extent — To a very small extent — Not applicable

15b) The purpose of creating knowledge base is to easily understand the new knowledge received from external source of knowledge.

6 5 4 3 2 1 0
To a very large extent — To a very small extent — Not applicable

16b) Application of knowledge transferred from external source of knowledge provider has dramatically increased the rate of innovation at your R&D Department/company.

6 5 4 3 2 1 0
To a very large extent — To a very small extent — Not applicable

Section C

This section is also related to your relationship with external source of knowledge. It is created for a situation when the recipient company acquires knowledge from external source after buying in.

4c) Your Company has identified external source of knowledge as customer (e.g. supplier, service provider) providing desired knowledge for innovation projects.

6 5 4 3 2 1 0
To a very large extent — To a very small extent — Not applicable

5c) If Yes, then what is the organizational relationship of your organization with external source of knowledge:

3 first sourcing; 2 Second Sourcing; Any other relationship

6c) Your company acquires knowledge for innovation projects from the following numbers of external sources of knowledge:

> 6 (Greater than 6) 6 5 4 3 2 1

7c) Your Company transfers knowledge from external source of knowledge which is geographically located at:

3 In land only (if you choose this option, please skip question no. 8c and go to question No: 9c) — 2 Outland only — 1 Inland and outland (both)

8c) In case external source/s of knowledge is geographically located in a different country/region, your organization prefers to create virtual teams to share knowledge for innovation.

6 5 4 3 2 1 0
To a very large extent — To a very small extent — Not applicable

9c) Your Company transfers knowledge from external source of knowledge which is technologically distinct

6 5 4 3 2 1 0
To a very large extent — To a very small extent — Not applicable

10c) Your Company has clearly designed the process of knowledge transfer from external source of knowledge with mutual agreement.

6 5 4 3 2 1 0
To a very large extent — To a very small extent — Not applicable

11c) Your Company has an agreement with the external source of knowledge to provide you unlimited access to knowledge on 'as and when required' basis for innovation projects.

6 5 4 3 2 1 0
To a very large extent — To a very small extent — Not applicable

12c) Your Company has identified channels of communication *(telephone, personal contacts, groupware and other team collaboration tools, chatting messengers, video conferencing etc)* to contact external source of knowledge on routine basis.

6 5 4 3 2 1 0
To a very large extent — To a very small extent — Not applicable

13c) In your opinion, when your Company receives knowledge from a single external source of knowledge, it can be directly applied (without alteration) into innovation project.

[2] Yes *(if you choose this option, please skip questions 14c-16c and go to question # **17c**)*

[1] No

14c) In case of No to 13c, your company needs to alter, integrate and combine this externally obtained knowledge before applying into innovation project

[6] [5] [4] [3] [2] [1] [0]

To a very large extent — To a very small extent — Not applicable

---

15c) In case of No to 13c, your company needs input from external sources of knowledge that are quite distinct in their R&D focus

[6] [5] [4] [3] [2] [1] [0]

To a very large extent — To a very small extent — Not applicable

---

16c) In case of No to 13c, your company needs input from external sources of knowledge that are quite distinct in their market focus

[6] [5] [4] [3] [2] [1] [0]

To a very large extent — To a very small extent — Not applicable

---

17c) In your opinion, it is helpful to provide correct feedback to the external source of knowledge about knowledge received for innovation projects.

[6] [5] [4] [3] [2] [1] [0]

To a very large extent — To a very small extent — Not applicable

---

18c) In your opinion, the level of mutual trust is an important factor to successfully transfer knowledge from external source of knowledge.

[6] [5] [4] [3] [2] [1] [0]

To a very large extent — To a very small extent — Not applicable

---

19c) In your opinion, your Company acknowledges the importance of transfer of knowledge from source organization for its innovation projects.

[6] [5] [4] [3] [2] [1] [0]

To a very large extent — To a very small extent — Not applicable

Section D

To what extent do the following statements are applicable in your organization regarding

a. *Importance of innovation in your company*
b. *Importance of successful transfer of knowledge.*

1d) In your opinion, your company has identified in advance that external knowledge source will be required to complete its innovation projects.

[6] [5] [4] [3] [2] [1] [0]

To a very large extent — To a very small extent — Not applicable

---

2d) In your opinion, success rate of innovation projects depends on proper task identification (i.e. who will do what).

[6] [5] [4] [3] [2] [1] [0]

To a very large extent — To a very small extent — Not applicable

3d) In your opinion, your company can identify mechanism of transfer of knowledge (*training, seminars, documents, videos, software, manuals etc*) for successful transfer of knowledge.

6	5	4	3	2	1	0
To a very large extent				To a very small extent		Not applicable

4d) Please rate how frequently your company uses the following transfer mechanism and activities during knowledge transfer?

	daily	Weekly	Monthly	Quart-erly	Biann-ually	Annu-ally	Not applicable
i. On the job training.	6	5	4	3	2	1	0
ii. Brainstorming sessions.	6	5	4	3	2	1	0
iii. Job rotation.	6	5	4	3	2	1	0
iv. Face to face meetings.	6	5	4	3	2	1	0
v. Web based exchange of data.	6	5	4	3	2	1	0
vi. Groupware and other team collaboration tools.	6	5	4	3	2	1	0
vii. Access to knowledge repositories.	6	5	4	3	2	1	0
viii. Written knowledge transfer (documents, reports etc).	6	5	4	3	2	1	0
ix. Other activities:							

5d) Your Company has capability to identify technological tools that may be required to complete process of knowledge transfer from external source of knowledge.

6	5	4	3	2	1	0
To a very large extent				To a very small extent		Not applicable

6d) Your Company has the capability to identify source personnel from within your company who can be involved in the knowledge transfer processes with external source of knowledge.

6	5	4	3	2	1	0
To a very large extent				To a very small extent		Not applicable

7d) Your Company can identify necessary IT infrastructure which may facilitate innovation process at your company.

6	5	4	3	2	1	0
To a very large extent				To a very small extent		Not applicable

8d) Your Company can install the required infrastructure (IT related) that may be used to perform different tasks, activities or processes related to innovation process.

6	5	4	3	2	1	0
To a very large extent				To a very small extent		Not applicable

9d) One of the purpose of acquiring knowledge from external source of knowledge is to create and sustain common knowledge base at your company.

6	5	4	3	2	1	0
To a very large extent				To a very small extent		Not applicable

10d) Common knowledge base (*existing knowledge*) helps to understand the new knowledge received from external source of knowledge (*e.g. know how of tools, performance of products, expertise of personnel received*).

6	5	4	3	2	1	0
To a very large extent				To a very small extent		Not applicable

---

11d) Innovation projects of your company require exiting knowledge base being accessible to every research team member.

6	5	4	3	2	1	0
To a very large extent				To a very small extent		Not applicable

---

12d) Looking at your experience in innovation projects, when the knowledge received from external source is utilized in a particular innovation project, the rate of innovation in that project is higher as compared to those where external knowledge was not used.

6	5	4	3	2	1	0
To a very large extent				To a very small extent		Not applicable

---

13d) Application of knowledge transferred from knowledge vendor/s has also increased performance of other functional departments (*e.g. Marketing, production, procurement etc*) of your company.

6	5	4	3	2	1	0
To a very large extent				To a very small extent		Not applicable

Following space is provided in case you want to express your views about the business model your company has. Kindly describe in your own terms:

1. What is your company's business model?

2. Do you agree that your company's business model can be affected by transfer of knowledge with external source of knowledge, if yes, how?

3. Do you agree that your company's business model can be affected by terms of collaboration with external source of knowledge, if yes, how?

Glossary

Transfer of knowledge: Transfer of any technology, human skills/expertise, data based information, new ideas, product based information, tools or any other value added knowledge which can be part of your innovation process to increase rate of innovation at your company.

Process of innovation: Group of activities, tasks and procedures carried out alone at your company or in collaboration with your strategic partners to create something new (in the form of a product, tool or a solution to a complex problem).

Innovation project: A project designed to create something new (product, service, tool, or a solution to a complex problem) within a specific time frame and allocated resources for its successful completion.

Knowledge: Any information, database, product, service, tool or human expertise which act as an input in an innovation process to achieve better results.
Knowledge as product: when knowledge acquired from external source can be used as input or raw material and becomes part of final product.
Knowledge as tool: when knowledge acquired from external source can only facilitate the innovation process and does not become part of final product.

R&D collaboration team: A team of personnel from the different organizations with different skills and capabilities to solve complex problems. A heterogeneous team may be composed of your personnel, experts from strategic partners, your clients, customers, suppliers etc.

Knowledge base: Existing skills, competencies and expertise of your company to solve complex problems of innovation projects.

External source of knowledge: An organization or an independent entity from where your organization acquires any technology, human skills/expertise, data based information, new ideas, product based information, tools or any other value added knowledge which can be used as an input in an innovation process at your company to achieve better results.

Rate of innovation: Number of new products, processes or processes produced in a specific time period.

Innovation: It can be measured either as creating new products or improving existing products, creating new ideas to modify existing processes or creating new process in order to deliver value object to consumers or suppliers. It can also be new or improved services to be provided to existing or new customers.

Business Model: An articulate structure for sharing products, services, resources, assets and knowledge flow among interacting partners (including external and internal customers, consumers, competitors and the environment) in order to exchange potential benefits from specific resources of revenue with the capability of flexible boundaries.

List of questions with measurement item labels:

CONTENT	
Measurement Item label	**Question statement**
contentq9c	Your Company transfers knowledge from external source of knowledge which is technologically distinct
contentq11c	Your Company has an agreement with the external source of knowledge to provide you unlimited access to knowledge on 'as and when required' basis for innovation projects.
contentq15c	In case of No to 13c, your company needs input from external sources of knowledge that are quite distinct in their R&D focus
contentq16c	In case of No to 13c, your company needs input from external sources of knowledge that are quite distinct in their market focus
content17c	In your opinion, it is helpful to provide correct feedback to the external source of knowledge about knowledge received for innovation projects.
contentq18c	In your opinion, the level of mutual trust is an important factor to successfully transfer knowledge from external source of knowledge.
contentq19c	In your opinion, your Company acknowledges the importance of transfer of knowledge from source organization for its innovation projects.
STRUCTURE	
structureq2b	Your Company collaborates with other organizations for transfer of knowledge at partnership level and it is identified as external source of knowledge.
structureq5b	For performing different tasks for innovation, your Company wants to create research teams which includes employees from your organization and employees from external source of knowledge.
structureq7b	Each research team member has been assigned with different research activities to be performed during ongoing innovation project.
structureq8b	Your Company always has clearly defined research objectives for the research team members.
structureq14b	Research team members have identified channels of communication (telephone, personal contacts, groupware and other team collaborating tools, chatting messengers, video conferences etc) to contact other members during innovation projects.
structureq15b	The purpose of creating knowledge base is to easily understand the new knowledge received from external source of knowledge.
structureq6b	In doing so, your Company can identify expert personnel that will be part of research teams for innovation projects.
structureq4c	Your Company has identified external source of knowledge as customer (e.g. supplier, service provider) providing desired knowledge for innovation projects.
structureq8c	In case external source/s of knowledge is geographically located in a different country/region, your organization prefers to create virtual teams to share knowledge for innovation.
structureq10c	Your Company has clearly designed the process of knowledge transfer from external source of knowledge with mutual agreement.
structureq12c	Your Company has identified channels of communication (telephone, personal contacts, groupware and other team collaboration tools, chatting messengers, video conferencing etc) to contact external source of knowledge on routine basis.
structureq1d	In your opinion, your company has identified in advance that external knowledge source will be required to complete its innovation projects.
structureq2d	In your opinion, success rate of innovation projects depends on proper task identification (i.e. who will do what).
structureq5d	Your Company has capability to identify technological tools that may be required to complete process of knowledge transfer from external source of knowledge.
structureq3d	In your opinion, your company can identify mechanism of transfer of knowledge (training, seminars, documents, videos, software, manuals etc) for successful transfer of knowledge.
structureq6d	Your Company has the capability to identify source personnel from within your company

	who can be involved in the knowledge transfer processes with external source of knowledge.
structureq8d	Your Company can install the required infrastructure (IT related) that may be used to perform different tasks, activities or processes related to innovation process.
structureq7d	Your Company can identify necessary IT infrastructure which may facilitate innovation process at your company.
structureq9d	One of the purpose of acquiring knowledge from external source of knowledge is to create and sustain common knowledge base at your company.
structureq10d	Common knowledge base (existing knowledge) helps to understand the new knowledge received from external source of knowledge (e.g. know how of tools, performance of products, expertise of personnel received).
structureq11d	Innovation projects of your company require exiting knowledge base being accessible to every research team member.
CONTEXT	
contextq4b	Your employees are willing to collaborate with other (external source of knowledge) partners' R&D department on routine basis to work on innovation projects.
contextq9b	Most of the time, innovation projects assigned to these research teams is not aligned with the core research objectives of R&D Teams.
contextq10b	At times these research teams have research findings that are beyond the product/service focus of your company
contextq11b	The main objective of creating research teams with external source of knowledge provider is to enhance rate of innovation at your company.
contextq12b	The objective of research teams' members is to share knowledge and expertise in order to increase creativity.
contextq13b	The objective of sharing knowledge and expertise among research team members is to increase group synergy.
contextq16b	Application of knowledge transferred from external source of knowledge provider has dramatically increased the rate of innovation at your R&D Department/company
contextq14c	In case of No to 13c, your company needs to alter, integrate and combine this externally obtained knowledge before applying into innovation project
contextq12d	Looking at your experience in innovation projects, when the knowledge received from external source is utilized in a particular innovation project, the rate of innovation in that project is higher as compared to those where external knowledge was not used.
contextq13d	Application of knowledge transferred from knowledge vendor/s has also increased performance of other functional departments (e.g. Marketing, production, procurement etc) of your company.
COLLABORATION	
collaborationq2b	Your Company collaborates with other organizations for transfer of knowledge at partnership level and it is identified as external source of knowledge.
collaborationq4b	Your employees are willing to collaborate with other (external source of knowledge) partners' R&D department on routine basis to work on innovation projects.
collaborationq5b	For performing different tasks for innovation, your Company wants to create research teams which includes employees from your organization and employees from external source of knowledge.
collaborationq7b	Each research team member has been assigned with different research activities to be performed during ongoing innovation project.
collaborationq4c	Your Company has identified external source of knowledge as customer (e.g. supplier, service provider) providing desired knowledge for innovation projects.
collaborationq1d	In your opinion, your company has identified in advance that external knowledge source will be required to complete its innovation projects.
collaborationq2d	In your opinion, success rate of innovation projects depends on proper task identification (i.e. who will do what).
KNOWLEDGE EMBEDDEDNESS	
k.embedq6b	In doing so, your Company can identify expert personnel that will be part of research teams for innovation projects.
k.embedq5d	Your Company has capability to identify technological tools that may be required to

	complete process of knowledge transfer from external source of knowledge.
k.embedq6d	Your Company has the capability to identify source personnel from within your company who can be involved in the knowledge transfer processes with external source of knowledge.
k.embedq7d	Your Company can identify necessary IT infrastructure which may facilitate innovation process at your company.
k.embedq8d	Your Company can install the required infrastructure (IT related) that may be used to perform different tasks, activities or processes related to innovation process.
	ABSORPTIVE CAPACITY
abs.q8b	Your Company always has clearly defined research objectives for the research team members.
abs.q10b	At times these research teams have research findings that are beyond the product/service focus of your company
abs.q14b	Research team members have identified channels of communication (telephone, personal contacts, groupware and other team collaborating tools, chatting messengers, video conferences etc) to contact other members during innovation projects.
abs.q15b	The purpose of creating knowledge base is to easily understand the new knowledge received from external source of knowledge.
abs.q9d	One of the purpose of acquiring knowledge from external source of knowledge is to create and sustain common knowledge base at your company.
abs.q10d	Common knowledge base (existing knowledge) helps to understand the new knowledge received from external source of knowledge (e.g. know how of tools, performance of products, expertise of personnel received).
abs.q11d	Innovation projects of your company require exiting knowledge base being accessible to every research team member.
	INNOVATION
innovationq9b	Most of the time, innovation projects assigned to these research teams is not aligned with the core research objectives of R&D Teams.
innovationq11b	The main objective of creating research teams with external source of knowledge provider is to enhance rate of innovation at your company.
innovationq12b	The objective of research teams' members is to share knowledge and expertise in order to increase creativity.
innovationq13b	The objective of sharing knowledge and expertise among research team members is to increase group synergy.
innovationq16b	Application of knowledge transferred from external source of knowledge provider has dramatically increased the rate of innovation at your R&D Department/company
innovatoinq11c	Your Company has an agreement with the external source of knowledge to provide you unlimited access to knowledge on 'as and when required' basis for innovation projects.
innovationq14c	In case of No to 13c, your company needs to alter, integrate and combine this externally obtained knowledge before applying into innovation project
innovation17c	In your opinion, it is helpful to provide correct feedback to the external source of knowledge about knowledge received for innovation projects.
innovationq19c	In your opinion, your Company acknowledges the importance of transfer of knowledge from source organization for its innovation projects.
innovationq12d	Looking at your experience in innovation projects, when the knowledge received from external source is utilized in a particular innovation project, the rate of innovation in that project is higher as compared to those where external knowledge was not used.
innovationq13d	Application of knowledge transferred from knowledge vendor/s has also increased performance of other functional departments (e.g. Marketing, production, procurement etc) of your company.
	PHYSICAL DISTANCE
phy.distq8c	In case external source/s of knowledge is geographically located in a different country/region, your organization prefers to create virtual teams to share knowledge for innovation.
phy.distq12c	Your Company has identified channels of communication (telephone, personal contacts, groupware and other team collaboration tools, chatting messengers, video conferencing

	etc) to contact external source of knowledge on routine basis.
KNOWLEDGE DISTANCE	
know.distq9c	Your Company transfers knowledge from external source of knowledge which is technologically distinct
know.distq15c	In case of No to 13c, your company needs input from external sources of knowledge that are quite distinct in their R&D focus
know.distq16c	In case of No to 13c, your company needs input from external sources of knowledge that are quite distinct in their market focus
ACTIVITY CONTEXT	
activitycontextq10c	Your Company has clearly designed the process of knowledge transfer from external source of knowledge with mutual agreement.
activitycontextq18c	In your opinion, the level of mutual trust is an important factor to successfully transfer knowledge from external source of knowledge.
activitycontextq3d	In your opinion, your company can identify mechanism of transfer of knowledge (training, seminars, documents, videos, software, manuals etc) for successful transfer of knowledge.

Bootstrap output for ***Sub-hypothesis 1b***

```
Run MATRIX procedure:

Dependent, Independent, and Proposed Mediator Variables:
DV =    INOV1
IV =    CTN2 = customer specialty
MEDS = KDIST1
       KDIST2
Sample size
         10
```

IV to Mediators (a paths)

	Coeff	se	t	p
KDIST1	,9981	,0219	45,5800	,0000
KDIST2	,0261	,3534	,0738	,9430

Direct Effects of Mediators on DV (b paths)

	Coeff	se	t	p
KDIST1	-14,9667	3,6520	-4,0982	,0064
KDIST2	-,2119	,2263	-,9367	,3851

Total Effect of IV on DV (c path)

	Coeff	se	t	p
CTN2	,0912	,3521	,2591	,8021

Direct Effect of IV on DV (c-prime path)

	Coeff	se	t	p
CTN2	15,0347	3,6533	4,1154	,0062

Model Summary for DV Model

R-sq	Adj R-sq	F	df1	df2	p
,7473	,6210	5,9147	3,0000	6,0000	,0318

```
**************************************************************

           NORMAL THEORY TESTS FOR INDIRECT EFFECTS
Indirect Effects of IV on DV through Proposed Mediators (ab paths)
```

	Effect	se	Z	p
TOTAL	-14,9435	2,9919	-4,9946	,0000
KDIST1	-14,9380	2,9922	-4,9924	,0000
KDIST2	-,0055	,0708	-,0781	,9378
C1	-14,9325	2,9930	-4,9891	,0000

```
**************************************************************
           BOOTSTRAP RESULTS FOR INDIRECT EFFECTS

Indirect Effects of IV on DV through Proposed Mediators (ab paths)
```

```
            Data      boot      Bias        SE
TOTAL   -14,9435   -9,9385    5,0050   32,0000
KDIST1  -14,9380  -10,0532    4,8848   32,0222
KDIST2    -,0055     ,1147     ,1202     ,2343
C1      -14,9325  -10,1679    4,7645   32,0460

Bias Corrected and Accelerated Confidence Intervals
           Lower     Upper
TOTAL  -178,9735   -4,2515
KDIST1 -127,1249   -1,7541
KDIST2    -,8909     ,1074
C1      -71,0555    7,4683

************************************************************
Level of Confidence for Confidence Intervals:
  95
Number of Bootstrap Resamples:
  1000
************************************************************

  INDIRECT EFFECT contrast DEFINITIONS: Ind_Eff1 MINUS Ind_Eff2
  contrast  IndEff_1  IndEff_2
  C1        KDIST1    KDIST2

************************************************************

WARNING: SOME BOOTSTRAP MATRICES WERE SINGULAR
SINGULAR MATRICES WERE REPLACED DURING RESAMPLING
Number of singular bootstrap samples replaced:
  1
------ END MATRIX -----
```

Bootstrap output for ***Sub-Hypothesis 2b***

```
Run MATRIX procedure:

Dependent, Independent, and Proposed Mediator Variables:
DV =   INOV1
IV =   CTX1
MEDS = ABS1
       ABS2
       ABS3
Sample size
         10
```

IV to Mediators (a paths)

	Coeff	se	t	p
ABS1	,6503	,2686	2,4214	,0418
ABS2	-,4368	,3180	-1,3734	,2069
ABS3	-,4763	,3109	-1,5322	,1640

Direct Effects of Mediators on DV (b paths)

	Coeff	se	t	p
ABS1	,7931	,2079	3,8142	,0124
ABS2	-,2546	,1612	-1,5790	,1752
ABS3	-,5408	,1693	-3,1937	,0242

Total Effect of IV on DV (c path)

	Coeff	se	t	p
CTX1	,8585	,1813	4,7350	,0015

Direct Effect of IV on DV (c-prime path)

	Coeff	se	t	p
CTX1	-,0261	,2725	-,0957	,9275

Model Summary for DV Model

R-sq	Adj R-sq	F	df1	df2	p
,9408	,8935	19,8752	4,0000	5,0000	,0029

```
************************************************************************
           NORMAL THEORY TESTS FOR INDIRECT EFFECTS
```

Indirect Effects of IV on DV through Proposed Mediators (ab paths)

	Effect	se	Z	p
TOTAL	,8846	,2394	3,6948	,0002
ABS1	,5158	,2247	2,2954	,0217
ABS2	,1112	,0926	1,2003	,2300
ABS3	,2576	,1695	1,5195	,1286
C1	,4045	,2446	1,6538	,0982
C2	,2582	,3074	,8398	,4010
C3	-,1464	,1930	-,7584	,4482

```
************************************************************************
```

```
           BOOTSTRAP RESULTS FOR INDIRECT EFFECTS
Indirect Effects of IV on DV through Proposed Mediators (ab paths)
            Data      boot      Bias        SE
TOTAL      ,8846    1,1347     ,2501    8,3163
ABS1       ,5158     ,5982     ,0824    6,2935
ABS2       ,1112     ,1926     ,0814    1,8524
ABS3       ,2576     ,3439     ,0863    1,8093
C1         ,4045     ,4055     ,0010    6,4955
C2         ,2582     ,2542    -,0039    4,7001
C3        -,1464    -,1513    -,0049    2,3448

Bias Corrected and Accelerated Confidence Intervals
           Lower     Upper
TOTAL   -2,3745    6,9875
ABS1     -,6114    9,0588
ABS2    -1,0949     ,7957
ABS3     -,4291    2,8716
C1      -1,3611   11,0792
C2       -,6696   10,1849
C3      -3,7951     ,6108
************************************************************
Level of Confidence for Confidence Intervals:
  95
Number of Bootstrap Resamples:
  1000
************************************************************
  INDIRECT EFFECT contrast DEFINITIONS: Ind_Eff1 MINUS Ind_Eff2
  contrast  IndEff_1  IndEff_2
  C1        ABS1      ABS2
  C2        ABS1      ABS3
  C3        ABS2      ABS3
************************************************************
WARNING: SOME BOOTSTRAP MATRICES WERE SINGULAR
SINGULAR MATRICES WERE REPLACED DURING RESAMPLING
Number of singular bootstrap samples replaced:
  18
------ END MATRIX -----
```

Bootstrap output for ***Sub-Hypothesis 3e***

```
Run MATRIX procedure:
Dependent, Independent, and Proposed Mediator Variables:
DV =   INOV1
IV =   STR1
MEDS = ABS1
       ABS2
       ABS3
Sample size
         10
IV to Mediators (a paths)
         Coeff        se         t         p
ABS1     ,8510     ,1857    4,5838     ,0018
ABS2     ,0081     ,3535     ,0229     ,9823
ABS3    -,4162     ,3215   -1,2945     ,2316

Direct Effects of Mediators on DV (b paths)
         Coeff        se         t         p
ABS1     ,8420     ,3076    2,7370     ,0409
ABS2    -,2426     ,1084   -2,2389     ,0753
ABS3    -,5606     ,1776   -3,1559     ,0252

Total Effect of IV on DV (c path)
         Coeff        se         t         p
STR1     ,8705     ,1740    5,0024     ,0010

Direct Effect of IV on DV (c-prime path)
         Coeff        se         t         p
STR1    -,0774     ,3383    -,2288     ,8281

Model Summary for DV Model
      R-sq  Adj R-sq         F       df1       df2         p
     ,9413     ,8944   20,0573    4,0000    5,0000     ,0028
************************************************************
           NORMAL THEORY TESTS FOR INDIRECT EFFECTS
Indirect Effects of IV on DV through Proposed Mediators (ab paths)
         Effect        se         Z         p
TOTAL     ,9479     ,2783    3,4056     ,0007
ABS1      ,7165     ,2445    2,9302     ,0034
ABS2     -,0020     ,0809    -,0243     ,9806
ABS3      ,2333     ,1786    1,3061     ,1915
C1        ,7185     ,2569    2,7965     ,0052
C2        ,4832     ,3165    1,5270     ,1268
C3       -,2353     ,1958   -1,2015     ,2296
************************************************************
           BOOTSTRAP RESULTS FOR INDIRECT EFFECTS
```

```
Indirect Effects of IV on DV through Proposed Mediators (ab paths)
           Data      boot      Bias        SE
TOTAL     ,9479     ,7086    -,2393    2,4572
ABS1      ,7165     ,4315    -,2850    1,9282
ABS2     -,0020    -,0002     ,0018     ,2764
ABS3      ,2333     ,2772     ,0439    1,3687
C1        ,7185     ,4317    -,2868    2,0085
C2        ,4832     ,1543    -,3289    2,1375
C3       -,2353    -,2774    -,0421    1,5373

Bias Corrected and Accelerated Confidence Intervals
          Lower     Upper
TOTAL    -,3348   32,1906
ABS1     -,0263   32,3488
ABS2     -,7872     ,3048
ABS3     -,1029    5,6987
C1       -,0977   32,1928
C2       -,9554   11,3300
C3      -4,4076     ,2962
************************************************************************
Level of Confidence for Confidence Intervals:
  95
Number of Bootstrap Resamples:
  1000
************************************************************************
  INDIRECT EFFECT contrast DEFINITIONS: Ind_Eff1 MINUS Ind_Eff2
  contrast  IndEff_1  IndEff_2
  C1        ABS1      ABS2
  C2        ABS1      ABS3
  C3        ABS2      ABS3
************************************************************************
WARNING: SOME BOOTSTRAP MATRICES WERE SINGULAR
SINGULAR MATRICES WERE REPLACED DURING RESAMPLING
Number of singular bootstrap samples replaced:
  11
------ END MATRIX -----
```

Bootstrap output for ***Sub-Hypothesis 3e*** (*Value Configuration*)

```
Run MATRIX procedure:
Dependent, Independent, and Proposed Mediator Variables:
DV =   INOV1
IV =   STR3
MEDS = ABS1
       ABS2
       ABS3
Sample size
         10
IV to Mediators (a paths)
         Coeff        se         t         p
ABS1     ,8348     ,1947    4,2881     ,0027
ABS2     ,2676     ,3407     ,7854     ,4548
ABS3    -,3186     ,3351    -,9508     ,3696

Direct Effects of Mediators on DV (b paths)
         Coeff        se         t         p
ABS1     ,8928     ,2686    3,3237     ,0209
ABS2    -,2058     ,1326   -1,5517     ,1814
ABS3    -,5729     ,1421   -4,0306     ,0100

Total Effect of IV on DV (c path)
         Coeff        se         t         p
STR3     ,7330     ,2405    3,0477     ,0159

Direct Effect of IV on DV (c-prime path)
         Coeff        se         t         p
STR3    -,1397     ,2954    -,4731     ,6561

Model Summary for DV Model
      R-sq  Adj R-sq         F       df1       df2         p
     ,9433     ,8979   20,7806    4,0000    5,0000     ,0026
************************************************************
           NORMAL THEORY TESTS FOR INDIRECT EFFECTS
Indirect Effects of IV on DV through Proposed Mediators (ab paths)
         Effect        se         Z         p
TOTAL     ,8727     ,2954    2,9541     ,0031
ABS1      ,7452     ,2340    3,1842     ,0015
ABS2     -,0551     ,0712    -,7734     ,4393
ABS3      ,1826     ,1841     ,9913     ,3215
C1        ,8003     ,2050    3,9041     ,0001
C2        ,5627     ,3265    1,7236     ,0848
C3       -,2376     ,1884   -1,2616     ,2071
************************************************************
           BOOTSTRAP RESULTS FOR INDIRECT EFFECTS
```

```
Indirect Effects of IV on DV through Proposed Mediators (ab paths)
           Data      boot      Bias        SE
TOTAL     ,8727     ,8044    -,0684    2,4654
ABS1      ,7452     ,8241     ,0789    2,3285
ABS2     -,0551    -,1648    -,1098     ,7590
ABS3      ,1826     ,1451    -,0375     ,8794
C1        ,8003     ,9889     ,1886    2,2187
C2        ,5627     ,6791     ,1164    2,7740
C3       -,2376    -,3099    -,0723    1,2721

Bias Corrected and Accelerated Confidence Intervals
          Lower     Upper
TOTAL   -1,3273    3,3099
ABS1     -,5736    2,7844
ABS2     -,6539    1,5257
ABS3     -,6972     ,9399
C1      -8,1540    2,5717
C2      -3,4295    2,3117
C3       -,8582    3,6237
************************************************************
Level of Confidence for Confidence Intervals:
  95
Number of Bootstrap Resamples:
  1000
************************************************************
  INDIRECT EFFECT contrast DEFINITIONS: Ind_Eff1 MINUS Ind_Eff2
  contrast  IndEff_1  IndEff_2
  C1        ABS1      ABS2
  C2        ABS1      ABS3
  C3        ABS2      ABS3
************************************************************
WARNING: SOME BOOTSTRAP MATRICES WERE SINGULAR
SINGULAR MATRICES WERE REPLACED DURING RESAMPLING
Number of singular bootstrap samples replaced:
  22
------ END MATRIX -----
```

Bootstrap output for ***Sub-Hypothesis 3f*** (*Technological Resources*)

```
Run MATRIX procedure:
Dependent, Independent, and Proposed Mediator Variables:
DV =   INOV1
IV =   STR2            Resources
MEDS = COL1
       COL2
Sample size
         10
IV to Mediators (a paths)
         Coeff        se         t         p
COL1     ,5932     ,2846    2,0839     ,0707
COL2    -,6481     ,2693   -2,4070     ,0427

Direct Effects of Mediators on DV (b paths)
         Coeff        se         t         p
COL1    1,2223     ,2436    5,0179     ,0024
COL2    -,2355     ,2575    -,9145     ,3957

Total Effect of IV on DV (c path)
         Coeff        se         t         p
STR2     ,2841     ,3390     ,8379     ,4264

Direct Effect of IV on DV (c-prime path)
         Coeff        se         t         p
STR2    -,5936     ,3199   -1,8559     ,1129

Model Summary for DV Model
      R-sq  Adj R-sq         F       df1       df2         p
     ,8600     ,7899   12,2809    3,0000    6,0000     ,0057
************************************************************
           NORMAL THEORY TESTS FOR INDIRECT EFFECTS
Indirect Effects of IV on DV through Proposed Mediators (ab paths)
         Effect        se         Z         p
TOTAL     ,8777     ,3731    2,3522     ,0187
COL1      ,7251     ,3486    2,0799     ,0375
COL2      ,1526     ,1488    1,0257     ,3050
C1        ,5724     ,3715    1,5408     ,1234
************************************************************
           BOOTSTRAP RESULTS FOR INDIRECT EFFECTS
Indirect Effects of IV on DV through Proposed Mediators (ab paths)
           Data      boot      Bias        SE
TOTAL     ,8777     ,8387    -,0390     ,6217
COL1      ,7251     ,7195    -,0055     ,5640
COL2      ,1526     ,1191    -,0335     ,2778
C1        ,5724     ,6004     ,0280     ,6356
```

```
Bias Corrected and Accelerated Confidence Intervals
          Lower     Upper
TOTAL    -,0954    2,2558
COL1      ,0923    2,2952
COL2     -,3809     ,8285
C1       -,3154    1,7007
************************************************************
Level of Confidence for Confidence Intervals:
  95
Number of Bootstrap Resamples:
  1000
************************************************************
  INDIRECT EFFECT contrast DEFINITIONS: Ind_Eff1 MINUS Ind_Eff2
  contrast  IndEff_1  IndEff_2
  C1        COL1      COL2
************************************************************

WARNING: SOME BOOTSTRAP MATRICES WERE SINGULAR
SINGULAR MATRICES WERE REPLACED DURING RESAMPLING
Number of singular bootstrap samples replaced:
  2
------ END MATRIX -----
```

Bootstrap output for ***Sub-Hypothesis 3f*** (*Value Configuration*)

```
Run MATRIX procedure:
Dependent, Independent, and Proposed Mediator Variables:
DV =   INOV1
                        value
IV =   STR3             configuration
MEDS = COL1
       COL2
Sample size
        10
```

IV to Mediators (a paths)

	Coeff	se	t	p
COL1	,8441	,1895	4,4534	,0021
COL2	,4036	,3235	1,2475	,2475

Direct Effects of Mediators on DV (b paths)

	Coeff	se	t	p
COL1	1,2892	,4610	2,7964	,0313
COL2	,3495	,2701	1,2938	,2433

Total Effect of IV on DV (c path)

	Coeff	se	t	p
STR3	,7330	,2405	3,0477	,0159

Direct Effect of IV on DV (c-prime path)

	Coeff	se	t	p
STR3	-,4963	,5039	-,9850	,3627

Model Summary for DV Model

R-sq	Adj R-sq	F	df1	df2	p
,8102	,7154	8,5396	3,0000	6,0000	,0138

```
************************************************************
          NORMAL THEORY TESTS FOR INDIRECT EFFECTS
Indirect Effects of IV on DV through Proposed Mediators (ab paths)
```

	Effect	se	Z	p
TOTAL	1,2293	,4225	2,9096	,0036
COL1	1,0882	,3925	2,7727	,0056
COL2	,1410	,1389	1,0156	,3098
C1	,9472	,3854	2,4579	,0140

```
************************************************************
          BOOTSTRAP RESULTS FOR INDIRECT EFFECTS
Indirect Effects of IV on DV through Proposed Mediators (ab paths)
```

	Data	boot	Bias	SE
TOTAL	1,2293	,8669	-,3624	,8645
COL1	1,0882	,7300	-,3582	,8611
COL2	,1410	,1369	-,0042	,2840

```
C1        ,9472     ,5931    -,3541     ,9471

Bias Corrected and Accelerated Confidence Intervals
          Lower     Upper
TOTAL    -,1509    3,3826
COL1     -,0955    6,0167
COL2     -,2516     ,9168
C1       -,1492    8,6507
************************************************************
Level of Confidence for Confidence Intervals:
  95
Number of Bootstrap Resamples:
  1000
************************************************************
  INDIRECT EFFECT contrast DEFINITIONS: Ind_Eff1 MINUS Ind_Eff2
  contrast  IndEff_1  IndEff_2
  C1        COL1      COL2

SINGULAR MATRICES WERE REPLACED DURING RESAMPLING

Number of singular bootstrap samples replaced:
  162
------ END MATRIX -----
```

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To my

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&

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