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Radical Shift in Focus and Perspective of IT: a conceptual analysis on how to overcome the obstacles and drive the change

A Master's Thesis submitted for the degree of
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Affidavit

I, **Dominik Rosenberg**, hereby declare

1. that I am the sole author of the present Master's Thesis, "Radical Shift in Focus and Perspective of IT: a cenceptual analysis on how to overcome the change and drive change", 79 pages, bound, and that I have not used any source or tool other than those referenced or any other illicit aid or tool, and
2. that I have not prior to this date submitted this Master's Thesis as an examination paper in any form in Austria or abroad.

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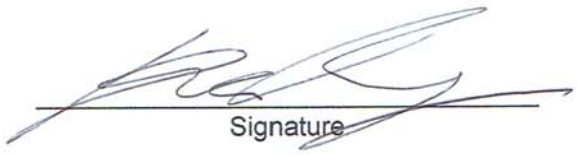

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ABSTRACT

Over the last decade information technology has started to get embedded into an ever increasing range of products and services. This development expands the role of IT and changed IT's business and technical context. In consequence, most business and IT organization are facing new challenges as current practices and plans no longer meet future realities and expectations. The thesis is aimed to highlight this radical shift in focus and perspective of IT, with the goal to provide a detailed conceptual analysis on how enterprises, in particular the IT organization and their leaders can overcome the resulting obstacles and drive the change. The essence of the finding is that the perception of the IT organization has to be readjusted and the main identified obstacles in this regards are about insight, alignment, value and risk.

A part of the answer to the challenge is the establishment of IT governance practices and the right kind of mature mix of structures and processes where IT leaders act as members of the business team, right down to their practice of building business plans to achieve a higher degree of business/IT alignment maturity, business understanding and insight into IT. Furthermore the intrinsic need to prove the business value delivered through IT investments can be provided through the translation of the vision, goals and frustrations of the stakeholders into specific programs, which deliver clear and obvious results back to the business, taking tangible and intangible costs and benefits into account. Special attention must also be given to the factor that meaningful business innovation and differentiation calls for some level of risk taking. This requires a setting where all levels within an enterprise are aware of how and why to respond to adverse IT events and acceptable levels of risk are understood and freely discussed.

Current Frameworks, standards, best practise and even older expert literature can be of great assistance to manage this transition. However given IT's essential role in most organization today, it has become most critically important to break free from set behaviours and relationships in order to establish IT as a full business partner. Organizations that continue to organizationally and conceptually isolate IT and business will fall behind competitors that have recognised the signs and are responding accordingly.

Table of Content

List of Figures

List of Tables

Chapter 1: Introduction

This chapter will create an outline of the thesis by providing a brief description of the relevant concepts and create a context for understanding the current development regarding Information technology and it´s increasingly significant role in creating value for the enterprise.

1.1 Context of the thesis

"Innovation is the specific instrument of entrepreneurship... the act that endows resources with a new capacity to create wealth" (Drucker, 1985).

This citation from Peter Drucker, one of the greatest management thinkers from the last century, seems like a perfect match for what Information Technology (IT)[1] is all about, however this is not an uncontroversial matter. In 2003 Nicholas Carr wrote a Harvard Business Review article, in which he argued that IT has become ubiquitous, an infrastructure technology just like water or electricity, possessed by everyone and therefore loses its potential for creating sustainable competitive advantage (Carr, 2003). This view has become a widespread perception among most business leader, where IT is perceived as a money-spending necessary evil and therefore is managed no more and no less like an operational resource.

Whether coincidental to the economic recovery or opportunistic, over the last decade information technology started to get embedded into an ever increasing range of products and services (Yoo, Henfridsson, & Lyytinen, 2010). Digital technologies, including mobile, big data/analytics, social and cloud started to expand the role of IT and changed IT's business and technical context. In consequence, most business and IT organization are facing a crisis as current practices and plans no longer meet future realities and expectations. Reacting to limited budgets by restructuring costs, outsourcing and doing more with less made sense from 2002 to 2011, when the supply of innovative technologies was scarce (Gartner, 2013e). Now the mission states: "Evolve IT's strategies, priorities and plans from IT as usual toward IT as growth engine". In this regard the perception of the IT organization has to be readjusted and their leaders have to prove that they are capable to fill a tactical role in forming the future of the enterprise by creating value for their stakeholders.

Value creation means realising benefits at an optimal resource cost while optimising risk (ISACA, 2012a). The IT organisation has to demonstrate that it is the optimal partner in this procedure and is able to link its capabilities to business outcomes, because selecting and getting the technology is only half the job. Innovation is not the introduction of the new

[1] In this document, "IT" is understood to encompass the infrastructure as well as the capabilities and organisation that establish and support Information Technology.

technology itself but rather a "new way of doing things" when providing service and conducting day-to-day operation for their business. This makes it abundantly clear, it´s not the Information Technology itself that matters, but how firms utilize it.

Much literature is available on this current development and how to handle it, but regarding the rapid change most of the literature are yesterday's news until they are available at the bookstore. This fact itself, is prove for the current age of digitalization, where most of the up-to-date knowledge is only available online.

1.2 Aims and objectives

The overall aim of this theses it to answer the following question: How can enterprises or in particular the IT organization and their leaders overcome the obstacles, which are arising through the radical shift in focus and perspective of IT, drive the change and create value for their stakeholders?

This objective can be split in two parts. In the first part the current radical shift in focus and perspective of IT and there implication have to be pointed out. This will be done by identifying the opportunities and challenges of the ongoing digital evolution regarding IT in general, current technology trends and the IT organization.

The second part addresses the multi-dimensional challenge on how to overcome the main obstacles and drive the change. The goal of the research is to develop an understanding of the factors that would either constrain or promote successful implementation of current technology trends to create value for the enterprise. With this purpose the thesis further, sought to explore what needs to change, within the enterprise context, to encourage the right behaviour to proactively drive the change. The objective of this is to analyse the conceptual link between the IT and the business organisation, in particular the indirect link to business performance and why different firms investing in the same technology may exhibit different payoffs. This calls for understanding the strategic and organizational implications: How IT frameworks, standards or best practises may expand innovation opportunities. Do they have the potential to provide guidance on managing the complexity of the transition of processes and structures, preventing undesired consequences while allowing and foster for innovation?

The results of this thesis will help business and IT leaders not only to identify the key areas which require special attention but also will finally come up with conclusions and recommendations on how to overcome these obstacles on the basis of qualitative data analysis and results of this work.

1.3 Methodology

The research method chosen for this study is a conceptual analyse. A qualitative approach serves the purpose of revealing the nature of certain processes, relationships and systems in regard to the goal of the thesis.

With the purpose of the thesis in mind study literature related to the current radical transition of Information Technology and how to overcome the involved obstacles is collected and analysed. A conceptual literature analyse method is well suited for addressing this purpose because it enables the collection and review of current perspectives. The timeliness of the literature is essential for this thesis in order to support the effectiveness of factors today.

The first step taken in the data collection process is to search academic databases and the World Wide Web in order to gain confidence that this topic could be studied through a literature review. Preliminary searches reveal an acceptable amount of literature. More thorough searches are conducted for material published optimally not later than three years ago and relevant specifically to sources addressing the current Information technology transition and the resulting challenges for the enterprise to create value through IT-enabled investment.

Academic databases used to collect literature are accessed from the Vienna University of Technology Libraries (http://www.ub.tuwien.ac.at/eng), ProQuest ABI/INFORM Complete (http://www.proquest.com), SpringerLink (http://link.springer.com) and Google Scholar (scholar.google.at).

Additional a review of online resources has led to websites maintained by organizations that provide material with a high degree of relevance to this thesis and help to frame the research problem. For the purpose of this study, resources made available through the website of Gartner Inc.(www.gartner.com) and the Information Systems Audit and Control Association (www.isaca.org) were most useful:

Gartner, Inc. is the world's leading information technology research and advisory company, which has 6,100 associates, including more than 1,460 research analysts and consultants, and clients in 85 countries. Gartner deliver technology-related insight. The resources of Gartner Research, Gartner Executive Programs, Gartner Consulting and Gartner Events offer research, analysis and interpretation information concerning Information Technology.

With more than100.000 constituents in 180 countries, ISACA is a leading global provider of knowledge, certifications, community, advocacy and education on information systems (IS) assurance and security, enterprise governance and management of IT, and IT-related risk and compliance. The following ISACA sources among others are used to collect literature:

- **COBIT** helps IT professionals and enterprise leaders fulfil their IT governance and management responsibilities, particularly in the areas of assurance, security, risk and

control, and deliver value to the business. ISACA continually updates and expands the practical guidance and product family based on the COBIT framework.

- **Val IT** provides proven practices to help enterprises address this challenge and realize value from IT investments.
- **Risk IT** is a framework based on a set of guiding principles for effective management of IT risk.
- **The ISCA Online Knowledge Centres** aims to equip its members and the public with timely resources related to business and accountancy matters.
- **ISACA Journal** is a source for IT Governance Professionals. This award-winning bimonthly publication delivers practical, professional knowledge through peer-reviewed articles focused on topics critical to IT audit, governance, security and risk professionals.
- **IT Governance Institute** (established by ISACA) provides knowledge, which helps ensuring that IT delivers value and its risks are mitigated through alignment with enterprise objectives, IT resources are properly allocated, and IT performance is measured.

Table 1.1 shows further relevant websites that are used to collect literature (in alphabetical order):

NAME	DESCRIPTION	WEB ADDRESS
CAPGEMINI	management consulting firm	http://www.capgemini-consulting.com
COMPUTERWEEKLY.COM	The latest news on information technology (IT)	http://www.computerweekly.com
COMPUTERWORLD	IT news, features, blogs, tech reviews	http://www.computerworld.com
DELOITTE	multinational professional services firm	http://deloitte.wsj.com
ERNST & YOUNG	multinational professional services firm	http://www.ey.com
FORBES.COM	information for the World's Business Leaders	http://www.forbes.com
HARVARD BUSINESS REVIEW	business education material	http://hbsp.harvard.edu/
IBM	multinational technology and consulting corporation	https://www.ibm.com
IDG ENTERPRISE	CFOworld, CIO, CIO Executive Council, CITEworld, Computerworld, CSO, DEMO, ITworld…	http://www.idgenterprise.com/
INTEL	designer and builder of essential technology	http://www.intel.de
KPMG	multinational professional services firm	http://kpmg.com
MCKINSEY & COMPANY	advisor and counsellor firm	http://www.mckinsey.com
NETWORK WORLD.COM	network news, trend analysis	http://www.networkworld.com/
ORACLE	provider of enterprise resources planning software	http://www.oracle.com
TECHREPUBLIC	resource for IT professionals	http://www.techrepublic.com
THE ENTERPRISERS PROJECT	CIO community powered resource	https://enterprisersproject.com
ZDNET	technology news, analysis, comments	http://www.zdnet.com

Table 1-1: Further relevant websites that are used to collect literature

1.4 Structure of the thesis

The thesis is divided into four chapters (as can be seen in **Figure 1-1**) with this being the introductory **Chapter 1**. Set out below is an outline of each of the remaining chapters.

Chapter 2 deals with the changing role of IT and provides an elaborate literature review, which related to the radical shift in focus and perspective of IT. For this purpose in a first step the current increasing role of Information Technology in the enterprise environment will be point out. In the next step the major trends which are driving the change will be explained in details with their opportunities and challenges. The last section of this chapter deals with the impact of the transition on the IT organization and their leaders.

Chapter 3 extends the literature analysis to frameworks, standards, best practises and expert guides by focusing specifically on the arising challenges through the changing role of IT in the enterprise. For this purpose the main obstacles, which are derived from the research findings of Chapter 2 are discussed and with the help of the most up-to-date sources a set of recommendations on how to overcome the obstacles and drive the change are elaborated.

Chapter 4 summarises the key findings of the research, contains conclusions and also addresses the limitations and suggests recommendations for further research.

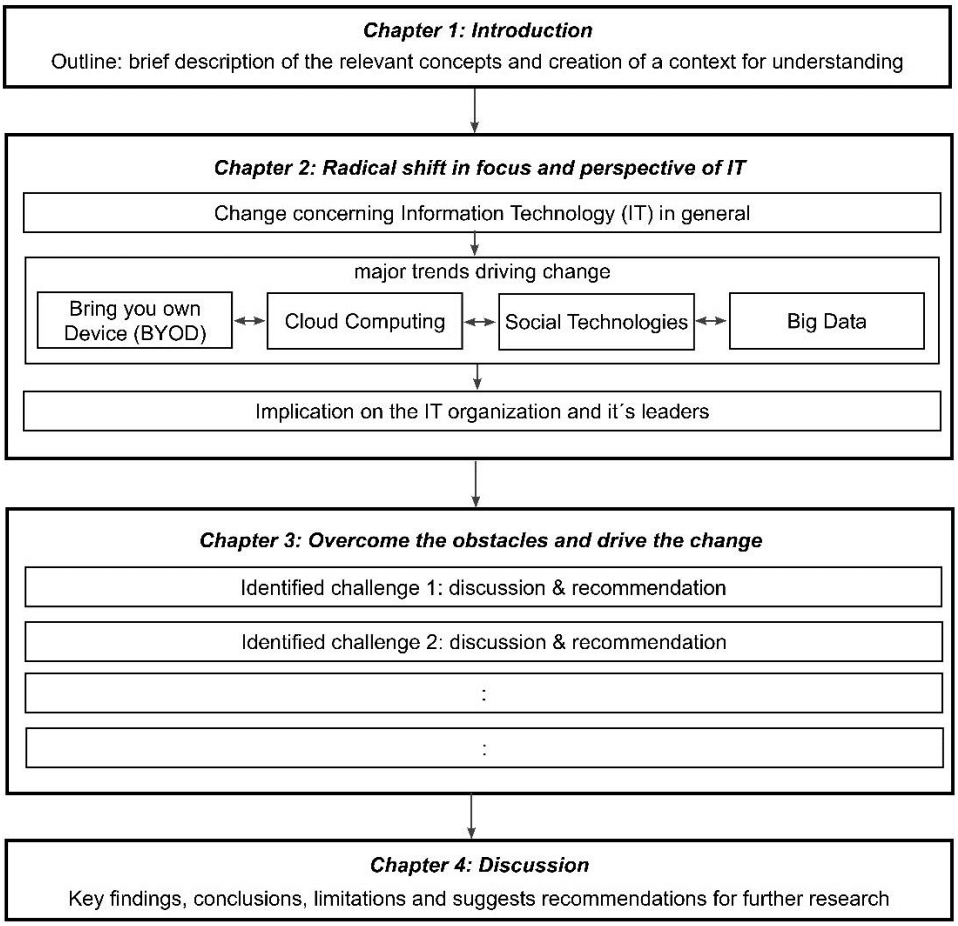

Figure 1-1: Structure of the thesis

Chapter 2: The changing role of IT

The role of Information Technology (IT) has been rapidly advancing for decades and it is still evolving today. We can look back on the days of centralized computing on mainframes, client-server technology, web 1.0 and telecommunications advances gains. Now we have new drivers for change. Most recently, enterprises heavily leverage the significant development of cloud technology, social networking, big data analysis and the advancement of consumer devices in the corporate world. Information technology is playing an increasingly significant role in determining how companies interact with customers[2], partners, suppliers as well as how companies function internally. Worldwide IT spending is projected to total $3.8 trillion in 2014, according to the latest forecast by Gartner, Inc. (2014a).

This trend will only accelerate as new tools become crucial in binding company's products, services, and operations together into a functional whole (The Economist, 2013). Many of the information technologies, which are driving the change and innovation in the marketplace, help enterprises to be more collaborative, open and remote in the goals of driving revenue and improving customer support. This evolution is making the role of the chief information officer[3] (CIO) more strategic than ever.

2.1 "IT Matters" – more than ever

For most organisations, if their computer network goes down, so does their business. Considering how little can be accomplished without the support of IT, gives a clear perspective of its importance and ubiquity. However this is yesterday's news and a fact since nearly a decade. Nonetheless in May 2003, the Harvard Business Review published an article entitled "IT Doesn't Matter" by Nicholas Carr (2003). The paper argued that IT was being commoditized, and thus offered little hope of sustained competitive advantage. According to his article companies have overestimated the strategic value of IT, which has become ubiquitous and therefore diminishes as a source of competitive differentiation. Carr suggests that rather than seeking advantage through cutting edge equipment, companies should instead manage IT to reduce costs and risks. Consequently, most firms should focus on reducing the cost and risk of IT – "spend less, follow, don't lead, focus on vulnerabilities, not opportunities". The article quickly became popular and did set off heated debates as it was passed around the offices.

[2] In this document, the concept of the customer is anyone who is receptive to information about products or service. Further no difference is made between customers who work in the same organization as the IT service provider or is external to the enterprise.

[3] The CIO is the most senior official of the enterprise who is responsible for aligning IT and business strategies and accountable for planning, resourcing and managing the delivery of IT services and solutions to support enterprise objectives (ISACA, 2012a).

In a recent interview Carr freely admitted (Bednarz, 2013) that the article was primarily about IT infrastructure, which is basically what IT departments were mainly concerned with 10 years ago. He states that, in this context, many of the points that he made in his article had become true, because infrastructure is only about risk management and costs, not about acquiring cutting edge equipment. There is no big competitive advantage to be gained by buying new servers. However, he did not anticipate the scope of the advancements of today's technology and its capabilities. From this point of view, Carr acknowledges that he probably underestimated the new issues that IT departments would have to deal with today.

While many people saw these limitations, it appears that, at this time, many global executives took great comfort in Carr's message (Moschella, 2014). Why get involved in what the firm is doing with IT, if a Harvard Business Review says that "IT doesn't matter"? The common impression quickly spread that Information technology is a job for IT professionals, while business executives have to focus on what really matters and if cost-cutting is the overall IT goal, the optimal scenario is an IT organization reporting to the chief financial officer[4] (CFO).

These days as can be seen in **Figure 2-1**, a lot is happening in enterprise technology, often flowing straight from the consumer world. This can presents a significant challenge, but at the same time a historic opportunity, because some of these emerging technologies are not just disruptive, but have the potential to guide entire industries into an early retirement (Hinchcliffe, 2014). Today you can be still sceptical regarding particular IT trends and fashions, but you will find it really hard to say that "IT doesn't matter".

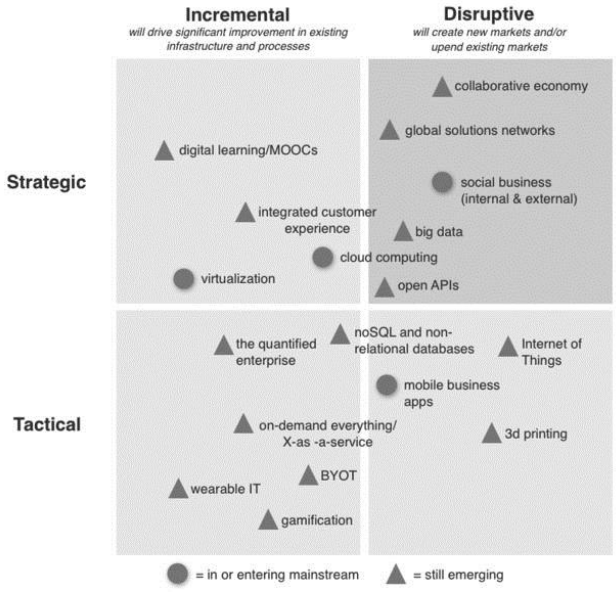

Figure 2-1: Technologies to watch for the next-generation enterprise (Hinchcliffe, 2014)

[4] The Chief Financial Officer (CFO) is the most senior official of the enterprise who is accountable for all aspects of financial management, including financial risk and controls and reliable and accurate accounts (ISACA, 2012a).

These emerging technology enablers and disrupters are prompting many companies to reconsider their business strategies. A study, conducted in 2013 by Deloitte, of more than 300 major companies around the world, revealed that 91% of the surveyed companies say they have changed their business strategies since the emergence of mobile, social, big data and various other major technology innovations. According to the survey data, these new technologies are having an impact on companies in every region and industry. However, some areas are being more affected than others. For example, the biggest impact is being felt in three sectors: technology/media/telecommunications (97%), consumer/industrial products (96%), and life sciences/healthcare (94%). Regionally, the biggest impact is in Asia Pacific, where 98% of respondents report having changed their business strategies.

This statement is underpinned by a recent Harvard Business survey of more than 400 business leaders around the world (Harvard Business Review, 2014), which states that nowadays businesses are transformed by new technologies, especially those that bring more intelligence and mobility to their operations and products. On the top of the list of areas, which will be changed the most by IT enabled innovation, is the way organizations engage with and understand their customer's, closely followed by the business model. Respondents also said that IT enabled innovation would change the way employees do their work, the company's products/services and business models. Furthermore some companies are accelerating this transformation by pursuing IT-enabled business innovation as a core strategy throughout their organization. For this purpose firms are seeking executives and employees, who can thrive in an increasingly digital environment and are capable of envisioning new services and working in new ways.

This means business and IT leader everywhere, no matter which region and industry have to be aware that the digital revolution is transforming the global marketplace. The new technologies are changing the way people live, work and interact, creating a networked economy. People now want products, services and experiences that are tailored to their individual preferences, wherever they are, at whatever hour they choose (IBM, 2013).

2.2 The major trends driving change

Today, discussions about innovation with the IT department frequently focus on new or cutting-edge technology. Executives are under a constant bombardment of e-mails, phone calls, press releases, and marketing material about the "next big thing". This new area, the one we're experiencing today is marked by four transformational trends: mobile, cloud, social, and big data (Mann, Watt, & Matthews, 2013). While the use of these technologies has been in effect now for more than a decade, their adoption and popularity has increased significantly over the last few years (Gartner, 2013f) and to some extent it can be said that this development originate in the "Consumerization of IT".

It wasn't that long ago that the workplace was the role-model for cutting-edge technology and the IT department has defined the direction, path, and strategy of the solutions that are to be used and deployed in the office. Through the increase in availability and choices of new IT solutions, technology plays an increasingly important role in personal lives and everyone becomes used to the convenience, power and flexibility (Muller, 2011). It didn't take long to realize that these new products would not only be useful to personal life, but in corporate life as well. The consequence are users[5] that started to tell (if not demand) IT which devices and applications they want to use. This trend is called among experts "Consumerization of IT" (Holtsnider & Jaffe, 2012) and means in details that "*consumers adopt technologies well before the companies they work for, and subsequently bring this trend to work*" (Mann, Watt, & Matthews, 2013). A development, which would not have been possible, without the rise of mobile applications and devices as well as through consumers using social technologies[6], which already was a big thing, but started to multiply as social applications migrate to mobile devices (e.g., smartphones and tablets). All these mobile gadgets and applications have to use Cloud technology to stay updated and synchronise their data between the different devices. Together with the development that more and more things are online[7] today, which has led to the concept formation "Internet of Things" (IoT), more data than ever before is created, which offers the opportunity to be analysed to deliver valuable insights. This development is disrupting business as usual at companies in all industries.

This disruption, which will continue to morph into a new kind of business, with enterprises expanding their reliance on the cloud, mobile technologies, social media and increasingly predictive analytics. The most frequently mentioned goals in this regards are reducing costs, creating new revenue streams, boosting customer satisfaction and strengthen brand awareness (Computerworld, 2013). This development is not only improving what businesses do with technology to make themselves faster, cheaper and more scalable, but is fundamentally changing businesses by changing the basis of competition and in some cases, creating new industries (Gartner, 2013f).

Ernst & Young (2013) calls these technologies the four "transformative megatrends" that will shape global technology adoption over the next decade whereas Gartner (2013f) calls them the "Nexus of Forces". These labels should describe the convergence and mutual

[5] In this document, the concept of the user is anyone who is receptive to information about products or service. Further no difference is made between users who work in the same organization as the IT service provider or is external to the enterprise.

[6] In this document social technologies are defined as IT products and services that enable the formation and operation of online communities, where participants have distributed access to content and distributed rights to create, add, and/or modify content.

[7] In this document the term "online" refers to a connection to the internet.

reinforcement of the four interdependent trends: social interaction, mobility, cloud, and information. The “Nexus of Forces” combine to empower individuals as they interact with each other and their information through well-designed ubiquitous technology. Additionally, they enable and compel the necessity for a more social, mobile, accessible and data-driven workplace. Gartner (2013f) further states that “*IT leaders can use these combined forces to drive the digital workplace, which promotes workplace agility, effectiveness and engagement*.”

IT leaders have to keep pace with this development and require an understanding of the business needs that are driving these demands for new technologies. Otherwise the IT department may see only business users buying unauthorized devices, signing up for rogue cloud services or wasting bandwidth on social media. Meanwhile, the business simply needs to deliver corporate content in real time in a casual setting, issue electronic contracts and accept electronic payments from on the road or chat online with customers about new products or service issues. Without any intention IT can stifle the business by refusing these requests without really understanding them (Mann, Watt, & Matthews, 2013).

The particular challenge for IT managers is that they have to balance all the collaboration and innovation which is stimulated through these tools against new security risks, as well as data access and management challenges. While they can be strategic tools for business and improve employee productivity, they can also be factors contributing to employee distractions and performance problems. Many companies are still trying to figure out how to best use these technologies, and the answers won't come from the IT department alone. It is required and should always be the case that many parts of the organization need to be involved in developing the most fitting strategy (Holtsnider & Jaffe, 2012).

2.2.1 BYOD (Bring Your Own Device) - curse or a blessing?

"BYOD strategies are the most radical change to the economics and the culture of client computing in business in decades" (Gartner, 2013b)

Traditionally, users had to go to their computers to run programs or access Internet- based services. Computers were connected via wires to peripheral devices, other computers, and networks. This lack of mobility significantly constrained the performance of people. These days, wireless technology makes mobile computing and commerce a source of vast opportunities for businesses (Turban, Volonino, Wood, & Sipior, 2013). The mobile computing landscape has evolved rapidly over the last two decades. The global usage of notebook, tablets and smartphones is rising rapidly, which is accelerating the effects of the “Consumerization of IT” impact on organizations (Smith, 2013). Gartner (2013a) estimates that the amount of mobile technology will be growing exponentially through 2018. This isn’t really a

surprise, but the problem that Gartner sees is that some companies aren't prepared for the rate in which mobile device usage at work will grow.

Today's business demands 24/7 working around the globe and this has placed a greater emphasis than ever on mobile applications. As stated previously, the technology used in personal lives has a distinct impact on the technology experience expect at work. If employers fail to deliver the right technology, or are slow to do so, employee's don´t hesitate anymore to bring what they need. IT Leaders first have ignored this trend or at worst encountered with active resistance (Mann, Watt, & Matthews, 2013). Gartner (2013b) describes this development as a point where IT officially has to recognize what has always been going on: People use their business device for non-work purposes and they often use a personal device in business. Once this has been realized, an understanding that there must be another way besides locking down full devices has to be created. Otherwise, employees will work around what the enterprise limits (Mobile Enterprise, 2014). **Figure 2-2** shows that there are essentially three ways how companies can deal with this development, with increasing complexity for the enterprise.

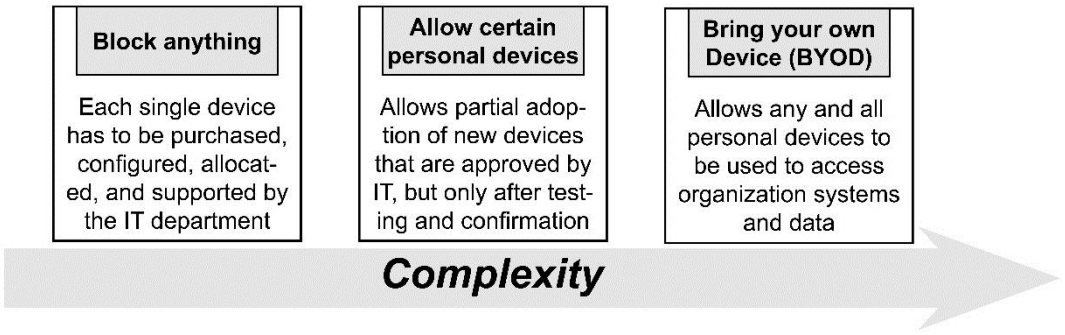

Figure 2-2: Mobile device deployment options with increasing complexity

Those executives who "put their heads in the sand", try to block anything and ignore this trend may "be hailed as security hawks", but won't be loved by their employees (Smith, 2013). On the other hand, a passive acceptance of workers choosing, buying, using, and bringing their own devices and services is also not part of the solution. The IT department is compelled to become active and to support new consumer-style approaches. It is essential during this process that IT specifies which platforms will be supported and how, what service levels a user should expect, what the user's own responsibilities and risks are and who qualifies. Furthermore IT leaders have to realize that in this new age of digital innovation, enabling isn't enough, they need to be driving it, suggesting it to the business, and showing ways to adopt these technologies institutionally to drive new opportunities and new business-focused technology initiatives (Mann, Watt, & Matthews, 2013).

Bring Your Own Device, or BYOD is the concept by which organizations allow employees to connect their personal devices, such as laptop, tablet and smartphone, to the corporate network, so that they can access business and collaborative applications (Capgemini,

2013). Many associate BYOD directly with the “Consumerization of IT” term (Intel, 2012), but BYOD is only driven by and a subset of this development (Mann, Watt, & Matthews, 2013). Like described in the introductory of this chapter the “Consumerization” phenomenon extends beyond devices and include the entire computing experience.

According to a global survey of CIOs by Gartner (2013b) mobile initiatives are in general often exploratory nature and may not have a clearly defined and quantifiable goal, which makes the business executives uncomfortable. Most leaders do not understand the benefits, and only 22 percent of the respondents believe they have made a strong business case. This is evident in the fact that the driving belief behind BYOD adoption is that companies benefit by saving on capital expenditure of hardware and software, and related IT operational expenses, as they no longer have to provide employees with computing devices or related software (Capgemini, 2013). An approach, which might be true for some smaller companies, because it allows them to go mobile without a huge device and service investment (Gartner, 2013b), but it should not be forgotten that additional investments are needed to support the usage of personal devices in a business environment. For instance, a study conducted by Capgemini (2013), one of the world's largest IT service consulting found that only 9% of organizations have been able to reduce expenditure by deploying some kind of BYOD program. The cost benefits often get eroded by further investments such as virtualization or security reinforcement to support the BYOD model and the need to increase skills and resources to support a new diversity of enterprise devices (Mann, Watt, & Matthews, 2013). With such long-term sustained investments, the real business benefits lie elsewhere. People are satisfied, because they use the devices they have chosen and invested in, rather than what was selected by IT (IBM, 2011). Productivity and innovation has the potential to increase, mainly due to the fact that employees are more comfortable with a personal device and become expert using it. They are able to experiment with new routes to productivity without having to clear them first with finance, procurement, contracts, legal, and, of course, IT (Mann, Watt, & Matthews, 2013). Personal devices tend to be more cutting-edge, so the enterprise benefits from the latest features. Also users upgrade to the latest hardware more frequently (IBM, 2011). BYOD allows the business to rapidly change the composition of its workforce, from rapidly on boarding new, temporary, casual or permanent staff to sourcing staff from global resource pools or to rapidly expanding resources on demand as long as they bring their own devices (Mann, Watt, & Matthews, 2013). Further the BYOD model leads to changes in employee work habits, because it enables employees to use their devices during “out of office” periods to deal with basic tasks, which reduces wait times and enables quicker resolution. A survey among mobile workers showed that workers who use mobile devices for both work and personal purposes, put in 240 more hours per year than those who do not (Fogarty, 2010). BYOD initiatives also communicates the message to the

workforce that the organization trusts its employees in making their own decisions about how they work, which improves the working atmosphere and can additional act as an important tool for attracting and retaining talented people (Capgemini, 2013).

However, it is hardly surprising that BYOD does increase risks and changes expectations for IT leaders. With a range of innovative new devices combined with existing legacy systems, there will be concerns about compatibility, standardization and compliance (Intel, 2012). The mobile infrastructure may not be able to support the increase in mobile network traffic and data processing, causing unacceptable delays or requiring additional investments (IDG Enterprise, 2013). Moreover, the BYOD practice is seeing enterprises take risks they would not consider taking for conventional computing devices. Many devices are not being managed as secure devices e.g., the use of unknown third party cloud providers, no anti-malware or data encryption (Dunn, 2012), which leaves the risk of data leakage on mobile platforms particularly acute (Gartner, 2013b). Companies, which taking control over these risks, actually raise several legitimate areas of concern, because new vulnerabilities are created when personal and business data and communications are mixed together, for example controls placed on employee-owned devices can infringe on personal privacy (Turban, Volonino, Wood, & Sipior, 2013).

There is also the need to be cautious about the cost and complexity associated with managing numerous different tablets, smartphones and apps (Turban, Volonino, Wood, & Sipior, 2013). Additional apart from the necessary investments already mentioned, there is a high chance that there will be demand for new applications from both end users and customers/clients to get the most out of their mobile devices. Likewise, consumer technologies will drive the adoption of related technologies, creating a snowball effect at many companies (IDG Enterprise, 2013).

These challenges are confirmed by a global C-suite study conducted by IBM (2013), which revealed that CIO´s are having a tough time figuring out the value of BYOD, as well as addressing the legal, security and privacy implications.

This freedom from IT control potentially has good and bad aspect, but it is also seems inevitable, users will use their own devices and arguably always have. The task to be solved is to enable and guide to benefit the most from this new iteration of the IT cycle. However, it is important to recognise that BYOD is not a simply an IT project, because it questions how IT is viewed and implemented, and requires significant evolution in IT organization to promote service-oriented models. In this regards it is critical for organizations to analyse the overall enterprise key factors related to delivery model and support structure in order to define a successful customized BYOD strategy (Capgemini, 2013).

2.2.2 Unlocking value and productivity through social technologies

"Enterprise social networks will become the primary communication channels for noticing, deciding or acting on information relevant to carrying out work" (Gartner, 2013c).

Communication and collaboration have always been at the centre of a successful business strategy. The idea of communicating and collaborating more effectively through technology certainly isn't new. It wasn't long ago that company Web sites functioned as vehicles for corporate communication, product promotion, customer service, and in some cases as e-commerce. Although relatively few people were members of online communities, social networking sites were for college students and chief marketing officers did not worry about how many online fans "liked" their company's products. Within a decade the use of social technologies has become a far-reaching cultural, social, and economic phenomenon (McKinsey Global Institute, 2012). Facebook is growing by an additional 15% percent year over year and is approaching 1.3 billion active users in 2014 (Zephoria, 2014). Twitter (2014) has about 255 million monthly active users and 500 million tweets are sent per day. With the migration of social applications to mobile devices the use of social technologies continues to multiply. More than six billion mobile phones are in use worldwide, enabling consumers to socialize online wherever they go and inspiring a new range of social marketing applications (McKinsey Global Institute, 2012). One can imagine, when these ways of interacting are used for commercial and professional activities (e.g., developing and selling products, working together to solve a business problem) the resulting value creation can be impressive.

Nowadays the range of products and services that enable social interactions and thus allow people to connect and interact virtually has tremendously increased (e.g., social networks, blogs/microblogs, rating and review, social commerce, wikis, discussion forums, shared workspaces, crowdsourcing, social gaming, media and file sharing). The McKinsey Global Institute (2012) has identified ten value "levers," or techniques, that enterprises can use to generate value from these technologies. These tactics fall into four segments of the value chain: product development (device customer insights, co-create products), operations and distribution (leverage social to forecast and monitor, use social to distribute business processes), marketing and sales (derive customer insights, use social technology for marketing communication/interaction, generate and foster sales leads, social commerce), and customer service (provide customer care via social technology), plus two enterprise-wide value levers create value by improving organizational productivity (use social technology to improve intra- or inter- organizational collaboration and communication, use social technology to match talent to tasks).

Some gains are based on shifting communications among interacting workers from channels designed for one-to-one communication (e.g., e-mail, phone calls) to many-to-many communication, because today, a huge amount of relevant enterprise knowledge is locked up in e-mail inboxes and as more enterprise information becomes accessible and searchable, rather than locked up, workers could start to become much more productive. This technology will also allow people to connect at a different scale and create a unified, powerful voice (McKinsey Global Institute, 2012).

As it is true with most IT enabled opportunities, also social media brings inherent risk. Some of them overlap with areas traditionally considered the domain of human resources, including workplace issues and behaviour, personal data, and privacy. For this it has been found that governance is a key to making sure that use of social computing aligns to corporate guidelines (Intel, 2009). Furthermore, exist some unique risk areas, including public image damage created by negative comments and postings in social media venues and risks similar to those brought by other IT initiatives, such as inefficiency, wasted investment, insufficient effectiveness (Hanson, 2011).

Gartner (2013c) estimates that through 2015, 80 percent of social business efforts will not achieve the intended benefits, due too much focus on content and technology, and not enough focus on leadership and relationships. By the reason that social technology is not just another IT implementation, which is available nicely packaged & wrapped from a single vendor, nor is it simply a tool to improve communication and collaboration. It's a fundamentally different way to approach strategic challenges and achieve desired results (Violino, 2013). Employees can't be forced to use social apps, they must opt-in. There needs to be a detailed understanding of social networks: how people are currently working, who they work with and what their needs are. It is important to realize that the issue about how best to encourage collaboration, is that it is not just about what people know that determines their value, it’s what they are willing to share, because when employees, suppliers and partners cooperate, they can be more productive and innovative and ultimately create more value for the organizations (IBM, 2013).

Capturing this full potential value requires the ability to create trust, a critical mass of participation to transform changes in organizational structures, processes, and practices, as well as a culture compatible with sharing and openness (McKinsey Global Institute, 2012). This includes enterprise-level commitments for collective intelligence, community building, knowledge sharing and virtual teaming as key drivers of expanding and enhancing usage (Mobile Enterprise, 2014). In this regards leadership sponsoring alone is not enough, managers need to demonstrate their commitment to a more open, transparent work style by their actions (Gartner, 2013c).

In conclusion it can be said that in order to develop a social business strategy, IT leaders need to work with the business and their users so that social and collaboration software blends naturally with the tasks they need to carry out every day, while meeting the requirements of the business of tomorrow (Mobile Enterprise, 2014).

2.2.3 Cloud computing changes the game

"Cloud computing could be a disruptive enabler of business value and a means of providing technology services that are available more quickly and at a lower total cost" (ISACA, 2013).

Cloud-based services are on the rise. According to recent publications, the cloud is the future for the provision of a wide range of IT services. Gartner (2013d) predicts that from 2013 through 2016, $677 billion will be spent on cloud services worldwide.

From a technology standpoint, the components that make the cloud computing model possible are not new. It applies numerous technology advances that have been around for a long time, which include, among others high-speed Internet access, server virtualization, new software development approaches and advances in high-capacity storage (ISACA, 2013). Oracle Corp.'s Chief Executive Officer Larry Ellison commented at a financial analyst conference in September 2008 in this regard, "The interesting thing about cloud computing is that we've redefined cloud computing to include everything we already do" (Farber, 2008). So what is so new and revolutionary about this trend?

In the traditional model of IT, the enterprise acquires and maintains a portfolio of slowly depreciating technology assets that may or may not be employed efficiently. Conversely, cloud enables the enterprise to manage computing much like electricity, buying only what it uses (no more and no less). Cloud service providers charge customers either on the subscription model or the utility model, one pays for what one uses. This means no pay upfront for expensive real estate, electricity, cooling equipment and physical security. This allows companies to reduce costs and to operate more flexibly than with a traditional IT infrastructure and thus can enable them to develop new business (ISACA, 2013).

There are numerous examples of companies using the cloud to expand capacity with little or no notice. For example, when Indianapolis Motor Speedway, home of the Indianapolis 500, streams IndyCar races live online, it causes a huge spike in web site traffic. The Speedway worked with a cloud service provider to mirror its web site and scale up as needed during the events (Amazon, 2009). This allows it to use only the servers it needs and save costs by monitoring servers remotely. Additional is it easier to allocate cloud computing cost since most cloud service provider's bill for each instance. This leads to better accountability. Cloud computing allows further to outsource competencies that are not core to the business like human resources with specific IT-skills, which are now bought in as a service (Gadia, 2009).

The agility of cloud is driving innovations in customers' products, services and processes. Sectors such as healthcare and financial services can connect customers and influencers within the business, to assess market needs and quickly translate this into new ideas and ultimately new products and services. Without the need to invest in infrastructure such as servers and data-centers, companies can now move faster and take more risks. Setting up a new division overseas, or entering into a new product area is faster and cheaper when the IT backbone already exists on the cloud (KPMG, 2013).

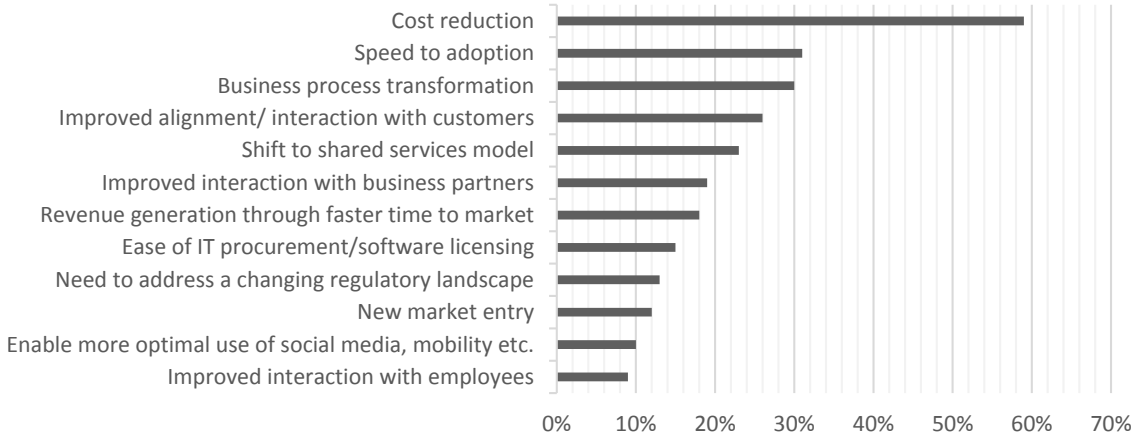

Figure 2-3: What are the main reasons for using cloud environments? (KPMG, 2013)

The KPMG's global survey (2013) showed that, when respondents were asked for the reason to use a cloud service, almost 6 out of 10 say that cost reduction is the main goal, as they seek to run and/or upgrade their IT infrastructure, email, servers and data storage more efficiently. Although only 43 percent believe they are aware of the cost of cloud vis-à-vis their existing IT services, and a similar proportion feel they do not fully understand cloud security, pricing models, integration with existing infrastructure and contractual arrangements such as SLAs (Service Level Agreements). Speed to adoption and business process transformation are the next two reasons, indicating that companies are not just looking for short-term efficiencies, but are also considering how cloud can change the way they run their entire business (see **Figure 2-3**).

But unfortunately the promising opportunities of this technology go hand-in-hand with certain risk arising from migrating and operating a business service following the new technological paradigm. One may think, for example, of failures of large cloud service providers such as the Amazon EC2 service in 2011, where customers could not access their data for days (BBC News, 2011), the Dropbox vulnerability that allowed users to access files of other users without authorization (Ducklin, 2011), or recent US National Security Agency (NSA) discussions (Owen, 2013). In the context of service migration to the cloud, such incidents indicate the importance of considering the spectrum of information security and data privacy risk and properly managing these. This is also reflected, among other things, in the KPMG's

global survey (2013), which states that the main concern over switching to cloud is losing control, an issue voiced by almost half of all respondents. As well, 39 percent say that data loss and privacy risks are a major worry. Another major challenge is integrating cloud with existing architecture (see **Figure 2-4**). As mentioned earlier, the costs of migrating to cloud are not insignificant, and customers need to be fully aware of all the implications. Organizations must keep information safe and secure to protect their customers, their business and their reputation. It should also be acknowledged in this regard that the risk profile for cloud migration itself is in a state of flux, as existing offerings are maturing and new offerings are emerging (Vohradsky, 2012).

Figure 2-4: Biggest concerns about adopting cloud services? (KPMG, 2013)

By most reports, cloud goes way beyond an emerging technology trend. What's actually happening is that the very manner in which companies conduct business is changing. A recent Forbes article states that "*Cloud computing is often referred to as a technology. However, it is actually a significant shift in the business and economic models for provisioning and consuming IT that can lead to significant cost savings*" (Jackson, 2011). Cloud computing has implications outside of the traditional IT landscape. The impact of cloud computing extends throughout the enterprise. Its impact, facilitates potential changes in enterprise culture and requires change in areas such as customer service, change management and vendor management (ISACA, 2013). For a company to consider cloud computing depends on the nature of the IT service, future growth expectations, the business's risk appetite, legal and regulatory compliance requirements, and cost. With all these factors to consider, it is essential that businesses carefully think through their IT service delivery strategy and prepare a business case that covers all of these factors. When it is time for a business to start evaluating service providers against its needs, transparency is a very important factor to consider, because cloud computing is much more than just buying IT hardware or software. It is about engaging a service that may be entrusted to manage critical assets and services, and there may be little day-to-day visibility of how this occurs (Speed, 2011).

For businesses to make right decisions regarding the adoption of cloud services, IT governance and risk managers need to work closely with business managers to promote understanding of key cloud computing principles and to help establish effective governance practices.

2.2.4 Business intelligence through Big Data

The World Economic Forum describes the personal information garnered by big data as "*the new 'oil'—a valuable resource of the 21st century*," (2011) and the analytics of this data as "*the new engine of economic and social value creation*" (2013).

In the past traditional business intelligence has generally targeted "structured data" that can be easily parsed and analysed. New technologies like cloud computing, which can scale up or down as needed and advances in analytics methods allow examination of more varied data types. This expands the possibilities how enterprises can derive value from existing data and allows enterprises to make better business decisions and increase competitive advantage (ISACA, 2014).

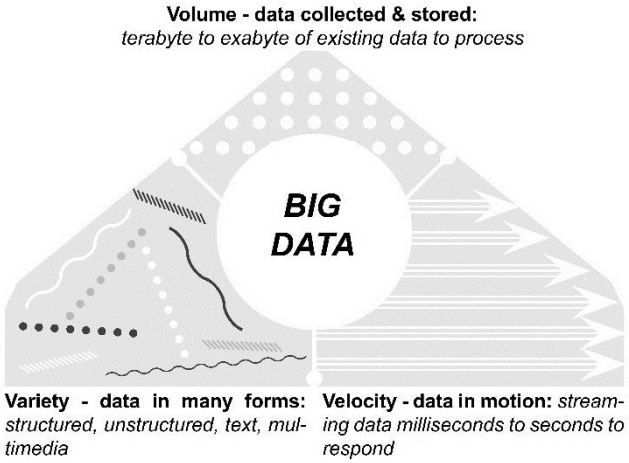

Figure 2-5: Big data´s three dimensions or characteristics (Laney, 2001)

The definition of big data was given for the first time in a paper by Doug Laney (2001). He defined big data as data sets with three aspects that introduce specific processing challenges: Volume, Velocity and Variety. "Velocity" is the speed at which data is created. "Variety" refers to the diverse data types being processed, which have changed from simple files and relational databases to audio, video, sensor information and "Volume" refers to the increasing variety and velocity. Today in just a single minute on the web 216,000 photos are shared on Instagram, a total of $83,000 sales take place on Amazon, 278,000 Tweets are send, there are 1.8 million likes on Facebook and three days' worth of video is uploaded to YouTube (Qmee, 2013). This presents very large data sets that are being produced at a tremendous speed by the growing digitization of the society and consists of data from all possible sources from structured to unstructured (see **Figure 2-5**).

The amount of data generated each day by technologies like mobile devices, social networks and real-time information is so huge that an exact quantification is quite impossible. What is known is that it is very “big” and the chain of information created by computers and then used by another set of computers continues to grow at an unprecedented and unimagined pace. Now the real challenge lies not in the availability, but in deriving useful knowledge from this very large amount of structured, unstructured and complex data (Riffat, 2014).

A study by the McKinsey Global Institute (2011) established that nowadays “data is as important to organizations as labour and capital”. The study concluded that if organizations can effectively capture, analyse, visualize, and apply big data insights to their business goals, they can differentiate themselves from their competitors and outperform them in terms of operational efficiency. The application and power of the concept seems unlimited. Expenditure patterns of any individual or section of individuals can be predicted, which allows that vehicle traffic on a road can be anticipated or election results in a democratic country can be forecasted (Mayer-Schonberger, 2013).

According to IDG Enterprise’s survey (2012), concerning the application of big data analysis, 59 percent of respondents want to improve the quality of decision-making, while 53 percent want to increase the speed of decision-making. Getting better planning and forecasting, and developing new products/services and revenue streams are goals of 47 percent of respondents. Keeping existing customers or acquiring new ones is a goal of 44 percent of those who took the survey.

However, what makes these improvements particularly compelling from a business perspective is that, like in retail or healthcare, the data already exist. During the normal course of business, many enterprises collect large volumes of data about their customers such as their habits, preferences, the specifics of individual transactions, etc. When analysed, these data allow enterprises to make changes and, subsequently, measure the performance of those changes (ISACA, 2014). This allows to have a more complete picture of customers, products, operations and competitors to drive innovation (new products and services), operational efficiencies, customer delight, increased revenue and low costs (Ernst & Young, 2013).

As was said in the introduction of this chapter, if initiatives aimed at giving an organization a competitive advantage and be of value, it is not enough to just collect and own the appropriate data sets. In fact, this is only the starting point of every big data initiative. As with any new technology trend, challenges are anticipated; in fact, 60% of IT executives interviewed during the 2012 IDG Enterprise big data research (2012) believe big data integration will be very/extremely challenging. The top challenge listings were: limited budget, legacy issues, security issues, development time and growing demand on storage capacity/infrastructure.

According to the IT Risk/Reward Barometer conducted by the professional association ISACA (2013) only 4 percent of IT professionals say their enterprises are very prepared to ensure effective governance and privacy of big data.

The financial, policy, and pragmatic details required to set up a big data project, are sometimes beyond the time constraints and expertise of many CIOs and their staff (Desouza, 2014). Most of the existing IT leader know technology but are not as well versed in big data technologies, because big data doesn't process like online transactional data does and it requires a different strategy for both storage and processing. This requires a level of strategic expertise, suitable analytical models, tools and organizational capabilities that IT departments haven't demanded before (Shacklett, 2012). In fact, the ISACA Risk/Reward Barometer (2013) found that lack of analytics capabilities or skills was the second most frequently cited obstacle to big data, chosen by 22% of respondents. This lack of knowledge or examples of actionable methods for initiating big data projects poses a significant challenge. Without analytics skills it’s hard to engender an analytics culture, and hard to influence and educate the senior leadership team about the potential of analytics. (ZDNet, 2013).

Furthermore, companies in all industries and all geographies are struggling with the massive volumes of data and increasingly complex compliance requirements. What data should be included and how should governance on big data be defined and delivered? (ISACA, 2013). Government regulations, standards, and policies are far behind in monitoring the development, usage, ethics, and management of big data and its products (Yan, 2013) and most organizations don´t have any established formal process of data management in place (Ernst & Young, 2013). Existing data lacks integrity and cannot be easily integrated across systems due to a lack of standardization in data definitions, and even if data could be integrated there are security and privacy considerations that need to be worked through. Moreover, at many enterprises information is spread across multiple isolated silos, repeated in redundant copies scattered throughout the company, and underutilized. These data is connected with particular organizational functions (i.e. sales, distribution etc.) in “function silos” rather than pooled for the benefit of the entire company. This can extend beyond the department level down to the level of individual employees and often implies a history of competitiveness, antagonism or resistance to outside influence, which will make them less willing to share information or act on information they receive. These cultural barriers can hinder open and collaborative exchange of important data elements and act as a barrier to adaptation (ISACA, 2014). Another culture issue may be that currently key decisions are more made on intuition than rigorous analysis of datasets, which requires to adopt a data-centric culture and to make decisions as data-driven as possible, instead of basing them on hunches and instinct (Brynjolfsson & McAfee, 2012).

While data enthusiasts see great potential for using big data, privacy advocates are worried as more and more data is collected about people, both knowingly and unknowingly (Yan, 2013). Most users have been unaware of the volume of personal data retained by entities for various purposes. This is beginning to change as awareness of the data privacy debate is increasing. Companies that in future intend to capitalize on this era of big data need to be conscious about these ethical concerns (Yu, 2014). Moreover, currently, each region (European Union, USA, etc.), government and enterprise handles privacy and data protection in a different way. This geopolitical impact, forces enterprises to reconsider the way they handle and protect the privacy of individuals and the information collected about them and how enterprises implement their cloud-based big data solutions (ISACA, 2013).

Regarding the adaption of cloud computing questions about the technological and organisational ecosystem need to be asked because investments made before readiness is fully achieved may be inefficient, suboptimal in terms of the results they produce or, as a worst case, represent needless expense. However, it is important to make it clear that, if an enterprise elects not to employ these techniques, there is a risk to the business, because competitors will capitalize on the opportunity. This result could have ramifications just as serious to the enterprise as a security or privacy breach implications (ISACA, 2014).

2.3 Moving from the back office to the front lines

"All industries in all geographies are being radically reshaped by digital disruption — a "digital dragon" that is potentially very powerful if tamed but a *destructive force if not. It's a CIO's dream come true, and also a career-changing leadership challenge"* (Gartner, 2014a).

Year 2000 and the dot.com bust brought the first area of enterprise IT with the focus on how IT could help do new "stuff" to an end. The last decade represented the second era of enterprise IT, the "industrialization" era of processes, services, standards and smart sourcing, making IT more reliable and professional, open and transparent, and treating the rest of the business as its internal customers with rigorous budget control. This area had little appetite for risk left and little to no room for innovation. Today, CIOs still face the challenge of the second era of enterprise IT, but are already in the beginning of a new, third "digitalization" area (see **Figure 2-6)**: moving from running IT like a business within a business, into a period characterized by deep innovation beyond process optimization, exploitation of a broader universe of digital technology and information, more-integrated business and IT innovation, and a need for much faster and more agile capability (Gartner, 2014a). To capitalize on this development, enterprises have to create a culture that, within reason encourages experimentation and exploration, because almost by definition, meaningful business innovation and differentiation require some level of risk taking (CIO/Redhat, 2014)

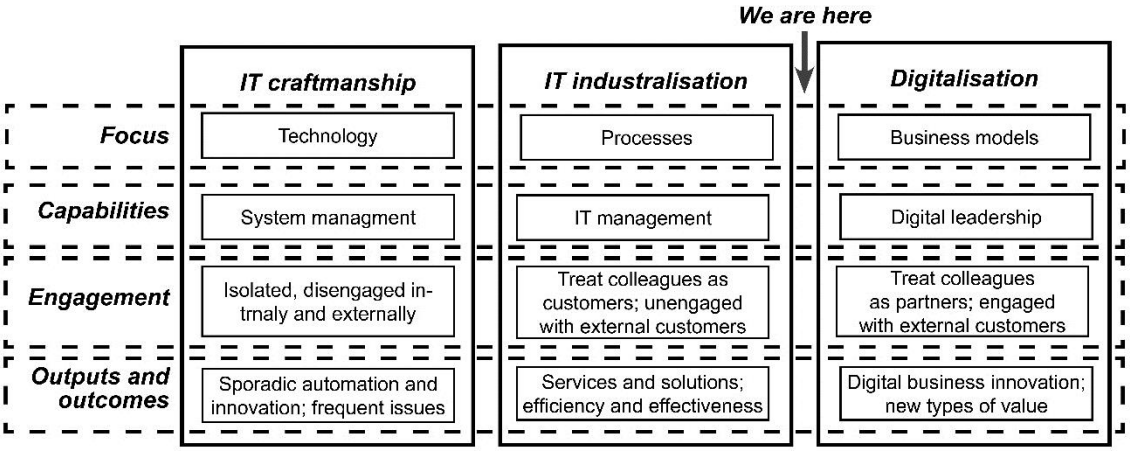

Figure 2-6: The beginning of the digitalization area (Gartner, 2014a)

According to Gartner's annual CIO Agenda survey (2014a), which represents the views of 2,339 CIOs across 77 countries, the respondents say that "*they often feel overwhelmed by the prospect of building digital leadership while, at the same time, renovating the core of IT infrastructure and capability for the digital future*". The survey found that 51 percent of CIOs are concerned that this change is coming faster than they can cope and 42 percent don't feel that they have the right skills and capabilities in place needed to face this future. The survey shows that CIOs are facing all the challenges they have for many years, plus a flood of digital opportunities and threats.

Most of the executive-level positions like the CEO, CFO and COO carry with them commonly understood responsibilities and powers. The CIO, position, by comparison, has been something of a cipher, with roles and responsibilities that vary considerably from organization to organization and with tactical demands that often overshadow more-strategic functions. They face a constantly changing landscape of opportunities, threats and job demands. On the IT side of the ledger, like described in the preceding sub-chapters, each technological advance confronts CIOs with a double-edged sword of risk and reward (CIO/Redhat, 2014).

It was much simpler in the earlier days, where IT departments worked primarily to make existing business practices more efficient and workers more productive. Today, by contrast, computing and communications technologies allow enterprises to create entirely new business processes and revenue streams that simply couldn't exist without IT advances. It is not clear any more where does "IT" end and "business" begin. IT's influence stretches into nearly every facet of the business, from human resource and finance right through to the supply chain and product development (Ernst & Young, 2014).

As enterprise and consumer technologies become more interoperable, scalable and pervasive, the line between strategic and operational applications continues to blur. Technologies like mobile computing are both customer-facing and operational in that they can lead to more efficient business processes and less employee downtime (The Economist, 2013). In

this mind-set, IT becomes not only a success factor for survival and prosperity, but also an opportunity to differentiate and achieve competitive advantage. These maturing disruptive technologies need to be embraced and should cause the CIOs to rethink their strategies and way of working. As a result, the role of the CIO in any organization continues to be demanding and requires solid technical skills, business insight, and exceptional communication skills to properly succeed (Smith, 2013).

For many years, CIOs have been talking about becoming a true partner to the business and the executive management team. Now the next era of enterprise IT is upon us and relatively few have broken out of their comfort zones to actually become one. Although CIOs are engaged in the execution aspects of the role, such as dealing with cost management and keeping the lights on, the facet of the development role is least often pursued by CIOs, which is to deliver transformation by introduce business model innovation (Ernst & Young, 2014). CIO often don´t have the budget to support and enable new business ideas, because funding for Innovation is very rare. Even so, many felt hindered by factors outside their control (CIO/Redhat, 2014).

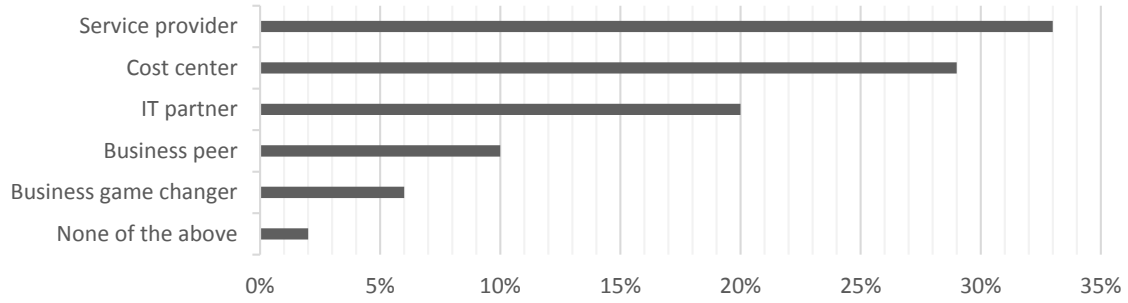

Figure 2-7: How would you characterize your company's current IT organization? (Harvard Business Review, 2014)

One of the reasons for this may be that today's IT departments still are not well positioned to support the innovation agenda. Too few CIOs are currently regarded as true members of the executive management team. This limits their potential for change. Many CIOs nowadays appear to be C-level in title only, but their rank is not necessarily reflected in how they are perceived in the leadership team (Ernst & Young, 2014). When the Harvard Business Review (2014) surveyed more than 400 business leaders around the world, the executives were asked to describe how their companies' business stakeholders[8] viewed the IT organization, only 10 percent said they were perceived to be "business peers" engaged in developing, not just enabling, business strategy. Even fewer of the business stakeholders, just 6 percent, were thought to perceive IT as a "business game changer" that serves as the primary driver of the enterprise's competitive future. Meanwhile, the IT respondents said that

[8] "Stakeholder" is used to indicate anyone who has either a responsibility for or an expectation from the enterprise's IT, e.g., shareholders, directors, executives, business and technology management, users, employees, governments, suppliers, customers and the public.

nearly 62% percent of the business stakeholders still consider the IT department to be merely a cost-center or service provider (see **Figure 2-7**).

During the survey, commissioned by Red Hat through CIO Strategic Marketing Services (2014) with 100 respondents at the IT director level (and above) the same question has been asked and the result were nearly identical. Judging from the survey results, many business executives and line-of- business units may not be doing everything they can to foster more-strategic relationships with their IT peers, when it comes to business and IT alignment. This constrained perception of IT was further evidenced in the assignment the survey respondents said they receive from line-of-business units. The top assignment, cited by 47 percent of the respondents, was “drive costs down” by contrast, “improve time to market”, a task that reflects the type of business benefits IT can deliver, was identified by just 26 percent of the respondents.

Also the report “The DNA of the CIO: opening the door to the C-suite” published by Ernst & Young (2014) describes that in a worrying number of businesses, the perception of IT still appears to be shaped by its role as “helpdesk”. Indeed, what is clear throughout this thesis is that the views of the rest of the leadership team often remain stuck in the past, when IT was simply a back-office function that operated the basement server center. Most leaders aim to keep any discussions with IT leaders focused on IT budgets, with few seeing this as a chance to engage in a wider discussion about the value of technology.

The CIOs interviewed during the Redhat/IDG survey (2014) believe it’s crucial to position the IT function at a high level within the enterprise and see significant potential where the can add value to the business. Many are keen to improve the weak or limited perception of IT within the business. They want to move away from being seen as a mere support function, and toward a stronger role as an innovative and transformative part of the business. As illustrated in **Figure 2-8**, the survey respondents have particularly high hopes for the business benefits of mobile technology and business intelligence and analytics.

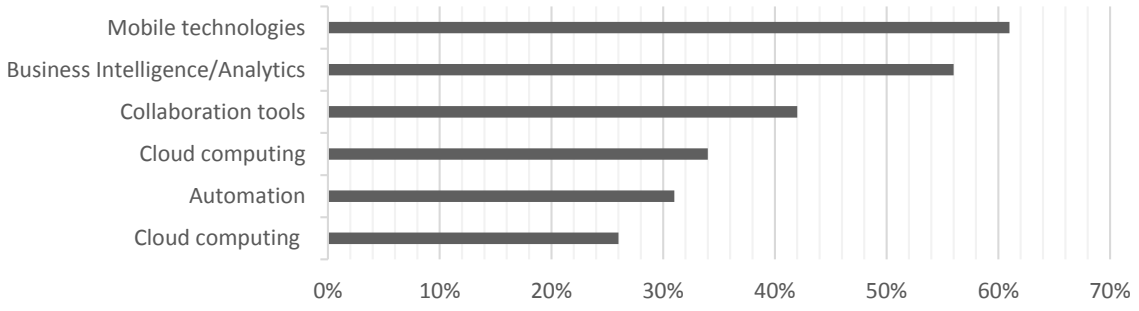

Figure 2-8: Top technologies that will help to differentiate the company (CIO/Redhat, 2014)

Given the chance, the surveyed IT executives believe they could be valuable contributors to business strategies. When asked where they would like to spend more time in the next 3

to 5 years, survey respondents indicated that they would like to identify opportunities for competitive differentiation, cultivate the IT- business partnership, drive business innovation, align IT initiatives with business goals, develop and refine business strategy. However, this list shows also the disconnect between the daily IT reality and the ideal, because the top desired role “identifying opportunities for competitive differentiation” wasn’t even among the top five current activities of the IT executives surveyed.

Another most recently conducted study by IBM (2013), which draws input from the 4,183 Executives showed how the IT function has developed in the last years and that CIOs expect to play a critical role in enabling their organizations strategic vision from now on, which can be seen in **Figure 2-9**.

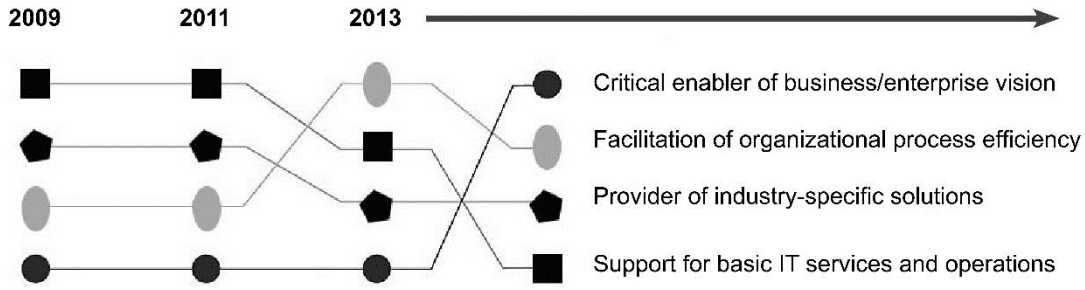

Figure 2-9: Shifting goals: CIOs aspire to play a much bigger role in enabling strategy (IBM, 2013)

But the IT leaders in the survey freely admit that a lot of ground needs to be covered before this will happen. Indeed, only two-thirds of CIOs think their IT departments have mastered the basics. And more than half say considerable room for improvement exists when it comes to performing more complex activities. “We need to anticipate the requirements of the business functions, help them understand how technology will impact them in the future and be efficient in managing change,” said one of the interviewed CIO´s from a European food producer (IBM, 2013).

This statement points out that CIOs who want to move into more strategic roles must adopt a “business first” mind-set and evaluate all technology in that light. They need to be IT leaders with tremendous business and technical skills, for example understanding security, cloud computing, social networking, virtualization, and business intelligence in addition to the “softer” skills like vendor and contract management, communication, financial management, and IT governance to be able to succeed in today’s complex environments and beyond (Smith, 2013).

A necessary first step in this process, is for IT executives to fully understand their company’s business operations and objectives. This requires regular and meaningful communications with business leaders and managers, which will help building the relationships and the trust necessary to truly raise IT’s strategic profile and impact (CIO/Redhat, 2014). With this in mind technology issues need to be discussed in terms of the business value they bring,

whether costs saved, revenues gained, customer satisfaction achieved or similar, rather than in terms of uptime, gigahertz and terabytes (Ernst & Young, 2014). IT executives need to help their business peers understand how technological innovations like cloud computing, smartphones, big data or some yet-to-emerge technology, can have a direct impact on productivity, efficiency, revenues and competitiveness (CIO/Redhat, 2014). In-depth interviews with 156 CIOs from a cross-section of major corporations conducted on that matter by the Economist Intelligence Unit (2013) confirmed the above-mentioned approach and revealed that the current inability to predict the costs and returns keep most CIOs from effectively adopting new technologies. In short, IT leaders have to be able to speak the same language as the people in the business to identify what's important and how to achieve it, and to get buy-in from the business units. However, it should be pointed out that it is still necessary and equally important to be honest about the pain and gain (IBM, 2013).

But who is the initiator for these types of projects? Doubtfully, the ideal model for this would be a collaborative process in which IT and business representatives jointly identify new projects and opportunities for innovation, but the Redhat/IDG survey (2014), shows that such a collaborative approach "always" happens just 16 percent of the time. Given the tight synergies and dependencies between business and IT, organizations would be wise to ensure that a significant majority of their IT project launches always involve a collaborative process.

Chapter 3: Overcome the obstacles

Through the analysis of the data collected in course of chapter 2 of this thesis, it has been highlighted that the current shift and focus in IT not only offers remarkable opportunities but goes hand in hand with challenges for the enterprises and in particular their leaders. The identified main obstacles are about the lack of:

- *business understanding and insight into IT*
- *alignment between business and IT*
- *evidence of the value derived from IT investments*
- *adequate risk management*

This following sub-chapters tackles now these issues and shows how the position of the IT organization in the enterprise can be readjusted to moving away from managing IT as a "cost" toward managing IT as an "asset" to create business value. For this purpose the identified obstacles will be discussed in detail and valuable information how to overcome them will be introduced.

3.1 Lack of business understanding and insight into IT

Each of the trends mentioned in chapter 2 are significant undertakings with major implications across the organization, which cannot be realized without proper involvement of the business. Although when it comes to emerging technology or the IT in general one of the biggest hurdles can be the missing support of the board members, executives or senior managers who are reluctant to engage with IT. This lack of committed and satisfied business sponsors for IT often relate to a lack of business understanding and insight into IT, a lack of IT visibility at the appropriate levels, a lack of management structures, or issues with board mandates, which is often caused by poor communication between the business and IT and the misunderstanding of the business and IT by the business sponsors. This indicates a Governance issue where communication between IT and the business needs to be improved and a common view on the role and value of IT needs to be established.

3.1.1 Create the appropriate environment

Alignment cannot happen without a direct and control environment. This kind of direction and control is provided by enterprise governance. Recent high-profile cases of corporate failure and fraud have brought enterprise governance back to the top of business and political agendas. Nevertheless more essential should be that the *McKinsey Global Survey* (2009) results confirm that governance programs do create shareholder value, which is the main goal for each enterprise (ISACA, 2012a).

In order to tackle each mentioned obstacles in the instruction of this chapter, IT governance should be, an integral part of enterprise governance. Since developing and maintaining a spot-on IT governance structure supports all the things governance is supposed to do: ensure alignment with business goals, ensure proper controls (e.g., change management, security), provide communications up and down the management chain, monitor progress, and manage risk (Brown & William A. Yarherry, 2009). In these regard the *ITGI survey report* (2009), found that IT governance practices and IT outcome are correlated. IT governance is more often found in organizations in which IT is a significant contributor to business. Furthermore, two years later another *ITGI survey report* (2011) found that IT governance supports many opportunities for firms to transition IT's role to a more proactive one.

Most of the literature to the topic of IT governance can be found around COBIT, a Business Framework for the Governance and Management of Enterprise IT developed by the independent, non-profit, global association ISACA (Information Systems Automation and Control Association), which is the most popular and according to the IIA (The Institute of Internal Auditors), one of the most commonly used IT governance frameworks to comply with Sarbanes-Oxley[9] (IIA, 2008).

3.1.2 Governance and Management of Enterprise IT

The origin of the term "IT governance" isn´t clearly defined, but the expression "Improving IT Governance" has been 2003 for the first time included and ranked in Gartner's Top Ten CIO Management Priorities (Van Grembergen & Haes, 2009). Governance enables IT to align with business objectives and maximize value from investment. The main objective is value creation and is achieved when the three underlying objectives: benefit realization, risk optimization and resource optimization are all balanced (ISACA, 2012a). The literature to COBIT 5 - the business framework for the governance and management of enterprise IT from ISACA (2012a) provides for better understanding a definition and clear distinction between governance and management:

- ***"****Governance ensures that stakeholder needs, conditions and options are evaluated to determine balanced, agreed-on enterprise objectives to be achieved; setting direction through prioritization and decision making; and monitoring performance and compliance against agreed-on direction and objectives"*

[9] The Sarbanes–Oxley Act of 2002 (Pub.L. 107–204, 116 Stat. 745, enacted July 30, 2002), also known as the 'Public Company Accounting Reform and Investor Protection Act' (in the Senate) and 'Corporate and Auditing Accountability and Responsibility Act' (in the House) and more commonly called Sarbanes–Oxley, Sarbox or SOX, is a United States federal law that set new or enhanced standards for all U.S. public company boards, management and public accounting firms.

- *"Management plans, builds, runs and monitors activities in alignment with the direction set by the governance body to achieve the enterprise objectives"*

The scope of IT governance involves setting objectives, providing direction and evaluating the performance of IT in relation to enterprise business objectives to ensure that current and future business goals/needs are supported at all times, while the scope of IT management involves translating strategy into action, and measuring reporting performance, as shown in **Figure 3-1**. In most enterprises, governance is the responsibility of the board of directors under the leadership of the chairperson whereas management is the responsibility of the executive management under the leadership of the CEO (ISACA, 2012a).

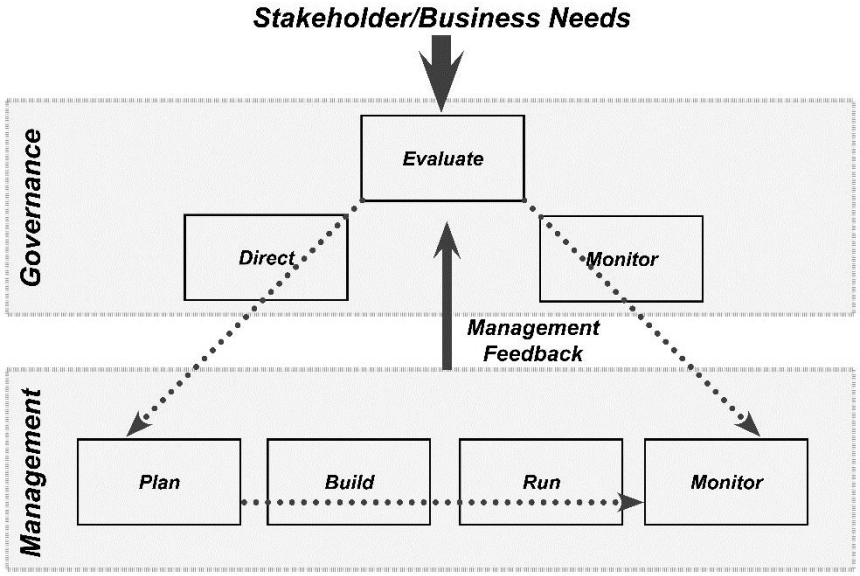

Figure 3-1: Governance and Management key areas (ISACA, 2012a)

Today IT governance is gaining importance, as management´s reliance on information provided by IT system has been increasing. Enterprises have to realize that the board and executives need to embrace IT like any other significant part of doing business. The *Global Status Report on Governance of Enterprise IT* (2011), states that the main driver for activities related to IT Governance is ensuring that IT functionality aligns with business needs, and the most commonly experienced outcomes are improvements in management of IT-related risk and communication and relationships between business and IT.

Therefore the IT strategy has to be an extension of the enterprise strategy and is required to be aligned with the enterprise´s overall business strategy. Each IT goal must be clearly assigned to an enterprise goal. Both business and IT functions must collaborate and work together, so that IT is included within the governance and management approach. To facilitate this IT governance has to provide the direction and control to help ensure that the significant investments made in IT bring value to the enterprise and IT's resources are used responsibly and its risks are mitigated (ISACA, 2014)

The *Global Status Report on Governance of Enterprise IT* (2011) further shows in this matter that most respondents (57 percent) indicated a lack of familiarity with any kind of standard or framework that they could use for assistance/guidance in governing IT. This is surprising given that a large number of frameworks, standards and best practices exist when it comes to “IT governance and management” (as shown in **Table 3-1**).

IT GOVERNANCE	
COBIT 5	*A business framework for the governance and management of enterprise IT*
ISO 38500	*Standard for corporate governance of IT*
IT MANAGEMENT	
CMMI	*Capability Maturity Model Integration (staged and continuous)*
EFQM	*European Foundation of Quality Management model*
ISO 27001 (ISO17799/BS7799)	*Standard for information security*
ISO 9000 (GB/T 19000)	*Standard for total quality management (TQM)*
ISO/IEC 20000	*Standard for IT service management*
ISO 31000:2009	*Risk Management Standard*
ISPL	*Information Services Procurement Library*
ITIL	*IT Infrastructure Library*
M_O_R	*Management of Risk*
MSP	*Managing Successful Programs*
PMBOK	*Project Management Body of Knowledge*
PRINCE2	*PRojects IN Changing Environments*
SIX SIGMA	*Six Sigma model for quality management*
TOGAF	*The Open Group Architecture Framework*
TQM	*Total quality management*
COBIT 5	*A business framework for the governance and management of enterprise IT*

Table 3-1: IT governance and management frameworks, standards and best practices

A framework is a generally accepted, business-process-oriented structure that establishes a common language (e.g., set of guidelines, policies) and enables repeatable business processes whereas a standard is a mandatory requirement, code of practice or specification approved by a recognized external standards organization, such as those issued by ISO (International Organization for Standardization). Also mentioned should be a “best practice”, which is a frequent or usual action performed as an application of knowledge (ISACA, 2014a). The special feature of the COBIT framework is that it aligns with the other relevant standards and frameworks at a high level, and thus can serve as the overarching framework for governance and management of enterprise IT (ISACA, 2012a).

The IT governance framework should be selected by management to ensure that the chosen framework represents the enterprise. But no matter how good a framework may be, it needs to be tailored and applied to a number of factors such as size, industry (type, growth status, practices and competitive landscape), and the enterprise´s organizational culture

and needs. Doing so will put the IT governance framework into context to the enterprise´s proprieties and support the achievement of business objectives unique to the enterprise. However, it should be noted that the analysis of the two areas (needs and culture) should be treated separately to ensure process integrity (ISACA, 2014a).

The direction for IT governance implementation should ideally come from the highest level of the enterprise (ideally form the board) to ensure sufficient support. The implementation challenge of a comprehensive governance and management system for enterprise IT is related to what is described in strategic management literature as the need for an organizational system, i.e., “the way a firm gets its people to work together to carry out the business” (De Wit & Myer, 2005). Any plan to significantly modify existing processes and behaviour should start with establishing a common desire to change or a “call to action,” which should be linked to current pain points to establish a sense of urgency (Kotter, 1996). The next step in establish IT governance is to define the requirements and objectives based on a review of current practices and processes. This review should help to fully understand the status quo, the enterprise as it exists currently, its mission objectives, vision, values, culture, management style and relevant regulations to establish a solid foundation (ITGI, 2003). These structures include organizational units and roles responsible for making IT decisions and for enabling contacts between business and IT management decision- making functions (e.g., IT steering committee). They can be seen as a blueprint for how the governance framework will be organized structurally. De Haes and Van Grembergen (2008, 2009) describe in this context that organizations should deploy IT Governance by using a holistic mixture of various structures, processes and relational mechanisms.

The COBIT 5 business framework for governance and management of enterprise IT builds on these insights and talks about “enablers” in its framework (as shown in **Table 3-2**). Enablers are defined as factors that, “individually and collectively, influence whether governance and management over enterprise IT will work” (ISACA, 2012a).

Enabler	***Description***
Principles, policies and frameworks	These are the vehicles to translate the desired strategy into practical guidance for day-to-day management.
Processes	Describe a set of practices and activities to achieve certain objectives and produce a set of outputs in support of achieving overall IT-related goals.
Organizational structures	These are the key decision-making entities in an enterprise.
Culture, ethics and behaviour	Belong to individuals and of the enterprise and are very often underestimated as a success factor in governance and management activities.
Information	Information is pervasive throughout any organization and includes all information produced and used by the enterprise. Information is required for keeping

	the organization running and well governed, but at the operational level, information is very often the key product of the enterprise itself.
Services, infrastructure and applications	They include the technology and applications that provide the enterprise with IT processing and services.
People, skills and competencies	They are required for successful completion of all activities and for making correct decisions and taking corrective actions.

Table 3-2: Governance enabler description (ISACA, 2012a)

Any enterprise must always consider an interconnected set of enablers. Each enabler needs the input of other enablers to be fully effective, e.g., processes need information, and organisational structures need skills and behaviour. Also reverse, every enabler delivers output to the benefit of other enablers, e.g., processes deliver information, skills and behaviour make processes efficient. Good decisions can be taken only when this systemic nature of governance and management arrangements is taken into account. This means that to deal with any stakeholder need, all interrelated enablers have to be analysed for relevance and addressed if required. A mind-set, which has to be driven by the top of the enterprise (ISACA, 2012a).

When then the business strategy is properly aligned with IT services as part of IT governance, the result is higher productivity and greater ability to respond to business requests. From the board and executive management viewpoint, the overall objective of IT Governance is to understand the issues and the strategic importance of IT so that the enterprise can sustain its operations and implement the strategies required to extend its activities into the future (ITGI, 2003).

Further major benefits to an enterprise implementing IT governance (ISACA, 2014):

- Reducing inefficient use of resources
- Providing the process for aligning IT investments with business strategy
- Helping to effectively prioritize requests form business units competing for resources
- Reducing redundancy within the project and application portfolios
- Minimizing business losses, reputational damage and a weakened competition position
- Reducing the failure of IT to bring the innovation and benefits the promised

3.1.3 Who should lead the effort?

It fundamental to realize that business value from IT investments cannot be realized by the IT function and will always be created by the business through its use of IT. The CGEIT Review Manual states to this that "*no business value will be created when IT delivers a new customer relationship management application on time, on budget and to specification, if*

the business has not made the necessary changes to the business model, business processes, organizational structure, people competencies, and the reward system required to effectively integrate the new IT system into its business operations". The literature of Thorp (2003) and De Haes & Grembergen (2008) points out that IT-enabled investments should therefore always be treated as business programs, composed of a collection of business and IT projects delivering all the capabilities required to create and sustain business value. This shows the need for the business to take ownership of, and be accountable for, governing the use of IT in creating value from IT-enabled business investments. It also implies that a crucial shift in the minds of the business and IT is necessary, moving away from managing IT as a "cost" toward managing IT as an "asset" to create business value. As Weill and Ross describe in their book titled IT Savvy: What Top Executives Must Know to Go from Pain to Gain (2009): "If senior managers do not accept accountability for IT, the company will inevitable throw its IT money to multiple tactical initiatives with no clear impact on the organizational capabilities. IT becomes a liability instead of a strategic asset."

Lack of accountability and commitment increases the risk in the enterprise that IT is failing to meet objectives and furthermore any kind of process improvement effort is unlikely to become normal practices without a management structure that assigns roles and responsibilities, commits to their continued operation, and monitor conformance. The optimal tool to answers the question "Who is getting the task done?" and "Who accounts for the success of the task?" is the responsibility assignment matrix (PMI, 2010), also known as RACI matrix (Jacka & Keller, 2009). It illustrates who is Responsible, Accountable, Consulted and Informed within an organizational framework.

3.1.4 Facilitate effective communication

Communication will improve if the business views the technology provider not as a simple enabler, but as a valued business partner, and if IT presents benefits in a language that the business understands. Therefore to facilitate effective communication, a common language is required and a balance must be found between the business trying to understand IT and IT trying to understand the business (ISACA, 2014).

An effective method of continuously promoting the value of IT across the enterprise is to distribute periodic bulletins form the IT department. Such an in-house bulletin from the IT department, published and circulated within the enterprise, can give the IT department the opportunity to communicate directly with stakeholders. Bulleting will also help the IT department inform stakeholders about enterprise wide IT initiatives and seek their buy-in, which will bring support for implementing such initiatives. The UK National Computing Centre (2005), has created in this regard a list of key messages that need to be communicated, based on three primary IT governance objectives and the related benefits that can be realized (see **Table 3-3**).

Ability to Address These Objectives	*Will Realize These Benefits*
IT and Business Strategic and Operational Alignment	***ROI Stakeholder Value, Transparency and Accountability***
• IT and business working toward the same corporate goals	*• Shareholder value*
• Architecture and other technology approaches seen as relevant and value adding to the business	*• Leveraging investments for greatest return*
	• Better use of IT capabilities
Effective Relationship Management (Internal and External)	***Opportunities and Partnerships***
• Mutual understanding of goals	*• Increased synergies*
• Shared language and terminology	*• Improved speed to market*
• Working in partnership—equal investment and responsibility	*• Improved efficiencies, particularly with third parties*
• Clear accountabilities	*• Agility to respond to change*
Management Control/Quality Management	***Performance Improvement***
• Standardized processes	*• Risk mitigation*
• Consistent approaches	*• Continuous efficiency and quality improvements*
• Comparison/adoption of external best practices (e.g., ISO, CMMI, COBIT, ITIL)	*• Increased assurance that controls are working*
• Professional IT services	*• Transparency and confidence about measures*
• Management of risks	

Table 3-3: Key communication messages (UK National Computing Centre, 2005)

Obviously, effective communication requires to consider the audience's needs, communication preferences and level of knowledge of the subject at hand. Additional in instances where data is shared, constant coordination, communication, and feedback is necessary to ensure mission success. Communication about milestones, inefficiencies, pain and gain in a language that all sides understand will help business and IT get a better understanding of the requirements. It is important to moving away from the silo mentality and to see the company as a whole and not individual departments. Where necessary there must to be changes in the corporate culture initiated to make technology more apprehensible, so that more and more parts of the enterprise are recognizing the power of collective action (Desouza, 2014).

3.2 Lack of alignment between Business and IT

IT-enabled changes are frequently failing to meet business needs and delivered late or over budget. In the end business is frustrated with failed initiatives, rising IT costs and a perception of low business value of IT. This is usually the result of missing alignment between business and IT. This strategic alignment is a multifaceted and complex endeavour, often referred to as the alignment challenge (ITGI, 2003). The accelerating pace of business change on the one hand, and the exploding rate of technology innovation on the other, is making it increasingly difficult for IT Leaders to align business and IT strategies - one might

almost say it is never completely achieved, because enterprise goals change too quickly, but it is nevertheless a worthwhile ambition, because an inability to solve this endeavour threatens IT's relevance within the enterprise (Oracle, 2013).

The statement that IT Leaders must align more closely with the needs of the business has both heard and preached for more than a decade, as can be seen in the summary "Top 10 IT Management Concerns" list from 2003 to 2011 (see **Table 3-4**).

IT MANAGEMENT CONCERNS	2011	2010	2009	2008	2007	2006	2005	2004	2003
IT AND BUSINESS ALIGNMENT	1	3	2	1	2	1	1	1	1
BUSINESS AGILITY AND SPEED TO MARKET	2	2	3	13	17	7		5	7
BUSINESS PROCESS RE-ENGINEERING	3	5	4	18	15	11	5	10	10
BUSINESS PRODUCTIVITY & COST REDUCTION	4	1	1	7	4				
IT STRATEGIC PLANNING	5	6	7	3	8	4	4	4	2
IT RELIABILITY AND EFFICIENCY	6	4	6	8					
ENTERPRISE ARCHITECTURE	7	13	11	11	33	15	15	9	8
SECURITY AND PRIVACY	8	9	9	8	6	3	2	3	3
REVENUE-GENERATING IT INNOVATIONS	9	7	8	17					
IT COST REDUCTION	10	8	5	7	4				

Table 3-4: Top 10 IT Management concerns from 2003-2011[10] (Luftman & Ben-Zvi, 2011)

While some good practices do exist within many enterprises to maximize alignment, the IT Governance Institute (2005b) identified in a global survey on alignment that there are a number of concerns including:

- Almost 50 percent of the entities responding to the survey did not have a formalized governance structure designed to ensure IT and business alignment.
- The responsibility for IT strategy is often delegated to management below the board level. In particular, fewer than 25 percent of entities engage board members directly in the IT strategy-setting process.

According to Gartner (2013) it will in future become increasingly difficult to face the alignment challenge and states further in this matter "How technology will support growth and results is a fundamental question. It is no longer sufficient to tend the IT "garden" and declare success. Digital technologies provide a platform to achieve results, but only if CIOs adopt new roles and behaviours to hunt for digital value".

Already in 1998, Weill and Broadbent (1998) dealt with this topic and described a number of obstacles that organizations are facing while aligning business with IT:

Challenges arise from the organization's strategic context and from senior management behaviour, including lack of direction in business strategy. This results in insufficient understanding of and commitment to the organization's strategic focus by operational management. Further barriers can arise from circumstances around the organization's IT strategy,

[10] Cells with blank data indicate that the issue was not asked in the survey or not selected.

such as lack of IT involvement in strategy development and business and IT management conducting two independent monologues, which results in a situation in which business and IT strategies are set in isolation and are not adequately related. Also the nature of the organization's current IT portfolio creates implementation barriers, which arise when there are technical, political or financial constraints on the current infrastructure.

3.2.1 Strategic Alignment Model

Henderson and Venkatraman (1993) were the first to clearly describe the interrelationship between business strategies and IT strategies. The concept of their invented Strategic Alignment Model is based on two building blocks: strategic fit and functional integration, which is based on the definition that business and IT alignment is the fit and integration among business strategy, IT strategy, business structures and IT structures (**Figure 3.2**).

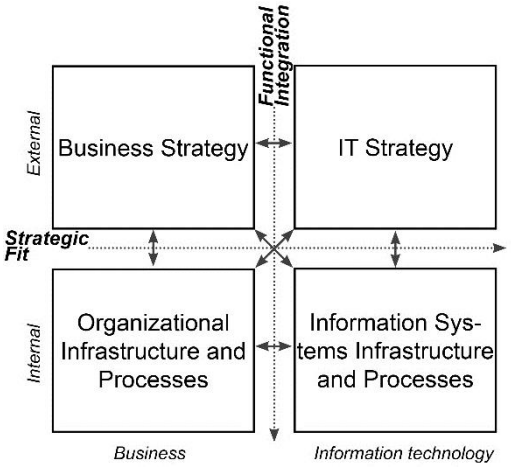

Figure 3-2: Strategic Alignment Model (Henderson & Venkatraman, 1993)

- Strategic fit describes how the firm is positioned in the IT marketplace (IT strategy in terms of an external domain) and how the IT infrastructure should be configured and managed (IT strategy in terms of an internal domain). Strategic fit is equally relevant in the business domain.
- For the functional integration exist two types: strategic and operational. The functional integration is the link between business strategy and IT strategy reflecting the external components that are important for many companies as IT emerges as a source of strategic advantage. Whereas the operational integration covers the internal domain and deals with the link between organizational infrastructure and processes and IT infrastructure and processes alignment.

Henderson and Venkatraman (1993) argue that the external and the internal domain are equally important. A point, which cannot be stressed enough, because the fact that historically IT has been looked at as a support function that was less essential to the business, makes the authors warn of the problems that may surface when initiatives are undertaken without taking care of the balance of all the four domains. This balance has to work in all

direction. If we take for example a case where only the external issues from IT strategy and business strategy are considered, there will be a serious underestimation of the importance of internal issues, such as the possible need for the redesign of key business processes.

These linkages may not be obvious or well-known, but making the link between relevant best practices and enterprise business strategy, and then being able to convince stakeholders of their adoption, will facilitate strategic alignment, since convinced stakeholders will sponsor and facilitate the changes necessary (ISACA, 2014a).

3.2.2 Set and communicate alignment

In aligning IT strategy with business strategy, it is important that the strategy is endorsed by all relevant parties and can be broken down into manageable parts, each with a clear business case incorporating a plan for achieving outcomes and realizing benefits through clear expectations and measurement (further details on measures are discussed in chapter 3.3.3). Awareness of the strategic role of IT at a top management level needs to be created and sustained, by clarifying the role that IT should play: utility vs. enabler. The focus has to be set, for example to use IT to break into new markets, drive competitive strategies, increase overall revenue generation, improve customer satisfaction and/or assure customer retention (ITGI, 2003).

Joe Stenzel (2007) also addresses these topics in his book “CIO Best Practices—Enabling Strategic Value With Information Technology” and is recommending activities to undertake when setting alignment and selling the value proposition of the IT strategy to key stakeholders. Stenzel findings point out that that when setting direction and crafting approaches to implement enterprise wide improvements through IT investments, it is crucial to tie these initiatives to the organizational mission, vision and strategy. Therefore, it is important for practitioners to understand why the IT strategy is important and how the IT strategy can be linked to the enterprise strategy by leveraging a variety of techniques and methods like the SWOT Analysis, BCG Matrix, Porter’s five forces model, Porter’s value chain model, McKinsey 7S Framework or the McFarlan matrix. Of particular importance here is here to mention the IT BSC (Balance Sore Card), which is referred by the IT Governance Institute (2003) as one of the most effective means to aid board and management in achieving IT and business alignment and is a best practice for performance measurement and alignment - this method is described in more details in chapter 3.3.3.

Stenzel (2007) finding further state that securing feedback and participation are both integral elements of strategy execution, because there is a need for active cooperation and participation of different people, all of whom probably have slightly different agendas. The CIO has to listen to people’s responses and makes adjustments to IT strategy when necessary. It must be remembered in this context that the business goal usually remains steady over a two- to four-year period, but the way to reach that goal can change as the situation

unfolds. In this way stakeholders will buy in and become supporters of the strategy when they know that what they have to say is being heard. While the communication must take place enterprise wide, there is a need for the CIO to focus a special level of explanation and training on the small subset of people building or using the systems. With such people, the CIO moves beyond communicating the strategy and is listening to feedback, while explaining the details of the tactics being used and why those tactics can deliver success, and making sure that people get the training they need so they can perform the tasks that the tactics demand of them. If the CIO handles the communication, explanation and training phases effectively, he or she will generate more opportunities to secure commitment and participation, leading to a more open decision-making process. One of the CIO's role is to make sure that timely and accurate information is available and that people get a chance to examine it, ask questions and voice their opinions. On the other hand is the CIO's role to ask questions that focus people's attention on the important issues. When the CIO acts as a participatory leader, consensus decisions usually emerge that combine the collective wisdom of the entire management team.

Practices, which support alignment throughout the enterprise are policies and procedures, which reflect management guidance and direction in developing controls over information systems, related resources and information system department processes. Policies are high-level documents that represent the corporate philosophy of an organization. Whereas procedures are derived from the parent policy and are designed to achieve the intent of the policy statement. To be effective they must be clear, concise and be written in a clear and concise manner so they may be easily and properly understood by those governed by them. Generally, procedures are more dynamic than their respective parent policies, because they must reflect the regular changes in business focus and environment. Therefore, frequent reviews and updates of procedures are essential to ensure continuous relevance and alignment with the respective policies (ISACA, 2014a).

3.2.3 Manage Innovation in alignment with the need of the stakeholders

Obviously, an important element of future orientation should be the innovation commissioned by IT to support its business customers. Clearly, this requires that IT organizations have their "eyes wide open" to trends in information technology and services. And it requires as well, an IT organization with the ability to deliver against innovation opportunities and ensure that the benefit from the innovation really solve business needs. However a common complaint is that IT's role is that of a support function, whereas there is a requirement for innovation capabilities to provide a competitive edge. These are symptoms that may point to a lack of true bidirectional alignment between business and IT, which could be due to communication issues or suboptimal business involvement in IT decision making. The consideration of the technological direction to adopt is a key in preparing IT to be an agile

enabler for the business. This is especially important for strategic alignment and must be addressed in the context of the role of IT in the future of the business (ISACA, 2014).

The global consulting firm Booz & Company annually comes out with a list of 1000 global innovators. Trying to distinguish what matters when it comes to innovation, Booz (2013) refers to an enterprise's system of capabilities. Their studies consistently show that innovation investments in select capabilities, tools, talent, and culture which are tightly aligned with a business's strategy are what drive sustained success. The human elements of the enterprise, if properly motivated, are those that are capable of learning, changing, innovating and providing creative thrust and ensuring the long-term survival of the enterprise. Human capital can be regarded as the prime asset of an enterprise, and businesses need to invest in that asset to ensure their survival and growth (ISACA, 2014).

Additional there is a whole new set of digital tools available today. More recent tools, such as big data and social media are focused on generating deep customer insights to help create more compelling products. While some of these are still pretty new, they are beginning to prove their value in multiple industries. It's still a risk to invest in them, but the Booz study (2013) found that respondents whose companies made significant use of these digital enablers, were much more likely to report that they outperformed competitors than those who employed enablers more moderately.

The recommendations of the experts of the ISACA publication "COBIT 5: Enabling Processes" (2012), regarding the Innovation process suggest that it is important to maintain an awareness of information technology and related service trends, identify innovation opportunities, and plan how to benefit from innovation in relation to business needs. Further, it has to be analysed what opportunities for business innovation or improvement can be created by emerging technologies, services or IT-enabled business innovation, as well as through existing established technologies and by business and IT process innovation. The next step is to create an optimal environment by providing an infrastructure that can be an enabler for innovation, such as collaboration tools for enhancing work between geographic locations and divisions. It is also important to start or maintain relevant Human Resource initiatives, such as innovation recognition and reward programmes, appropriate job rotation, and discretionary time for experimentation. A collection of talented people are necessary to increase the chances of success of any project. However, collecting talented individuals without aligning them with the business and project objectives or not having proper accountability and appreciation of the business value of activities makes it difficult to success in the company mission. Good governance facilitates this process of collecting and retaining enough talented people in the right proportion. In this regard an effective Human Resource strategy has to be aligned with the needs of line managers and employees as well as those

of the enterprise and its other stakeholders. Furthermore the enterprise culture should encourage innovation ideas from customers, suppliers and business partners. Therefore practices should be in place, so that staff is able to submit innovation ideas and an appropriate decision-making structure is created to assess and take these ideas forward. IT has to work with relevant stakeholders to understand their challenges and maintain at the same time an adequate understanding of enterprise strategy and the competitive environment or other constraints so that opportunities enabled by new technologies can be identified. Systematic monitoring and scanning of the enterprise's external environment needs to be performed to identify emerging technologies that have the potential to create value (e.g., by realising the enterprise strategy, optimising costs, avoiding obsolescence, and better enabling enterprise and IT processes). This means monitoring the marketplace, competitive landscape, industry sectors, and legal and regulatory trends for emerging technologies or innovation ideas in the enterprise context. After emerging technologies and/or other interesting IT innovation suggestions have been identified, they need to be analysed together with the related stakeholders to validate the assumptions. Subsequently proof-of-concept initiatives should be evaluated and monitored. If favourable, recommendations for further initiatives have to be generated and stakeholder support gained. Finally, monitoring of the implementation and use of emerging technologies and innovations during integration, adoption for the full economic life cycle is required to ensure that the promised benefits are realised and to identify lessons learned.

3.2.4 Focus on the appropriate IT investments

IT investments represent a profound challenge within many enterprises. There are no other investments within a company that occupy such a large and growing expenditure and, at the same time, lack disciplined management, processes and performance measurements. A majority of enterprises are aggressively inspecting the amount of investment allocated to IT in an effort to cut costs, achieve economies of scale and drive shareholder value to get more and do more with less. Most of the time the primary focus on IT investments is on short- term projects and priorities with near-term benefits, delaying and, in many cases, eliminating long-term strategic investments that are crucial for the growth and transformation of the enterprise (ISACA, 2014).

Surveys in this regards are consistently revealing that 20 to 70 percent of large-scale investments in IT-enabled business change are wasted, challenged or fail to bring a return to the enterprise. Some references that provide validation of this are:

- A 2002 Gartner survey found that 20 percent of all expenditures on IT is wasted—a finding that represents, on a global basis, an annual destruction of value totalling about US $600 billion (Huber, 2002) .

- A 2004 IBM survey of Fortune 1000 CIOs found that, on average, CIOs believe that 40 percent of all IT spending brought no return to their enterprise (Watters, 2004).
- A 2006 study conducted by The Standish Group found that only 35 percent of all IT projects succeeded while the remainder (65 percent) were either challenged or failed (Cook, 2007).

ISACA's global surveys (2006, 2008) support these findings. The survey measurements of costs and value show that ineffective or immature value governance practices seem to be the cause for the fact that less than eight percent of the IT budget is actually spent on initiatives that create value for the enterprise (Butler Group, 2005).

This shows the clear reason, why no investment, whether IT-related or not, should be undertaken without full knowledge of the expected cost and the anticipated return.

Ensuring that the right projects are approved in the first place implies a need for accurate predictive costing of the total project across its lifetime and robust predictions of the potential return, including quantification of the direct and indirect benefits (ITGI, 2005c). Optimizing these investments requires the ability to evaluate and compare them, objectively select those with the highest potential to create value, and manage all of the investments to maximize value (ISACA, 2008).

This is the duty of the Portfolio management, which has to make sure that the enterprise's overall portfolio of IT-enabled investments is aligned with, and contributes optimal value to, the enterprise's strategic objectives. Given the unpredictability nature of a portfolio of IT-related business projects, it is essential to embed active portfolio management into the organisation to maximise value creation and minimise the risk of value destruction (ISACA, 2014a). This includes establishing and managing resource profiles, defining investment thresholds, evaluating, prioritizing and selecting, deferring or rejecting new investments and monitoring and reporting on portfolio performance (ISACA, 2008). To maximize the return at the enterprise level, various techniques can be helpful, such as preparation of formalized, consistent business cases, use of hurdle rates and application of metrics such as internal rate of return (IRR), net present value (NPV) and payback period (ITGI, 2005c).

Depending on the type of IT investment made, the anticipated returns will vary. In this regards, the IT Governance Institute states in there publication "Optimising Value Creation From IT Investments" (ITGI, 2005d) the need of having a form of categorization scheme for IT investments, with the purpose to provide a greater ability to construct and monitor a balanced portfolio of IT investments. A healthy, growing enterprise will have investments in all categories. A proper mix is essential to ensure that risk is understood and managed, growth is encouraged and focus continues to be placed on essential "keeping the lights on" activities as well as the longer-term strategic investments. This enables a better ability to define risk and return targets for investments, because expected return should always be

related to risk as, given the higher likelihood of failure. For example, it is probable that a strategic investment will carry a higher risk and, therefore, an expectation of higher return than an informational investment, which will almost certainly be low-risk and will, therefore, be undertaken with an expectation of a lower return. Below are two examples of typical categorization classifications suggested by different industry experts:

A model developed in the early 2000s by Louis Boyle at Meta Group, and in increasing use by advisers as Gartner and McKinsey, offers a business-oriented way to categorize IT-related spending or investment at a high level (Hunter & Westerman, 2009):

- **Run the business:** This is the spending necessary to maintain existing operations at the existing level, including initiatives to observe regulatory compliance.
- **Grow the business:** Examples of this category include the spending necessary to provide additional automation to improve efficiency or the consolidation of data centers to reduce costs and increase competitiveness.
- **Transform the business:** This is the spending associated with the introduction of new areas of business, the expansion into new markets or any other radical transformation project designed to lead to significantly enhanced revenues and profits.

The second examples, introduced by Peter Weill of the Massachusetts Institute of Technology Center for Information Systems Research (CISR) suggested the following four-part categorization (Weill & Broadbent, 1998):

- **Transactional investments:** These investments provide the IT to process the basic, repetitive transactions of the business, e.g., mortgage processing, claims processing or account management. Their main purposes are to increase efficiency and reduce costs.
- **Informational investments:** These investments provide the information systems for managing and controlling the enterprise. Investments in this category typically include systems for management and financial control, decision making, planning, communication and accounting.
- **Strategic investments:** These investments are usually designed to add real value to the business by increasing competitive advantage, enabling entry into new markets, or otherwise increasing or enhancing revenue streams. Examples include a new system to support an Internet-enabled banking initiative or a cable-TV-enabled insurance marketing channel.
- **Infrastructure investments:** Investments in infrastructure can be costly and of long duration, but they may not, in themselves, generate any directly quantifiable financial benefits, although the business applications that depend upon the infrastructure will

benefit. Examples include implementation of a new or upgraded systems management product or the implementation of a new operating system.

There are clear similarities across these classifications as well as different nuances within each. Each enterprise must select and adopt the categorization scheme that is most relevant to them.

As with any aspect of IT governance, to be successful, the portfolio management process needs visibility, leadership and commitment from the top. However, it must be keep in mind that realizing value from IT-enabled investments requires most of the time more than delivering IT solutions and services, it also requires changes to the nature of the business itself, business processes, skills and competencies and organization, all of which must be included in the business case for the investment (ISACA, 2014a).

3.2.5 The Business Case as plan- and operational tool

According to Maes, Haes, & Grembergen (2014) a business case is a formal investment document that includes a structured overview of relevant investment information and provides a justification to support well-founded decision making. It further represents a valuable tool for decision making on investment matters, both prior to and after initiating an investment, is often captured as a document or presentation, and it is heavily promoted by the Val IT framework (ISACA, 2008), COBIT framework (ISACA, 2012a) and the Certified in the Governance of Enterprise IT framework (ISACA, 2014). Expert literature recognises that using a well-developed business case throughout the investment life cycle can increase the investment success (Swanton & Draper, 2010), (Ward, Daniel, & Peppard, 2008).

The recent research from the University of Antwerp Management School (UAMS) clearly positioned the entire portfolio management process, including business case development, as one of the key practices for achieving better alignment between business and IT and, by extension, business value (De Haes & Grembergen, 2008). However, a lot of enterprises generally still fail at developing or using complete and comprehensive business cases especially when it comes to IT. A 2006 Cranfield University School of Management study (Ward J. , 2006) found that most respondents develop business cases for most investments involving IT, but they are not satisfied with the business case development process, the identification and structuring of benefits and with the evaluation and review of results. Especially shocking is that more than one third of the respondents admitted that benefits claims were exaggerated to get the business cases approved, which is totally not part of the idea and purpose of a proper business case.

Many business cases are weakly developed or gather dust after the investment has formally been approved (ISACA, 2012) and are seen as a necessary evil or a bureaucratic hurdle to

get over to obtain required financial and other resources. The focus is only on the technology project, and the costs of the technology, with only a brief discussion of benefits or changes that the business might need to make to create or sustain value from the use of the technology. Business cases are also all too often treated as “one-off” documents that are rarely looked at again once the required resources have been obtained.

This approach to business cases can cause challenges down the road. A well-developed and intelligently used business case for a business change program is actually one of the most valuable tools available to manage and report on IT investments. This understanding is of primary importance for all management levels across both the business and IT parts of the enterprise, from the CEO and the C-suite to those directly involved in and responsible for the selection, procurement, development, implementation, deployment and benefits realization processes. The business case should be developed from a strategic perspective, from the top down, starting with a clear understanding of the desired business outcomes and progressing to a detailed description of critical tasks and milestones as well as key roles and responsibilities. As an essential starting point, organisations need to spend sufficient time and resources to understand what the investment is about and what they want to realise. The inclusion of relevant stakeholders, their active involvement and formal confirmation can be considered a critical ingredient to achieving a successful outcome. In summary it can be said that the quality of the business case and the processes involved in its creation and use throughout the economic life cycle of an investment has an enormous impact on creating and sustaining value. “*It describes a proposed journey from initial ideas to realizing expected outcomes for beneficiaries (i.e., those whose money is being invested and for whom the return should be secured) and other affected stakeholders*” (ISACA, 2010).

According to ISACA´s *Val IT Framework* (ISACA, 2008) an IT business case consists of the major input resources as well as the three work streams driving the outcome. These work streams include delivering technical capabilities (e.g., a customer relationship management application), operational capabilities (e.g., users have access to complete customer information) and business capabilities (e.g., information is used to support cross-selling). Each of these work streams needs to be documented with data to support the investment decision and portfolio management processes, like initiatives, costs, risk, assumptions, outcomes and metrics.

Like already mentioned above it is fundamental to be aware that the business case is not a static document, just for initial commitment of resources, but for managing the investment through its full economic life cycle. This makes the business case a dynamic operational tool that must be continually updated to reflect the current reality so as to provide the basis for informed decision making. Based on the “Four Acres” as described by John Thorp in his

book “The Information Paradox—Realizing the Business Benefits of Information Technology” (2003) the business case must include answers to the following relevant, current and accurate business-focused questions (**Figure 3-5**):

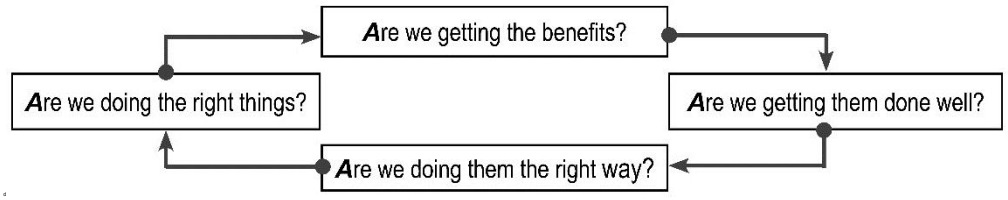

Figure 3-3: The “Four Acres” (Thorp, 2003)

- **Are we doing the right things? -** What is proposed? For what business outcome? How do the projects within the program contribute?
- **Are we doing them the right way? -** How will it be done? What is being done to ensure that it will fit with other current or future capabilities?
- **Are we getting them done well? -** What is the plan for doing the work? What resources and funds are needed?
- **Are we getting the benefits? -** How will the benefits be delivered? What is the value of the program?

The study related to the Val IT framework states that the ongoing management through the full economic life cycle is where most enterprises cut corners. Therefore the managing of the investment will be considered closed after completing the activities in the program plan and delivering the required business and IT capabilities. However, in general, the benefits and the expected value, as set in the business case, will not be realized until some later time, long after the delivery of IT and business capabilities. It is only then that the program and, subsequently, the business case will have proven that they delivered the expected benefits (ISACA, 2010).

3.3 Lack of evidence of the value derived from IT investments

Investments in IT are growing extensively, and cost of the IT department is perceived as ever-increasing. The business asks if they have get back from IT what was promised and how their IT performs compared to their competition. Without clear evidence of the value derived from the expenses the business will always see the IT organization as cost-center and wonder if any of the expected benefits might have been realized. Furthermore they want prove that their IT organisation is implementing its strategy in line with the business strategy and if they are willing to invest, they like to know what they will get back if they would spend extra funds on IT.

Most organizations are not able to answer these above-mentioned question, because their IT investments focus on the implementation of technology not on the realization of expected business benefits. Consequently, benefits are not seen as realized, despite projects being

considered a technical success (Peppard, Ward, & Daniel, 2007). However, no IT investment should ever be just about technology, because IT has no inherent value. Just having technology does not confer any benefits or create value (Carr, 2003). Unlike many other assets, such as real estate, the value of technology is not in its possession. In fact without proper benefit realization, all it does is incur cost (Soh & Markus, 1995).

3.3.1 Focus on benefits realization

A focus on benefits realization helps to overcome these above mentioned obstacles by actively managing investments across their full economic life cycle, from proposal to profit or improved service performance. Benefits realization ensures that intermediate benefits, such as improvements in customer service contributes to business benefits (e.g., additional profits). Benefits realization further ensures that the realization of business benefits is unfolding at levels of return, sufficient enough to value the resources being expended to achieve the benefits. On the contrary, "*in the absence of effective benefits realization, optimal value will not be created, or, worse, value may be eroded or destroyed*" (ISACA, 2008) plus there is no chance to learn from past performance to optimize the organization.

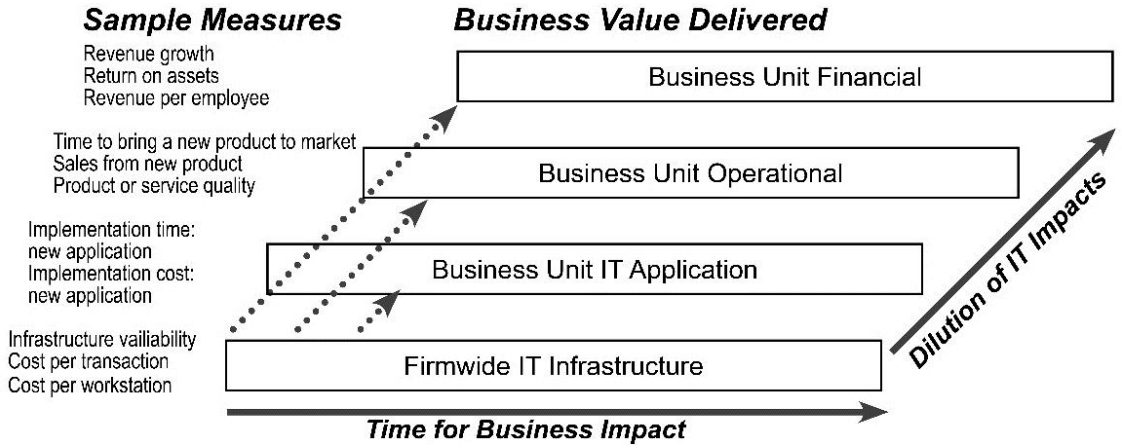

Figure 3-4: Business value hierarchy (Weill & Broadbent, 1998)

In this regard, measuring IT performance should be a key concern of both business and IT executives because it demonstrates the effectiveness and added business value of IT. Traditional financially-oriented cost-benefit performance methods such as return on investment (ROI), net present value (NPV) or internal rate of return (IRR) capture only the financial worth of IT projects and systems, but fall short in capturing the total value add of any IT-enabled investment, because they reflect only the tangible part of the value that can be delivered by IT. However most of the time IT generate intangible benefits such as better customer service. Furthermore, different levels of management and users perceive the value of IT differently, which is described by Weill and Broadbent (1998) in this context as the "business value hierarchy," as seen in **Figure 3-4.** This illustration shows that only very successful investments in IT have a positive impact on all levels, whereas less successful

investments are not strong enough to impact the higher levels and consequently influence only the lower levels. This dilution means that measuring the impact of an IT investment is much easier at the bottom of the hierarchy than at the top.

3.3.2 Nonfinancially-oriented Cost-Benefit Analyse

Emphasis on intangible factors in the evaluation of IT-enabled investments should be a part of any complete Cost-benefit analysis, because there is a need to look beyond cost savings in evaluating IT benefits. The approach attempts to deal with two problems: the difficulty of quantifying the value of benefits that do not directly accrue to the investor in the project and the difficulty of identifying the benefits or costs which do not have an obvious market value or price, like intangible factors (ISACA, 2014). Below are two examples for quantifying the benefit suggested and used by different industry experts like the Office of Management and Budget (OMB) and the Federal Enterprise Architecture Project Management Office (FEAPMO):

- **Organizational flexibility**: Ram Kumar wrote already 1999 in his article "*Understanding the Business Value of Information Systems: A Flexible-Based Perspective*" that investments in information technology can result in improved organizational flexibility and that this is one way of understanding the business value of IT. The concept of flexibility is operationalized using the ideas of stimulus, response and ease of response (time, cost, scope). When combined with Michael Porter's value chain model, in which each part of the value chain is thought of as consisting of multiple processes, it is argued that areas may be identified where flexibility may add value to enterprises. Examples of IT-driven organizational flexibility are presented in distinct areas of the value chain (logistics, operations, marketing and sales) as well as across different areas of the value chain. Among the advantages of this approach is that organizational flexibility may be viewed as a source of competitive advantage and that IT-enabled investments can add significant business value by enhancing organizational flexibility.
- **Information economics**: Parker and Benson (1988) are the developers of the information economics model, which is a composite Cost-benefit analysis technique, tailored to cope with the particular intangibles and uncertainties found in information systems projects. It is driven by the notion that information has economic value and is a system of weights and measures that quantifies intangible benefits and ranks proposed projects by their expected contribution to business objectives (intangibles and risk factors associated with the IT-enabled investment). Surrogate measures are also often used for most intangible and risk factors that are hard to estimate. A related technique is value linking, which involves assessment of benefits achieved in other departments in calculating the contribution of IT.

3.3.3 Deliver the evidence

The purpose of performance measurement is to deliver the evidence by uncovering, communicating and evolving organizational performance drivers. The choice of measures communicates to stakeholders what is important, and this affects what gets done. Choosing measures that answer critical management questions improves management's visibility into key processes.

Likewise great care has to be taken, when designing the IT performance reports. They have to be concise, easy to understand and tailored to various management needs and audiences. Executive managers, in particular, often require data presentations and displays that focus on bottom-line performance results. When presented in this manner, they can quickly digest information, focus on problem areas, seek relevant follow-up data and be more efficient in making or recommending project or program decisions (ISACA, 2014).

The IT Governance Institute (2003) promotes the IT Balance Score Card (BSC) as one of the most effective means to communicate with the board of directors about the business value of IT. This recommendation is supported by De Haes and Van Grembergen (2005) and testimonials of several executives in their literature, such as:

"The Balanced Scorecard gives a balanced view of the total value delivery of IT to the business. It provides a snapshot of where your IT organization is at a certain point in time. Most executives, like me, do not have the time to drill down into the large amount of information", Vice president of an insurance organization (Van Grembergen, Saull, & Haes, 2003).

The original Balance Score Card concept, was initially developed on the enterprise level by Harvard University professors Robert Kaplan and David Norton (1996) and is a performance management system based on four fundamental perspectives (financial, customer, internal business process and learning and growth) that enables businesses to drive strategies based on measurement and follow-up. The idea behind these perspective is that the evaluation of an enterprise should not be restricted to the traditional financial measures, but should be supplemented with a mission, objectives and measures regarding customer satisfaction, internal processes, and the ability to innovate and prepare for the future. By applying a series of specific objectives, measures, targets and initiatives to each perspective, this "balanced" method allows management to plan and evaluate a range of important organizational areas with a single approach. By using the Balance Score Card, managers rely on more than short-term financial measures as indicators of the enterprise's performance. They also take into account intangible items, such as level of customer satisfaction, streamlining of internal functions, and creation of operational efficiencies and development of staff skills. This unique and more holistic view of business operations contributes to linking long-

term strategic objectives with short-term actions. "*At the heart of these score cards is management information supplied by relevant stakeholders and supported by a sustainable reporting system*" (ITGI, 2005c).

To apply this best practice to the IT function, the four perspectives of the generic BSC have been adapted by Van Grembergen and Van Bruggen (1997) accordingly, as can be seen in **Figure 3-5**.

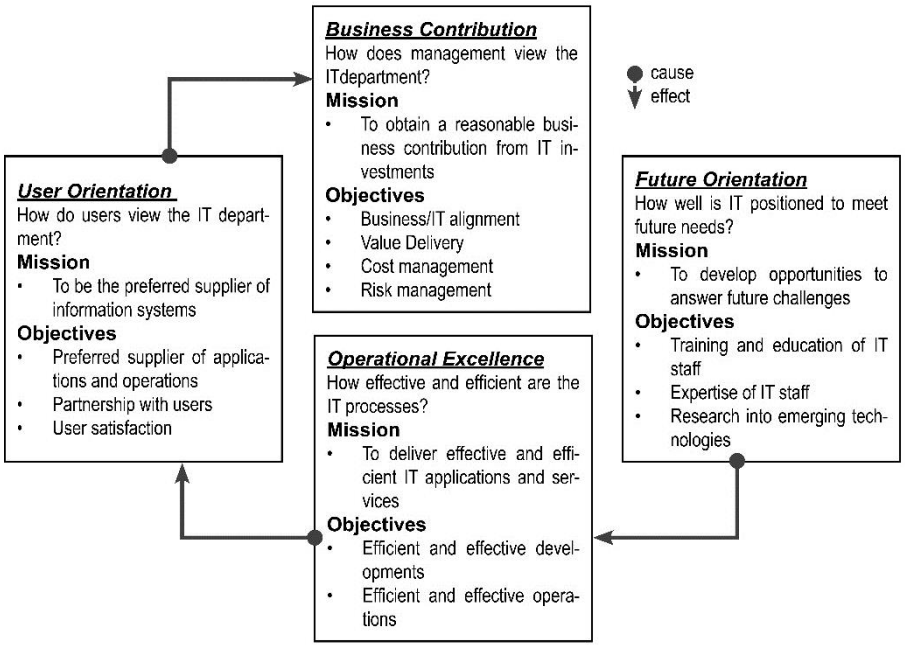

Figure 3-5: Generic IT Balanced Scorecard (ITGI, 2005c)

- **The user orientation perspective** represents the user evaluation of IT. How do users view the IT department?
- **The operational excellence perspective** represents the IT processes employed to develop and deliver the applications. How effective and efficient are the IT processes?
- **The future orientation perspective** represents the human and technology resources needed by IT to deliver its services over time. How well is IT positioned to meet future needs?
- **The Business contribution perspective** captures the business value created from the IT investments. How do business executives view the IT department?

The aim of these adaption is to establish a vehicle for management reporting to the board, to foster consensus among key stakeholders about IT's strategic aims, to demonstrate the effectiveness and added value of IT and to communicate about IT's performance, risk and capabilities (ITGI, 2003).

The "Measuring and Demonstrating the Value of IT" publication of the IT Governance Institute (2005) stresses that each of the Balance Score Card perspectives must be translated

into corresponding metrics and measures that assess the current situation. A cause-and-effect relationships between measures are essential components of the IT Balance Score Card, and these relationships are articulated by two types of measures:

- **Outcome measures** such as programmers' productivity, need performance drivers, such as IT staff education, to communicate how the outcomes are to be achieved.
- **Performance drivers** need outcome measures to ensure a way to determine whether the chosen strategy is effective.

These cause-and-effect relationships of these measures must be defined throughout the entire scorecard. As an example, more and better education of IT staff (future orientation) is an enabler (performance driver) for a better quality of developed systems (operational excellence perspective) that in turn is an enabler for increased user satisfaction (user perspective) that eventually will lead to higher business value of IT (business contribution). By defining these measures for each strategic project, the enterprise will be in a position to measure the actual success of the project in terms of meeting business needs expressed in performance parameter or numbers (ITGI, 2005c).
The relationship between IT and business can be more explicitly expressed through a cascade of BSCs.

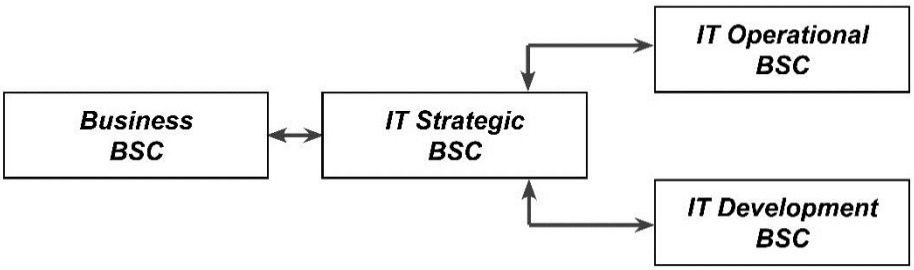

Figure 3-6: Cascade of Scorecards (ITGI, 2005c)

In the example in **Figure 3-6**, the IT development BSC and the IT operational BSC are both enablers of the IT strategic BSC, which in turn is the enabler of the business BSC. This cascade of scorecards becomes a linked set of measures that are required to achieve the alignment of IT and business strategy and to show how business value is created through IT (ISACA, 2014).

3.3.4 Requirements for measures

"*Measures build a common results language among all decision makers, because selected measures define what is important to an enterprise, what it holds itself accountable for, how it defines success and how it structures its improvement efforts*" (ISACA, 2014).

As stated in the previous sub-chapter measures and performance information need to be linked to strategic management processes and function. Historically, IT has never lacked in the measurement area. In fact, many IT organizations usually measure far too many things

that have little or no value, but if there are too many measures, enterprises may become too intent on measurement and lose focus on improving results. In terms of defining what to measure, performance metrics should concentrate on a few vital, meaningful indicators that are economical, quantitative and usable for the desired result. A guiding principle is to measure that which matters most (TSO, 2011).

Periodic feedback to employees, customers and stakeholders about the quality, quantity, cost and timeliness of products and services are among the typical required measurement information. This information can then be used as input to resource allocation and planning, early warning indicator of problems and to review the effectiveness of corrective action. Furthermore this helps enterprises to prepare for future conditions that are likely to impact program and support function operations and the demands for products and services, such as decreasing personnel or financial resources or changes in work load (ISACA, 2014).

3.4 Lack of adequate Risk Management

"Risk is defined as the possibility of an event occurring that will have an impact on the achievement of objectives, and it is typically measured in terms of likelihood and impact." (ISACA, 2009b). While risk management is not new and risk taking is an everyday part of managing an enterprise, the necessary focus and recognition of risk management on the part of business management seems to be lacking when it comes to information risk management or IT risk management (ISACA, 2014).

Emerging technologies can offer the possibility of high rewards (opportunities for benefit - upside), but can also bring the potential for high risk (threats to success - downside). Much of the risk associated with the current technology trends does overlap and can to some extent already be found in enterprises today, example are risks concerning security and privacy, managing third-party service providers, data management, data & technology, regulatory and compliance. Effectively managing these risks is essential to an enterprise's success. If left unmanaged, the uncertainty can spread, but if managed effectively, losses can be avoided and benefits obtained (ISACA, 2009b).

According to a global survey conducted by Deloitte (2013), the major trends mentioned in chapter 2 can at the same time mapped to the top four technologies threats for enterprise´s business models. In America data mining and analytics is viewed as the top technology enabler/disrupter, while in Europe, the Middle East and Africa the top focus is on social media. In Asia, social media and mobile applications tie for the top spot. Other technologies such as data mining and analytics, mobile and cybersecurity are also having a major impact. It should be emphasised in this regards, that risk can also be incurred either through adoption or non- adoption of new technologies. Executives must weigh the technical and operational risk against the business risk that is associated with failure to adopt. If an enterprise

chooses not to invest while its competitors do, this equates to an overall decrease in enterprise competitiveness (ISACA, 2014).

The ISACA *CGEIT Review Manual* (2014) states that understanding opportunity and risk, and capitalizing on them, calls for a CIO to know the difference between a smart, calculated risk and a foolish gamble. "*A smart, calculated risk is an action that is not a certain success, but one that has potential to deliver extraordinary rewards compared to the risk taken. A foolish gamble is one that delivers a small reward at the cost of risk bearing dire consequences.*" CIOs need to clearly understand the potential upside of a project in comparison to the magnitude of its downside, because practically every business decision requires executives and managers to balance risk and reward. Significant incidents related to IT-related business risk, such as data loss or project failure are often the tip of the iceberg and the impacts can be worsened if they receive public and/or media attention.

3.4.1 IT Risk is Business Risk

It is important to understand that IT risk is not purely a technical issue. The US National Institute of Standards and Technology states in its *Risk Management Guide* (NIST, 2012) in this regard that the principal goal of an organisation's risk management process should be to protect the organisation and its ability to perform its mission, not just its IT assets. Therefore, the risk management process should not be treated primarily as a technical function carried out by the IT experts who operate and manage the IT system, but as an essential management function of the organisation.

ISACA´s *Risk IT Framework* (2009b) states further that while IT experts are needed to understand and manage the aspects of IT risk, business management is the most important stakeholder. Business managers determine what IT needs to do, to support their business and set the targets for IT. They should be therefore accountable for managing the associated risk. However, practice has shown that the IT function and IT risk are often not well understood by enterprise's key stakeholders, including board members and executive management. Although these are the very people who should be accountable for risk management within the enterprise. Without a clear understanding of the IT function and IT risk, senior executives have no frame of reference for prioritizing and managing IT risk. For most of them IT risk is only known as technology risk and information security issue as subgroup of operational risk (ISACA, 2014). However, even strategic risk can have an IT component to it, especially where IT is the key enabler of new business initiatives. For these reason it is better not to assign IT risk to one of the other risk categories, but instead display IT risk as a component of the overall risk universe of the enterprise as shown in **Figure 3-7** (ITGI, 2005a).

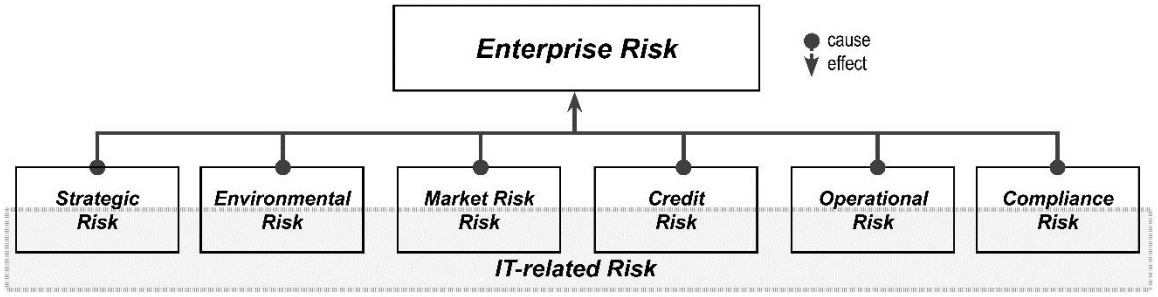

Figure 3-7: IT Risk is Business Risk

This illustration reveals clear that IT risk should be seen as business risk or to be more precisely, the business risk associated with the use, ownership, operation, involvement, influence and adoption of IT within an enterprise. Therefore, to enable effective governance, IT risk should always be expressed in a business context rather than in the technical language. Furthermore executives should also be aware that an effective risk management framework belongs to a cost optimization strategy, because the sooner a risk is identified and managed, the more favourable the cost or the benefit (ISACA, 2009b).

The MIT Center for Information Systems Research (CISR) promotes in this regards three core disciplines, which together build an effective Enterprise Risk Management capability (Westerman, 2004):

- **Risk governance process:** Complete and effective risk-related policies, combined with a mature, consistent process to identify, assess, prioritize and monitor risk over time
- **Risk-aware culture:** Skilled people who know how to identify and assess threats and implement effective risk mitigation
- **Effective IT foundation**: IT infrastructure and applications that have inherently lower risk because they are well architected and well managed

This is the conclusion reached after interviews carried out with more than 50 IT managers. Another important finding as result of the research is that if an enterprise is seriously lacking in one of the three disciplines, it cannot be effective at IT risk management at all. No level of governance process or expertise can overcome a complex, overly risky IT foundation and on the other hand heavy risk governance alone cannot be effective without the expertise to identify and reduce risk. However, enterprises don´t have to be world-class in all three disciplines, to be world-class in one, can sometimes already be enough, if the other two disciplines have lower but still acceptable capacity levels.

These statements are also confirmed by an *ISACA governance report* (ITGI, 2008), from the cross-reference of the questions, "*How would you rate your organization's maturity level on IT governance?*" and "*How important is IT risk management to your organization?*", where it is evident that the maturity of IT governance and how serious IT risk management

is handled, follows a linear evolution. This means that the higher the organization's governance maturity level is, the more the importance of IT risk management is recognized.

This context shows that it is important to align/integrate IT risk management approaches into the overall Enterprise Risk Management approach, which provides the foundations and organizational arrangements that will embed it throughout the enterprise, at all levels. This ensures that management has a process in place to both set objectives and align the objectives with the enterprise's mission or vision (ISACA, CGEIT Review Manual, 2014). In the professional field, frameworks do exist that provide guidance on this matter, as can be seen in **Table 3-5**.

framework/standard	*description*
The Risk IT Framework	- intended to help implement IT governance and enhance IT-related risk management
COSO ERM Framework	- usable by management to evaluate and improve organizations' enterprise risk management
ISO 31000-series	- the ISO 31000 is a family of standards related to risk management
M_o_R Framework	- offers a structured and effective framework for risk management
ISO/IEC 27000-series	- best practice recommendations on information security management, risk and controls

Table 3-5: Risk frameworks and standards

Once such a risk management framework is in place, a common method can be used across the whole enterprise to bring different risk disciplines and functions into a consolidated and consistent approach (**Figure 3-8)**. This will allow that the strategy for managing risk can be led from the top of the organization (board-level sponsorship), while be embedded in the normal working routines and activities of the organization and being able to fit into the corporate culture of the business (ISACA, 2009b).

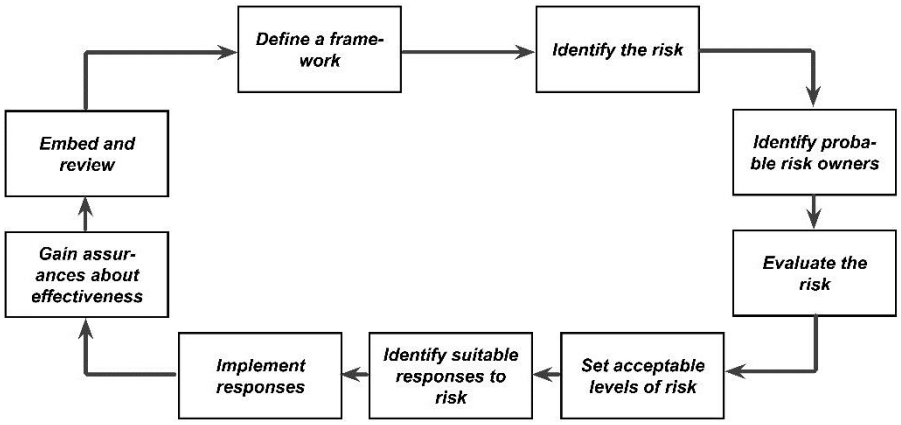

Figure 3-8: OGC framework for managing risk (OGC, 2010)

3.4.2 Risk appetite and tolerance

Before defining the risk management strategy risk appetite and risk tolerance needs to be set. These concepts are frequently used and have a high potential for misunderstanding. Some use the concepts interchangeably, others see a clear difference. According to the Committee of Sponsoring Organizations of the Treadway Commission COSO Enterprise

Risk Management (2004) definitions, which are equivalent to International Organization for Standardization ISO 31000 (2009b) definitions:

- Risk appetite is the broad-based amount of risk a company or other entity is willing to accept in pursuit of its mission or vision.
- Risk tolerance is the acceptable variation relative to the achievement of an objective and often best measured in the same units as those used to measure the related objective

The level of risk appetite and tolerance are different across enterprises even if they are in the same industry or of the same size. They vary depending on management´s culture (e.g., cautious or aggressive) and the amount of risk that internal stakeholders are willing to accept (e.g., financial loss, reputation damage) in relation to business objectives, which involves the attitude of the enterprise and sets the basic for how risk is viewed and addressed by an enterprise, including risk management philosophy, integrity and ethical values, and the environment in which the operate (ISACA, 2014).

Risk appetite and risk tolerance should be approved by senior management and has to be reflected in policies set by the executives so that it is clearly communicated to all stakeholders. Further a process should be in place to review and approve any exceptions to such standards (ITGI, 2005a).

It is essential to defining risk appetite at the enterprise level. Once this is done all projects can be evaluated by reference to this level. This helps the approval process and periodization of projects with varying acceptable risk levels and sets the overall tone of enterprise governance as well as IT governance within the enterprise levels (ISACA, 2009b). In this way, when evaluating how to comply with for example a new privacy regulation (e.g., in the context of a BYOD initiative), the enterprise should consider first it´s Risk appetite and tolerance. For better illustration the risk appetite can then be displayed via risk maps. Different bands of risk significance are defined and indicated in the illustration by zones on the risk map, as shown in **Figure 3-9**.

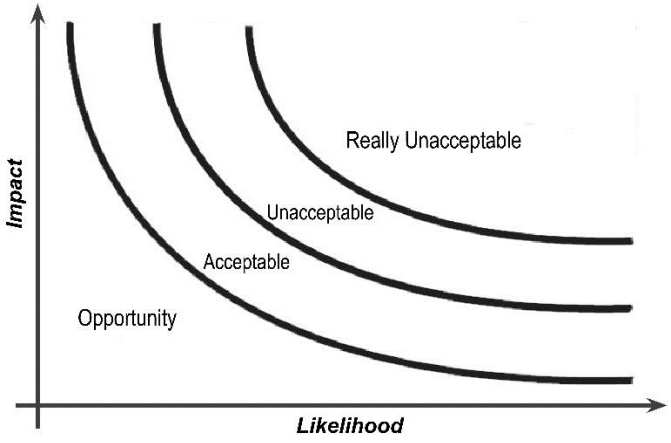

Figure 3-9: Risk appetite scheme (ISACA, 2012)

Risk above acceptable risk appetite requires, as a matter of policy, mitigation or another adequate response to be defined within certain time boundaries. Acceptable risk indicates normal acceptable levels of risk, usually with no special action required except for maintaining the current controls or other responses. Opportunity indicates very low risk, where (cost) saving opportunities may be found by decreasing the degree of control, or where opportunities for assuming more risk might arise. Every organization must define their own risk appetite levels and review them on a regular basis, because new technology, new organizational structures, new market conditions, new business strategy and many other factors require to reassess the risk portfolio at regular intervals, so that they are in line with the overall risk culture that the organization wants to express (ISACA, 2012).

At lower (tactical) levels of the organization, or in some entities of the organization, exceptions can be tolerated (or different thresholds defined) as long as the overall exposure at the enterprise level does not exceed the set risk appetite (ISACA, 2009b). In this way management has the option to exceed risk tolerance levels and pursue new opportunities, because organizations where policies are “written in stone” could lack the agility and innovation to exploit new business opportunities.

There is no universal good or wrong, regarding the determination of risk appetite and tolerance. For example, when the IT organization blocks all social media web sites from their staff members at work, blocks access to personal e-mail, doesn´t allow online shopping during business hours and doesn´t support or allow personal devices on their networks, the business and IT leader have to be aware that they sacrificed opportunities for both professional and business growth for the sake of firm control. This is a decision, which has to be made in the wider context of the enterprise environment/industry, because it can be that these kind of controls are required and necessary (e.g., bank industry regulations) and the downside is a calculated risk. What´s important is that it needs to be defined at the enterprise level, well understood and communicated (e.g., policies, procedures, awareness training). Such strong corporate messages about levels of risk tolerance to managers in each part of the enterprise ensure that they are able to use this information when risk is assessed and managed (ISACA, 2014).

3.4.3 Risk response selection and prioritization

The purpose of adopting risk response strategies is to minimize residual risk to an acceptable level and bring risk in line with the defined risk tolerance for the enterprise after due risk analysis. Which states clear that risk appetite and tolerance are key considerations in developing risk mitigation strategies for an enterprise and need to be set as first step (ITGI, 2005a).

Risk mitigation is the management of risk through the use of countermeasures and controls. This is not a one-time effort rather, it is part of the risk management process cycle. When risk analysis, after weighing risk vs. potential return, has shown that risk is not aligned with the defined risk tolerance levels, a response is required. This response can be any of the four possible responses, which are explained with examples in the following section: risk avoidance, risk reduction/mitigation, risk sharing/transfer or risk acceptance (ITGI, 2005a).

If for example an enterprise has identified a risk with a high likelihood and high impact effecting a critical IT process, risk transfer is generally not eligible option. Risk transfer is the process of assigning risk to another enterprise, usually through the purchase of an insurance coverage for IT-related incidents or by outsourcing part of the IT activities or sharing IT project risk with the provider through fixed price arrangements or shared investment arrangements.

Also risk avoidance, which is the process for systematically avoiding risk, such as not engaging in a specific activity is not an option. This applies only for non-critical processes where no other risk response is adequate. This means that there is no other cost-effective response that can succeed in reducing the likelihood and magnitude below the defined thresholds for risk appetite or the risk cannot be shared or transferred. Some IT-related examples of risk avoidance may include relocating a data center away from a region with significant natural hazards or declining to engage in a very large project when the business case shows a notable risk of failure.

Another option which can be excluded is risk acceptance, which would mean that no action is taken relative to a particular risk, and loss is accepted when it occurs. This doesn´t mean that risk is ignored. This means the risk is known and an informed decision has been made by management to accept it as such, because a particular risk is assessed to be extremely rare but very important (catastrophic), and insurance premiums are prohibitive. Such option should be accepted only by business management (and business process owners), in collaboration with and supported by IT, and be communicated to senior management and the board.

Finally the fourth and last option risk mitigation is for this example the most appropriate risk response. The objective of risk reduction is to reduce the residual risk to levels below the enterprise´s risk tolerance level. Reduction means that action is taken so the risk can be detected, followed by actions to reduce the likelihood or impact of a risk, or both. A good example for this in the context of the thesis is the statement of an IBM chief information security officer during the development of an Enterprise Social Computing Strategy: *“Given the reality that many employees will use social media with or without support from Intel IT, we realized that we could mitigate the risks by providing them with internal social computing tools and by guiding their use of external tools”* (Intel, 2009).

This situation is also a good example to demonstrate that any risk response requires resources to implement and maintain. This is the reason why minimizing risk or keeping risk at the lowest level at all costs is not available or a good business practice. Risk has to be managed, mitigated and reduced according to risk likelihood and impact. At the previous example, the fact that it referred to a critical process made mitigation absolutely necessary, but at times the cost of mitigation outweigh the risk likelihood and impact objective, the enterprise may choose to accept the risk and take no action.

But what action should a risk management group consider for an identified “low risk”? Simple remove the processes from the scope of future risk assessment, because it is not worth mentioning may hurt the enterprise if the risk turns out to be getting higher over time. By not reporting these areas the risk management group will depriving senior management and/or the board of vital information on which they may wish to provide direction such as exploring the opportunity offered by low-risk processes. Also simple accept the risk and log risk acceptance in the risk register is not enough because this could become an opportunity lost, if no action is taken. The right thing to do, would be to flag them as potential opportunities to reduce cost or increase value, because they may present opportunities which needs to be explored. For example, cost-saving opportunities could be found by decreasing the degree of controls (e.g., BYOD), or opportunities for assuming more risk might rise.

Complementary to the examples mentioned above the COBIT Framework (2012a) provides a useful overview with a list of parameter, which have to be taken into account when making the selection for the optimal risk response option (**Table 3-6**):

response parameter	***description***
• *cost of the response*	for risk transfer: cost of the insurance premium for risk reduction: cost (capital expense, salaries, consulting) to implement control measures
• *importance of the risk addressed by the response*	position on the risk map: combined likelihood and magnitude of impact levels
• *enterprise’s capability to implement the response*	when the enterprise is mature in its risk management processes, more sophisticated responses can be implemented; when the enterprise is rather immature, some basic responses may be better
• *effectiveness of the response*	extent to which the response will reduce the impact and magnitude of the risk
• *efficiency of the response*	relative benefits promised by the response

Table 3-6: Parameter for selection for the optimal risk response option (ISACA, 2012a)

It is likely that the aggregated required effort for the mitigation responses that need to be implemented or strengthened, will exceed available resources. In this case, prioritization is

required. The Risk IT Practitioner Guide (2009c), which is available through the ISACA Knowledge-Center offers on this a detailed guidance:

Very efficient and effective responses to high risk should be given high priority whereas costly responses to lower risk will be ranged with lower priority. On the other hand, more expensive or difficult responses to high risk and efficient/effective responses to lower risk require careful analysis and management decision on investments by using a business case to allow informed decision making. It must be taken into account that one response may address several instances of risk while another may not and that investing in risk response measures always competes also with other IT or non-IT investments.

3.4.4 Risk awareness

A risk-aware culture begins at the top with business executives, who set direction, communicates risk-aware decision making and reward effective risk management behaviour. In this setting risk awareness is about acknowledging that risk is an integral part of the business. This does not imply that all risk is avoided or eliminated, but rather that IT risk is understood and known, risk issues are easily identifiable, and the enterprise recognizes and uses the means to manage IT risk. Apart from the already above mentioned policies and procedure operational risk management data should be communicated. This include, among others the risk profile of the enterprise (the overall portfolio of identified risk to which the enterprise is exposed), the root cause of loss events, thresholds for risk, options to mitigate (cost and benefits) risk, event/loss data, key risk indicators (KRIs) to support management reporting on risk. To be effective this communication similar to all directive or reporting communications should always be: clear, concise, useful, timely, designed for the correct target audience (ISACA, 2009b) and available on a need-to-know basis like the risk register with all documented risk, which should not be public information. Therefore it has to be properly protected against internal and external parties with no need for it (ISACA, 2014).

The benefits of open communication about risks will result in an Executive management understanding the actual exposure to IT risk, enabling definition of appropriate and informed risk responses. This will create awareness among all internal stakeholders of the importance of integrating risk and opportunity in their daily duties and provide assurance to external stakeholders on the level of risk and risk management processes, which are in use (ISACA, 2009c).

Chapter 4: Discussion

The thesis is aimed to highlight the radical shift in focus and perspective of IT and to presents a detailed conceptual analysis on how to overcome the obstacles and drive the change. This chapter summarises the key findings and also addresses the limitations and suggests recommendations for further research.

The first part of the thesis has identified that IT considered strategically can provide enterprises in these times with the opportunity to add value to products and services and assist in competitive positioning. Today's emerging technology enablers and disrupters are prompting many companies to reconsider their business strategies. Additional, consumers adopt technologies well before the companies they work for, and subsequently bring this trend to work. This means Business and IT leader everywhere, no matter which region and industry have to be aware that the digital revolution is transforming their global marketplace. As a result companies require new generations of IT technologies and processes to make informed decisions, immediately capitalize on emerging opportunities and quickly counter competitive threats. The four transformative megatrends: social interaction, mobility, cloud, and big data/analysis have been identified as important parts in this development, which are shaping global technology adoption by enabling and compelling the necessity for a more social, mobile, accessible and data-driven workplace. In this regard the thesis showed that the potential of today´s technologies are different from the IT projects and task in the past, were software/hardware were developed or bought from a vendor, installed and delivered to the users to improve their way of working.

Today´s new transformative technologies provide a fundamentally different way to approach strategic challenges and achieve desired results. This development is changing the scope of "IT", so much so that it is necessary that the structure of entire organisations has to change. In this context IT departments must stop being hardware and software pushers and become brokers of IT services and information.

How IT handles this new developments will have influence on how the IT organization will viewed and implemented in the future, and requires significant evolution in IT organization. For businesses to make right decisions regarding the adoption of these technologies, it is essential that IT promotes an understanding of the principles and helps establish effective governance practices. Therefore it is critical for organizations to analyse the overall enterprise key factors related to delivery model, culture, support structure, policies and processes in order to define a successful IT strategy. IT leaders need to work with the business and their users so that the new technologies blends naturally with the tasks they need to carry out every day, while meeting the requirements of the business of tomorrow. In this new setting IT leaders are facing all the challenges they have for many years, plus a flood of

new digital opportunities and threats. This leaves IT departments undertaking an enormous range of tasks that could never have been imagined a decade ago. In this way business will become more and more dependent on a reliable IT organisation, a trend that has boosted the profile of IT as well as their leaders. This movement requires a new broader range of complementary skills. In conclusion it can be said that this transformational age of Information Technology raises questions about strategy, leadership, structure, talent, funding and almost everything else as all industries in all geographies are undergoing a digital disruption.

Sitting at the centre of this tumult, many CIOs and IT executives “feel overwhelmed by the prospect of building digital leadership while, at the same time, renovating the core of IT infrastructure and capability for the digital future” (Gartner, 2014a). The task to be solved is to enable and guide, how to benefit the most from this new iteration of IT. This means that IT leaders have to keep pace with this technological development and require an understanding of the business needs that are driving demands for new technologies.

Through the analysis of the data collected in course of the first part of the work the main obstacles introduced through the radical shift in focus and perspective if IT could be identified as about insight, alignment, value and risk. The research was able to elaborate a number of recommendations, with a practical focus on how to overcome them, based on the conceptual analysis of recent frameworks, standards, best practise and surprisingly even older expert literature.

The primary emphasis needs to be put on the relationship between IT and the business, because regardless of the recent development IT often is still seen as a “necessary evil” and too few of their business counterparts think of IT executives as business strategy leaders or peers. However, given IT’s essential role in virtually every organization today, it has become critically important to break free from set behaviours and relationships in order to establish IT as a full business partner. A first step in this development is that enterprises should make the decision to take good corporate governance seriously because it is good for the enterprise rather than because it is required by law or formal codes of best practice. It should nevertheless be understood that good corporate governance is a necessary, but not sufficient, foundation for success. In other words, “while bad governance can ruin an enterprise, good governance cannot, on its own, ensure success” (ISACA, 2014). Although undeniably, the establishment of IT governance practices, create the optimal basis to help enterprises implement practices that improve the communication across the enterprise and establishes a clear understanding of roles, responsibilities and accountabilities, which ensures that enterprises do not lose sight of the conformance and performance aspects of business perspective. In this way a formal and structured architectural approach to define and develop the IT capabilities the business needs to function and grow will be created. In

this environment IT leaders need to strengthen their relationships across the C-suite and listen closely to clearly identify the business imperatives that will drive future technology initiatives.

The thesis delivers the finding that to fully take advantage of the current digital evolution CIOs and the organizations for which they work must completely commit to delivering on a vision of IT/business integration. There needs to be institutional recognition at every level of an organization of the strategic value of IT. For their part, CIOs and other top IT executives must finally become both business leaders and technology leaders. This will impact the process of decision making at all levels of enterprises for deriving business value effectively and efficiently. Further in this context it can be said that organisations with the right kind of mature mix of structures, processes and relational mechanisms, where CIOs act as members of the business team, right down to their practice of building business plans achieve a higher degree of business/IT alignment maturity compared to other organisations. As a result it can be determined which parts are strategic, core or simply a necessary cost of being in business, which allows that together, the organizational leadership and IT leadership are able to develop a business driven IT strategy aligned with organizational goals and objectives. This further enables to identify the most effective way to develop or source the required capabilities in each area, e.g., cloud computing to provide scale and flexibility or leveraging external partners to help create exceptional customer experiences in the mobile and online environments. In conclusion, it can be said that the IT departments must become business experts understanding the organizational objectives, business needs and functions, and help their business division acquire IT services effectively, efficiently and economically.

The research also determines that there is an intrinsic need to prove the business value delivered through IT investments. This implies to translate the goals, aspirations, frustrations and challenges of the stakeholders into specific programs of work that, with their active support, deliver clear and obvious results back to the business. These are the responsibilities of both the business and IT and should take tangible and intangible costs and benefits into account. Good IT performance management will enable that the business and IT fully understand how IT is contributing to the achievement of business goals, in the past and in the future. In this regards, IT leaders should get more involved in managing the financial performance of the business, if they aren´t already doing so. The result is an organizational leadership, which stops viewing the IT department as a cost centre and begin viewing IT as a strategic asset of the organization, a business enabling division.

Furthermore, enterprises must create a culture that, within reason encourages experimentation and exploration, because meaningful business innovation and differentiation require some level of risk taking. A fundamental finding of the thesis in this regard is that business

risk is affected by the business environment, like management style or culture, risk appetite and industry sector factors such as competition, reputation, and national and international regulations. Therefore, specific IT risk can be similarly affected. Thus, it is important to consider IT risk within the wider business context at operational, portfolio, program, project and strategic levels and not delegated it to technical specialists outside the boardroom. The essence of the finding is that the overall risk management practices need to be consolidated and a setting created, where all levels within an enterprise are aware of how and why to respond to adverse IT events plus components of risk are discussed openly and acceptable levels of risk are understood and maintained.

"Technology delivered as a utility, previously the goal, is now the expected norm" writes the Economist (2013). This states that operational aspects of IT have not declined in importance, in fact rather the opposite. To be strategic requires a fully functioning infrastructure that supports the business without fail. This implication is candidate for a more comprehensive analysis, because when disruptions occur to key services, the CIO has still the ultimate responsibility for fixing them and this day-to-day tactical demands continue to pull CIOs away from more-strategic functions. Is the solution for IT-leaders to delegate keep-the-lights-on activities and to operate as full-fledged businesspeople? Or can some of the current technological advances like third-party cloud computing help to ditch some of the more onerous and time-consuming tactical activities, to lessen deployment and maintenance burdens while permitting more time for strategic explorations and planning.

Also additional research would have to be conducted in the medium term and in the long term effect, of the implication that IT department no longer has a monopoly on technology. The "Consumerization of IT" is infiltrating the workplace, meanwhile through the ubiquity of cloud-based offerings delivered as a 'service', the business does not necessarily need to involve IT at all. However if this includes bypassing established governance processes and failing to inform others this may complicate information sharing and additional result in the enterprise assuming unknown risks.

Further needs to be mentioned that the thesis and most of the researched literature is limited in regard to softer aspects involved in organizational change such as overcoming resistance to change, gaining commitment, empowering, motivating and involving. In addition, the content of the vision and reasons for organizational change becomes less understood as it moves down through the organization. These characteristic should not be overlooked, because the success of most of the initiative depends on the buy-in of all stakeholders. Using an approach like John P. Kotter's (1996) eight step process or the Lewin (1947) Approach (Unfreeze–Change–Refreeze), coupled with formalized project management skills and practices, will significantly increase the chance of success.

The technology evolution has just started. **Figure 2-1** on page 20 in the introduction chapter reveals that there is a lot to come, which means that the future outlook for IT leaders is full of new and still unknown multifaceted challenges. The four trends mentioned in chapter 2 of this thesis are only the harbingers of the growing digitalisation trend. In this regard a significant number of the respondent to the CIO/Redhat survey (2014), when asked what might be an appropriate job title for the CIO in three years from now, come up with alternatives like chief innovation officer, chief solutions officer and chief integration officer.

In the end, it doesn't matter if the title remains chief information officer or becomes a more business-centric name, but it is essential that the existing CIO job position must continue to break free from its IT-centric focus. In this digital world, IT is business and business is IT. Organizations that continue to organizationally and conceptually isolate the two will fall behind competitors that have recognised the signs and are responding accordingly.

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