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Innovation Management: How to drive Innovation through IT – A conceptual Model

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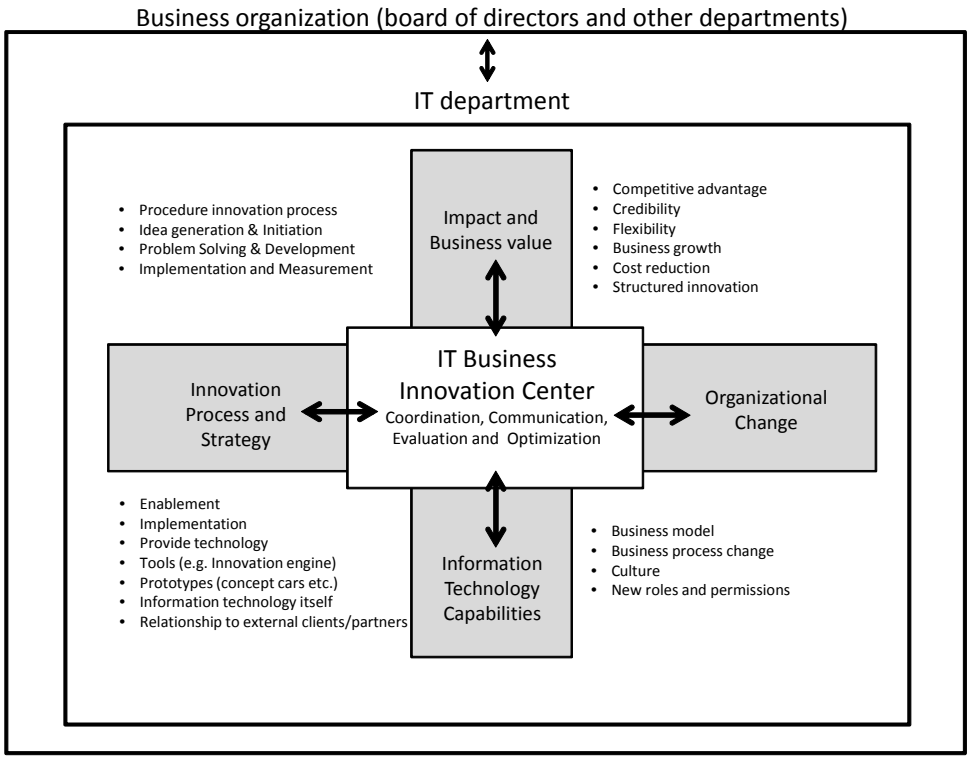

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Abstract

This paper focuses on innovation management and how to drive innovation through IT. While the IT used to operate in the back ground of a business organization, it is now responsible to create a competitive advantage. Especially, when today's business environment becomes hypercompetitive, business organizations have to consider how to become more competitive. To achieve an competitive advantage many business organizations focus on IT innovations. In this context, this paper describes how the IT can be used as an internal strategic resource by creating an IT strategy with regard to the business value and goals. Based on the aligned IT strategy this paper presents an approach which describes how the IT department can engage in business processes and creates an IT value to the entire business organization. The IT value is an important pre-condition for being accepted as a source to drive innovation. On the basis of the IT strategy and IT value an IT innovation management model is created, which includes organizational relationships that have to be noted when implementing an IT innovation management approach. The theoretical model describes how the IT department can contribute to drive innovation and business opportunities by operating a centralized IT Business Innovation Center (IT-BIC).

Keywords: Innovation Management, IT Innovation, IT value, IT and business strategy, Innovation Center

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List of Abbreviations

AISeL	Association for Information Systems Electronic Library
BPMS	Business Process Management System
CEO	Chief Executive Officer
CIO	Chief Information Officer
ER	Entity Relationship
ERP	Enterprise Resource Planning
HR	Human resources
IS	Information System
IT	Information technology
IT-BIC	IT Business Innovation Center
MIS	Management Information Systems
OECD	Organization for Economic Co-operation and Development
R&D	Research and Development
ROIC	Return on invested capital
SME	Small and Medium Enterprises
TSLRP	Technology Strategic Long Range Planning
UML	Unified Modeling Language

1. Introduction

The awareness of the role of Information Technology (IT) has changed over the past decades. While the IT used to operate in the back ground of a business organization, it is now responsible to generate strategic competitive advantage (see Eul et al., 2012, p. 101). According to a global management consulting business organization named A.T. Kearney (2009, p. 2), approximately 90% of executives surveyed identified the IT as an "extremely important" differentiator.[5] Nevertheless, some executives are often concerned about growth and raising the market share (see Hofbauer and Wennmann, 2008, p. 81). Especially, when today's business environment becomes hypercompetitive, business organizations have to consider how to achieve competitive advantage. With regard to the aforementioned study, 85% of the business organizations stated that at least 10% of their growth rate was due to IT innovations (A.T. Kearney, 2009, p. 3). However, according to the latest Gartner (2012) survey many business organizations and their management teams have lost their focus on IT innovation. Approximately 50% of Chief Executive Officers (CEO) say they will invest more in innovation but only 25% are actually addressing it as an explicit discipline.[6] For many CEO's, new information on customer sales and threatening competitors become more important than setting the focus on new IT innovation. In addition, innovation leaders often have the opinion the IT is a barrier to innovation. They believe that the IT should be used just for automating and standardizing business processes (see Tarafdar and Gordon, 2005, p. 1). Therefore, it is necessary to convince the executives and other employees to focus again on a strategic IT innovation management. This can only be realized if the IT is acknowledged as an innovative partner. However, the research on how the IT can use their capabilities to drive innovation is very young (see Kießling et al., 2012, p. 3). In this context, this paper describes first of all how the IT can be used as an internal strategic resource to create competitive advantage. Furthermore, the paper presents an IT innovation management model, which includes organizational relationships that have to be noted when implementing an IT innovation management approach. This leads to the central research question of:

RQ: *How to drive Innovation and Business Opportunities through IT?*

Based on Webster and Watson (2002), the structure of the paper is as follows: After describing the topic motivation and explaining the contribution to the innovation topic in the introduction, the theoretical and practical background on innovation, IT innovation and the Innovation Management is described. Then, the research design together with the literature search process is presented. Afterwards, the principal part of the paper begins. The first part presents two approaches on the creation of IT value. The second part explains how IT can be used as an enabler or implementer of innovation. Furthermore, a practical approach of an innovation center is

[5] The survey conducted 150 executives from American and European business organizations. A requirement was annual revenue of $500 million or more.
[6] The survey conducted more than 220 CEO's and business executives from over 25 countries. A requirement was annual revenue of $500 million or more.

adopted and extended. On this basis, four organizational relationships are identified and described. Subsequently, a discussion of the observation follows. The identified limitations and further implications for additional theoretical and practical research are drawn. Finally, a conclusion and outlook is provided.

2. Research Background

2.1 Theoretical and practical background

Invention vs. Innovation

The terms invention and innovation are often used synonymous. However, it is important to distinguish these terms as they have different meanings. An invention is usually an outcome of research and experimentation. It is often a creation of something new and is not a measurable business value (see Hall and Smith, 2012, p. 5). It usually can be seen as an essential preliminary of an innovation, which is limited to the process of an idea generation or the initial implementation of a new idea (see Vahs and Brem, 2013, p. 21).

The term innovation has its roots in the Latin language and comes from the words “novu”=new and “innovare”=renew (see Horsch, 2003, p. 1). There is a variety of innovation definitions in the scholarly literature, yet in every definition the characteristics new or renewal products and processes are mentioned (see Noé, 2013, p. 1; Diedrichs et al., 11/2006, p. 10). The official definition by the Organization for Economic Co-operation and Development (OECD) is:

> *“An innovation is the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organizational method in business practices, workplace organization or external relations* (OECD, 2005, p. 46)*.”*
>
> In other words an innovation is understood as an initial economic implementation i.e. the priority is the optimization of economic knowledge exploitation. In the long term this will bring economic success (see Vahs and Brem, 2013, p. 21).

The OECD definition can include several kinds of innovation types. An innovation can be seen as a product, process, marketing or organizational innovation. The product and process innovation have the same characterizations. Both innovations introduce or significantly improve different kinds of goods, services, productions or delivery methods. This includes significant improvements and changes in material components, software, equipment or technical specifications, etc.. Thus, technological product innovations and technological process innovations are closely related to the product- and process innovations (see OECD, 2005, pp. 48-49). Marketing and organizational innovations concentrate more on implementing and improving either marketing or organizational methods, which do not produce or improve various goods or products. A marketing innovation has the characterization through an introduction of a new mar-

keting method such as product placement, product promotion, design or pricing. Organizational innovations include the implementation of new firm's business practices, improvements in workplaces or external relations (see OECD, 2005, p. 59 et seqq.).
Moreover important are the three principal kinds of innovations, which are also called innovation grades (see Vahs and Brem, 2013, p. 31). These principals can occur in every innovation type. The literature distinguishes between the incremental, platform, breakthrough and disruptive innovation. This differentiation sets the focus on how an innovation can achieve high consumer value benefit and higher competitive advantage. Nonetheless, the economic risk has to be taken into account too.[7]

An **incremental innovation** does not offer future customer superior benefits. In such case the demand for organizational products is very low. Nevertheless, an incremental innovation is necessary for every business organization since it defines the organizations baseline against competitors. On this account, it can be seen more as a form of maintenance or renovating the existing products and services with new features (see Koetzier and Kristensen, 2011, p. 3; Noé, 2013, p. 3 et seqq.). Therefore, incremental innovations are often used in IT, businesses, where business organizations always have to be "one step ahead" of their competitors. These innovations have a relative low economic risk since they are based on approved and existing products, technology etc. (e.g. High Definition Technology).

The **platform innovation** delivers future customers higher consumer value. Therefore, a higher demand for the products or services exists. This kind of innovation drives market growth. Hence, the prime cause is to increase the innovators market share by addressing the innovation to customers of different competitors. To create a platform innovation it is vital to have sustainable competitive advantage through existing technology or brand etc. (e.g. Coca Cola Zero) (see Koetzier and Kristensen, 2011, p. 3; Noé, 2013, p. 3 et seqq.).

Breakthrough or radical innovations are known for their market changing innovations. By delivering future customers high value benefits, the innovator can influence a new market for a certain time. Dominating a new market is accompanied by a high economic risk. New innovations have a risk of failure because they are not approved to the new market. Consequently, it can be a mistaken investment. Therefore, it is very important to analyze potential development and marketing risks (e.g. Apple I-Pad) (see Koetzier and Kristensen, 2011, p. 3; Noé, 2013, p. 3 et seqq.).

A **disruptive innovation** is often a unique business models, product or process etc. that essentially can change the status quo. It can disrupt a market that existed for years. (see David and Dreischmeier, 2010, p. 3). However, the disruptive innovation has the potential to destroy the business model or even the entire business organization. Every innovative organization should

[7] To receive a better overview of the innovation types see the appendix 1

have the aim to recognize potential disruptive innovations, so mistaken investments can be avoided. This is one of the tasks among the innovation management (see Noé, 2013, p. 4).

IT Innovation

Almost every business unit inside a business organization is impacted by Information technology. Over the last few years IT has been a driver of endless new possibilities and successful business innovations. Moving from the merely use within the "back office" into the reach of every consumer, new product, process and service (see Kießling et al., 2011, p. 1; Orlov, 2005, p. 2).

Defining IT innovation in a business organization is the creation or adoption of something new by involving technology so that an organizational value accrues. Using technology in a new way, an improved collaboration between IT and business goals/strategy can be achieved (see Teo et al., 2007, p. 211).

The scholarly literature based on Lyytinen and Rose classifies three forms of IT innovations (see Namchul, 2010, p. 2). The first IT innovation is the system development innovation, which involves changes in the systems development process, such as developing or programming new tools. The second IT innovation is the service innovation, which is the outcome of a development process. An example is an IT service that supports administrative core activities. The third IT innovation is an IT base innovation which effects business functions or core business processes through IT. The IT base innovation contains changes in new software, hardware architectures and services that are often used for new IT innovations (see Namchul, 2010, p. 2).

Nevertheless, IT innovations can only be implemented, if the promised IT performance and its high quality are sustainable. Yet, this is still not enough for the IT department to become part of the organization's business strategy. It only makes sense, when a contribution through IT can be expected. Therefore, it is important for the IT to have a wide range of business knowledge, which includes the industrial development, what potential lies in the organization, who the competitors are and their strategies. This is where business meets technology (see Prottung, 2008, p. 66).

Innovation Management

After the global economic crisis, business organizations aimed for corporate growth. Therefore, innovations became an important driver for increasing economic revenue, which can be seen as a consequence of a successful implementation of innovation (see Kießling et al., 2010, p. 2). A.T. Kearney (2005, p. 16) has shown in previous research that business organizations with progressive innovation management grow twice as fast as their competitors without innovation management.

Innovation management can be defined as a successful implementation of new ideas and discoveries. Besides, it covers the introduction of an innovative organizational culture to promote the development of advanced ideas and new business opportunities (Baier et al., 2005, p. 6). Furthermore, innovation management not only combines development and improvement of new products or processes; it also develops the structure of a business organization and defines

internal processes (see Koudal, 2005, p. 2). This means that innovation management includes all activities within the value process and successful product implementation. Additionally, it is supported by other organizational processes and functions such as Human resources (HR) Management or Accounting etc. (see Vahs and Brem, 2013, p. 27).
Successful innovations emerge through systematically preparation, implementation, coordination and controlling. To improve the organizational innovation culture, necessary fundamentals have to be created. This furthers the development and realization of innovative ideas. Hence, innovation management follows these goals so the quality of innovation activities and -processes can be increased (Granig and Perusch, 2012, p. 53).

2.2 Role and responsibility of the CIO related to innovation

To receive the maximum of IT business value, the IT has to be managed as economically as possible. This will ensure the belief that: "IT is a large cost factor without business value" (see Soh and Markus , 1995, p. 29), which circulated for years, can be disproved. Especially after the economic crisis, IT management has to constantly look for efficient investment opportunities before causing a mistaken investment. The IT innovation management in today's business organizations is closely associated with the role of the Chief Information Officer (CIO) (see Hofbauer and Wennmann, 2008, p. 81).
In the last three decades the role of the CIO has changed significantly. Over many years the CIO has never really been recognized as a member of the executive team. Especially when technology was used as a backroom utility, the credibility was very poor (from 1960s-1970s) (see Feeny et al., 1992, p. 441). The technology transformation and a dependence on IT shifted the role of the Head of IT from an ordinary technology provider to a respected member of the executives, who deals with operational technology and defining the future strategy (since the mid-1980s). Through technological transformation many changes in the use of managing IS, including the types of technologies, the necessary qualifications and skills of users and professionals of IS, the impacts -intentionally and unintentionally-, and the investment in IT have changed considerably (since 1990s –today) (see Feeny and Ross, 1999, p. 1).[8]
Since the beginning of the new century, the responsibility of the IT department has been associated with more customer orientation. Especially today, products and services are designed not only as consumables but rather in the expectations and demands of the customers (see Uebernickel and Brenner, 2013, p. 19). Besides an efficient and effective IT landscape, this requires a radical customer focused organization. Therefore, the role and responsibility of the CIO has changed from the 1960s. The CIO was a manager of operational and specialist functions-dealing with the development of new systems under a time and budget restrictions or operating existing systems, and now the CIO is a customer orientated and strategic innovative leader, who is involved in the entire organizational planning process for new products, processes, etc..

[8] To receive a brief overview of the different CIO competencies and roles from the beginning of 1960 until today see appendix 2

The CIO plays not only an important role in the idea generation of product development; he can also contribute added value to the marketing and production department (see Uebernickel and Brenner, 2013, p. 20). In other words, the knowledge from the production and development is combined and complemented with technological competencies from IT. In this context, besides defining technology and infrastructure standards, the IT department has the task to develop and provide platforms, where innovation can be created (see Uebernickel and Brenner, 2013, p. 21). The largest conflict for a CIO comes with the combination of current and future tasks. On the one side he/she has to ensure that the IT department works as expected-, with its smooth operations, optimized business processes, security and globosity. On the other side he/she has to make sure that the integration of organization-wide innovation and development-processes for new products, services or business models will be realized (see Uebernickel and Brenner, 2013, p. 22). According to the newest IT trend survey conducted by the IT consulting firm Capgemini (2013, p. 13), CIO's see themselves more as a business partner and technical innovator. This supports the opinion that the IT and its CIO's have changed their roles from a service provider and business process optimizer to a respective business partner.

2.3 Research design

The present research design consists of two phases. The first phase consists of an explorative literature search process and a structured search key process based on initial representative papers.

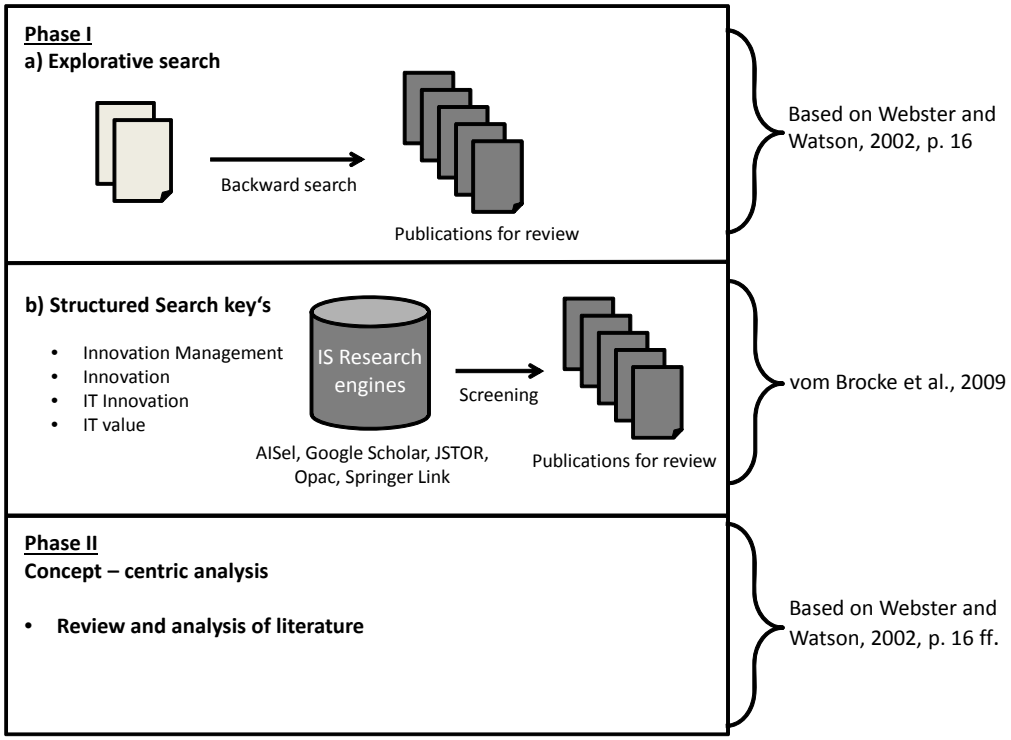


Figure 1: Literature search phases

An acknowledged research method and a structured literature search process ensures methodological rigor, which guarantees the validity and credibility of the underlying search process (vom Brocke, 2009, p. 3). The validity of the search process comprises two approaches in

searching for literature by using keywords and backward or forward searches on the basis of relevant articles. A backward search means analyzing the references of an article from a previous keyword search. The forward search is the contrary and requires reviewing additional references that have been cited within the article (Webster and Watson, 2002, p. 16). Furthermore, the validity depends on the keywords, database and publications (vom Brocke et al., 2009, p. 3). Credibility can be created through documenting and presenting the literature search process as transparently as possible (vom Brocke et al., 2009, p. 1). This gives the reader the reliability on knowing how and what the author has analyzed his references.
The first used search method was the backward search process based on initial representative papers. The second used search method was conducted by five explorative search engines, named AISeL, Google Scholar, JSTOR, Opac (Online library of the Hannover university) and Springer Link . To have an overview of the complex issue, keywords such as *Innovation Management, Innovation, IT innovation AND IT value* were used for all search queries. After receiving search results the interesting and potential titles where combed and analyzed through reading the abstract, table of content and topic sentences. In some cases high quality papers or known journals were identified and used. According to the Management Information Systems (MIS) journal rankings published by the Association for Information Systems (2012) these references raise the credibility. However, literature from books, consulting firm brochures or papers without high valuation were equally considered and used. At the beginning of the research, relevant articles and books were screened, identified and selected. To have a greater understanding of the topic not only German literature was considered. Especially current knowledge on innovation management and IT is in English literature more up to date. Other literatures that were not in German or English (e.g. Chinese, Spanish or Russian) were not considered at all. After using both methods the literature list was 53 articles and books long.
The second phase consisted of carefully reviewing and analyzing the chosen literature. Interesting and necessary paragraphs were highlighted and noted in a separate table, which contained the structure of the scientific work. After classifying and categorizing the articles the writing of the paper could begin.

3. Driving Innovation and Business Opportunities through IT

Today's IT plays a very important role in achieving competitive advantage over current or future competitors for every business organization. Therefore, the IT must be used as a strategic asset in order to succeed within the hypercompetitive market. IT departments often face a challenge in building an infrastructure and the processes that may lead to a competitive advantage (see Neumann et al., 2010, p. 85). To receive a strategic benefit from IT, business organizations have to be innovative. However, this can only be achieved, if the IT department creates an IT value to the entire organization. As mentioned in chapter 2.2, one of the CIO responsibilities is to educate the organization and external environment in believing that the IT is indispensable in today's business.

3.1 Accenture's practical approach to create IT business strategy

The management consulting organization Accenture created an approved and known IT strategy development concept, which is used to drive business value for many business organizations (see Melnicoff et al., 2005, p. 83; Accenture, 2010). In other words, this model provides a road map to have the most efficient IT governance (Melnicoff et al., 2005, p. 83). IT governance can be defined as an effective and efficient process where the use of IT can achieve the determined business goals (Gartner, 2013).

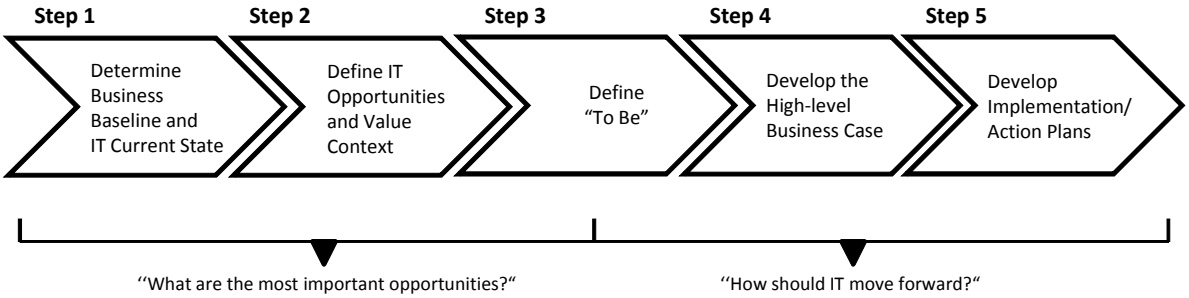


Figure 2: Accenture concept for creating an IT value strategy (Hofbauer and Wennmann, 2008, p. 84).

The concept is divided into five different steps. The entire approach can be divided into two parts. The first part addresses the question of "What are the most important opportunities?" The second part concentrates on "How IT should move forward" (see Hofbauer and Wennmann, 2008, p. 84).

In Step 1: Every IT strategy has to be consistent with their internal and external issues. Therefore, it is necessary to know the organizational goals and values, external environment and capabilities, etc.. Understanding or predicting these factors is the first step of achieving a successful IT strategy. Also, knowing the sources of competitive advantage within the relevant industry can have a future impact on the added IT value (see Hofbauer and Wennmann, 2008, p. 84). This can be examined through another Accenture model, which discusses the role of IT in an organization and its potential of business value. The model is based on the organization's and industry's rate of change and the organizational potential of competitive advantage (see Melnicoff et al., 2005, p. 84).

In Step 2: The most important aspect that has to be addressed is "How the scheduled budget can be best invested?" An efficient investment strategy must leverage competencies so that the invested capital can generate a maximum on return (ROIC) for all investors. This leads to the question: "How- can a defined IT value strategy generate the highest ROIC?" This can be predicted by using an analysis where the value creation of all investors is compared to the potential IT budget (see Hofbauer and Wennmann, 2008, p. 85).

In step 3: The activities to reach the "to be" state will be defined. These activities arise as result from the aforementioned opportunities or business values. An example can be reducing time, cost or business growth support (see Hofbauer and Wennmann, 2008, p. 85). Furthermore, it is necessary that the resource requirements (e.g. employee skills) will be defined.

In steps 4+5: The development of the business case and implementation begins. After identifying the value driven opportunities the intended IT strategies have to be prioritized. This will help the business organization in focusing on the right opportunities. It is important to link the IT with the business strategy and business case. This creates IT capabilities that will support the organization in the future (see Hofbauer and Wennmann, 2008, p. 85). To achieve the intentional success, a value realization plan, which supports the ongoing process should be created. The plan lists important action steps and milestones in relation to the time schedule. Together with the business case and –strategy the implementation and progress of the IT value strategy can be managed and controlled more efficient. This is where the CIO can demonstrate the importance of the IT so that the organizational value can be enabled (Hofbauer and Wennmann, 2008, p. 85).

3.2. A theoretical approach to create business value from IT-services

On the basis of the created IT value strategy, the IT department has to prove that it can be a strategic internal resource to create competitive advantage. Although, the department has established itself as an efficient strategic partner, it is still necessary to improve themselves in regard to its IT-Services (see Neumann et al., 2010, p. 85). Previous studies have shown that business organizations using IT in combination with organizational individual resources can improve their performance and competitive advantage (see Neumann et al., 2010, p. 89).
According to Neumann et al. (2010, p. 87) this can be achieved by creating internal relevant competitive resources, which are not available to other business organizations. Such resources must be strategically valuable, unique and especially not imitable. Resources that have these characteristics are for specific organizational core processes or individual employee knowledge (see Neumann et al., 2010, p. 88). However, competitive IT-resources can only arise through using process-specific IT skills. These skills enable smooth individual solutions and processes (see Neumann et al., 2010, p. 88). Nevertheless, this strategy cannot maintain a strategic competitive advantage in the long term (see Neumann, et al., 2010, p. 89). To address this issue Neumann et al. (2010) created an IT-Service reference model that can create an IT business value by considering the internal IT-governance structures.

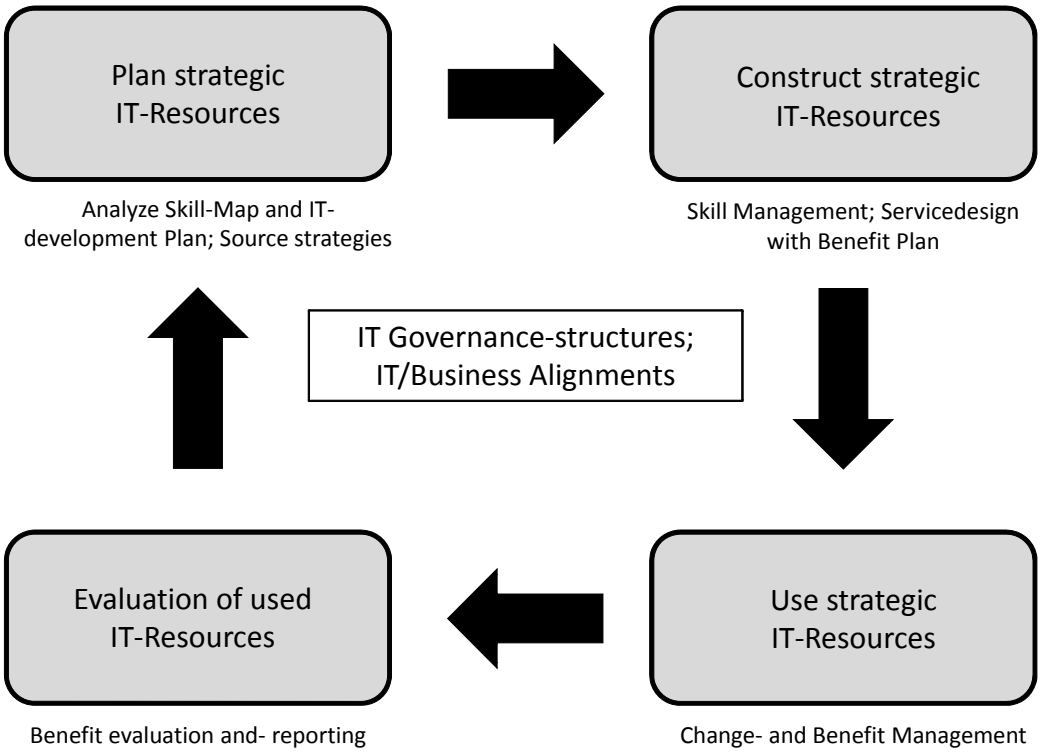


Figure 3: IT-Service reference model
(Neumann et al., 2010, p. 89)

The reference model consists of four phases and illustrates how the IT can be a strategic service partner to the business organization. The model is developed to provide an approach, which establishes the IT into internal business processes.

Plan strategic IT-Resources

The model begins with planning the strategic IT-Resources. As mentioned above the IT department generates a competitive advantage by creating valuable resources. Therefore, the first phase conducts a demand analysis with regard to IT-Services and employee skills (technically and process specifically). Within this phase it is essential to determine the strategic IT competencies, so that a decision on using internal resources or even outsource individual resources can be made (see Neumann et al., 2010, p. 90). To determine the required resources Neumann et al. (2010, p. 90) suggested the use of two documentation methods. The first documentation method addresses which internal processes and activitivies can be supported by IT-Services. The second method lists the existing organizational wide IT skills.

Construct strategic IT-Resources

Based on the determined strategic goals further measures for implementing IT-Resources have to be defined. Additionally, the IT employees have to raise their IT knowledge and skills to transform new submitted business process ideas and solutions. This is where the IT can be acknowledged as a credible consultant and may provide an IT specific solution (see Neumann et al., 2010, p.91). Furthermore, the phase is characterized by either redeveloping or extending

the IT-Service portfolio. Creating further IT-services require a planned benefit business case (see Neumann, et al. 2010, p. 91). This case consists of several time-, cost-, business goals, various scenarios and action plans. To realize the determined benefits further resource developments with regard to systems, applications and skills have to be identified.

Use strategic resources

The next step of creating an IT value is to ensure that the identified available resources can be used. According to Neumann et al. (2010, p. 91), IT-based projects do not fail because employees do not maintain to the predefined deadlines or cost targets, but rather the defined business goals between the IT and other departments are often unrealistic. Therefore, it is vital to carefully plan the above described second phase. Furthermore, it is essential that employees of other departments are integrated in the planning process. The predefined goals must be specified through a "Change- and Benefit Management" (Neumann et al., 2010, p. 91). The "Change Management" is responsible to ensure that the needed skills and process structures can realize the desired benefits. The "Benefit Management" engages with monitoring the predefined solutions process. Thereby, it is responsible to ensure that all activities are working towards the determined goals. This can be done by tracking the solution process permanently (see Neumann et al., 2010, p. 91).

Evaluation of used IT resources

The last phase is characterized by using previously designed prototypes. A prototype is built to test a concept or process so that a decision on enhancing the design can be made. This is where the end-user has the opportunity to review the IT-Service solution. The next step would be to evaluate the user's benefit of the internal IT-Service. This would be realized by questioning the user and evaluating the key performance indicators. The following findings have to be documented and provided to all involved employees.

3.3 Davenport's framework of IT in process innovation

After aligning the IT strategy with the business strategy and creating an organizational IT value, the focus on how IT can enable and drive innovation or business opportunities can begin. With regard to Müller et al. (2012, p. 2), who have analyzed eight process innovation frameworks, only one framework specifically considers IT an enabler of innovation and as an opportunity to achieve innovation. Other framework discussions concern the innovation process and the role of IT but never consider that IT can help to accelerate business process innovations.

The initial framework provides a good understanding of how process innovation can be driven by IT. Process innovations are essential for all organizational matters. They involve not only in the manufacturing process of products, but also in planning, coordinating and support processes (see Baier et al., 2005, p. 8). Furthermore, process innovations also include improving organizational functions such as strategic planning and implementation, customer use optimi-

zation, communication processes, capacity planning, etc.. Since defined processes are immensely important for organizational work, process innovations are required to implement new products, services, etc.. (see Baier et al., 2005, p. 8). Under these requirements, it can be assumed that process innovations must occur parallel to product or other innovations. Therefore, Davenport's framework can be used as a starting point for organizational innovations.

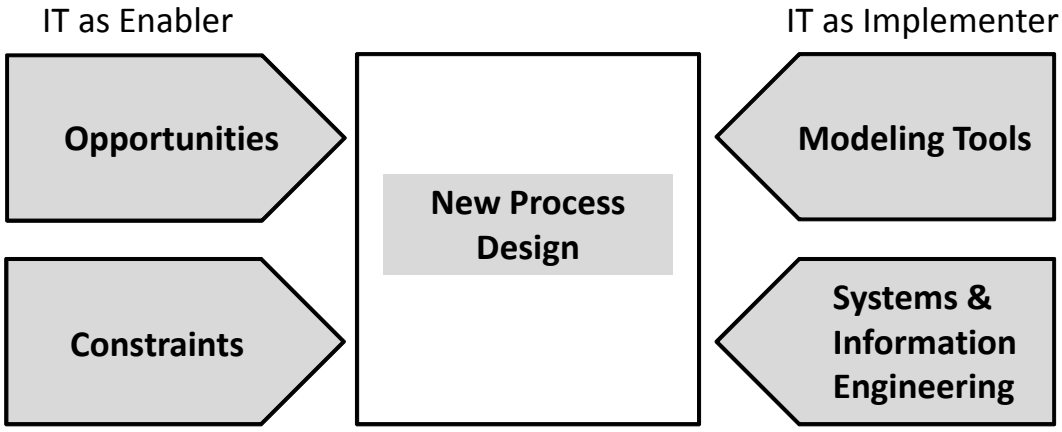


Figure 4: The role of IT in Process Innovation (adapted from Davenport, 1993, p. 49).

The framework is composed out of three sections. First, how IT can lead or has an impact on process innovations (IT as Enabler). Second, how IT can be used to implement process innovations (IT as Implementer) and third, which activities are used while defining or designing new processes. Furthermore, the section "IT as an enabler" is differentiated in "Opportunities and Constraints" whereas the section IT as an implementer is differentiated in "Modeling Tools" and "Systems and Information Engineering". Each sub element must be considered when designing a new process (New process design) (see Davenport, 1993, p. 50). On the one hand possibilities (Opportunities and Constraints) can arise when the IT is used as an enabler. On the other hand the implementation of a new process can be driven by the IT and its (Modeling Tools or Systems and Information Engineering) (see Müller et al., 2012, p. 3).
The developed framework often uses the term Information Technology (IT). However, this term has a different meaning within the framework and can be compared with the term Information System (IS) since the framework focuses on the interaction between technology, processes and people. Actually, it illustrates how technology can influence the people that create the processes, which lead to innovations (see Müller et al., 2012, p. 3).

Opportunities: The first thing that has to be considered when dealing with IT enabled process innovation are the opportunities that come from using technology in a new way to the business organization or industry (see Davenport, 1993, p. 50). Davenport has characterized four different opportunities that come from IT. First and the most common recognized benefit is that IT facilitates work automation in order to eliminate or reduce human labor. Second, IT provides possibilities in changing or reducing simultaneously processes in order to achieve process cycle-

time reductions. Third, IT helps to monitor and track work in progress, shipped goods and articles, and coordinating activities over a long geographical distance in order to be more efficient in customer orientation. Fourth, IT enables data collection, knowledge management, and data analysis and information dissemination (see Davenport, 1993, p. 50 et seqq.; Müller et al., 2012, p. 3). More important than just identifying IT opportunities is the understanding of how technology can be used in the innovation process. Davenport (1993, p. 49) reveals that understanding the technology can improve future design process with regard to time and cost reductions.

Constraints: Although a business organization and its internal process innovations receive opportunities through IT, there are a few constraints which influence today's and future processes to bear in mind. A "constraint" is considered as a process innovation that is limited by current IT systems (Müller et al., 2012, p. 3). This is often the case when either the current technology cannot be changed in a short time period or because a change would be too expensive (see Davenport, 1993, p. 63). An example could be a new process design which arises from an opportunity in tracking shipped objectives or goods. This can be constraining if a current IT system does not have the required features. As a result this could lead to a lack of communication between the supplier and the customer. Some IT systems only provide a limited number of components which constrain organizational work processes (see Müller et al., 2012, p. 3).

Modeling Tools are used to facilitate the "New process design". An often used tool is the Business Process Management System (BPMS) that provides software engineers, systems architects and business analysts an architecture to transform unintelligible applications supported by processes into a user friendly environment (Müller et al., 2012, p. 3). Another well-known modeling tool is the Enterprise Resource Planning (ERP) system. This system connects organizational departments through a central data base. Therefore, the data is saved in-house and is available for every authorized person. The ERP system can be used as a modeling tool, so that it can be modified to accommodate current or future process innovations. When implementing a new process innovation the modeling tools become the most important part. Basically they are the technologies (software and programming language) that establish the process innovation (see Müller et al., 2012, p. 3).

Systems and Information Engineering: The term "System and Information Engineering" implies the process of transforming a process concept design into a design that is implemented by means of "Modeling Tools". This can be done by transforming a workflow diagram into a data flow diagram (see Müller et al., 2012, p. 3). However, the transformation can also be accomplished by using "Modeling Tools". Thus, the differentiation between "Modeling Tools" and "Systems Information Engineering" can be unclear because some tools or systems feature both purposes. Especially a BPMS can define and implement a new process design. An example for a "Systems and Information Engineering" is the creation of a prototype, unified modeling language (UML) diagram or entity relationship (ER) diagram (Müller et al., 2012, p. 3 et seqq.).

New process design: Besides the before explained "Opportunities", "Constraints", etc. the design and implementation of the innovation process has to be considered as well. According to Davenport (1993, p. 154), a "New process design" is the implementation of a new process including all requisite steps to a new organizational structure which has new designed systems to work in a new way. However, it is important to consider that the design depends on the activity of the designing group. To have an ideal balance the team members must be creative and innovative with process solutions and knowledgeable with the implementation process (Davenport, 1993, p. 153). The key activities within the "New process design" are Brainstorming and prototyping different process designs. The prototyping in the "Systems and Information Engineering" has a different meaning then the prototyping in the "New process design". Creating a new prototype within the "Systems and Information Engineering" field refers to developing for example new software products, whereas prototyping a "New process" considers the design of possible new processes (see Müller et al., 2012, 4).

3.3 Intel's innovation center and tools

The following practical approach, describes how the business organization Intel Cooperation used their IT capabilities to receive significant benefits from IT innovation (see Curley and Westerman, 2008, p. 33). More specifically, they created an innovation center to achieve their innovation goals.

After Intel's IT department created a value to the business organization the next step for being completely accepted as a source of important ideas and leaders of organizational change was to provide and improve their innovation capabilities (see Curley and Westerman, 2008, p. 33 et seqq.). Therefore, they built an innovation center, where all IT innovation activities would take place. The center brings people, ideas and technologies together so a cross-organizational culture can exist (Goldman, 2013). Furthermore, they implemented an innovation process enabled through IT tools and an infrastructure that improved Intel's innovation capability and culture, which will be described below.

The innovation pipeline process

Intel implemented an innovation process that consists out of 6 dimensions.

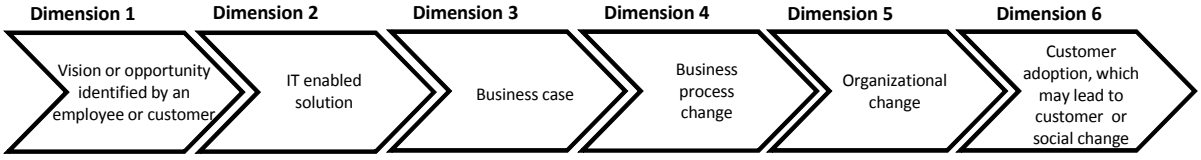


Figure 5: Intel's innovation pipeline process

(own representation based on Curley and Westerman, 2008, p. 40).

The innovation process begins with an opportunity from a particular problem that can be identified by someone who believes that the IT can solve the problem. However, the vision usually evolves over time from the identified problem after having a vision that an IT enabled solution

has to be delivered (see Curley and Westerman, 2008, p. 40). The main goal of the solution delivery is to provide time and cost efficient deployment to support the innovative process. Depending on the business organization either the hard and software can be produced internally or it has to be purchased from an external provider (see Curley, 2004, p. 157).
The next step is to capture the vision and intended IT solution into a business case, which plans the innovation launch, adaptation and anticipated generated returns (see Curley and Westerman, 2008, p. 40).
Within the last three dimensions problems and changes can occur more easily when creating an IT innovation. Especially the business process change is usually part of an IT innovation, which often requires organizational change. This can be a change in an employee's behavior, new roles or even a new organizational structure. The most important dimension is at the end of the innovation process, where the adaption success will be measured. Today's IT enabled innovations have many societal and customer impacts. Therefore, the society's ability in accepting the IT innovation can influence the success. If this is the case, the business organization has to make sure that it implements a mechanism to facilitate customer or social change (see Curley and Westerman, 2008, p. 40).

Innovation pipeline process enabler
The process described above is enabled by a set of tools and methods that are used by the IT department to drive innovation. According to Curley and Westerman (2008, p. 40) the most important ones are the Innovation Engine, the Innovation pipeline yield process, the IT Innovation Zone, Innovation assignments and IT concept cars.

The **innovation Engine** is an online platform which gives creative employees the opportunity to suggest their ideas for solving a business problem. The platform is accessible to all employees and enables everyone to capture his/her ideas so that a useable idea can address key business opportunities. The innovation engine offers another feature by supporting the "Technology Strategic Long Range Planning (TSLRP)" process (see Curley and Westerman, 2008, p. 41). This feature is used to submit ideas that do not particularly address a problem. More specifically, it captures ideas of potential disruptive technologies and opportunities. The process selects submitted ideas that should be more focused on. This improves the quality because all ideas are considered equally and can be enhanced by all employees (see Curley and Westerman, 2008, p. 41).

The **Innovation pipeline yield process** is used to identify which creative ideas can actually be realized and addresses the customer expectations. Intel recognized that there were many ideas which could lead to a yield output (see Curley and Westerman, 2008, p. 41).
At the beginning of the innovation pipeline yield process the ideas are collected and evaluated. The evaluation is used to verify if the suggested idea offers a future value. The next step would be determining if there is any available technology to transform the idea into an output. If this is the case then the potential technology would be evaluated and a concept could be written.

Should the technology not meet the innovation needs then the innovation process is premature ended. After finishing the concept a team proves it and begins to develop a prototype. If the results are promising the project can begin (see Goldman, 2013). According to Intel's Chief Technology Officer Goldman (2013) the yield targets will rise through the process. They expect low yield in the research phase and a very high yield in the transformation phase (see Goldman, 2013). The output of the process can be distinguished in various outcomes. For example the IT product lifecycle adoption influences the IT infrastructure or adds value to a future product. Another example is the rapid adoption, where a solution does not have to pass the usual IT product lifecycle; instead it can be quickly deployed (Curley and Westerman, 2008, pp. 41-42).

The **IT innovation Zone** is a separate room within the innovation center. The zone is often used to exchange ideas and prototypes. As a consequence, Intel attaches great importance to communicate all ideas so that the value of innovations rises when they are spread and adopted (see Curley and Westerman, 2008, p. 41).

The **Innovation assignment** gives motivated employees the opportunity to exclusively concentrate on an innovation idea so that it may be realized. Therefore, Intel's IT department developed a process that supports a fixed time assignment where the employee is released from his daily duties within the innovation center (see Curley and Westerman, 2008, p. 41).

The **IT "concept cars"** enables employees and end users to validate the IT concepts together. This helps the innovator to receive direct customer's reaction so that either the innovation can be built or adjusted to customer needs (see Curley and Westerman, 2008, p. 41).

4. The organizational IT Business Innovation Model

Today's business organizations create their value from optimizing their vertical business level (e.g. improving Research and Design, Marketing or Sales etc.). Of course this will be important for future competitive advantage; however it will get a lot harder to differentiate the organizational activities from others (example the innovation I-Pad and its imitations). For the future it is essential that organizations increase their competitive advantage along the horizontal level by optimizing their supply chain or market research. This can be achieved by concentrating on the IT's strengths (see David and Dreischmeier, 2010, p. 3).
The following organizational theoretical model describes how the IT department can contribute to drive innovation and business opportunities by operating a centralized IT Business Innovation Center (IT-BIC). Based on the theoretical and practical concepts described in chapter 3 the model combines these concepts and describes further relations between the IT and the business organization. The combined models were further extended based on the reviewed literature. The resulting extended framework for driving innovation and business opportunities from IT (Figure 7) was elaborated from the business organization perspective.

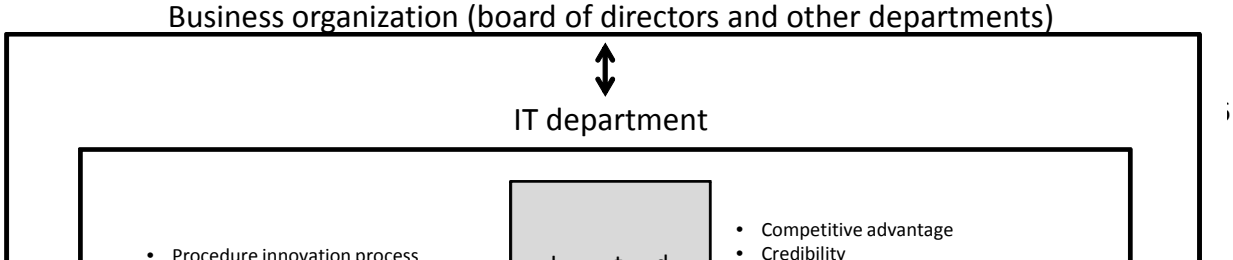


Figure 6: The organizational IT Business Innovation Model

Combining the concepts lead to recognition of four attributes that are in interrelation with the IT-BIC.

- Impact and Business value
- Organizational Change
- Information Technology
- Innovation Process

Therefore, the model depicts how the innovation center can influence an "Organizational Change" and the "Innovation Process". Furthermore, the IT business innovation center creates an "Impact and Business value" by using their "Information Technology capabilities.

4.1 IT Business Innovation Center

The core element of the model is the IT Business Innovation Center, which belongs to the IT department. The center is used to provide a platform where business and IT representatives can work together on innovation projects. Therefore, the IT-BIC's core task is to manage the entire innovation activities.

To achieve the highest return on innovation research, all team members must work full time. The innovation team should be managed by a head of innovation, who directly reports to the CIO, who can then communicate all activities to the board of directors (see Kießling,, 2011, p.

7; David and Dreischmeier, 2010, p. 3). The head of IT innovation must ensure that the innovation process is aligned with the organizational strategy and capabilities (see Alonso et al., 2010, p. 531). The members should have impressive knowledge on technology and core business. This will give the innovation center flexibility in changing the strategy quickly while working on projects.

The core tasks of the innovation center are coordinate the innovation process, communicate the process to the business organization, evaluate the developed innovation and optimize the process status quo. Furthermore, the innovation center is responsible for all innovation activities. It is essential that the core strategy of the IT department and the IT-BIC is aligned to the organizational strategy including with the board of directors. The main goal of the innovation center is to achieve a business value by creating competitive advantage. According to Kießling (2011, p. 7) this can be achieved by creating and maintaining an IT innovation portfolio.

Besides the full time team members, employees from other departments are essential for developing an innovation. Every important department (e.g. research and development, production, marketing, etc.) should contribute to the innovation center (Kießling et al., 2011, p. 7). As mentioned in chapter 3.4 this can be realized by introducing a platform, where motivated employees can submit their ideas and problem solutions. Furthermore, the communication of the IT strategy and current activities can be driven more easily.

4.2 Identified Attributes

4.2.1 Impact and Business value

The IT-BIC can achieve a business value and impact by concentrating on the core innovation tasks. A major advantage of the IT-BIC is that all team members come from different departments and are equally involved in the innovation process. Through the high involvement an agile and flexible innovation management can emerge. Since the IT-BIC is responsible for a structured innovation management, the entire innovation process can specifically be controlled. This guarantees an efficient performance from the beginning of the process (idea generation) until the final implementation. Another impact can be generated through aligning the organizational strategy to the IT-BIC strategy. This can lead to a competitive advantage and cost reduction because all operations are coordinated and work in the same direction. Furthermore, this also precisely leads to a risk minimization, since the product-, process innovation etc. is integrated early into the business organization strategy. As the IT-BIC members can concentrate and commit themselves mostly to innovative topics, this implies that only innovations will be implemented, which have a business relevance to the entire organization.

4.2.2 Organizational Change

Establishing an IT-BIC will lead to a cultural change. On the one side the IT department receives a new sight and on the other side the entire business organizations becomes more open to innovation (see Curley and Westerman, 2008, p. 42). According to Curley and Westerman (2008, p. 42) promoting and improving the organizational culture and IT's importance requires

a lot of work. Furthermore, the IT department and cultural improvements must have consistent support from the board of directors. The goal of the entire business organization should be: making innovation a daily matter for every employee. To improve the innovative thinking various measures can be implemented. An example can be an online questionaire where employees have to assess the innovation potentials so that they understand and may diagnose innovation capabilities. Another measure can be an innovation training course that teaches all participants the correct innovation management and the use of the innovation tools (see Curley and Westerman, 2008, p. 43).

Implementing new innovation tools may lead to a change of role definitions and permissions. This can lead to a new alignment of internal business processes since some of the desired processes are not consistent with the needed roles or permissions. In addition, an IT-BIC will quite possibly lead to further changes in the business structure, and some departments will have to work more closely (e.g. R&D and IT). Instead of isolating research from IT, it is necessary that the IT is involved in the experimentation and research processes, thus the IT can provide technology to prototype and simulate (see Orlov, 2005, p. 8). Furthermore, a new innovation can change the entire business model (e.g. Apple and its I-Pod innovation) (see Amit and Christoph , 2010, p. 4). The new business model involves the designing of a new activity system, which relies on new intern and extern processes such as recombining the existing resources of an organization and its partners (see Amit and Christoph , 2010, p. 1).

4.2.3 Information Technology Capabilities

A new innovation may not come from the IT department, but it's about using the existing technology. Therefore, many business organizations cannot design or introduce a new process, product or service without using technology (see Cameron, 2008, p. 3). As described in chapter 3.3 the IT capabilities can be used as an innovation enabler or implementer. IT's core competences greatly impact the business opportunity, boosting the value of the business organization. Orlov (2005, p. 4) identified six IT competences that add value when engaging with business innovation.

Table 1: IT's competences engaging with business innovation (adapted from Orlov, 2005, p. 4)

IT competences	**How they can be used**
Problem solving	The IT can identify technical and organizational problems and then develop solutions to address these problems.
Business process knowledge	The IT can develop applications that meet business process demands. This provides all stages, connections and implications of the processes.
Technology knowledge	The IT's technology knowledge can accelerate the recognition of business problems so these complications can be solved through technology solutions.

Data protection	The IT's permanent interaction with data leads to the responsibility to effectively manage and ensure integrity.
Process platform ownership	The IT's own application development ensures a reconfiguration of all processes that boosts flexibility.
Collaboration enabler	The IT can maintain web based applications that provide for all employees possibilities to submit new ideas and problem solutions.

More specifically one of the IT's competences (collaboration enabler) can be used to establish a collaborative platform where ideas can be collected and may be approved for implementation. Furthermore, the IT should provide a new process creation infrastructure, where employees can improve existing or new products, processes etc. by using a simulation and process modeling tool. But this can only be done if the organizational data assets are safely secured. To achieve a competitive advantage all sensible organizational information must stay company secret. One of the biggest challenges is that the IT has to create a technology that business users can use to drive organizational innovations without depending on IT (see Orlov, 2005, p. 10). Furthermore, the IT capabilities are essential for business interactions with external partners. Especially when new clients and other business partners request new solutions IT personnel are always involved from the beginning. They can suggest "transformational solutions" and educate clients about potential benefits (see Teo et al., 2007, p. 220).

4.2.4 Innovation Process and Strategy

Since every business organization has different priorities, goals and challenges it is presumable that each innovation process and strategy is different. Therefore, it is difficult to adopt a successful process from another business because different circumstances exist (see Barth, 2013). These circumstances can be cultural and financial issues or economic and technological changes within or outside the business organization. However, several established innovation processes (Thom, 1980; Utterback 1971; Damanpour, 1991) consist of three broad activities "Idea generation and Initiation", "Problem Solving and Development" and "Implementation and Measurement" (see Corsten, 2006, p. 34; Tarafdar and Gordon, 2005, p. 3). All frameworks are more or less idealized processes, whereas in reality most of the activities take place at the same time. This is because sub processes like non-linear time lapses and numerous cross-linkages with the innovation processes of customers and suppliers exist (Vahs and Brem, 2013, p. 236).

The first activity comprises the decision on the part of the organization to adopt an idea (see Tarafdar and Gordon, 2005, p. 3). This can be supported by using an online idea management system, which is used to gather and test all potential ideas. The ideas should be tested with clients, researchers, financiers. Furthermore, the viability of proposed technologies should be tested so future impacts may be measured (see Alonso et al., 2010, p. 531). It is important that the IT-BIC does not lose their focus on unsuccessful ideas. These should be electronically stored,

so when the technology becomes mature it may be able to transform the submitted idea (see Alonso et al., 2010, p. 531).

The second activity involves the design and development of the chosen most valuable idea. These activities are fast moving and the most important of the entire process. This is where new information on competitors, customers and existing knowledge is acquired, which can be received through electronically research systems. (Tarafdar and Gordon, 2005, p. 3). Choosing ideas from an online system requires communication of the selected idea to the entire business organization. This is necessary to generate an innovative cultural change. The idea transformation should be developed through a range of technology resources in collaboration with members of the IT-BIC. The team can begin to design a prototype technology, which should be optimized through a target performance analysis.

The third activity concentrates on the implementation and commercialization of the designed and chosen innovation. However, it is important to remember that some innovations have a high risk of not being approved to the new market. Therefore, it is necessary to always be open for new ideas. Furthermore, organizations with a great record of innovation constantly create prototypes, including web based content to demonstrate feasibility (see Alonso et al., 2010, p. 532). This creates credibility towards customers, which may increase their confidence in organizational products or services. Throughout the entire process a measurement analysis should take place. After setting milestones it is very important that a cost-benefit assessment is undertaken. Thus, it is the responsibility of the IT-BIC in cooperation with the CIO to measure if the determined milestones are reached. If this is not the case, then it is up to those responsible to decide whether to carry on with the process or not.

5. Discussion, Limitations and Recommendations

In order to construct an IT innovation management model, which describes how IT departments can support organizational innovations, Intel's innovation center was extended and organizational relationships were identified. The model described in great detail that operating an IT-business innovation center requires IT capabilities, an organizational innovation culture and an adjusted innovation process. Therefore, the IT department is able to create an IT value to the entire business organization by not only addressing their line tasks, for instance giving support with business processes, implementing standard software or operating data centers and networks, but rather by implementing a successful innovation which can generate higher revenues. According to an A.T. Kearney technological innovation study, 47% of IT innovators believe that the IT department is the significant driver in generating revenues (see Eul et al., 2012). More specifically, 20% of respondents report that IT innovation is a major revenue driver. Furthermore, IT innovators understand the importance in investing in innovations and designing an innovative culture that encourages and manages new ideas (Eul et al., 2012). Therefore, it is necessary that the entire business organizations believes in the value of the IT department. As mentioned earlier, the IT department has several opportunities in engaging

with innovation topics. The department can support these topics by providing either technology to drive the innovation process or they can use their capabilities to transform innovative ideas. The aforementioned online innovation platform provides an integrated database with needed information for every employee. This raises the information and knowledge exchange and enables a simultaneous work progress. The provided technology also allows individuals to communicate all ideas and information's both internally and externally with small circumstances. Using technology as an implementer enables a lot of opportunities. Nearly every production and implementation process is supported by the employment of technology. Nowadays, the majority of processes are automatized through diverse IS. It is possible to create or transform nearly every business idea through technology. However, technology is not only used for transforming an idea; it can also optimize a process. An example is when Procter and Gamble were seeking to implement a new product, they not only used their technological capabilities to build the product, they even had possibilities to virtualize and simulate shortened engineering processes by minimizing the laboratory time and improving their product placement in stores (see Orlov, 2005, p. 7).

Furthermore, implementing an organizational IT Business innovation center requires several organizational preconditions. First, an important requirement for accomplishing an IT innovation management is that the IT innovation culture has to be taken over, accepted and communicated by the entire business organization. Therefore, it is essential that all employees must participate either in creating new ideas and solutions or transforming the idea through the innovation process. Second, it is vital that at least one employee takes over the coordination responsibilities within the IT-BIC. His/her job is to support the CIO and his/her innovation management tasks. Furthermore, it is necessary that other employees from other departments engage with the innovation process. Of course this will not always be easy while human resources are often minimized. Third, having support and trust from the board of directors is a fundamental requirement for a successful innovation management. The CIO and other executives and business partners must believe in the IT innovation abilities because they permit and provide funding's which create new innovation possibilities. Fourth, IT innovation budget must be available for future innovation processes. Kießling et al. (2011, p. 9) suggest that a "partnership based financial model" between the IT innovation management and business department should exist. This would support the sharing of responsibilities, which assures the concentration on innovations that actually generate business value. Fifth, using IT resources to drive innovation requires creative and effective IT employee's knowledge. IT tools and methods can only support an innovation process to a certain stage. Therefore, it is vital that IT employees raise their innovation skills to support innovation processes. This would be another great opportunity to demonstrate the IT's ability in being a credible internal consultant.

The described innovation management model is very generic. Therefore, the first limitation refers to the analysis of only one business organization (Intel Inc.). To have a greater understanding it would be appropriate to review further business organizations and their innovative

culture. According to a Boston and Consulting survey Apple and Google are the world's most innovative business organizations, whereas Intel is "only" ranked as 19th place (see Taylor et al., 2012, p. 5). It would be interesting to review how Apple or Google use their IT resources to drive innovation. For example Google's innovation management is based on their employee's ideas. Google uses an innovation management tool called Google Moderator, where ideas can be suggested, discussed and voted for (Forbes, 2013).

The second limitation deals with the possibility of implementing such an IT business innovation center. As Intel is a large business organization with approximately 100.000 employees and $54 Billion annual revenues (2012), it has way more opportunities in implementing such an innovation center. If such an IT innovation center is possible for small or medium sized businesses cannot be verified through the organizational IT-BIC model. However, it can be assumed that certain adjustments have to be realized when implementing such an innovation center.

The third limitation deals with the lack of literature. Although we used several search engines not many credible references that discuss the IT innovation management topic were found. According to Kießling et al. (2012, p. 3) the research field of IT innovation management is very young. Therefore, the IT innovation research lacks of consistent and approved approaches. Some relevant practical approaches were found but only address how IT should be managed to use it for business innovation. Unfortunately we could not find one credible reference model which discussed the IT innovation management topic. Therefore, we used the Intel's practical approach and tried to identify the organizational relationships to such an IT innovation center.

In order to design an integrated IT innovation management model, further research must be conducted. The extended IT innovation center and its organizational relationships can be used for further research. With regard to organizational relationships, further business organizations can be examined so a best practice may be identified. The best practice could identify how the organizational strategy should be aligned to the IT's innovation strategy. Further examinations on the use of IT resources in an innovation process could be made. As the organizational culture plays an important role in the management of innovations this could be another research issue. Because the IT Business Innovation model conducts no quantitative research, there could be a need for addressing the benefits empirically of such a model. Intel's innovation center increased the demand of their products, external recognition and their substantial business value. According to Curley and Westerman (2008, p. 45) Intel's innovation center delivered 40% of the annual revenues and an overall return on investment of more than 350%. Therefore, it would be useful to analyze which outcome can be achieved by implementing such a model in other business organizations.

In addition to the organizational relationships, other relationships should be considered. These could include for example a specific relationship of external partners. The above described model focuses more on internal relationships; therefore it would be interesting to research how an IT innovation center can collaborate with the industry. Intel uses their partnerships with other business organizations (e.g. Microsoft, SAP, Google etc.) to establish an Innovation value

institute. There they can investigate on new ideas and disseminate frameworks and tools for managing IT innovations (see Curley and Westerman, 2008, p. 44).

Based on the organizational IT-BIC, business organizations and their IT departments can use this model as a foundation. The model offers an overview of how the IT-BIC can be implemented in the business organization. Although, every business organization will have different circumstances through their environment and strategic orientation the model illustrates which organizational relationships may influence the IT-BIC. However, it is necessary that the IT department is accepted as a strategic needed asset that is able to accelerate innovation topics.
In today's economy more and more business organizations already use innovation centers in collaboration with their R&D. Microsoft for example has more than 80 innovation centers worldwide. They collaborate with local governments, academic institutions or other industry organizations etc. (Microsoft, 2010). Therefore, implementing such an IT-BIC model should consider collaborations with academic institution etc. According to Andersen et al. (2013, p. 4) business organizations that collaborate with universities have successful experiences. Especially the co-creation and an exchange of knowledge is a benefit for both sides. The created new knowledge may identify new opportunities in solving or optimizing sophisticated business challenges. Furthermore, the created knowledge can be used to develop new products or processes. However, Andersen et al. (2013, p. 11) identified that Small and Medium Enterprises (SMEs) had difficulties in using such a collaboration concept compared to large business organizations. Thus, it would not only be essential that the above described IT-BIC is adjusted to SME's moreover an incentive has to be created for all SMEs to engage in such collaboration.

6. Conclusion and Outlook

With the beginning of a review of innovation management research in IS domain, this paper focuses on innovation management and how to drive innovation through IT. First of all, we described a practical approach, which supports the creation of an IT strategy process with regard to the business value. Based on the aligned IT strategy we presented a theoretical approach which describes how the IT department can engage in business processes and creates an IT value to the entire business organization. The IT value is an important pre-condition for being accepted as a source to drive innovation. Either the IT can be used as an enabler or implementer to create new products, processes or services etc. Within design oriented research, we developed an IT Business Innovation Center model, which referenced the Intel innovation center. The model describes how the IT innovation center should be positioned in the IT department. Furthermore, we identified four attributes which are in a close relationship to the IT-BIC.
In conclusion the IT department can support and drive innovations by using their capabilities. They can contribute by creating a flexibility of technology, promoting their technology resource and encourage all employees to engage in the innovation thinking. Therefore, the IT has to be accepted as a reliable partner. More important is that successful innovations can only occur if

the organizational strategy and especially the culture are aligned to the innovation purposes. Furthermore, the business organization has to ensure that one of the core activities is IT innovation.

Today's innovation management trend goes more and more towards open innovation. Open innovation means "looking outside" for innovative ideas and collaborating with external partners including customers and inventors. Future research can address how IT can facilitate in open innovation processes. Especially the different strategies between the innovation partners may become a difficulty. Therefore, it can be analyzed in what way the IT can enhance the trust, knowledge sharing and coordination among diverse partners (see Nambisan, 2013, p. 220).

References

A.T. Kearney, 2005. *European Best Innovators – The New Frontiers.,* Düsseldorf: A.T. Kearney.

A.T. Kearney, 2009. *Delivering Technology Innovation - A.T. Kearney's IT Innovation and Effectiveness Study.* [Online]
Available at:
http://www.atkearney.com/documents/10192/628355/Delivering_Technology_Innovation.pdf/8ee101f5-741a-4edf-9c78-1b0f68fae4f3
[Accessed 27.11.2013].

Accenture, 2010. *Achieving high performance through an effective IT strategy.* [Online]
Available at:
http://www.accenture.com/SiteCollectionDocuments/PDF/IT_Strategy_brochure_page_view.pdf
[Accessed 01.11.2013].

Allison, D. H., 2010. *The Future CIO: Critical Skills and Competencies,* Colorado, USA: ECAR Research Bulletin 15.

Alonso, I. A., Verdún , J. C. and Caro, E. T., 2010. Information Technology to Help Drive Business Innovation and Growth. In: T. Sobh & K. Elleithy, eds. *Innovations in Computing Sciences and Software Engineering.* Dortrecht: Springer Science + Business Media , pp. 527-532.

Amit, R. and Christoph , Z., 2010. *Business Model Innovation: Creating value in times of change,* Barcelona, Spain, IESE Business School - University of Navarra: Working Paper 870.

Andersen, B., De Silva, M. and Levy, C., 2013. *Collaborate to innovate - How business can work with universities to generate knowledge and drive innovation,* Lancaster, UK: Big Innovation Centre.

Association for Information Systems, 2012. *MIS Journal Rankings.* [Online]
Available at: http://start.aisnet.org/?JournalRankings
[Accessed 24.10.2013].

Baier, M., Graefe, G. and Riederer, J., 2005. Innovation Management – An Overview and some Best Practices. In: W. Kern and F. Rammig, eds. *C-LAB Report Vol. 4.* Paderborn: C-LAB, pp. 1-58.

Barth, S., 2013. *Breakthrough thinking - how companies boost innovation.* [Online]
Available at: http://www.krauthammer.com/articles/breakthrough-thinking-%E2%80%93-how-companies-boost-innovation
[Accessed 11.11.2013].

Cameron, B., 2008. *IT Can Help Accelerate Business Innovation,* Cambridge, Massachusetts, USA: Forrester Research.

Capgemini, 2013. *IT Trends 2013.* [Online]
Available at: http://www.de.capgemini.com/sites/default/files/resource/pdf/capgemini-studie_it-trends_2013.pdf
[Accessed 23.10.2013].

Corsten, H., Gössinger, R. and Schneider, H., 2006. *Grundlagen des Innovationsmanagements.* 1. ed. München: Vahlen Verlag.

Curley, M., 2004. *Managing Information Technolgy for Business Value - Practical Strategies for IT and Business Managers*: Intel Press IT Best Practices Series.

Curley, M. and Westerman, G., 2008. Building IT-Enabled Innovation Capabilities at Intel. *MIS Quarterly Executive Vol. 7 No. 1*, pp. 33-48.

Davenport, T. H., 1993. *Process Innovation: Reengineering Work through Information Technology.* 1. ed. Bosten, Massachusetts, USA: Harvard Business School Press.

David, S. and Dreischmeier, R., 2010. *Technology Enabled Innovation,* Atlanta, Georgia, USA: Boston Consulting Group.

Diedrichs, E., Engel, K. and Wagner, K., 11/2006. *European Innovation Management Landscape - Assesment of current practices in Innovation Management Consulting Approaches and Self-Assessment*

Tools in Europe to define the requirments for future "best practices", Augsburg: Europe INNOVA paper no. 2.

Eul, M., Hagen, C., Hughes, C. and Miller, J., 2012. *A.T. Kearney study - IT Innovation Spurs Renewed Growth.* [Online]
Available at: www.atkearney.com/research-studies/it-innovation-study/full-report/
[Accessed 14.11.2013].

Feeny, D. F., Edwards, B. and Simpson, K., 1992. Understanding the CEO/CIO Relationship. *MIS Quarterly (16:4)*, pp. 435-446.

Feeny, D. F. and Ross, J. W., 08/1999. *The Evolving Role of the CIO,* Cambridge, Massachusetts, USA: CISR Working Paper Nr. 308.

Forbes, 2013. *Google's Secrets Of Innovation: Empowering Its Employees.* [Online]
Available at: http://www.forbes.com/sites/laurahe/2013/03/29/googles-secrets-of-innovation-empowering-its-employees/
[Accessed 23.11.2013].

Gartner, 2012. *Gartner CEO Survey Shows 2012 is the Year of Living Hesitantly.* [Online]
Available at: http://www.gartner.com/newsroom/id/1984416
[Accessed 17.10.2013].

Gartner, 2013. *IT Glossary - IT Governance (ITG).* [Online]
Available at: http://www.gartner.com/it-glossary/it-governance/
[Accessed 01.11.2013].

Goldman, E., 2013. *IT peer network - IT as an Applied Science: A Disciplined Process for IT Innovation.* [Online]
Available at: https://communities.intel.com/community/itpeernetwork/blog/2013/07/02/it-as-an-applied-science-a-disciplined-process-for-it-innovation
[Accessed 05.11.2013].

Granig, P. and Perusch, S., 2012. *Innovationsrisikomanagement im Krankenhaus - Identifikation, Bewertung und Strategien.* 1. ed. Wiesbaden: Springer Gabler Verlag.

Hall, E. and Smith, A. B., 2012. *The CEO's guide to: Driving Innovation - Innovation: An act of leadership.* [Online]
Available at: http://www.ddiworld.com/DDIWorld/media/booklets/ceo-guide-to-innovation_bk_ddi.pdf?ext=.pdf
[Accessed 16.10.2013].

Hofbauer, T. H. and Wennmann, M., 2008. Auf dem Weg zur Geschäftsentwicklung mit der IT – Die innovative Kraft der IT für die Geschäftsentwicklung nutzen. In: F. Keuper, M. Schomann & R. Grimm, eds. *Strategisches IT Management.* Wiesbaden: GWV Fachverlag, pp. 79-98.

Horsch, J., 2003. *Innovations- und Projektmanagement: Von der strategischen Konzeption bis zur operativen Umsetzung.* Wiesbaden: Gabler Verlag.

Kießling, M., Wilke, H. and Kolbe, L. M., 2010. Overcoming challenges for managing IT.. *Proceedings of the 16th Americas Conference on Information Systems (AMCIS 2010). Lima, Peru*, 12-15 August.

Kießling, M., Wilke, H. and Kolbe, L. M., 2011. An Organizational Model for Managing IT Innovations in Non-IT Companies.. *Proceedings of the 44th Hawaii International Conference on System Sciences (HICSS 2012)*, 4-7 January, *Hawaii, USA*.

Kießling, M., Wittig, N. and Kolbe, L. M., 2012. Innovationsmanagement in IT-Abteilungen – eine fallstudienbasierte Untersuchung. *Multikonferenz Wirtschaftsinformatik 2012 Tagungsband der MKWI 2012, Braunschweig*.

Koetzier, W. and Kristensen, S., 2011. *Accenture - The Innovation Death Spiral.* [Online]
Available at:
http://www.accenture.com/SiteCollectionDocuments/PDF/Accenture_The_Innovation_Death_Spiral.pdf
[Accessed 15.10.2013].

Koudal, P., 2005. *Deloitte - Mastering Innovation – Exploiting Ideas for Profitable Growth.* [Online]
Available at: https://www.deloitte.com/assets/Dcom-Australia/Local%20Assets/Documents/Mastering%20Innovation%20Exploiting%20Ideas%20for%20Profitable%20Growth.pdf
[Accessed 15.11.2013].

Melnicoff, R. M., Shearer, S. G. and Goyal , D. K., 2005. Is there a smarter way to approach IT governance?. *Accenture Outlook Journal – The Journal of High-Performance Business, No. 1*, pp. 81-87.

Microsoft, 2010. *About Microsoft Innovation Center.* [Online]
Available at: http://www.microsoft.com/mic/mic-about.aspx
[Accessed 24.11.2013].

Müller, S., Möller, E. and Nygaard, T., 2012. IT-enabled Process Innovation: A Literature Review. *Proceedings of the 18th Americas Conference on Information Systems (AMICS 2012)*, 9-11 August, Seattle, USA.

Nambisan, S., 2013. *Information Technology and Product/Service Innovation: A Brief Assessment and Some Suggestions for Future Research,* Milwaukee, USA: Journal of the Association for Information Systems: Vol. 14: Iss. 4, Article 1, p. 215-226..

Namchul, S., 2010. An empirical study of the relationship between information technology and firm performance. *Proceedings of the International Conference on Information Resources Management (CONF-IRM 2010)*, 16-18 May, Montego Bay, Jamaica.

Neumann, M., Hohler, B. and Breitner, M. H., 2010. Beyond Delivery Excellence: Ein Konzept zur strategischen Positionierung interner IT-Dienstleister. In: S. Reinheimer and H. Fröschle, eds. *Cloud Computing & SaaS.* Heidelberg: dpunkt.verlag, pp. 85-93.

Noé, M., 2013. *Innovation 2.0 - Unternehmenserfolg durch intelligentes und effizientes Innovieren.* Rheinbach: Springer Gabler Verlag.

Organisation For Economic Co-Operation and Development (OECD), 2005. *Oslo Manual - Guidelines for collecting and interpreting innovation data.* 3rd ed. Paris: OECD Publishing.

Orlov, L. M., 2005. *Make IT Matter For Business Innovation - How To Boost The IT Organization's Contribution To The Enterprise,* Cambridge, Massachusetts, USA: Forrester Research Best Practices.

Prottung, S., 2008. Auf dem Weg zur Geschäftsentwicklung mit der IT - Die innovative Kraft der IT für die Geschäftsentwicklung nutzen. In: F. Keuper, M. Schomann and R. Grimm, eds. *Strategisches IT Management.* Wiesbaden: GWV Fachverlag, pp. 65-78.

Soh, C. and Markus , M. L., 1995. How IT Creates Business Value: A Process Theory Synthesis. *Proceedings of the 16th International Conference on Information Systems (ICIS 1995). Paper 4.*, pp. 29-41, Amsterdam, Netherlands..

Tarafdar, M. and Gordon, S. R., 2005. How Information Technology Capabilities Influence Organizational Innovation: Exploratory Findings from Two Case Studies. *Proceeding of the 13th European Conference on Information Systems (ECIS 2005) Proceedings. Paper 17.*, 26-28 May, Regensburg, Germany.

Taylor, A., Wagner, K. & Zablit, H., 2012. *The most innovative companies 2012.* [Online]
Available at: http://www.bcg.de/documents/file125210.pdf
[Accessed 25.11.2013].

Teo, T., Ranganathan, C. and Srivastava, S. C., 2007. Fostering IT-Enabled Business Innovation at. *MIS Quarterly Executive 6*, pp. 211-223.

Uebernickel, F. and Brenner, W., 2013. Die Herausforderungen der IT heute. In: F. Abolhassan, ed. *Der Weg zur modernen IT-Fabrik.* Saarbrücken: Springer Gabler Verlag, pp. 11-37.

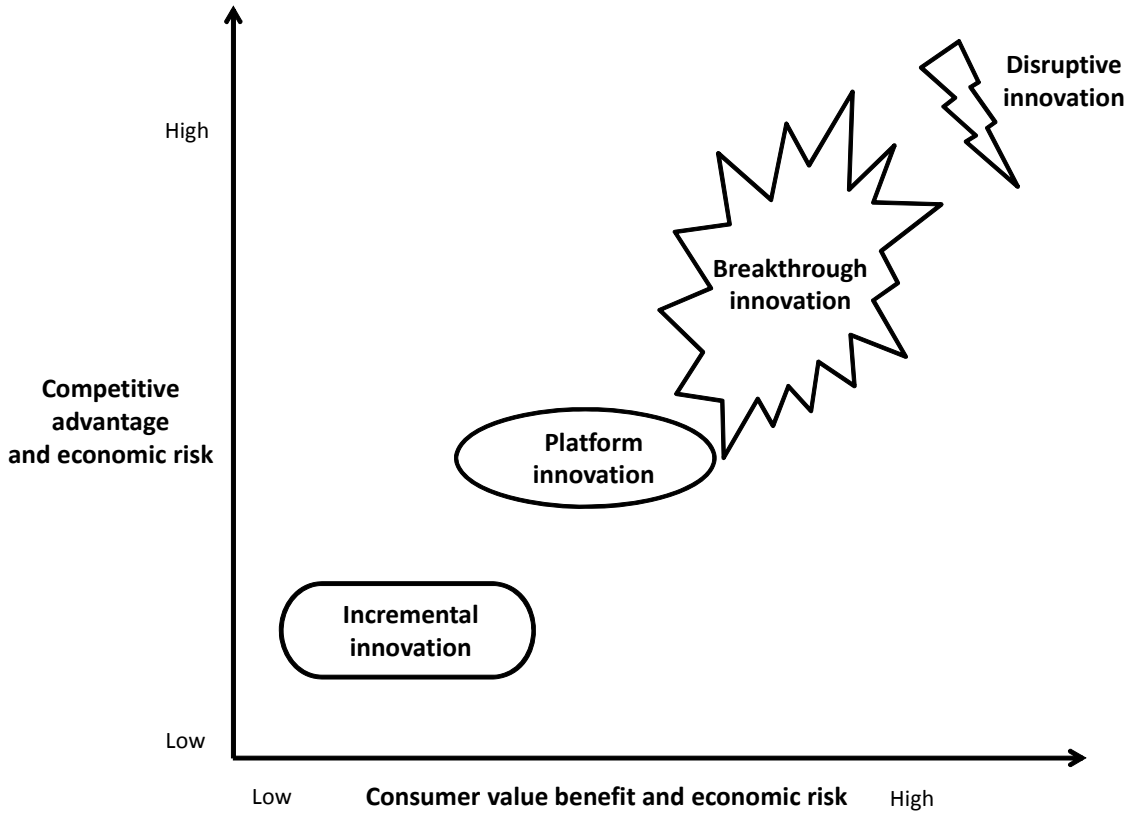
Vahs, D. and Brem, A., 2013. *Innovationsmanagement - Von der Idee zur erfolgreichen Vermarktung.* 4. ed. Nürnberg: Schäffer/Poeschel Verlag.

vom Brocke, J., Simons, A., Niehaves, B., Riemer, K., Plattfaut, R. and Cleven, A. 2009. Reconstructing the Giant: On the Importance of Rigor in Documenting the Literature Search Process. *Proceedings of the 17th European Conference on Information Systems (ECIS 2009)*, 8-10 June, Verona, Italy.

Webster, J. & Watson, R. T., 2002. Analyzing the past to prepare for the future: Writing a liturature review. *MIS Quarterly, 26, 2,* pp. 13-23.

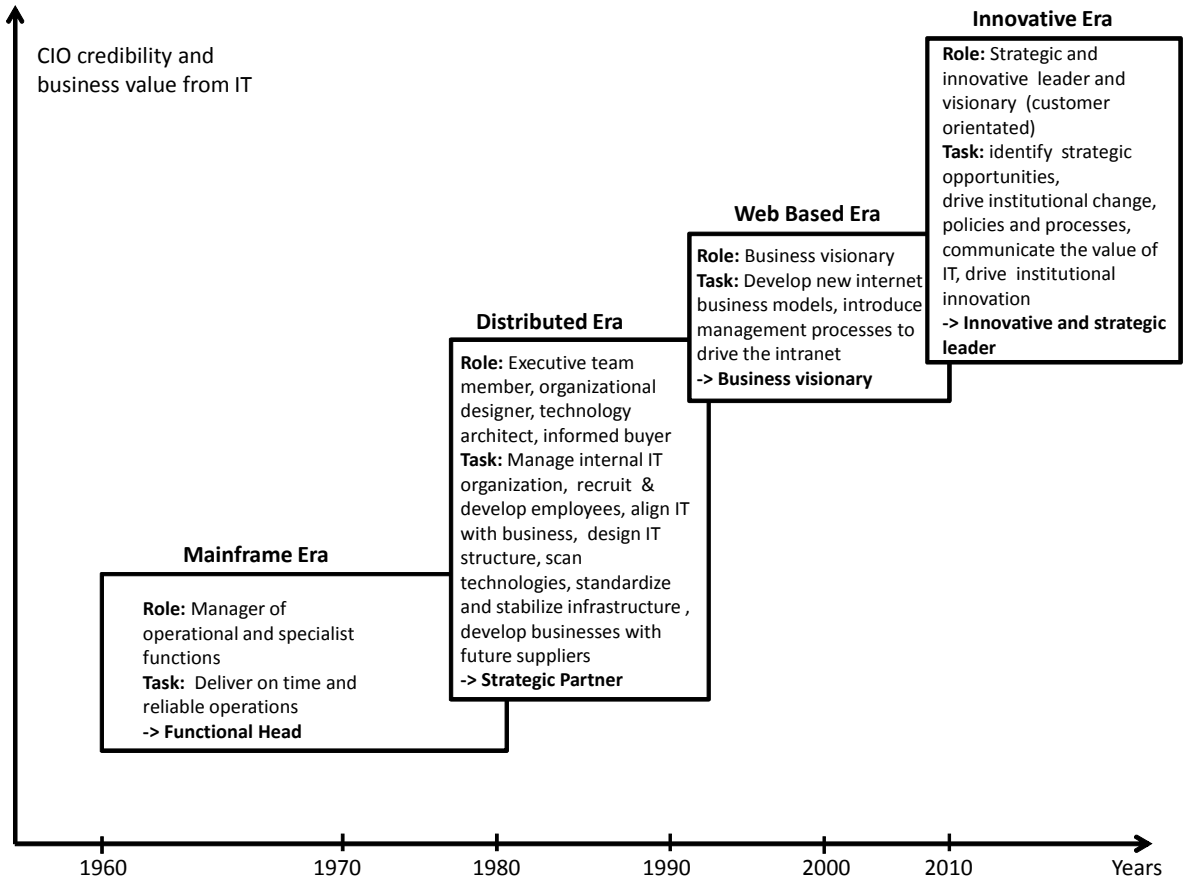
Appendix

Appendix 1: Competitive innovation matrix



(own representation based on Koetzier and Kristensen, 2011, p. 3; Noé, 2013, pp. 3-4)

Appendix 2: CIO's IT competencies matrix



(own representation based on Feeny and Ross, 1999, p. 3 et seqq.; Allison, 2010, p. 10)

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