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Overcoming challenges for managing IT innovations in non-IT companies

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ABSTRACT

Information technology (IT) impacts almost every business unit inside the enterprise. However, the role of the IT organization as an enabler of growth and driver of business innovation is mostly ignored. In this paper we introduce six non-IT companies which assess IT innovations as important for their strategy and competitive advantage. Four companies already created formalized structures for managing IT innovations. We describe the reasons why companies have chosen to create those structures and which challenges they experienced. Furthermore, we reveal reasons why companies do not create formalized structures, although IT innovations are important for their business. As a result we propose measures how companies can overcome these challenges to manage IT innovations. Approaching these steps will not only lead to successful IT innovations and improved processes, it will also strengthen the perception of the IT organization as an innovative partner.

Keywords

IT innovation, IT innovation management, IT innovation management challenges

INTRODUCTION

An IT innovation can be defined as the creation and adoption of something new whose underlying basis lies with information technology that creates business value (Teo, Ranganathan, Srivastava and Loo, 2007; Lind and Zmud, 1991). We further define an IT organization as a company or department that provides IT products and IT services. Contrary, a non-IT company is an organization that does not have its core business in IT.

IT organizations in non-IT companies are always in a fundamental tension between the need to make IT more efficient and to provide an innovative IT (Baldwin and Curley, 2007). During the past 30 years, IT has been the source of endless new possibilities and successful business innovations. American Airlines and its product Sabre or Dell's supply chain management process are only a few examples among these innovations (Orlov, Radjou, Pohlmann and Bright, 2005). IT organizations which are the origin of these innovations have become increasingly responsible for the success of the enterprise. However, many IT organizations have lost their way in the past few years. Spending on IT innovations in percentage of the IT budget decreased from 30% in the year 2000 to 14% in 2009 (Haas, Hagen, Kane, Beebe, Miller, Philip and Sansone, 2009). Instead of investing in new work, experimentation and innovation, IT organizations spend more and more resources on legacy systems to keep the business running.

While companies that focus on IT innovations like Google or Microsoft are born to innovate (Kohli and Melville, 2009) companies in other industries often facing enormous challenges with managing IT innovations that creates business value. Although more than 50% of non-IT managers recognize the IT organization's contribution to business strategy, only 22% see a contribution to business innovation (ITGI 2009). As a result, many non-IT companies keep the IT organization out of the innovation process.

In order to examine challenges that companies face with the management of IT innovations, we followed Eisenhardt's (1989) case study research and started with addressing the following two research questions:

- Which challenges are non-IT companies facing with the management of IT innovations?
- Which measures can be taken to overcome these challenges?

Our study identified four specific challenges that non-IT companies are facing with the management of IT innovations. As a key contribution to research and practice, we propose measures, how the challenges can be approached.

The next chapter encompasses a brief review of the IT innovation literature. After that, the methodology of the study will be explained. Following this, the results of the study will be presented, challenges identified and measures described. Finally, limitations of the study and theoretical as well as practical implications are provided.

THEORETICAL BACKGROUND

Organizational innovation and IT innovation

Regarding to Wolfe (1994), organizational innovation can be divided into three sections: diffusion of innovation, factors of the innovativeness of organizations and the innovation process. The economic revenue as a consequence of a successful implementation of an innovation is as vital as the new idea itself. In the business sciences literature, organizational innovation is broadly defined as the new application of knowledge, methods and technologies, which increase the competitive advantage of a company at least for a certain amount of time (Andersson, Lindgren and Henfridsson 2008; Becker and Whisler 1967; Rogers 1995; Jetter, Satzger, and Neus 2009).

The literature on IT innovations has many parallels to organizational innovation. (Lee and Kim 1998). Lind and Zmud (1991) define an IT innovation “as administrative or operational ideas, practices or objects, perceived as new for an organizational unit and whose underlying basis lies with information technology”. A simplified definition can be found by Swanson (1994), who defined information systems innovations as “innovations in the organizational application of digital computer and communications technologies (now commonly known as information technology)”.

Furthermore, Swanson recognized the role of IT for organizational innovation and expanded Daft’s (1978) *Dual-Core-Model* with the IT innovation component. The developed *Tri-Core-Model* comprises three different typologies: (1) IT process innovations inside the IT organization, (2) IT process and product innovations in the administrative core of the host organization and (3) IT process and product innovations with core business technology and an impact on business administration as well. Finally, the *Tri-Core-Model* is widely accepted not only due to the empirical evidence by Grover, Fiedler and Teng (1997). Rose and Lyytinen (2001) criticize the missing consideration of changes in the underlying IT base. They extend Swanson’s model to the *Quad-Core-Model* which includes IT base innovations as a fourth outer core.

Business Value of IT

When defining the components of IT business value, Melville, Kraemer and Gurbaxani (2004) refer to organizational performance impacts of IT, including productivity enhancement, profitability improvement, cost reduction, competitive advantage, inventory reduction, and other measures of performance.

Empirical studies on whether IT does or does not contribute value have led to different results (Soh and Markus 1995). Kauffman and Weill (1989), for example, did not find an association between IT investments and superior business performance. Hitt and Brynjolfsson (1994) showed that IT is associated with increased productivity and substantial value for customers. Nevertheless, the benefits have not resulted in measurable improved business value. Soh and Markus (1995) underline, that the question of whether IT creates business value is not explicit enough. They developed a process model which determines exactly how, when and why IT investments lead to higher organizational performance.

Finally, Melville et al. (2004) state that companies in fast changing industries may perceive the business value of IT in using it to constantly innovate and create an IT-based competitive advantage.

IT innovations for business value

For the effective development of IT innovations for business value, Kohli and Melville (2009) describe a set of competencies which they call an IT Innovation Platform. These competencies enable IT innovations to impact the whole company, which lead to business value through improved business processes and competitive advantage. Regarding to Baldwin and Curley (2007), the management of IT innovations is a new research field, which consists of the immature research areas of IT management and innovation management. They developed a capability maturity framework which describes five different steps how the IT organization uses the following competencies for IT innovations: manage innovation like a business, manage the innovation budget, manage the innovation capability, realize and assess business value.

Research Gap

The role of the IT organization in enabling competitive advantage is well established (Kohli 2007), but empirical studies in this area have led to different results (Soh and Markus 1995). It is not surprising that especially non-IT companies find it

also challenging to manage IT innovations. Table 1 shows that IT innovation research has been explored from different perspectives.

Focus	Author	Result
Technical view of IT innovations	Swanson 1994	Tri-Core-Model
	Rose and Lyytinen 2001	Quad-Core-Model
Business value of IT innovations	Teo et al. 2007	Three Key Lessons
	Kohli and Melville 2009	Platform for adaptive IT innovation
IT innovation management process	Baldwin and Curley 2007	Capability Maturity Framework for systematic IT innovation

Table 1. Focus of current IT innovation research

However, literature on IT innovation research mainly focuses on technical aspects and the degree of novelty. Recently first studies for business value of IT innovations as well as the IT innovation management process have been conducted. Teo et al. (2007) contribute to research in this area providing three key lessons for CIOs and other organizational leaders on how to foster IT innovations for business value. Specific challenges that IT organizations face when managing IT innovations, especially in collaboration with other organizational units, have not been in focus of any research. This study aims to contribute to the IT innovation management research to fill the gap.

METHODOLOGY

Case study research is clearly useful when the research phenomenon is not supported by a strong theoretical base (Benbasat, Goldstein and Mead 1987; Yin 2008). Furthermore, a multi-case design allows for cross-case analysis and theory extension and can consist out of few cases. For our case studies we focused on non-IT industries that provide the biggest gap of sales generated by new products between top innovators and poor innovators (ADL 2005). As a result, we studied six companies from which four had already implemented formalized structures for IT innovation management.

All participating experts were IT innovation managers or equivalent manager positions with managerial responsibility on the topics innovation, research and development or technology. In Table 2, the interviewed companies are introduced, along with the number of employees and a description of their related industry.

Company	No. of employees	Revenue in million € in 2008	Formalized structures for managing IT innovation	Related industry	Share of total sales generated by new products between top innovators and poor innovators in the industry (Top / Poor)
A	> 100,000	> 50,000	Yes	Automotive manufacturer	66% / 24%
B	> 50,000	>10,000	Yes	Finance	31% / 7%
C	> 100,000	> 50,000	Yes	Logistics	37% / 6%
D	> 50,000	> 10,000	Yes	Automotive supplier	66% / 24%
E	> 10,000	> 2,000	No	Engineering	60% / 20%
F	< 5,000	< 500	No	Pharmaceuticals	40% / 11%

Table 2. Interviewees' sample demographics

An interview guideline that contained 20 questions was created to provide a framework for the survey. Based on the theoretical foundations, interview topics were outlined and grouped into three sections: 1) the role and importance of the IT organization; 2) the appreciation and awareness of IT innovations inside the company; 3) the management of IT innovations. In order to encourage interviewees to express their opinions, many questions were open-ended. The order and direction of topics varied, as openness and flexibility allowed new points to be raised. All interviews took place in August and September of 2009. All conversations were held as telephone interviews based on the interview guideline and took around 30 to 70 minutes of time. After consulting the participants, all conversations could be recorded.

We followed Kohli and Melville (2009, 124) to synthesize and extract meaning from the case studies using a qualitative comparative analysis (QCA) approach described by Ragin (1999). QCA is a technique which is used for problem solving by making causal inferences comparing a small number of cases. We collected data from the interviews in a table and identified similarities and differences from all four companies. Following this, we grouped the results by consistent dimensions and summarized the findings.

FINDINGS

In this section the findings of the study are presented. We provide information why four companies already implemented an IT innovation management department in the organizational structure and why the other two companies did not. The main tasks of the department are coordination of the IT innovation process and communication of the IT innovation culture as well as assessment of IT innovations. Furthermore we show four identified challenges companies are facing with the management of IT innovations.

Reasons for formalized structures to manage IT innovations

All interviewees argued that traditionally IT is not perceived as a source of innovation in their company. One reason for the implementation of the IT innovation management was to finally disprove this fact and increase the perception of the IT organization as a business innovator. Another mentioned reason was that IT innovations are not noticed by the classical innovation management team. Furthermore, the IT industry has proven to be extremely dynamic as new technologies and products are pushed into the market.

For example, innovation in the automotive sector starts to be more and more IT driven, due to rising innovation cycles in core business. As company A's head of IT innovation management stated: "Because 70-90 % of the firm's automotive innovations are enabled or driven by IT, a structured process for IT innovations became essential". Before the implementation, all companies described that they were not able to keep pace with the rapid development in this area. Although a variety of new ideas appeared in the IT organization a lack of resources for coordination and assessment often hindered successful IT innovations. Thus, changes in the organizational structure became inevitable for a structured IT innovation process.

Another important motivation for implementing an IT innovation management was to improve the perception of an innovative IT organization and to activate the innovative capabilities of the IT organization. Additionally, it was aimed to strengthen the position of the IT employees as competent and proactive partners rather than mere reactive suppliers. Finally, all experts referred to the fast-rising relevance of IT for all enterprise functions and the general need for consolidation and standardization.

Reasons against formalized structures to manage IT innovations

Company E and F did not yet implement any formalized IT innovation management structures. However, both companies are aware of the IT organization's importance for their business. Furthermore, it was mentioned that the size of companies is the main reason for no formalized structures.

Beside the company size, another important reason seems to be the companywide understanding of IT innovation: Within both companies, the origin of IT innovations is not perceived. In fact, IT innovation tends to be reduced on technical innovations. Therefore, IT driven business innovations are not considered as IT innovations. Both companies merely perceive IT innovations as new software applications to support the products developed by the company. In company F, information technology is currently perceived rather as a tool than a driver for innovation; nevertheless, its representative is aware of the future necessity of transforming the present informal approach to a guided process as the company expands.

Both enterprises apply IT to improve their business products or to provide additional services supporting their products. They can be seen as highly innovative, driving innovations with IT; however, these do not yet derive from the preliminary work of a systematic IT innovation management.

First challenge: IT organization is stuck between operational excellence and innovation

IT organizations in non-IT companies are always in a fundamental tension between the need to make IT more efficient and to provide an innovative IT. Business units demand an operational excellence in terms of maintenance and support for information systems. IT organizations spend more and more resources on legacy systems to keep the business running. Companies B, C and D mentioned that streamlining and cost pressure led to a lack of financial and human resources which hinders to invest in innovation. All companies report, that before implementing formalized structures for managing IT innovations, there were responsibilities for innovation, no dedicated budgets and no time for employees to experiment.

Second challenge: No management commitment

As for many other changes in a company, it is always an advantage to motivate the management team to support the new ideas and to take responsibility. All four companies that implemented formalized structures underlined that besides support from top management, it is essential to involve department managers for the management of IT innovations. Furthermore, companies B and D mentioned that it was against their perception no problem to achieve top management support, but even more difficult to convince department managers. Because these managers have to deal with an own lack of resources in the department, they are rarely convinced that they should provide resources for IT innovations.

Third challenge: No IT innovation culture

The third challenge, we identified deals with development and communication of an IT innovation culture. Company B stated that in the beginning it was difficult to define the term IT innovation and to communicate it to the employees to engage their motivation and activate their innovation potential. Company C tried to approach especially further education for employees in the areas technology and creativity. Another part of this challenge was the understanding that IT innovations are not only disruptive product innovations like an iPhone, but also incremental process innovations. Furthermore, we realized that many employees struggle with their own innovative ability because they think they are not innovative. All companies knew about the strength of flexible time for employees to invest in innovation like Google is providing it. Nevertheless it is not easy to arrange this flexibility. We also identified constraints from employees to provide new ideas because they were afraid of rejection.

Fourth challenge: IT organization is not seen as an innovative partner

Taking the first three challenges into consideration it was quite obvious to identify the fourth challenge. All six companies argued that the IT organization is neither seen as innovative nor as a partner for the business units. In general, the origin of an IT innovation is not seen in the IT organization. It is rather seen in business units as one of our interviewees put it: "RFID is not an IT innovation, it is a logistic innovation". Although the IT organization changed dramatically in the last years, it is not able to communicate it to the business units which think more of a reactive service provider than an enabler of innovation and business growth. Companies A and D state that this challenge was also the initial driver to create and implement formalized structures for the management of IT innovations.

DISCUSSION

Our findings identified four challenges which have to be mastered for a successful management of IT innovations. These challenges have to be approached in different areas of a company. Figure 1 depicts a simple view of an organization including management, business units and the IT organization as well as culture. The numbers 1 to 4 represent the four challenges and where they have to be approached.

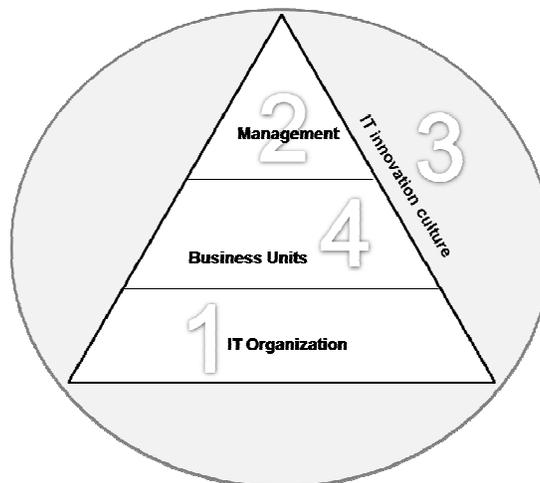


Figure 1. Managing IT innovations in different areas of the organization (see also Figure 2)

The first challenge has to be solved from the IT organization itself. They have to provide operational excellence and IT innovations that enable business innovations with sparse resources. For the provision of more resources to drive business growth, it is essential to get top management support. Moreover, one critical factor is the integration of department managers

because a large potential for IT innovations lies inside other departments than the IT organization. Furthermore, developing, communicating and implementing an IT innovation culture will spur employees to develop IT innovations and decrease rejection constrains. Revealing the origin of important IT innovations will also improve the understanding and differentiation of IT innovations. As long as the origin of those innovations is not seen, IT cannot reap the grapes for its work. Approaching these challenges will not only lead to successful IT innovations and improved processes, it will also lead to improve the perception of an innovative IT organization. Additionally, it will strengthen the position of the IT employees as competent and proactive partners rather than reactive suppliers.

We provide four measures for IT managers and other organizational leaders how the identified challenges can be approached. While first ideas for fostering an IT innovation culture (challenge three) can also be found in the literature (Teo et al., 2007; Kohli and Melville, 2009), the measures for challenges one, two and four are based on our case studies. Table 3 provides an overview of challenges, measures and operational activities for managing IT innovations.

Challenge	Measures	Operational activities
IT organization is stuck between operational excellence and innovation	Solving the conflict between operator and innovator – From operational excellence to successful IT innovations	<ul style="list-style-type: none"> - Providing operational excellence - Dedicate an IT innovation budget
No Management commitment	Obtaining management commitment – Effective integration of department managers is the key	<ul style="list-style-type: none"> - Motivate top management responsibility - Involve department managers in the IT innovation process
No IT innovation culture	Developing an IT innovation culture – Employee education as a starting point	<ul style="list-style-type: none"> - Define and communicate the term IT innovation throughout the company - Educate and motivate employees for participating in the IT innovation process - Provide more flexibility and space for experimentation, allow to take more risks
IT organization is not seen as an innovative partner	Position the IT organization as an innovative partner – Moving IT topics to top management agendas	<ul style="list-style-type: none"> - Develop a marketing strategy for the IT organization to make the business value of IT innovations visible - Position IT innovation topics to top management agendas

Table 3. Challenges, measures and operational activities for managing IT innovations

Measure one: Solving the conflict between operator and innovator – From operational excellence to successful IT innovations

Decrease spending on ongoing projects on the one hand and providing operational excellence on the other hand is the biggest challenge for IT organizations. First of all, IT spending on maintenance and support as a percentage of total revenue should be implemented as an IT efficiency metric. After that a benchmark target should be defined to ensure that this metric decreases over time – relatively to business activity and in absolute terms (Orlov, Bartels, Cameron, Radjou, Symons and Bright, 2005).

The dedication of an own IT innovation budget can help to distinct both activities. Moreover, a partnership based funding model with a business unit for IT innovations saves costs for the IT organization. Sharing responsibilities supports not only the business and IT alignment, it also assures the concentration on IT innovations which provide business value.

Measure two: Obtaining management commitment – Effective integration of department managers is the key

It is important to motivate a responsible member of the board and establish a direct link whereas it is not important which member (CIO, CFO, ...) is responsible. Furthermore, it is vital to get department managers involved in the IT innovation process. It will not always be easy to implement department managers because of the persistent lack of resources inside departments and the perception of a non-innovative IT organization. Thus, it should be aimed that department managers are involved in the IT innovation process. They should engage and let employees spend a certain amount of time to contribute ideas and develop innovations. Otherwise, the risk that the idea pipeline remains empty is high.

Measure three: Developing an IT innovation culture – Employee education as a starting point

As a first step the term IT innovation has to be defined and communicated to the employees to engage their motivation and activate their innovative capabilities. Especially further education in the areas technology and creativity should be provided

for employees. Letting employees work on IT innovation projects detached from operative business is one possibility for creating an IT innovation culture. Establishing IT innovation workshops and road shows are further starting points. To excel in IT innovations for business growth Radjou, Cameron and Radcliffe (2008) recommend sourcing while participating in an open innovation community. Another possibility is the provision of innovation centers which enable new capabilities within and beyond the company (Baldwin and Curley 2007). These centers also provide a setting for continuous education in innovative methods.

In general, companies tend to have a low willingness to take risks. To develop or adopt successful IT innovations, employees feel more motivated if they can get 7 out of 10 things right, rather than 3 out of 3. This can be achieved for example with time flexibility and encouragement for experimentation.

Measure four: Position the IT organization as an innovative partner –Moving IT topics to top management agendas

To gain the acceptance from business units and to develop the companywide perception of the IT organization from a reactive service provider towards a driver of business innovation and growth, the mere realization of successful IT innovations is not enough. Business units do not tend to associate the IT organization with innovation. Without marketing and explicit communication of the IT organizations innovative competencies, IT innovations are perceived as pure business innovations, while the IT organization remains unvalued.

Increasing the IT and business alignment with moving IT topics to the top management agendas will also improve the perceived role of the IT organization as a business innovator.

IT innovation management loop

The four companies which already implemented formalized structures described the four challenges as repetitive. The IT organization has always a lack of resources and therefore has to solve the conflict between operator and innovator. Without providing successful IT innovations and operational excellence, management support is not easy to maintain. Changes in the organizational structure, especially employee fluctuation, make it essential to constantly improve and communicate the IT innovation culture. Finally, the IT organization has to continuously prove their position as an innovative partner to the business units. Based on the measures one to four reflecting challenges one to four, Figure 2 summarizes the process for continuously approaching these challenges.

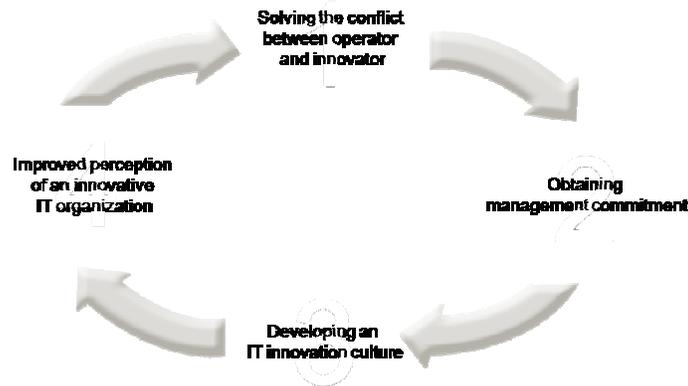


Figure 2. IT innovation management loop (see also Figure 1)

CONCLUSION

Implications for research and practice

The dedicated analysis of literature revealed that the management of IT innovations for business value is limited to few publications. In this paper, we examined non-IT companies which identified IT innovations process as vital for their business. All companies are facing challenges with the management. We identified four specific challenges and developed measures on how to overcome these challenges.

Furthermore we showed why companies implement formalized structures for the management of IT innovations and why not. As a result, we identified the existence of formal structures to depend on both a certain company size and a certain volume of employees for the topic of innovation. While this result has to be investigated in further studies, our work also extends the body of knowledge in the area of IT innovation.

Finally, we shed light on the addressed research question one with the findings sections in which four challenges are described. Following this, the discussion section as well as Table 3 provides an approach to answer research question two, how these challenges can be overcome.

Limitations and further research

The limitation of this paper deals with the generalizability of the findings because a set of six companies has to be considered as a limited number. Furthermore, all companies are from different industries. The collocation of solely German companies in the sample allows indeed for greater comparability as well as a simplification of data collection, but has to be considered as part of this limitation as well.

Although the findings of this paper allow for first recommendations, further research should be aimed to include the view of business units to identify their perception and measures as well. Finally, industry- and country-related characteristics have to be explored.

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