

# FOSTERING IT-ENABLED BUSINESS INNOVATIONS

## *An Approach for CIOs to Innovate the Business*

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Abstract: Nowadays companies are in worldwide competition for innovations which are essential to ensure their competitiveness and consequently their business success. Information Technology (IT) plays an important role in this context. Thus, it is expected from IT organizations to provide an own value contribution to the corporate performance by delivering innovations. This raises the questions how chief information officers (CIO) can facilitate the generation of IT-enabled business innovations. As a result of our research, we identified 22 factors concerning the relevant aspects in IT organizations - IT projects, IT systems, IT processes, IT services, IT personnel and aspects referring to the organizational structure. These factors help CIOs to foster the generation of IT-enabled innovations and therefore should be considered in the management of IT organizations.

## 1 INTRODUCTION

Business models and their constituent processes are increasingly IT-enabled. This means that IT is touching more parts of businesses and in more fundamental ways. Consequently, organizational efforts should not only focus on single IT innovations, but also on interrelated innovations (Fichman, 2001). Especially, IT-enabled business innovations attain more and more attention. These innovations are decisive factors for business development and competitiveness (Mahnke et al., 2006) (Müller and Neidhöfer, 2008). In general, IT can enable three kinds of business innovations (Dietrich and Schirra, 2006) (Hofbauer and Wennmann, 2008):

- product and service innovations: new products and services or the improvement of existing products and services
- process innovations: certain parts of a business process or the entire business processes are improved measurably
- strategic innovations: IT enables new businesses or new business models

The confluence of two forces – the strategic importance of innovations for a company, and the critical role of IT in driving business innovations – underscores the importance to CIOs of fostering innovation (Watts and Henderson, 2006). Therefore,

it is reasonable that the relevance of innovation increases from the viewpoint of CIOs: according a survey from Gartner Inc. innovation has the sixth highest priority for CIOs in the year 2009. For 2012, the interviewed CIOs consider innovation as the topic with highest priority on their agendas (Gartner, 2009).

Considering the previous explanations, it is imperative to understand how CIOs can foster the generation of IT-enabled innovations (Watts and Henderson, 2006). On the one hand, they can provide tools that support business managers in developing new products and services. For instance, IT can help to create linkages within the enterprise as well as with external entities to enable collaborative pursuit of new ideas. On the other hand, IT itself can fundamentally alter business processes, products, services, business models or enable new ones (Teo et al., 2007). In this paper we focus on the second way of enabling innovation through IT. Thereby, it is not sufficient to anchor innovation within the IT strategy, i.e. as an own partial strategy. It is rather particularly essential to configure the IT control objects, i.e. IT project portfolio, in an innovation-conducive fashion. This can be traced back to the fact that the actual, operative configuration of IT management takes place in these IT control objects (Mauch and Wildemann, 2006).

Principally, it also would be possible to consider the innovation aspect as a separate control object of IT management. But according to Kütz (2006) this aspect is invariably a characteristic of the conventional IT control objects. Therefore, the innovation aspect should not be regarded as own control object. Instead, specific characteristics of it should be aimed when managing the conventional IT control objects (Kütz, 2006).

Despite agreement on the importance of CIOs fostering IT-enabled innovations and the significance of an adequate configuration of IT control objects for successfully generating such innovations, there is no integrated concept available in literature which reveals factors for an innovation-facilitating management of IT control objects. Within our literature review, we analyzed a comprehensive number of selected sources. These sources included top academic IS conferences and journals as well as innovation management conferences, journals and handbooks. Preliminary research on IT-enabled innovations mostly focuses on the role of IT in business innovations (e.g. Cherian, 2009), IT-enabled innovations in the context of business process improvements (e.g. Habermann and Scheer, 2000), innovative IT climates (e.g. Watts and Henderson, 2006) and the relationship between IT competence and business innovations (e.g. Sambamurthy et al., 2003). In addition there are publications which illustrate the necessity of a framework for IT-enabled innovations but do not reveal the essential factors concerning the IT control objects (e.g. Watad and Paterson, 2009). However, until now there is no integrated concept available in literature which reveals relevant factors to be considered in the management of IT control objects for facilitating business innovations.

This paper aims to fill this gap by identifying factors which help to foster the generation of IT-enabled business innovations and therefore should be considered within the management of IT control objects.

## 2 RESEARCH METHODOLOGY

For this purpose, we used qualitative research methods. In doing so we conducted in-depth interviews which are particularly useful for exploration purposes, such as developing propositions on a particular subject (Churchill, 1999). It is a suitable research technique for relatively unexplored subjects (Eisenhardt, 1989). For this work several elements of the so called

Grounded Theory according to Glaser and Strauss were used (Glaser and Strauss, 1967). It is rather a style how to analyze qualitative data than a specific method or technique (Strauss, 1994). In contrast to other methods, the Grounded Theory does not start with a theory that should be proved. It starts with a research question and lets the theory evolve itself. For this reason, this paper doesn't start with a certain number of existing hypotheses but asks generally and impartial for factors which help to foster the generation of IT-enabled innovations and which should be considered when managing the IT control objects.

Within the sampling procedure we focused on participants who have been very experienced in both issues: IT management and IT-enabled innovations. For this, we analyzed IT management associations, CIO circles, CIO working groups and IT practitioner conferences in German-speaking countries (Germany, Austria, and Switzerland). In this way, we identified potential participants with different positions and perspectives: (1) CIOs who have concerned themselves intensively with fostering the generation of IT-enabled innovations, (2) IT business unit manager who have been responsible within their IT organization for innovation through IT and business development management as well as (3) specialized IT management consultants with much project experience on the subject of this paper. Altogether 14 experts – five CIOs, three IT business unit manager and six IT management consultants – were interviewed. The interviewed CIOs and IT business unit manager are from several industries, including automotive, banking & insurance, transport & logistics as well as IT and telecommunication. The interviews lasted for an average of 90 minutes. Comprehensive notes of the answers were taken and transcribed into an interview report immediately after each session. Follow-up questions were asked by telephone and/or e-mail when clarification was necessary. Immediately afterwards we studied the interview reports intensively to identify common categories of meaning.

## 3 FACTORS FOR FACILITATING IT-ENABLED INNOVATIONS

Based on our research we identified 22 factors concerning the management of IT control objects which should help to foster the generation of IT-enabled business innovations.

The following chapters describe these factors.

Table 1: Factors for facilitating IT-enabled innovations.

No.	Factor	IT control object
F01	Sufficient supply of IT project resources for the implementation of the business strategy	IT project portfolio
F02	Sufficient supply of resources for IT innovation projects	
F03	Creation of project teams with fundamental IT and business knowledge	
F04	Extensive involvement of business departments into the IT project portfolio management process	
F05	Systematic and continuous technology management	IT system portfolio
F06	Innovation-conducive composition of the IT system portfolio	
F07	Flexible IT architecture	
F08	Short development and implementation duration of information systems	
F09	Proactive management of innovative IT services	IT process and service portfolio
F10	Differential management of commodity services and strategic services in outsourcing situations	
F11	Continuous examination and adaptation of the IT service portfolio	
F12	Innovation-conducive design of cost charging for IT services	
F13	Continuous improvement of IT processes and services	
F14	Regular exchange of information between the IT department and business units about possibilities and demands concerning new information technologies	
F15	Technology management for information technologies should be anchored in the IT department	IT organization
F16	Cooperation with innovative external partners	
F17	Flexible organizational structure of IT department	
F18	Innovation-conducive IT Leadership	IT personnel
F19	Promotion of freedom and creativity	
F20	Support of exchange of ideas and communication between IT professionals	
F21	IT and business knowledge of IT professionals	
F22	Incentives for innovations	

We grouped these factors into the typical control objects of IT management: IT project portfolio, IT system portfolio, IT process and service portfolio, IT personnel as well as IT organization. Thereby, the control object IT organization contains aspects concerning the organizational structure as well as aspects which can't be assigned to one of the other four control objects because they concern the whole IT organization and not only one of the other IT control objects. Table 1 shows the identified factors (F01 – F22) and their assignment to the five IT control objects.

### 3.1 Factors Concerning the IT Project Portfolio

This chapter reveals four factors which should help to foster the generation of IT-enabled innovations and which refer to the IT project portfolio.

Sufficient supply of IT project resources for the implementation of the business strategy (F01): Several respondents stated that IT organizations usually are confronted with a high ratio of maintenance and support projects which oftentimes leads to insufficient resources for IT projects that help to implement the business strategy, e.g. new development projects. This is critical because the business strategy defines how the business should be changed and innovated. Therefore, IT requires sufficient supply of resources for the implementation of the business strategy. This way allows that business objectives are supported optimally by IT and the generation of IT-enabled innovations is encouraged. Hence, this aspect should be considered in the IT project portfolio management process, e.g. by using adequate prioritization criteria for IT projects or by bringing the issue of IT project resources in the top management's attention.

Sufficient supply of resources for IT innovation projects (F02): Most of the interviewees stressed that IT investments should not only help to run the current business and implement the business strategy but also help to enable new business practices and business strategies. To ensure such innovations, new information technologies need to be proved systematically and suitable possibilities for their use should be designed. Therefore, sufficient resources for IT innovation projects are required.

Creation of project teams with fundamental IT and business knowledge (F03): In order to exploit the entire innovation potential of IT, project members need more than just distinctive IT skills. They also need extensive knowledge about business processes. IT innovation projects require such

knowledge to allow an adequate evaluation of new technologies and to design specific options of usage for the company. This knowledge is also essential to accomplish IT projects that implement the business strategy and that transfer business requirements into the right IT systems. This can deliver a significant contribution to a successful generation of IT-enabled innovations. Therefore, most interviewees argued that it is essential to ensure an extensive IT and business knowledge within such IT project teams. For instance, this could be realized by an appropriately skilled IT staff, by integrating project members from business units and/or involving appropriately skilled external consultants.

Extensive involvement of business departments into the IT project portfolio management process (F04): Our interviewees stated another factor which is important when CIOs aim to foster the generation of IT-enabled business innovations: representatives from business units should be extensively involved into the IT project portfolio management process. This concerns particularly the identification of project ideas as well as their evaluation and prioritization. Relating to the identification of project ideas, business unit representatives often have valuable ideas for innovative IT-based processes, products and services. Within the evaluation and prioritization of IT projects, they can – due to their comprehensive knowledge about the business – help to identify these projects with the highest potential for business innovations.

### 3.2 Factors Concerning the IT System Portfolio

This chapter reveals four factors which should help to foster the generation of IT-enabled innovations and which refer to the IT system portfolio.

Systematic and continuous technology management (F05): According to what our interviewees said, a systematic and continuous technology management is the fundamental basis for identifying innovative information technologies and for considering them within the composition of the IT system portfolio. In this context, an environmental scanning helps to identify chances and risks of innovations within the IT section that influence the company's business units.

Innovation-conducive composition of the IT system portfolio (F06): The fundamental requirement for facilitating IT-enabled business innovations is an adequate composition of the IT system portfolio. In this context, our interviewees argued that CIOs should ensure an adequate ratio of

information systems with a high innovation potential within their portfolio, and not only the use of operational and support systems.

Flexible IT architecture (F07): Another important factor seems to be the IT architecture because it generally has to be adapted as a result of changing business practices and new information technologies. In this context, a flexible IT architecture supports IT-enabled innovations by creating an infrastructure that allows implementing or adapting technologies comparatively easy, fast and cost-efficient. This way, flexible architectures like SOA represent the basis for innovative processes and a fast and flexible enhancement of business concepts.

Short development and implementation duration of information systems (F08): In general, innovative information systems have a relatively short life cycle and allow first users only short-term competitive advantages as their competitors can use the same technology shortly after. Therefore, most of our respondents regard a short time-to-market as a decisive factor for achieving IT-enabled business innovations and emphasized the importance of a short development and implementation duration of information systems.

### 3.3 Factors Concerning the IT Process and Service Portfolio

This chapter reveals five factors which should help to foster the generation of IT-enabled innovations and which refer to the IT process and service portfolio.

Proactive management of innovative IT services (F09): IT services need to support business processes optimally. Oftentimes, they are derived from business unit requirements concerning new or changed business processes. Our research reveals that – in order to foster the generation of IT-enabled business innovations – CIOs should also arrange a proactive management of innovative IT services, i.e. informing the management of business units about feasible IT services proactively and illustrating their potential for business innovations. For this purpose, the insights of IT innovation projects or technology management activities could be used.

Differential management of commodity services and strategic services in outsourcing situations (F10): Interviewees suggest furthermore to distinguish between the management of commodity services and the management of strategic services in outsourcing situations. On one the hand, commodity services like email services, networking services and

services for providing end devices can be assigned to external services providers as long as the provider may deliver better conditions (cost, quality). On the other hand, outsourcing strategic IT services – which are usually characterized by a high innovation potential – requires more attention. In this situation, the internal IT organization has to care about issues which assure that these services deploy their entire innovation potential within the company, although they are provided by an external provider. This can include aspects such as innovation agreements between the internal IT organization and the external service provider.

Continuous examination and adaptation of the IT service portfolio (F11): Our interviews revealed the importance of an IT service portfolio which meets the business requirements at any time. If the IT service portfolio does not reflect these requirements at all or just with significant delay, disadvantages or even problems may result for the company. This is especially pertains in the context of IT-enabled innovations as short time-to-market is essential for success. Hence, most of the respondents assigned high importance to a continuous examination and adaptation of the IT service portfolio in the context of generating such business innovations.

Innovation-conducive design of cost charging for IT services (F12): One further important component of an innovation-facilitating management of IT could be the cost charging. According to what our interviewees said, IT cost charging could be used to incentivize business units to apply IT services with high innovation potential. For instance, the respondents argued that IT services which result from the use of new information systems could be priced lower than similar IT services resulting from the operation of older information systems with a lower potential for business innovations. Besides, an innovation-conducive design of cost charging seems appropriate for innovative IT services which do not base on business unit requirements but result from IT initiatives and should be managed proactively (cf. F09).

Continuous improvement of IT processes and services (F13): To support business units in generating innovations, the IT service portfolio does not only have to contain the right IT-services. In fact, interviewees stated that the included services need to be improved permanently to ensure a constant match with changing business conditions and thereby to optimally enable business innovations. The same applies to the IT processes. This offers another advantage: a permanent improvement of IT processes and services improves

efficiency. Ideally, as a result, costs for operation and support decline so that a greater part of the IT budget can be used for an innovative use of IT.

### 3.4 Factors Concerning the IT Organization

This chapter reveals four factors which should help to foster the generation of IT-enabled innovations and which refer to organizational aspect of IT.

Regular exchange of information between the IT department and business units about possibilities and demands concerning new information technologies (F14): Generally, IT und business units have to work closely together in order to assure an ideal IT support of business practices. Several respondents stressed that this aspect is especially important in the context of IT-enabled innovation generation as the exchange has two benefits: for the one thing, business units get to know to new information technologies and their potential for innovative applications within the company. For another thing, the IT organization gets information about future products, processes and business practices which require an adequate support by IT. In order to realize these benefits, our interviewees advised a regular exchange of information between the IT department and business units about possibilities and demands concerning new information technologies. For instance, such an exchange could be conducted with the help of boards, committees or liaison roles.

Technology management for information technologies should be anchored in the IT department (F15): Due to the significance of technology management for innovations, the responsibility for it should be anchored adequately within the IT organization. Interviewees revealed several alternatives to ensure this. On the one hand, each IT professional could conduct technology management for all technologies within the area of his responsibility. On the other hand, a separate department could be established within the IT organization which carries out technology management for all relevant areas of IT.

Cooperation with innovative external partners (F16): Usually, IT organizations are not able to observe the developments of all relevant areas of information technologies and evaluate their innovation potential for business practices on their own. Therefore, it seems promising to our respondents to cooperate with innovative external partners like vendors, customers, universities and further organizations.

Flexible organizational structure of IT depart-

ment (F17): Similar to the IT architecture, several interviewees consider the flexibility of an IT organization as a decisive factor for fostering the generation of IT-enabled innovations. They argue that a flexible organizational structure of an IT department enables fast and flexible adaptations to new requirements as business needs or IT-based changes.

### 3.5 Factors Concerning the IT Personnel

This chapter reveals five factors which should help to foster the generation of IT-enabled innovations and which refer to IT personnel aspects.

Innovation-conducive IT Leadership (F18): In general, leadership is of great importance for the performance of IT professionals. This also applies to the context of IT-enabled innovations, in which IT leadership can promote the generation of innovations in different ways. Particularly, coaching, job empowerment and enrichment as well as clear objectives, including innovation-related objectives, were stated as important activities to facilitate the generation of innovations.

Promotion of freedom and creativity (F19): Some interviewees stressed the importance of freedom and creativity. In their opinion these aspects are essential for the development of ideas for a new or changed application of information technologies within organizations. For instance, this could be realized in the following way: beside routine tasks, IT professionals should have fixed time slots which could be used to deal with innovative ideas.

Support of exchange of ideas and communication between IT professionals (F20): Besides freedom and creativity, interviewees also mentioned the exchange of ideas and the communication between IT professionals as decisive for enabling business innovations. They founded this onto the statement that innovation often results from intercommunication, not only between IT and business departments, but also within an IT organization. Therefore, IT department manager should create an environment which fosters the exchange of ideas and communication between IT professionals about information technologies and their application.

IT and business knowledge of IT professionals (F21): IT-enabled innovations concern two areas: (1) information technologies and (2) business-related aspects as processes, products, services or business models in which innovation occurs. Based on this statement, most of the respondents claimed that IT

professionals need adequate IT as well as business skills in order that the application of IT results in such innovations.

Incentives for innovations (F22): Although applying all above factors, several interviewees assume that not all IT professionals support the generation of IT-enabled business innovations as desired. To solve this problem, the respondents suggested using incentives – tangible and/or intangible – in order to encourage innovative behaviour of IT professionals.

## 4 CONCLUSIONS

Nowadays IT organizations are expected to provide an own value contribution to the corporate performance by delivering innovations. This paper helps CIOs to fulfil this requirement. As a result of our research, we identified 22 factors concerning the relevant aspects in IT organizations - IT projects, IT systems, IT processes, IT services, IT personnel and aspects referring to the organizational structure. Considering these factors, CIOs could facilitate the generation of IT-enabled business innovations within their organization.

Thus, the 22 factors can be regarded as a check list which should be considered in the management of the IT control objects. Thereby, one has to bear in mind that some factors aren't applicable to all IT organizations. For example, factor 10 – a differential management of commodity services and strategic services – is only applicable in IT organization which conduct outsourcing.

The current paper has some limitations that offer an agenda for future research. As we confined our research to identifying the relevant factors, further research work should examine how to incorporate our results in typical IT management methods like an IT balanced scorecard. This could help CIOs in managing the 22 factors within their IT organization. Another limitation results from the fact that the 22 factors aren't sufficient conditions. Thus, the effects of considering the 22 aspects could be limited as long as a company's top management doesn't support it. For instance, CIOs are presumably not able to enforce innovation-conducive charging of IT services (F12) without the help of the top management. Therefore, future research should also analyze how to involve other, non-IT employees – as top management representatives or business unit managers – who are decisive for a successful implementation of the 22 factors.

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