Influencing Factors in the Conception Phase of IS Projects – Lessons from a Case Study

Full paper

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Abstract

While scholars have dedicated great effort to investigating influencing factors in (IS) projects in general, considerably less attention has been paid to factors specific to individual project phases. Especially in projects that follow the traditional sequential approach, changes in later project stages are more expensive than those in early stages. It is therefore particularly important to steer the project in the right direction from the very start. We explore factors that are most important in the conception phase of internal, sequential IS projects. Conducting a single-case, multi-method, exploratory case study at a medium-sized IS service provider in Germany, we gain in-depth insights into the influencing factors in the conception phase of IS projects conducted in that organization. The concrete approach taken in the conception phase at the case organization and nine most important influencing factors are presented and discussed.

Keywords

Information systems, project success, conception phase, influencing factors, case study.

Introduction

Despite a great body of research, a rather large amount of information system (IS) projects continue to fail (e.g., Sauer and Cuthbertson 2003, The Standish Group International 2009). While researchers passed substantial criticism on existing success reports (for an overview see Basten et al. 2013), questioning their rigor and putting the high failure rates of IS projects into perspective, it is still acknowledged that the concept of (IS) project success is not yet entirely understood (Hyväri 2006, Ika 2009). Two general research streams can be distinguished on this topic: defining and measuring the concept of project success on the one hand and achieving success (or preventing failure) on the other (Ika 2009). The latter, being also in focus of the present study, addresses factors that influence success or failure of the project.

While scholars have dedicated great effort to investigating influencing factors in (IS) projects in general (e.g., Baker et al. 1988, Hyväri 2006, Kendra and Taplin 2004), considerably less attention has been paid to factors specific to individual phases of a project. As Pinto and Slevin (1988) point out, "different sets of [critical success factors] become more critical to project success at different phases in the project life cycle" (p. 67). Projects are unique, resource-intensive endeavors, involving multiple activities to achieve a stated objective (Project Management Institute 2013). Such endeavors require time, reaching from days to many years. Especially in projects that follow the traditional waterfall approach, which are in focus of the present study, changes in later project stages are more expensive than those in early stages due to the amount of rework required (Sommerville 2011). It is therefore particularly important to steer the project in the right direction from the very start to pave the way for success at the end. We focus on the conception phase, which includes everything from the first project idea to the start of the realization. Focusing only on internal (customer and contractor in the same organization) and sequential (following the traditional waterfall approach) projects, we set out to answer the following research question:

What factors are important in the conception phase of internal, sequential IS projects?

We conduct a single-case, multi-method, exploratory case study at an IS service provider in Germany. By means of a qualitative analysis of expert interviews with project managers and other stakeholders, as well as of project documents and other data sources, we gain in-depth insights into a real-world conception phase in practice. We present the conception phase approach taken at the case organization and the

identified influencing factors in that phase, substantiated with quotes from the expert interviews. By illuminating the factors specific to early project stages, we hope to contribute to the body of knowledge on the complex topic of achieving IS project success and ultimately to increasing the rate of successful projects in practice.

The remainder of the paper is organized as follows. Next, we present the theoretical background on IS project success, influencing factors, and the project lifecycle (including the conception phase). Then, we describe and explain our research design. Subsequently, we provide our results by elaborating on the conception phase approach and the identified influencing factors. We then discuss the limitations of our findings and their implications for research and practice. The article ends with a short conclusion.

Theoretical Background

IS Project Success

An IS "can be defined technically as a set of interrelated components that collect (or retrieve), process, store, and distribute information to support decision making and control in an organization" (Laudon and Laudon 2009, p. 46). A project is a unique temporary endeavor involving multi-functional activities in several phases with an objective to create a product or service within certain specifications, defined start and end dates, and funding limits (Project Management Institute 2013). Combining these definitions, an IS project is a project in above terms with the objective to develop, extend, or adapt an IS.

IS project success can be approached from two different angles: assessing success and achieving success. Accordingly, researchers differentiate between success *criteria* and influencing *factors* (Cooke-Davies 2002, Ika 2009). While the former are measures by which success or failure is judged (e.g., meeting the requirements), the latter directly or indirectly contribute to project success or failure (e.g., high/low skills of the project team). Investigating the factors that contribute to success requires determination of respective success criteria beforehand. As DeLone and McLean (1992, p. 61) put it, "[i]t does little good to measure various independent or input variables [...] if the dependent or output variable [...] cannot be measured with a similar degree of accuracy. [...] Without a well-defined dependent variable, much of I/S research is purely speculative." For this reason, although this study focuses on influencing factors, a definition and discussion of the dependent variable – IS project success – is needed at this point.

IS project success assessment has been traditionally undertaken by evaluating adherence-to-planning (ATP) criteria: meeting the budget, meeting the schedule, and conformance with specified requirements. However, researchers have extensively criticized the usage of ATP approach alone, considering it insufficient to capture the whole picture of project success (an overview is given in Karlsen et al. 2005). While ATP criteria are objective and easy to measure (which is one of the reasons for their popularity; Karlsen et al. 2005), project success is a concept that affects multiple stakeholders, making it a matter of perspective rather than an objective concept (Ika 2009, Nelson 2005). This view is substantiated by projects known as failed successes and successful failures, if projects meet their plans but fail to add enough value to the organization and vice versa (Nelson 2005). Accordingly, scholars have emphasized additional criteria like stakeholder satisfaction (Karlsen et al. 2005). Thus, the current prevalent view in literature is that IS project success is a multi-dimensional concept, including success criteria beyond ATP. We agree with this view and consider a project to be successful when relevant stakeholders are satisfied.

Influencing Factors

Striving to understand how to make projects more successful, researchers have undertaken major efforts to investigate factors influencing project success (or failure) in the past decades. One research stream focuses on identifying, categorizing, and reviewing success factors in projects in general (e.g., Baker et al. 1988, Cooke-Davies 2002), yielding numerous factors like top management support (Pinto and Slevin 1988), goal commitment of the project team (Baker et al. 1988), and communication (Hyväri 2006). Other scholars investigate success factors of IS projects specifically (e.g., Kendra and Taplin 2004). Yet other researchers investigate the impact of specific factors on project success (e.g., top management support; Young and Jordan 2008). Despite these efforts, there is a lack of a universally agreed-on, clear set of success factors (Cooke-Davies 2002). It stands to reason that this is due to the fact described above – success is a subjective concept and needs to reflect the views of different stakeholders.

Yet another research stream addresses project failure factors (or risks) (e.g., Gemino et al. 2007). The idea is to achieve success by preventing failure. In this regard, Baker et al. (1988) demonstrate that failure factors are not (always) just the opposite of success factors by presenting three lists: (1) factors that strongly affect project failure but their absence does not ensure success, (2) factors that are strongly associated with project success, and (3) factors related to both success and failure. While the aspects in the third list are both success and failure factors (depending on their manifestation), most aspects are found in the first two lists, showing that research is necessary on both success and failure factors. We focus on influencing factors, that is, we include both success and failure factors into consideration. However, we restrict our focus to a specific part of the project lifecycle – the conception phase.

Project Lifecycle and the Conception Phase

According to its definition, a project is a temporary endeavor with start and end dates. Its lifespan can be divided into phases by project managers or the organization to provide better management control (Project Management Institute 2013). These phases altogether are known as the project lifecycle. Most lifecycles are different in one way or another, despite similar phase names and outcomes. Some of them have four or five phases, while others have ten or more. Specific areas of application exhibit considerable variations. For instance, a single design phase in one organization can be opposed by separate phases for architectural and detailed design in another. A project phase is characterized by one or more deliverables, which are measurable, verifiable work products (e.g., specification or design document). The project phases can be defined as shown in Table 1 (Pinto and Slevin 1988).

Phase	Description
Project conceptualization	A strategic need is recognized by top management. Preliminary goals are established and resources are explored. Often, an initial feasibility decision is made requiring that management answer questions such as: What is the problem? Will the development of a project solve that problem? What are the specific goals of the project?
Project planning	Top management approves the project; a more formalized set of plans to accomplish the initially developed goals are established. The required resources, budget, and the allocation of specific tasks are determined in detail.
Project execution	The planned tasks are implemented by the project team; resources are transformed into the intended project result. Performance is continually reviewed to ensure that the project performs as intended. Execution ends with the implemented product.
Project termination	'Getting out of the business' that the project results provided. The product is handed over to the intended users and resources that were required for the project are released (the project personnel is reassigned to other duties, etc.)

Table 1. Project Phases

The degree of overlap and iteration of phases depends on the development approach taken in the project. As described in the introduction, we focus on the conception phase of internal IS projects following the sequential development approach, also known as the waterfall method (e.g., Sommerville 2011). In this method, project phases are arranged sequentially, that is, the following phase should not start until the previous one has finished (in practice, however, these stages overlap und feed information to each other). Our definition of the conception phase (all activities from the first project idea to the start of the realization) includes the phases *project conceptualization* and *project planning* in Table 1.

Research Design

The case study was conducted at an IS service provider in Germany, which is part of a German enterprise providing insurance and financial services in approximately 150 countries. To maintain the anonymity of the organization, we refer to the IS service provider as Xperosys in the following. Case study research has been extensively discussed in literature (e.g., Dubé and Paré 2003, Eisenhardt 1989, Keutel et al. 2014, Yin 2009). Striving to increase the rigor of case study research, those scholars made numerous recommendations, for instance, clearly stating the unit of analysis, using multiple data sources, and providing a detailed and justified description of the research design choices. Our case study was

explorative in nature and included multiple data sources as elaborated below. In accordance with our research objective, the unit of analysis were IS projects conducted at Xperosys.

Data Collection

We selected Xperosys with its approximately 700 employees as a representative case for medium-sized enterprises. One author was on-site three days per week for the period of the case study, which took place during five months from May until September in 2015. Xperosys conducts IS projects following the waterfall approach for the internal customer, that is, for the insurance and financial service departments of the enterprise. In order to gain deep insights into the way Xperosys functions, we made use of one of the greatest benefits of case study research – multiple data sources. The expert interviews as the main data source are elaborated below, followed by the description of other sources.

In total, eight qualitative, semi-structured expert interviews were conducted. Table 2 provides an overview of the respondents (names altered to ensure anonymity), their positions, and their experience in IS development as well as number of IS projects in which they gained their experience. The first seven interviews were conducted at Xperosys directly. The last interview was conducted with a project manager from the business department of the enterprise. IS project managers were the best possible respondents since they had an understanding of their own part of the projects as well as of the workflows in the business departments, for which they had provided services in the past. The interviewer began with a short introduction of the interview procedure and answered questions of the interviewees, if present. Then, the topic, objection, and the research method of the study were explained, followed by the opening question. According to the exploratory nature of the study, the interviewer took special care not to impose any answers but to let the information emerge from the interviewees. To minimize potential biases, the interviewer began by asking "Let's assume an idea for a new project is born. What would be the next step?" The topics of the interviews were the approach taken at the conception phase as well as the strengths and challenges of that approach. The interviews were conducted in German, lasting 15-50 minutes. They were transcribed and anonymized upon completion. All respondents were male except one; all interviews were one-on-one conversations except one interview with five top level executives.

Name	Position	Experience in IS development (years)	Participated in IS projects (quantity)
Peter	IS project manager at Xperosys	20	16
Scott	IS project manager at Xperosys	25	18
Marcus	IS project manager at Xperosys	7	2
Stephen	IS project manager at Xperosys	28	17
André	IS project manager at Xperosys	8	3
Group interview	Top management level at Xperosys	On average 25	On average 15
Leonard	Lead manager of Xperosys	25	19
Christine	Business manager (Customer side)	23	12
	Average	20,125	12,75

Table 2. Respondents' Demographics

Another important data source was the project management handbook at Xperosys, which served as a pillar for preparing the interviews. More concretely, the interviewer made himself familiar with the general process specified at Xperosys beforehand. By doing so, he was able to better understand the information emerging during the interviews and to capture the differences between specification in the books and practice. Thus, reasons for deviations from the process could be addressed in the interviews. Further data sources were: project manager meetings (which take place once a month and were attended by the author on-site), mandatory project documents like checklists, field notes (e.g., taken during informal conversations with project managers), and further documentation and knowledge management reports. In total, information from eight projects in the budget range of 50.000–100.000 Euros (and approximately equal duration) was collected during the study.

Data Analysis

The coding of all interviews was performed following the guidelines by Flick (2009). In particular, an adapted W-questions model was applied (since not all questions were applicable in the interviews). In this model, the respondents' statements are being paraphrased in order to be decomposed into their parts. The objective of this approach was to identify the core messages of the statements, which were then assigned to a phase of the process. Each phase contains work packages, and the respondents' statements were assigned to one or several work packages of a phase. Subsequently, the core messages of the statements were divided into information about the process, problems, and solutions. From this information, the actual influencing factors in the conception phase were derived.

In order to prevent misleading data points and to obtain a richer picture overall, we applied data triangulation regarding the influencing factors. Additionally to the information emerging from the respondents directly, the researcher on-site took field notes, which arose during meetings, informal conversations, etc. The findings presented in the next section are the result of a combined analysis of the interviews, field notes, project management handbook, and other project documents.

Results

The Conception Phase at Xperosys

Xperosys has established a standard process for IS projects, which is described in the project management handbook. The approach taken in the conception phase comprises the steps from the very first project idea until the start of the realization. The steps are illustrated in Figure 1 and explained in the following.

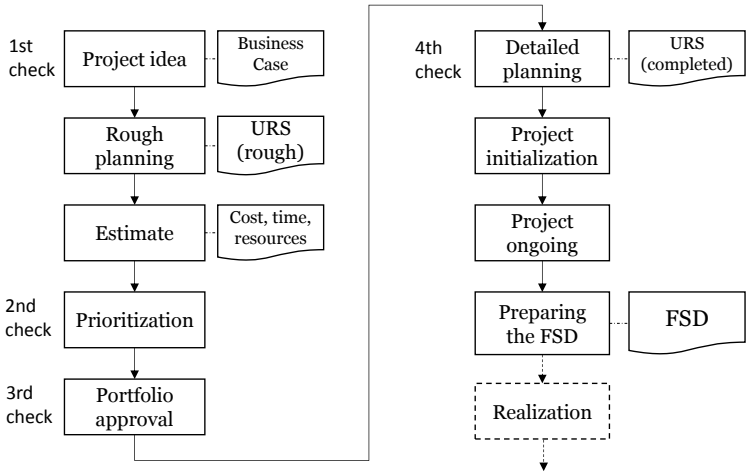

Figure 1. Conception Phase at Xperosys (Own Presentation)

An employee has an idea, born from a current project or daily operations. Mostly the ideas are generated within a business department (in the following: department), that is, by end-users. The employee approaches her colleagues to discuss the idea internally. After collecting feedback from the colleagues, and given that the idea still appears promising, the employee approaches her direct supervisor (mostly the business manager, first management level). The employee and her supervisor discuss the idea and clarify whether it already exists or was considered before. The discussion within the department can be considered the first check of the project's right to exist. If it is passed, the idea is committed to paper and a business case is created, which is a detailed description prepared by the employee and her supervisor of the idea's advantages and costs (very rough estimate). The idea including its business case is added to a designated tool through a virtual mailbox. Some ideas remain on paper in the drawer and are submitted to the tool with other ideas at a convenient point in time.

The entries in this tool are evaluated on a regular basis by the management (one level above the business manager). Provided that an entry is of sufficient interest (particularly, whether the idea is in line with the objectives set by the top management), a rough planning is initiated, performed by the department in

cooperation with the information technology department (in the following: ITD). The rough planning comprises the first (rough) version of the user requirements specification (URS) document. The ITD assists the department by clarifying questions like which interfaces would be required, how the infrastructure would be affected, and which security aspects would need consideration. Those aspects are written down in a designated checklist. The rough planning is followed by an estimate of the project budget, schedule, and resources (the latter specify the amount of internal and external human resources, while budget also comprises costs for software and hardware to be acquired).

The documents resulting from the rough planning and the estimate are the basis for prioritization. In this step, the ITD preselects potential projects by reviewing a project's fit into the available IT budget. This is the second point at which a project's stand is examined, this time from the ITD perspective. The projects are assigned into one of three categories: implementations of legal guidelines, strategic projects, or projects yielding indirect benefits for the organization. The former must be implemented and are thus of the highest priority. Approximately half of the projects conducted at Xperosys are legal projects. After those, projects yielding strategic benefits are taken into account. Those benefits can be cost savings, streamlined business processes, etc. If there is still budget left after legal and strategic projects, other projects (with indirect benefits) are considered as well. Subsequently, all projects are reviewed in the portfolio approval step. A designated committee, consisting of members from top management and controlling, meets regularly and decides which projects out of the pool will actually be conducted. Those decisions are made in line with the strategic objectives of the organization (except for legal projects, which are mandatory). Accordingly, this is the third decision about a project's continued existence.

Once a project is approved for the portfolio, the detailed planning is conducted by the department and the ITD based on the rough planning. Detailed planning is carried out with real resources, that is, concrete team members are requested and, if available, assigned to the project. Otherwise, alternative employees are requested. The URS must be finalized in this step. If the detailed planning results (schedule, budget, resources) considerably exceed the estimates of the rough planning (over 3% deviation), anew review of the project must be performed by the committee, leading to either a (re)approval or a cancellation of the project under consideration. This is the fourth and final check before a project is initialized. If the detailed planning is consistent with the rough planning, all necessary checks are passed and the project is initialized. To this end, a kick-off workshop is conducted and all team members are informed about their tasks. An internal ERP order is issued, enabling the cost centers of the project. Once initialized, the project is in ongoing status. From this point forward, the project cost centers are enabled, and external resources (e.g., specialists) can be requested. Costs arising before this point are ascribed to cost centers of the department where the project idea originated. Then, the ITD creates the functional specification document (FSD) – a detailed description of how the requirements are to be implemented. First tasks are carried out parallel to FSD preparation, such as planning of workshops, ordering external resources, and date arrangements. Once the FSD is completed, the conception phase ends and realization begins.

Influencing Factors in the Conception Phase

Following the chosen process: First of all, the choice of the process model is an influencing factor by itself. The waterfall model chosen by Xperosys is a rather easy-to-understand and easy-to-implement approach. There is a clear process for every step to take, and each step has to be finished before the next one begins. Still, the respondents pointed out that sometimes projects generate unnecessary effort, which is a result of incorrect understanding of individual process steps by the employees. This leads to change requests in later stages. "*I try to avoid the change request nature, or at least [minimize] the degree of deviation in terms of both time and effort*" (Steven). One deviation from the process that emerged in the interviews concerns the point in time at which the URS should be finalized. According to the standard process, the URS is to be completed right before the project initialization. However, several project managers would choose a different approach and strive for completion of the URS within the rough planning already. This is done to avoid discrepancies between rough and detailed planning in form of, for instance, changed requirements. However, this is simultaneously the problem arising from this deviation: the standard process allows for a certain flexibility until the detailed planning is finished, and a signed URS very early in the project deprives it of that flexibility. Furthermore, the effort accruing for the completion of the URS cannot be billed to the project cost centers at this time yet. Instead, it has to be taken into account via the cost centers of the departments. This leads to a distortion of the project results and a bias when it comes to comparing and assessing projects (see the factor *project assessment and reviews* below).

Project approvals: Before a project is initialized, it has to be approved on several levels (see Figure 1). A first elaboration of an idea is important to avoid waste of time and resources. As Peter emphasized, "*I would definitely discuss it within my department first. […] If I am to pursue an idea, it should be approved within the department. If I start running all by myself, and my supervisor says at the end, 'what were you thinking?', then I just wasted effort. […] Or maybe he says, 'it is good, but pay attention to this and this'. So I know directly where the tripping hazards are.*" By assessing the idea early, its fit with the goals of the department is examined. Furthermore, it is determined whether the idea can be realized within the available infrastructure. At the same time, responsibilities are clarified, for instance, whether it is an ITD topic only, whether other departments bear responsibility, etc. The next check is performed by the ITD, ensuring that the project is feasible and approved from their perspective. "*And then we evaluate on a regular basis, three or four times a year, which projects should be realized and which should not*" (Scott), which is done to ensure both the project's fit with the strategic goals of the organization and an adequate use of resources. Finally, the fourth check reviews the planning of the project. The numerous reviews reflect the importance of bringing a project that follows a sequential process on the right track from the very beginning. Due to these multiple checks in the conception phase, many potential mistakes are prevented at the outset, making a successful course of the project more likely.

Close collaboration and communication: A close collaboration is required in the conception phase, both between the ITD and the departments *and* within the ITD and the departments. As regards the latter, an ITD employee remarked in an informal conversation that some colleagues do not react to requests until escalation threats are made. The former is critical for the requirements to be implemented to the users' satisfaction. Regarding the consequences of poor collaboration, Scott remarked, "*It is unacceptable if a requirement has been made but not implemented at the end.*" Emphasizing the communication, Christine explained further: "*There are times when [ITD and departments] talk past one another. Then, it all takes more time, time that is not there*." Sometimes, the ITD and departments do not talk at all or only when it is absolutely necessary: "[*at the] planning stage of course, there we have to approve the planning by the ITD and, possibly, pass on less relevant functions. Apart from that, we are not involved again until the formulation of test cases*" (Christine). A reason for this lack of collaboration was said to be a competitiveness that is partly prevalent between ITD and departments. Since most collaboration and communication are required for the preparation of the URS, this factor is closely related to the following one and is explained in more detail below.

Preparation of the URS: The URS should not only contain what is to be implemented, but also what is not. This prevents mistakes and rework in later process stages. Peter highlights the issue of completeness: "*People gladly forget things or consider them self-evident. Then we have to say, write it down!*" As Steven suggested, "*defined workshops with the one part and with the other part [departments and the ITD], in which questions can be discussed*" can be conducted to ensure a clear and complete URS. The more clear and complete the URS, the more reliable the estimates of the required effort and the less the likelihood of delays, change requests, and unexpected project course. "*So that I know, with regard to content, what is it about, […] what does it mean exactly and is it complex or not*" (Steven). Another issue with the URS is that most end-users at Xperosys do not have the technical competence or time to produce an adequate URS document. "*Often enough, the ITD writes this thing, since the department does not want to or is not able to do it*" (Scott). Christine confirmed in this regard, "*yes, the user requirements specification is very difficult for us to write. We are barely involved in writing other documents. […] The problem is that we have little practice in the creation [of the URS] and the ITD mostly makes different demands towards it.*" What often happens when the URS is created by the departments is that users write down solutions instead of actual requirements, that is, they have a tendency to prepare the FSD instead of the URS. As a consequence of the points above, the URS at Xperosys is often prepared by the ITD, which is problematic since it is also the entity approving the URS. Thus, no adequate check of the document occurs. The solution are trainings for the departments and close collaboration with the ITD.

Motivation: Another central influencing factor was said to be the motivation of project members. Peter, Scott, and Marcus complained about poor motivation of both ITD colleagues and departments' employees. A simple example of poor motivation was an IS project manager requesting information from the department, receiving no answer for weeks, but not asking again what the problem was. He just assumed the position of 'well, I requested it, so it is their turn now'. Lack of motivation naturally leads to delays, worse working atmosphere, and poorer results.

Planning of buffers: The buffers provided in the rough planning make the detailed planning and the respective check (No. 4, see Figure 1) run smoothly. If a project's detailed planning results match or come below the rough planning's results, the project is approved without problems. In case of exceedance, the project has to be reviewed and go back to the portfolio approval step as described in the previous section. As André summed up, "*Mostly, the rough planning is generously dimensioned, so that there are no problems in the detailed planning. Whether it is for additional requirements or just buffer […], remains to be seen.*" Aside from the buffers in the rough planning, which are primarily used for the flexibility of the URS until the detail planning (see factor *following the chosen process)*, buffers should also be accounted for in the detailed planning according to our respondents to cushion unanticipated project events.

Project assessment and reviews: The detailed retrospective analysis of projects allows for the identification of both positive and negative aspects during the project. Even though projects are unique in their entirety, certain parts and procedures recur, and should be continuously improved. Accordingly, there is a review process at Xperosys as follows. When a project is assessed to be successful by controlling, it is considered sufficient for the IS project manager to meet with the business manager and review the project. If, however, a project exceeds certain values (primarily budget and time) in comparison to other projects, higher management levels are involved and the project is analyzed in more detail. This is where the conception phase plays a major role: in order for a project to be assessed correctly, it has to be set up properly and consistently with other projects. The division of effort present at Xperosys is obstructive in this regard. Since project cost centers are only available after the project initialization, the departments bear a share of the incurring costs (e.g., during the rough planning). As Scott confirmed: "*No, that goes somewhere onto the line […], I don't have a post there to book yet.*" Thus, for instance, if the URS of project A is finished before project initialization (and billed to cost centers of the department) while project B follows the standard process, the costs of project A are artificially embellished and look better on paper, but they might in fact be higher than those of project B. Thus, comparability is not given. Marcus also emphasized the importance of the URS overall: "*[URS] is a central document, which is ultimately used to assess project success.*" In the review process, the URS is not only examined by determining which requirements were implemented, but primarily by analyzing how it was done and what went well/wrong.

Documentation: Templates that exist due to rigorous documentation facilitate the work of all stakeholders and prevent the employees from forgetting important documents. As André explained, "*If you create a knowledge management initially, no matter whether it is for a project or not, you can then choose a template in the project later, and all the necessary folder structure is created. Everything that is stored there [is available to you]. From my perspective, this is what we can and must build on.*" Another important aspect are checklists used at Xperosys, particularly in the steps rough planning, estimate, and prioritization. There is a main checklist, containing points like 'the kick-off date for rough planning is set', 'the persons responsible for planning are informed', but also embedded checklists like: 'the rough planning checklist is filled and submitted to PMO at least five working days before rough planning ends.'

Test management: The complete and thorough test management is one of the influencing factors already in the conception phase. As Scott remarked, "*It is unacceptable […] if a requirement is implemented but not tested.*" While testing occurs in later project stages, the foundation is laid in the conception phase. The analysis of field notes yielded several insights into this aspect. First, it is considered important that users write the test cases themselves (rather than the developers or testers). Second, for each requirement (broken down to the simplest level) at least three test cases should be defined.

Discussion

Our study has two main contributions. First, it presents the concrete approach taken in the conception phase of internal, sequential IS projects at Xperosys. Second, nine most important influencing factors in the conception phase are provided. We discuss limitations of our study and its implications below.

To begin with, only one author was involved in the data collection. To counteract the potential bias, the interviews were designed in an open way, that is, the answers should emerge freely from the interviewees. The interviews were recorded and transcribed, and further information was collected in form of notes and documents. After the author on-site conducted the data analysis, the other author reviewed all available information and the coding to increase the reliability of the analysis. Also, while combining qualitative and quantitative data is recommended since it is said to be mutually informing (Mingers 2003), the data

collected in the case organization was purely qualitative in nature. Accordingly, statements like "the most important factors" in this paper are of restricted value. We invite future research to contrast our findings to respective quantitative analyses. Finally, all results are presented in the context of internal, sequential IS projects within the budget range of 50.000–100.000 Euros, limiting the generalizability accordingly.

We contrast our findings with extant literature by using two rather different works. The first – Pinto and Slevin 1988 (henceforth: (1)) – reports the results of a quantitative study of the most common success factors, considering the fluctuation of the factors over the project lifecycle. The second – Pankratz and Basten 2013 (henceforth: (2)) – is a recent qualitative work on failure factors identified in real-life IS projects. (1) identified five success factors to be most important in the conception phase (the first two phases in Table 1): clear project mission (initial clarity of goals and general directions), client consultation (communication, consultation, and active listening to all impacted parties), top management support (providing resources and authority for the project), client acceptance ('selling' the project to the intended users), and urgency (perceived sense of project's importance or need for quick implementation). (2) identified 54 failure factors in general and grouped them in the following ten categories: project conditions, directive decisions, insufficient consideration of customer, project planning, project management, change management, top management attitude, customer-contractor relationship, technology, and unexpected events. Some of those categories refer to specific project phases, while others include activities throughout the entire project. Table 3 presents a comparison of our results to those two works, listing our factors and factors that (to some degree) correspond to them. The comparison shows that five out of nine factors identified at Xperosys are at least partly covered.

Our factors	(1) - Pinto and Slevin 1988	(2) – Pankratz and Basten 2013
Following the chosen process		Development approach not understood; project management method applied incorrectly
Project approvals		
Close collaboration and communication	Client consultation; client acceptance	Uncooperative relationship between customer and contractor; ineffective communication; insufficient stakeholder involvement
Preparation of the URS	Clear project mission	Unclear project goals; inadequate requirements specification
Motivation	Urgency	Low morale of end-users
Planning of buffers		
Project assessment and reviews		
Documentation		
Test management		Insufficient quality assurance

Table 3. Comparison with Extant Literature

Although many identified factors do not come as a surprise, there are remarkable insights. It is of particular interest *which* factors are most important in the conception phase. There are both factors in our list that are not found in (1) or (2) and common influencing factors like top management commitment (TMC) that are not included in our list. Both findings can be attributed to the characteristics of our case – we were looking at the conception phase in internal projects only, following a specific sequential process. Accordingly, the factors *project approvals*, *planning of buffers*, *project assessment and reviews,* and *documentation* are of particular importance. TMC is emphasized in both (1) and (2), but (although not being irrelevant) was not accentuated by our respondents or in other data sources due to the well-structured process. A certain level of TMC is required in the portfolio approval step; however, if the other factors are considered, TMC is not said to be critical for project success at Xperosys. In conclusion, the relevance of influencing factors is not only dependent on project phases (Pinto and Slevin 1988), but also on the chosen development approach. Overall, our findings are of particular interest for practitioners following a similar process. Researchers can use our results to compare the influencing factors to different scenarios, for instance, to external projects or later project phases. Furthermore, dependencies among factors can be researched, and means to achieve specific factors can be explored (e.g., trainings to ensure process understanding; incentives and gamification elements to increase motivation, etc.).

Conclusion

In this article, we report the results of a single-case, multi-method, exploratory case study at an IS service provider in Germany. By means of a qualitative analysis of expert interviews and other data sources, we were able to gain insights into the conception phase of IS projects conducted in that organization. Nine most important influencing factors in the conception phase were presented and discussed. While many factors might not come as a surprise, the list of aspects specifically important at the early stages of an IS project as well as the concrete approach taken at the case organization should help practitioners improve the conception phase and, ultimately, the success rate of their own projects.

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