

Original article

SUCCESS FACTORS OF ICT PROJECTS IN DIGITAL TRANSFORMATION

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Abstract: Digital transformation induces sharp changes in society and the economy - in particular, regarding the latter, the transformation of businesses is heavily driven by ICT projects. In this paper, we analyze the specifics of ICT projects in digital transformation, the success factors of ICT projects in digital transformation in Germany, and different stakeholders' perspectives on the issue. For this purpose, we have interviewed experts with different backgrounds and have synthesized their statements using content-structuring qualitative content analysis. The findings indicate some specifics of the digital transformation context such as its interdisciplinarity, strategic relevance, and new demand for collaboration. Furthermore, certain factors concerning project management instruments as well as the quality of leadership and culture in addition to communication and involvement of stakeholders are of major importance. However, the emphases of the different success factors strongly depend on the background of the role of the experts.

Keywords: Digital transformation, ICT project management, project success factors, qualitative content analysis.

1. INTRODUCTION

In recent years, a variety of new technologies have emerged, especially in the areas of SMAC (social, mobile, analytics, cloud). This steady and rapid development continuously alters not only the economy but also the society (Legner et al., 2017). In Germany, digital transformation has become one of the top priorities and represents a crucial task for Germany's future competitive capacity (German Government, 2020). While Germany already has achieved some advancements (e.g., it has almost 282 industry robots per 10,000 industrial jobs compared to just 14 in China), the country faces big challenges in other areas (e.g., internet speed, trust in data, securing skilled workforce) such that this megatrend will continue to have its impact on

both private and professional life (Schweer, & Sahl, 2017).

Digital transformation is "a process that aims to improve an entity by triggering significant changes to its properties through combinations of information, computing, communication, and connectivity technologies" (Vial, 2019). Consequently, information & communication technology (ICT) and the successful implementation of change projects play major roles in this journey. In that respect, digital transformation substantially increases the organizational complexity of project realization as it creates additional interdependencies within businesses and requires a lot of flexibility (Jöhnk et al., 2020).

This work focuses on ICT projects that aim at realizing digital transformation. In this matter, we want to shed light on the key characteristics of digital transformation in project management:

RQ 1. What is special about digital transformation projects?

As our central research question, we want to detect potential factors for successful project realizations:

RQ 2. What are the success factors for ICT projects in the context of digital transformation in Germany?

The answer to this question might be subject to the perspective of different groups of stakeholders:

RQ 3. How homogenous are the perspectives of different stakeholders?

Concerning these questions, we interviewed six digital transformation project experts and conducted a content-structuring qualitative content analysis.

The remainder of this paper is structured as follows: After this introduction (Sec. 1), we present related work and potential success factors from the literature (Sec. 2). Subsequently, the methodology is introduced (Sec. 3) before we synthesize the findings of our qualitative research (Sec. 4). Finally, we discuss the results and conclude the study (Sec. 5).

2. RELATED WORK ON SUCCESS FACTORS

In this section, we focus on related works that cover success factors in ICT projects and digital transformation projects - the central focus of this study.

Leyh and Meischner (2018) ascertain success factors for general digital transformation projects based on a literature study that is verified with feedback from experts. The results show that the most covered factors in the literature (i.e., corporate culture, customer-centric management, big data) are not necessarily the most important for practitioners (digital strategy and vision, top

management support, omnichannel management) and vice versa.

From a systematic literature review with 39 articles, Iriarte and Bayona (2020) identify IT project success criteria as well as factors and analyze their interplay as well as their underlying attributes (e.g., classification into soft and hard attributes). Notably, just two out of the 39 articles (5 %) are classified as interview studies.

Similarly, Ayat et al. (2020) also conduct a systematic literature review for ICT project success factors and have found an increasing trend of this topic with only nine relevant articles before 2006 but more than seven per year in 2015-2019.

In another literature study, Nasir and Sahibuddin (2011) focus on critical success factors for software projects and survey the related literature from 1990 to 2010. In their review of 43 articles, they work out that clear requirements, clear objectives, and a realistic schedule are the most frequently covered success factors for software projects.

The CHAOS Report (Standish Group, 2015) has been conducted since 1994 and has been ascertaining tens of thousands of IT project performances. This corporate study claims that just 29 % of the IT projects are successful, whereas 19 % fail (52 % are challenged) in terms of value, achieving objectives, and satisfaction. The authors conclude that companies should primarily invest in executive sponsoring, emotional maturity, user involvement, and optimization.

To the best of our knowledge, there is little research that specifically covers the issue of ICT project success factors in the specific context of digital transformation and no research that further focuses on Germany in particular.

3. RESEARCH DESIGN

In this section, we present our research methodology (Sec. 3.1) and provide some details on the selection of experts, preparation, and execution of the interviews (Sec. 3.2), as well as coding and analysis (Sec. 3.3).

3.1. Methodology

In the course of this work, we have interviewed a selection of six experts from six different companies in the context of our research questions (for more details on the experts, see next section). The experts originate from three different backgrounds to represent different stakeholder perspectives: line management, project management, and consulting. These groups comprise both internal perspectives (run and change) as well as an external view. The semi-structured interviews were conducted based on a predefined interview guide that had been developed based upon potential success factors derived from literature. The interview guide had been tested and improved in a pretest interview. The transcription of the interviews was carried out according to the guidelines of Dresing and Pehl (2017), and Kuckartz and Rädiker (2019). For the

evaluation of the interviews, the methodology of content-structuring qualitative content analysis was applied according to Kuckartz (2019), which is based on the general qualitative analysis methodology according to Mayring (2014, 2019).

3.2. Experts & Interviews

Six experts were acquired either by personal recommendation or by contacting experts on the social business network LinkedIn. For the latter, we have searched the keywords ICT projects, ICT project management, ICT project manager, digital transformation, and digital transformation project. At this, we have ensured that the backgrounds of the interviewees are balanced with two experts from each of the three perspectives. A pseudonymized summary of the background, current job role, and general job experience is shown in Table 1.

Table 1: Overview on the six interviewed experts

Background	Label	Current Job Role	Experience	Length
Line Management	[LM1]	Manager at a renowned ICT company	Various management roles in well-known international ICT enterprises	57:57 min.
	[LM2]	Line Manager at an ICT advisory company	Several years in management with a focus on digital transformation	26:50 min.
Consulting	[CS1]	Senior Consultant & ICT project manager at a large ICT service co.	Several years in consulting of ICT projects, editor of ICT textbooks	34:27 min.
	[CS2]	Founder & Partner at an ICT consulting company	Owner of a consultancy focused on change and transformation projects, fmr. manager in renowned consultancies	40:45 min.
Project Management	[PM1]	Project Manager for ICT Infrastructure Projects at a large insurance co.	Various positions as ICT project manager, several supplementary qualifications in project as well as agile management	39:00 min.
	[PM2]	CDO, Head of Data & Customer Applications	More than ten years of exp. in ICT project mgmt., IPMA Level D	63:41 min.

3.3. Coding & Analysis

Following Mayring (2014, 2019) and Kuckartz (2019), we have executed two

rounds of coding of the interview transcription with the software MAXQDA. An overview of the coding and analysis process is shown in Figure 1.

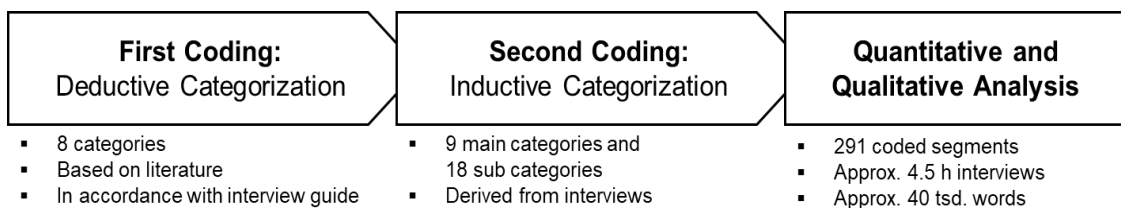


Figure 1: Process of coding analysis

In the first coding round, we have used a deductive categorization system with eight categories that are based on the interview guide. Since the interview guide itself has been developed following the literature, the first categorization system is therefore derived from theory.

For the second and final coding round, we have derived further categories during the examination of the material in the first coding, i.e., we have further differentiated the deductively derived categories by inductive reasoning. By doing so, we have identified nine main categories (eight of which are from this first categorization system) with 18 subcategories in total.

Finally, this process has resulted in 291 coded segments (originated from approx. 4.5 h of expert interviews or approx. 40,000 words of transcription) for the quantitative and qualitative analysis that we will present in the next section.

4. FINDINGS

In this section, we present findings specifics of digital transformation projects (Sec. 4.1) as well as our quantitative (Sec. 4.2) and qualitative results (Sec. 4.3) regarding success factors and stakeholders' perspectives.

4.1. Specifics of Digital Transformation Projects

The most distinctive feature of ICT projects is their complexity, which is mentioned in every interview. In this matter, digital transformation plays a central role because it has once again increased the complexity of ICT projects. Particularly in software projects, the complexity is high due to diverse options that may be in demand. Besides, digital transformation projects are often "cross-sectional" [LM1], i.e., there are a large number of people from different areas

involved - with a large number of interfaces and processes [LM2]. This also results in a higher need for communication [LM1] and diverging competencies [CS2].

The strategic relevance of ICT is increasing as a result of the digital transformation. This leads to the fact that there are many people involved that believe that they supposedly have expertise in digital transformation topics, even if this is not the case [PM2]. However, these circumstances make the arrangement of ICT projects more difficult, because it is necessary to evaluate and select thoroughly who is a stakeholder in the digital transformation project and who should have a say [PM2]. Even everyday communication can be challenging "because the vocabulary is different" [CS1]. This is mainly due to technical terms and specialized jargon, which makes it more difficult for many project participants to understand facts and contexts. As a result, even more aspects of a project need to be explained, especially in terms of communication between ICT and the business departments [CS1].

Regarding the further impact of the digital transformation on ICT projects, one expert says that ICT has only become strategically crucial in companies in recent years - particularly as a result of the digital transformation [PM2]. ICT has grown in importance to such an extent that it has now advanced into the core businesses. In this context, however, it can also happen that the human factor is increasingly pushed into the background because jobs are obsolete, e.g., due to automatization.

4.2. Quantitative Analysis of Success Factors

An overview of the frequencies of the categories - clustered by themes, main categories, and subcategories - is summarized in Table 2.

Table 2: Frequencies of the categories (bold) and subcategories, grouped by themes

Category	Total	Category	Total
Theme: Project Management Instruments (101)			
Project Planning	73	Project Mgmt. Methodology	28
– <i>Objectives & Requirements</i>	33	Risk Management	10
– <i>Personnel & Budget Planning</i>	40		
Theme: Leadership & Culture (79)			
Project Leadership	41	Corporate Culture	38
– <i>ICT Skills</i>	10	– <i>Change Management</i>	17
– <i>Soft Skills</i>	8	– <i>Corporate Culture in General</i>	21
– <i>Project Mgmt. Competence</i>	20		
– <i>Tools</i>	3		
Theme: Communication & Involvement (64)			
Stakeholder Management	37	Communication	27
– <i>General Stakeholder Mgmt.</i>	12	– <i>User Training</i>	5
– <i>Comm. w/ External Stakeholders</i>	19	– <i>External Communication Support</i>	6
– <i>Management of Expectations</i>	6	– <i>Comm. within the Project</i>	16
Theme: Strategic Management (37)			
Role of Top Management	20	Strategy & Vision	17
– <i>Support / Sponsoring</i>	17	– <i>Corporate Strategy & Vision</i>	13
– <i>Expertise in Digital Transf.</i>	3	– <i>Digital Strategy & Vision</i>	4

The most discussed category in the interviews is project planning (73 coded segments), concerning the subcategories of personnel & budget planning (40) and objectives & requirements (33). This category is part of the theme of project management instruments that also contains the categories project management methodology (28) and risk management (10) and deals with the different practical approaches towards managing projects. This cluster is a key success factor in digital transformation projects.

Besides this cluster, the theme of leadership & culture is also of an important role. This theme is concerned with project leadership (41), i.e., the skills and competencies of a project lead. In addition to that, it deals with corporate culture as well and how leadership has an impact on the respective corporate, change, and project culture.

The theme of communication & involvement shows a high relevance for success.

Stakeholder management (37), concerned with external stakeholders and management of expectation, is identified as an important factor. Furthermore, communication (27), concerned with communication within the project as well as the necessary skills and resources, plays also a major role in this context.

Finally, the theme of strategic management with its two categories still shows fair importance for the success of ICT projects in digital transformation: These categories are the role of top management (20), which embraces support and sponsoring as well as expertise, and strategy & vision (17), which focuses on both a corporate and digital vision.

Concerning the background of the experts, Figure 2 depicts the differences of the relative shares of the different perspectives for the main categories (line managers account for 120, consultants for 90, and project managers for 81 codes in total).

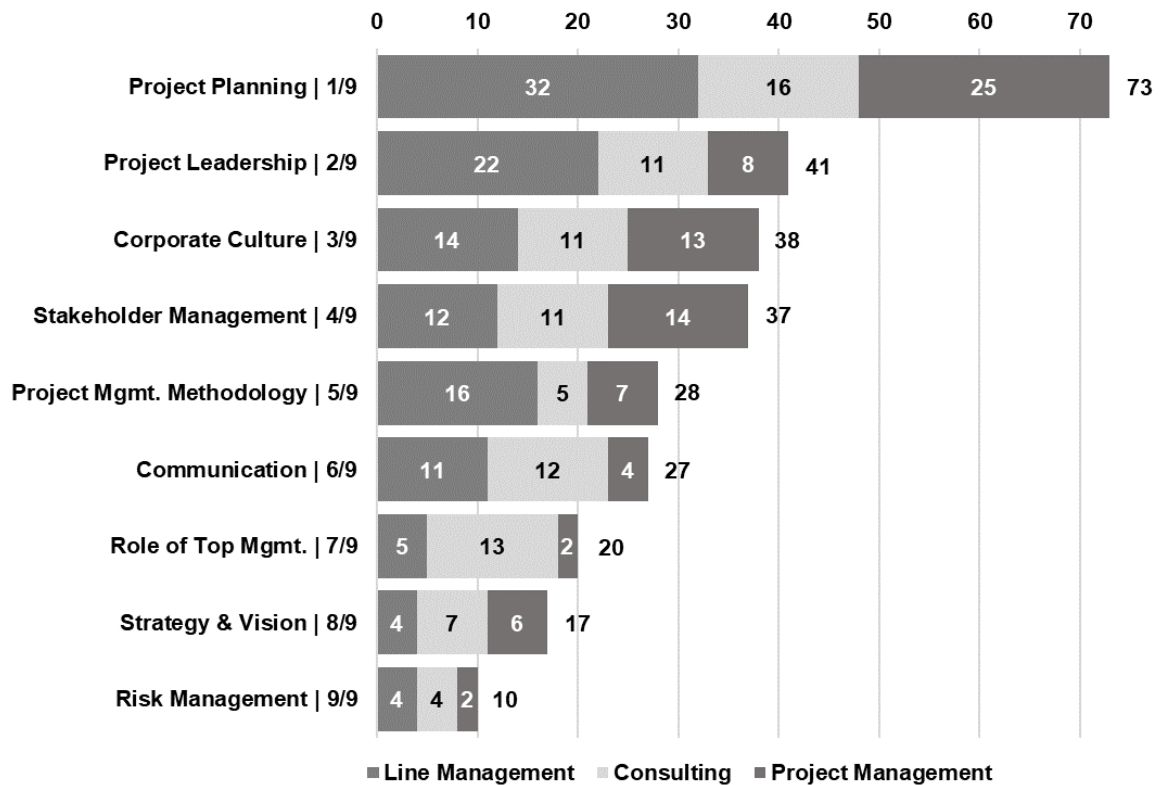


Figure 2: Frequencies of the categories with respect to the expert backgrounds

Interestingly, the line managers in this study show an emphasis on project operation orientated categories, although this is not their key focus in everyday business: the most named are project planning (32), project leadership (22), and project management methodology (16) that all are concerned with project operations. Project planning is also the most stated category for project managers (25) and consultants (16).

The project managers are relatively overrepresented with statements regarding stakeholder management (14), corporate culture (13), as well as strategy & vision (6). These categories are rather organization-oriented and aim at building a connection to the (line) organization. With this in mind, it is surprising that communication is merely coded four times.

For the experts from consulting, the role of top management is a critical element (13) which is excessively mentioned compared to the other two groups. Furthermore, they see a key role of communication (12) which complies with line managers but opposes

project managers, as mentioned above. However, consultants also name stakeholder management and corporate culture as well as project leadership (all 11). Hence, consultants seem to orientate themselves to the top management as well as other decision-makers or stakeholders.

4.3. Qualitative Analysis of Success Factors

In this sub-section, we give a synthesis of the qualitative statements of the experts on success factors.

Success Factors in Project Management Instruments

Accurate planning is particularly difficult in ICT projects. Due to the complexity, ICT projects should be given time and budget estimates as guidelines rather than rigid specifications to maintain some flexibility [LM3]. In the execution of the planning, the experience of the project managers plays a significant role [CS2].

In the interviews, it became apparent that the selected project management methodology has a great influence on the general project advancement as well as other success factors. In particular, the method must fit the company, whereby the company should have “a certain maturity of those involved and also a certain maturity of the culture” [PM2]. Agile methods can be very beneficial for a project if the project members have correctly understood the methodology and can apply it accordingly. However, this often fails because agility is associated in many cases with flexibility and spontaneity, although “there is a fairly strict regimen in agile methods” [CS2]. Furthermore, the context of the ICT project must always be in line with the chosen methods since agility is not suited for every ICT project and employee culture [LM1]. Another relevant factor is goal setting that affects not only the definition of the objectives but also their communication to achieve a common understanding among all project members [PM2] - even in agile operation modes.

Requirements management is another highly relevant factor according to the experts. It is important “that the requirements are not the conditions for implementation” [LM2], but rather that members can contribute their expertise to realize the desired features. Thus, the way of solving the problem should be determined by the ones that are responsible from a technical perspective. The requirements should be determined in a “dialog with each other, being in constant coordination, to move forward together again and again” [LM2].

In addition to budget control, human resource planning plays a very important role in digital transformation project planning. To meet the highly complex demands, “skills [...] are actually the absolute most important thing in such projects” [LM1]. It is necessary to find personnel with the right skill set for specific project tasks. Particularly in the context of digital transformation, project managers should focus on quality instead of quantity, even if specially qualified personnel may be more expensive [PM1]. However, this mindset is often not given because “costs are

prioritized higher than quality” [CS2]. Although resources are usually already scarce, planning should still be done with sufficient backup so that spontaneous failures or changes in requirements can be compensated. Thus, there is a need not only for a “certain heterogeneity but also a certain homogeneity” [LM2] in the project team.

All interviewees see risk management as crucial as well. Due to the relevance of the digital transformation for companies, ICT projects often have budgets in the millions, i.e., taking risks and making mistakes can easily cause huge damages [CS2].

Success Factors in Leadership

Concerning the skills of the project lead, the experts agree, with one exception, that project managers of an ICT project must also have a certain minimum level of ICT expertise. This is important to be taken seriously by the project team to understand contexts and be able to ask the right questions [CS2]. However, the project manager should never have the highest level of expertise, as this would only be an obstacle and “get in the way” of the project management [PM1]. Furthermore, there should be a high willingness to learn new topics, even if these are not in the personal area of interest [PM1].

The project management competence of the project leader is another success factor. A good ICT project manager should always act with the project management triangle (scope, cost, time) in mind [LM2] as well as be consistent in management, especially with building up deadline pressure and actively demanding results [LM1]. These characteristics, even if they may seem taken for granted [LM1], are frequently mentioned as one of the most important success factors.

The ability to escalate issues at the right time in an appropriate but determined manner is also a major competence of a successful ICT project manager. Escalation is not per se a negative issue; this view must also be shared by the impression of the project team [LM2]. With regard to soft skills, the project lead should be characterized first and foremost by

a high level of stress resistance. Stress events may not be transferred to the project team. The project manager must compensate for stress and shield the team from it [PM1]. Besides supporting and encouraging the team, the project manager must also be strong in terms of communication and maintain a constant dialog with customers and other stakeholders, both internally and externally.

Several experts also mention openness to modern tools. Due to the influence of digital transformation on project management itself, there are a lot of new tools in various domains. Openness to the use of these tools in line with an adequate implementation is a basic requirement for successful ICT project managers [CS1].

According to the interviewees, corporate culture has an even more significant role than corporate strategy in ICT projects, and it is named as one of the most important success factors in line with related work. Digital transformation projects often result in significant changes in companies such that the change management approach, in particular, is extremely relevant [PM1]. However, if the corporate culture is not designed for change and employees are exposed to changes, the digital transformation might fail. The human factor is very relevant here because “projects tend to fail because of people rather than technical circumstances” [CS1].

Moreover, a consensus culture, i.e., a corporate culture that is characterized by excessive discussion and coordination, represents a major obstacle to the success of ICT projects [CS2]. Accordingly, the establishment of a culture of error helps to lead ICT projects to success [PM2]. A culture of error is especially supportive with regard to agile methods. Consequently, errors must be generally accepted, and there is a need for “error-tolerant communication” [PM2]. Finally, the project lead must be aware of the corporate culture, understand it, and know how to put it in the context of the project, regardless of what type of culture prevails in a company [PM1].

Success Factors in Communication & Involvement

Communication is also confirmed as a success factor. Especially in internal communication, the influence of digital transformation means that there are a large number of new tools and new communication formats (e.g., daily stand-ups) for communicating efficiently. Successful internal project communication is characterized by regularity and active face-to-face communication. Passive communication methods, such as filing documents in storage, are a hindrance to effective communication [CS2]. For large ICT projects, working in project work areas has also been proven to be successful, as more direct communication is possible [CS2]. In addition to these individual approaches, various project management frameworks provide a solid basis for designing communication in the project [PM2]. With “an approach of gamification” [CS2] like humorous formats, the attention and interest can be enhanced among the recipients.

More generally, responsible project members should bear in mind that different stakeholders have different communication needs in terms of the amount and way [PM1]. Regardless of the format, positive reports should be made about the ICT project since these projects often take place “under the radar” [PM2]. This also includes the successful completion, which is often neglected [PM2]. Finally, particularly in ICT projects, which often involve the introduction of new applications or user interfaces, it is essential to train the potential end-users in the application [CS1] to increase the probability of success of the project [CS2].

Stakeholder management, in general, is also confirmed as a success factor for ICT projects. In this context, communication plays a crucial role. Project managers, in particular, have to ensure targeted and early communication [CS1]. Furthermore, permanent expectation management of stakeholders is mentioned by several experts as well. Expectations are equivalent to requirements; however, they are implicit, i.e., they are not expressed explicitly. Expectation management should be carried

out both in the direction of top management and in the direction of customers to identify expectations at an early stage and “to tell the stakeholders what they can expect and what is realistic” [CS2] to avoid disappointment from early on.

Success Factors in Strategic Management

For one consultant, the role of top management is the most important factor for ICT projects in digital transformation [CS2], whereby the other experts do not see this degree of importance. Although a digital transformation project can also succeed without sponsorship from the board, support from the board significantly increases the probability of success [PM1]. Therefore, at least one, ideally several, top managers should have a positive attitude towards the project, visibly support it [CS2], and actively defend it against criticism [LM2].

In practice, companies often try to follow the trend of digital transformation relatively arbitrarily by initiating ICT projects as quickly as possible [CS2]. However, ICT projects can only be successful if they are aligned with the strategy and thus contribute to achieving a corporate vision in the long term [LM2]. Albeit, there is often a lack of understanding of digital topics among top managers, particularly due to their age and lack of ICT affinity. In this way, measures are taken that do not contribute to the digital transformation [CS2]. However, most experts state that there is no need for a stand-alone digital strategy since it should be implemented as an integral part of the corporate strategy. Moreover, different responsibilities for the general and digital strategy can lead to difficulties [PM2].

The vision and the strategy have to be in line with the corporate culture [PM2]. If the employees are not sufficiently considered, ICT projects can be successful in their implementation but eventually fail if the employees either refuse the technical innovations or are not able to apply them adequately [PM1].

5. Discussion

In this section, we discuss our results in the mirror of the scientific literature (Sec. 5.1), before we integrate the findings in a general, theoretical framework of organizational change (Sec. 5.2). Finally, we discuss the limitations of the study (Sec. 5.3).

5.1. Discussion of the Findings

Concerning digital transformation, we have addressed the question of the specific feature of such ICT projects in this context (RQ 1). In the eyes of the German experts, ICT projects in digital transformation are centrally characterized by their interdisciplinary nature, their strategic relevance, and new ways of as well as an enhanced need for collaboration. On the one hand, these features come up with increased complexity and a lot of challenges for ICT projects, but, on the other hand, they also represent great opportunities for the discipline of ICT management and professionals in this path of career.

Regarding the question of success factors (RQ 2), we have worked out that, firstly, project management instruments (especially project planning) are of importance for digital transformation in the German context. This is in line with the findings in the literature that also see objectives, requirements, time, and personnel planning as at least a major success factor, often as one of the most crucial factors (Ayat et al., 2020; Iriarte, & Bayona, 2020; Nasir, & Sahibuddin, 2011; Standish Group, 2015). However, the study of Leyh and Meischner (2018) that also deals with the subject of digital transformation projects does not mention this theme at all - neither in their literature study nor in their interview study. The reasons why the work contradicts our findings and the mentioned studies from the literature remain unclear, partly due to its very brief description and the corresponding unresolved questions regarding the methodology and scope. Nevertheless, the evidence of our interviews, as well as the related work, is not only strong but also persuasive. Consequently, especially in the context of digital transformation, ICT projects

seem to require a solid basis for planning to cope with the increased complexity.

As further success factors, we have identified project skills and corporate culture with respect to the theme of project leadership. Previous studies support these issues as very high-ranking, but usually not foremost, concordantly (Ayat et al., 2020; Iriarte, & Bayona, 2020; Leyh, & Meischner, 2018; Nasir, & Sahibuddin, 2011; Standish Group, 2015). These factors are associated with emotional capabilities as well as the environment of the employees and might be of enhanced importance to cope with the challenges coming with major change.

Communication and involvement (in particular, stakeholder management) is a further theme of success factors that has shown value for ICT projects in digital transformation. Some of the studies that are concerned with general project success even have found these issues as one of the most crucial factors (Ayat et al., 2020; Iriarte, & Bayona, 2020; Standish Group, 2015). Other studies, however, support our classification as significant but not upfront factors (Leyh, & Meischner, 2018; Nasir, & Sahibuddin, 2011). Based on this observation, communication and involvement could be of less importance in digital transformation than in other project surroundings, which is counter-intuitive, though. Quite the contrary, we hypothesize that digital transformation projects already have relatively efficient and professional mechanisms of communication and involvement at their command because of their interdisciplinary and strategic relevance. Due to this degree of maturity, these factors might not be pivotal controls for project managers but may still be contributing to success, even if unseen.

Finally, the theme of strategic management, concerning the role of top management as well as strategy & vision, is still of some importance but not as decisive as the before-mentioned aspects according to our experts. Notably, other works find these factors as relatively more important than we can deduce from our interviews (Ayat et al., 2020; Iriarte & Bayona, 2020; Leyh, & Meischner, 2018;

Nasir, & Sahibuddin, 2011) - especially top management support is a repeatedly prominent factor. While this topic is not well-covered relative to other issues in all of the interviews, it is one of the most and deeply mentioned ones in the subgroup of consultants. Consequently, one must have the respective perspectives in mind.

This leads us to our third research question, in which we have analyzed the perspectives of different stakeholders (RQ 3). The findings show that the perspective veritably influences the perception of the significances. The respective roles seem to attach a lot of importance to other roles different from them. For instance, in the perspective of line managers, the project operation is key, whereas project managers seem to be more concerned with the integration into the organization. Then again, consultants seem to be focused on decision-making.

Although the findings of this study are based on qualitative interviews with only six experts from three groups, they could already show a significant impact of the background on the respective assessment. Hence, we conclude that practical implications always need to be context-related, i.e., they need to account for the different views of stakeholders and differentiate the argumentation in the mirror of that.

5.2. Relationship to Change Management Theory

The digital transformation is strongly interconnected with change management since it changes the ways of business models and processes work. In change management theory, the seminal model of organizational change by Leavitt and Bahrami (1988) is widely recognized: In this, organizational change is described as a change of structure (e.g., hierarchy, process), task (e.g., expectation, assignments), information & control (e.g., information flows, control mechanisms), people (e.g., skills, attitudes), and environment (i.e., external to the organization). Furthermore, every of these five change dimensions interacts with each other. In the model, we have projected the

identified success factors on the interaction, as shown in Figure 3. The success factors from this study cover all interactions between the change aspects comprehensively but

particularly densify around the dimensions of people and task, confirming some of the qualitative findings from the interviews.

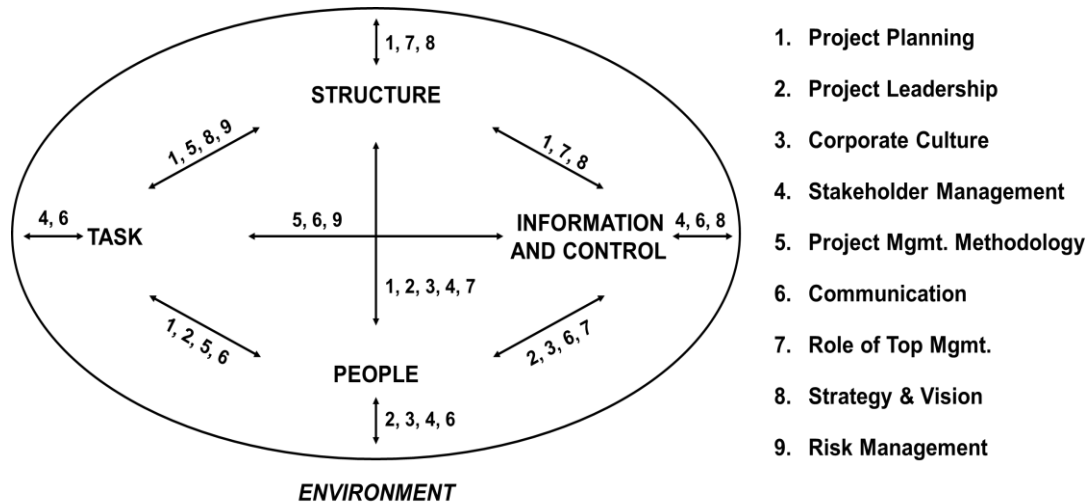


Figure 3: The success factors projected to the interactions in Leavitt & Bahrami's model of organizational change (Leavitt, & Bahrami, 1988)

This framework provides not only insights but also leverage points for project managers in digital transformation, combining ICT project success factors with a concept of organizational change.

5.3. Limitations

Concerning limitations, our approach suffers from the fact that qualitative studies generally underlie subjective assessment. In this study, we created qualitative data in the form of expert interviews, analyzed the data, and drew conclusions based on our very own judgment of the statements as well. Furthermore, the search for experts has been carried out carefully, but if alternative experts had been in place, different results could have been obtained. Besides, the experts do not refer to every single success factor as such in particular but often explain their characteristics and describe general relationships. Since all experts work in Germany, the results are limited to the views and situation in Germany - as we have addressed throughout the study.

Another limiting factor is that the individual experts have spoken to varying degrees,

which could mean that some perspectives could place more issues than others. However, more speaking time does not necessarily mean that the content is of higher quality. Despite having the longest speaking time, the project management experts account for only 28 % of the codes, while the line management group accounts for 41 %. For instance, this may occur due to complex explanations with larger segments to be coded but fewer codes in total. In general, the applied research design cannot identify all potential success factors; however, there is no claim to completeness in this research.

6. CONCLUSION

Digital transformation represents a central challenge for ICT project managers in Germany. In this sense, the digital transformation not only transforms businesses and business models but also the fashion of project management, especially in the case of ICT. This study provides valuable insights into the digital transformation practitioners' views of the core of digital transformation and project management success factors, as well as the impact of the respective role background on these views.

On a theoretical level, this paper contributes to the understanding of the phenomenon of digital transformation. The empirical research shows that success factors are particular and that there are different challenges in ICT projects in this context. Eventually, the findings are mapped and integrated into a generalized change management theory. Furthermore, the study examines and demonstrates different focus areas of different stakeholder groups in the project environment of digital transformation.

From a practitioner's perspective, digital transformation bears a lot of traps and pitfalls such as, e.g., considerably increased complexity, ill-defined objectives, and high interdisciplinarity - as we could point out. To overcome these challenges, the identified success factors, as well as the corresponding technical understanding, can provide guidance for project managers for successful ICT digital transformation projects. The findings can supportingly be implemented in project execution as well as in the training and education of project managers.

Future work should aim at analyzing the underlying factors of influence for emphasizing different kinds of success factors (e.g., more detailed study of backgrounds, project aims, notions of success criteria, etc.). Moreover, the qualitatively raised success factors should be confirmed quantitatively by employing a standardized survey.

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