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TOWARDS UNDERSTANDING THE RELATIVE IMPORTANCE OF RISK FACTORS IN IS PROJECTS: A QUANTITATIVE PERSPECTIVE

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Abstract

Commonly, project managers and researchers agree that identifying risks is the most crucial step in project risk management. Hence, extant research provides various rankings of risk factors. In this paper, we rank the importance of risk factors based on an archive of project risk reports provided by project managers of a large software development company. In contrast to previous research that ranks people and processes as most important risk domains, our analysis emphasizes technology-related risk factors. We argue that this conflict might result from two dimensions determining the perceived importance of risk factors: Controllability and micro-politics. A project manager will rank risks higher when he has only limited control on mitigating risks. Risks beyond control will be neglected. However, in a corporate context, micro-political mechanisms change the importance towards these risks. They will exploit risk management to escalate uncontrollable threats to project success and cover risk factors that stem from shortcomings of their own or of colleagues. Thus, micro-political mechanisms reveal the most important risks from a corporate perspective. Detached from the corporate context, project managers emphasize risks threatening efficient project management. We contribute to IS research by proposing alternative explanations for the ranking discrepancies.

Keywords: IS project risk management, Risk factors, Risk importance, Risk ranking.

1 INTRODUCTION

Both practitioners and researchers argue that risk management is one of the key approaches to reduce the likelihood of IS project failure (Schmidt et al. 2001; Wallace et al. 2004). Managing project risks allows project managers to identify, analyze, control, and monitor risks and the underlying risk factors (Chapman, Ward 1996). Obviously, the capability of project managers to identify the risks and underlying risk factors that are most important for a given project largely determines the effectiveness of project risk management.

Hence, a substantial amount of extant research on managing risks in IS projects focuses on ranking risks or their underlying risk factors (Schmidt et al. 2001; Kappelman et al. 2006; Barki et al. 1993). Although researchers provide few explanations, they agree that people-related risk factors and process-related risk factors should play the most important role in project risk management while technological risk factors are negligible (Schmidt et al. 2001; Kappelman et al. 2006).

Despite the apparent agreement, most of the rankings ground on the expertise of project managers, i.e., project managers were specifically asked to relatively weight given risk factors. Little research is available where other data sources where investigated. Furthermore, the majority of studies on the relative importance of risk factors are of descriptive nature (Gregor 2006). Despite the amount of research, no definite set of underlying mechanisms has been established yet.

The purpose of this paper is to appraise the extant research critically by shedding a quantitative light on the relative importance of risk factors. Our research question is: *Are there possible alternative mechanisms that explain rankings of risk factors in IS projects?* We analyze an archive of project risk reports of ALPHA[1], a large, internationally acting software development company. The purpose of the project risk reports is to evaluate project proposals, allow a corporate perspective on the status of the IS projects at ALPHA, and to signal critical project situations. We consolidate the project risk reports in a database to replicate extant rankings of risk factors.

The remainder of our paper is as follows. In the next section, we review existing rankings of risk factors in IS projects. Then, we outline our research design and the approach used to analyze the archive of project risk reports. Subsequent, we present the results of our analysis and compare them with a subset of rankings identified in the literature review. In contrast to existing rankings, our results show that the project managers weighted technology-related risks as most important in their projects. Then, we apply theories from the domain of risk management to propose initial explanations on the ranking discrepancies and critically review potential limitations of our approach.

In sum, our research contributes to the domain of project risk management by providing a new perspective on the relative importance of risk factors in IS projects. Furthermore, we contribute to the theoretical foundations of project risk management by proposing alternative explanations that consolidate existing research on risk factors and allow new attempts to understand the mechanisms of risk perceptions of IS project managers.

[1] Real name withheld.

2 LITERATURE REVIEW

The literature on IS project risk factors is comprehensive: Early studies were done by Alter and Ginzberg (1978), Zmud (1980), McFarlan (1981), Boehm (1991), Barki et al. (1993) or Moynihan (1997). More recently, Jiang and Klein (2000) surveyed 86 IS executives to rank twelve risk categories they derived from prior literature. However, the authors could only show a significant relation to project success in three cases. Tiwana and Keil (2004) asked 60 MIS directors to evaluate the risk situation of 12 separate projects and derived 720 single evaluations on which they based their analysis. Using structural equation modeling, the authors identified five key risk factors. Wallace et al. (2004) identified six dimensions of software project risk factors, grouped them into three risk domains, namely “Social Subsystem”, “Technical Subsystem” and “Project Management”, and investigated dependencies between risk dimension and project success. While the latter domain refers to the project team and the planning / control techniques applied by the project manager, the social subsystem domain comprises an unstable or highly political social context and users unable or not willing to contribute to project success. The technical subsystem domain captures risks related to unstable requirements, high project complexity as well as new or unfamiliar technology. As these domains reflect the consensus of 507 PMI members from various countries and have been substantiated in more recent research, we will employ them in order to compare our findings to prior studies (Huang, Han 2008; Tesch et al. 2007).

Table 1 shows a sample of existing studies. Among other things, they differ in their perspective on risks and the number of risk factors identified (i.e. level of abstraction). However, almost all of them collect their data by the means of surveys and/or interviews.

Study	**Risk perspective**	**Number of risk factors identified**	**Method of data collection**	**Number of projects investigated/ participants surveyed**	**Emphasized research Approach**	**Statement on the importance of risk factors**	**Provide rationales for ranking results**
Alter and Ginzberg (1978)*	Project	8	Survey/ Interviews	29/56	Empirical-Qualitative	No	No
Zmud (1980)	Project	4	-	-	Theoretical	No	No
McFarlan (1981)	Corporate	3	-	-	Theoretical	No	No
Boehm (1991)	Project	10	Survey	not specified	Empirical-Qualitative	Yes	No
Barki et al. (1993)	Corporate	34	Survey	120	Empirical-Quantitative	No	No
Moynihan (1997)	Project	22	Survey	42	Empirical-Qualitative	No	No
Jiang and Klein (2000)	Project	12	Survey	86	Empirical-Quantitative	Yes	No
Schmidt et al. (2001)	Project	53	Delphi Study	41	Empirical-Qualitative	Yes	Yes
Wallace et al. (2004)	Project	6	Survey	507	Empirical-Quantitative	No	Yes

Tiwana and Keil (2004)	Corporate	6	Survey	12	Empirical-Quantitative	Yes	No
Kappelman et al. (2006)	Project/ Corporate	12	Survey	55	Empirical-Quantitative	Yes	No

* The study combines two separate articles on risk factors

Table 1. Comparison of studies on risk factors in IS projects

We consider the studies by Schmidt et al. (2001) and Kappelman et al. (2006) central for this paper, as these are the most apt in terms of level of abstraction. Schmidt et al. (2001) were the first authors that highlight differences in importance between IS risk factors. Based on prior work by Keil et al. (1998), the authors' goal was to develop an authoritative, ordered list of common risk factors in order to support project managers in identifying IS project risk factors. Therefore, they conducted a "ranking-type" Delphi study with project managers among three different panels from the U.S., Finland and Hong Kong. The authors emphasized the importance of a cross-cultural perspective as differences in Hofstede's five dimensions may affect risk assessment (Hofstede 1984). As a first result a list of 53 risk factors which encompasses all but four risk factors that had been identified in prior studies so far is presented. It includes 26 new factors. Risk factors related to project management and the technical subsystem account for the lion's share of the 53 items. Interestingly, just two of the 53 risk factors are related to the technical subsystem. The authors assumed that the apparently diminishing importance of those risk factors is due to "better performance and scalability of hardware and software, and the widespread adoption of graphical user interfaces" – an argument which in the face of the ever increasing complexity of information technology seems at least dubious to us. Finally, a ranked list of risk factors is generated by each panel. As a rationale for the ranking-order Schmidt et al. (2001) proposed that project managers rank risk factors according to their level of control over a certain risk. This thought is based on a study by March and Shapira (1987) according to which a limited extent of control causes a high level of attention by project managers. No control at all and full control over a risk factor cause low and medium levels of attention respectively.

Finally, Kappelman et al. (2006) derived 53 "early warning signs" from prior literature as well as panel interviews and conducted a ranking-survey among 55 IS project managers and IS executives. The result of their study is a list of the "dominant dozen" risk factors in IS projects which were ranked above six on average on a seven point scale. Similar to the results of Schmidt et al. (2001), none of the twelve risk factors can be allocated to the technical subsystem. The authors argue, that their findings are not surprising "because IS projects almost never fail because of technical causes, despite the fact that people and process problems may manifest technically" (Kappelman et al. 2006, 32).

For several reasons we feel that further research on risk factors in IS projects is important: First of all, and despite its high practical relevance, several prior studies do not draw any conclusions about the relative importance of risk factors. Those studies which do rank risk factors somewhat agree on the fact, that risk factors related to the social subsystem and project management are more important than risk factors associated to the technical subsystem. However, the rationales offered to explain this result are not substantiated.

What is more, several authors state themselves that their results might be biased towards managerial risk factors as (senior) executives and not project managers or project team members assessed risk factors (e.g. Tiwana, Keil 2004). Following Barki et al. (1993), different levels of involvement within a project might result in different perspectives on risk. Hence, our archival research approach to risk importance allows us avoid biases caused by the research process and flaws in data collection (Keil et al. 1998).

3 RESEARCH APPROACH AND RESULTS

3.1 Overview

Our analysis aims at developing a ranking of risk factors in IS projects according to their relative importance as assessed by project managers before and during a certain project. Our data comprises a large set of risk assessments done by project managers of a major software company (ALPHA) between 2004 and 2007. By studying archival data an influence of the research process on the collected data is ruled out.

3.2 Data Collection

Risk management at ALPHA follows a standard approach comprising the four steps: “Risk Identification”, “Risk Assessment”, “Risk Response Planning” as well as “Risk Monitoring”. The process takes place at several stages before and during a project and is conducted by the project manager and partly by the project team. Depending on the project value, a central risk management unit assists the process. Risk identification is supported by a prompt list containing 317 questions from which the project manager chooses those risk factors that might occur during the project. In total there are 45 different risk types (see Table 3). Amongst other things, the identified risk factors are assessed in terms of probability and impact (from 1 “Insignificant” to 5 “Catastrophic”). After risk identification and assessment responses to counter the identified risk factors are defined.

The results of this process are stored in a spreadsheet file called risk register. For each risk review conducted during the course of a project one risk register file is created. In total 1548 files were available for our study. Thereof we were able to analyze 1222 files from 111 software implementation projects. The remaining 326 files were either corrupt, empty or it was not possible to identify the according project and/or customer. We extracted the data in a semi-automated way using a manual control mechanism where our extraction tool did not work (e.g. because of a slightly different structure of the spreadsheet file) in order to ensure data quality.

The projects in our sample dealt with the implementation or modification of large enterprise software systems and spanned various industries, with a focus on the consumer products sector (15 projects), the automotive sector (15 projects), the banking sector (14 projects), the high tech sector (9 projects) and the chemicals sector (8 projects).

3.3 Data Analysis

After adjusting for duplicates and incomplete records, 4570 risk factors remained for analysis. Table 2 shows several basic statistics for the three key variables “Impact”, “Probability” and “Risk Exposure”, the latter one being the product of “Impact” and “Probability”. We deem risk exposure a suitable construct for illustrating the relative importance of a given risk (Boehm 1991; Carbone, Tippett 2004).

Variables	**Mean**	**Std. Dev.**	**Minimum**	**Maximum**
Impact	2,58	1,23	0,00	5,00
Probability	0,45	0,21	0,00	0,99
Risk Exposure	1,22	0,86	0.00	4,95

N: 4570

Table 2. Descriptive statistics of key variables

In order to compile a ranking we calculated the average risk exposure per risk type (see Table 3).

Rank	Risk Type	N	Mean	Std. Dev.
1	Inadequate Technical Infrastructure	49	1,93	1,24
2	Customer Expectations	135	1,69	0,89
3	Core Development Dependencies	114	1,59	0,77
4	Complex System Architecture	129	1,53	1,01
5	Post Go Live Approach Not Defined	172	1,47	0,91
6	Customer Financial Obligations	40	1,42	0,99
7	Expected Performance Issues	204	1,37	0,91
8	Customer Inability to Undertake Project	203	1,36	0,87
9	Non-T&M Payment Terms	242	1,35	0,98
10	Functionality Gaps	191	1,34	0,93
11	Risk Tolerance	91	1,32	0,80
12	Unrealistic Budget	209	1,27	0,84
13	Ramp-Up	124	1,26	0,90
14	Non-Conducive Political Environment	126	1,24	1,09
15	Implementation & Development Interdependencies	77	1,22	0,74
16	No Implementation Strategy	52	1,22	0,88
17	Low Project Priority	146	1,22	0,74
18	Unclear Customer Objectives	161	1,18	0,79
19	Complex Data Conversion	119	1,18	0,69
20	No Comparable Installations	173	1,15	0,82
21	Undocumented Third Party Services	142	1,15	0,76
22	High Number of Interfaces	128	1,15	0,92
23	Unclear Critical Success Factors	100	1,15	0,96
24	High Impact on Processes	171	1,13	0,73
25	Unclear Roles	70	1,11	0,67
26	Weak Business Commitment	46	1,11	0,74
27	Requirements Not Understood	126	1,11	0,82
28	No Steering Committee	36	1,09	0,84
29	Ongoing Escalation Events	87	1,08	0,80
30	Unclear Governance Model	53	1,08	0,67
31	No QA or Risk Management	39	1,03	0,69
32	Production Downtime Impact	202	1,00	0,70
33	Incomplete Contract Requirements	76	0,95	0,81
34	Hardware Partner Not Involved	58	0,94	0,75
35	Penalties and Royalties	13	0,90	0,85
36	Implementation Partner Unknown	29	0,88	0,74
37	High Customer Visibility	140	0,86	0,61
38	No Risk Sharing Agreements	66	0,84	0,67
39	No Org Change Management Approach	86	0,83	0,60
40	Industry Specific Solutions	58	0,82	0,72
41	Internal and External Decision Makers	6	0,78	1,39
42	Inexperienced Project Lead	58	0,77	0,56

43	Solution Uncertainties	13	0,68	0,72
44	Language of Development Project	7	0,66	1,31
45	Development Methodology	3	0,17	0,21

Table 3. Risk perception by risk type

Table 4 describes the top 10 ALPHA risk factors in more detail. In order to be able to draw a comparison to existent rankings we mapped the risk factors to the domains suggested by Wallace et al (2004).

Rank	Risk Title	Explanation	Risk Domain
1	Inadequate Technical Infrastructure	The planned technical infrastructure is inadequate to meet the business requirements; the technical feasibility has not been validated by a reliable source.	Technical Subsystem
2	Customer Expectations	The Customer's expectations are not consistent with the complexities of the project.	Social Subsystem
3	Core Development Dependencies	Dependencies between ALPHA component release planning and the development project have not been considered or are unclear, or the custom development project is based on one or several unstable ALPHA components.	Technical Subsystem
4	Complex System Architecture	A complex or state-of-the-art system architecture is required to meet the requirements (whether or not the Customer is aware of or acknowledges the complexity).	Technical Subsystem
5	Post Go Live Approach Not Defined	The approach and responsibilities for post Go-Live Application or System Management have not been determined.	Project Management
6	Customer Financial Obligations	The customer may be unable or unwilling to meet its financial obligations under the contract.	Social Subsystem
7	Expected Performance Issues	Performance issues are expected either due to the high number of transactions, product limitations, or volumes are unknown.	Technical Subsystem
8	Customer Inability to Undertake Project	The customer does not have the ability, skills and/or culture to successfully undertake the project.	Social Subsystem
9	Non-T&M Payment Terms	The proposed services agreement is other than Time and Materials and/or contains non-standard prices, future price protection, or non-standard payments terms.	Social Subsystem
10	Functionality Gaps	There are gaps between the customer's business requirements and ALPHA's current/expected functionality	Technical Subsystem

Table 4. Explanation of risk factors and mapping to the risk domains identified by Wallace et al. (2004).

3.4 Results

We compared the top 10 risk factors of our ranking to the top 10 risk factors of the rankings by Schmidt et al. (2001) and Kappelman et al. (2006). Regarding the ranking by Schmidt et al. (2001), we chose the results of the Finnish panel for comparison, since Germany and Finland show similar cultural attributes (Hofstede 1984). Table 5 juxtaposes the three rankings.

Rank	ALPHA		Schmidt et al. (2001)		Kappelman et al. (2006)	
1	Inadequate Technical Infrastructure	T	Lack of Effective Project Management skills	P	Lack of Top Management Support	S
2	Customer Expectations	S	Lack of Top Management commitment	S	Lack of Documented Requirements	P
3	Core Development Dependencies	T	Lack of Required Skills in Project Personnel	P	Weak Project Manager	P
4	Complex System Architecture	T	Not Managing Change Properly	P	No Change Control Process (Change Management)	P
5	Post Go Live Approach Not Defined	P	No Planning or Inadequate Planning	P	No Stakeholder Involvement and/or Participation	S
6	Customer Financial Obligations	S	Misunderstanding the Requirements	P	Ineffective Schedule Planning and/or Management	P
7	Expected Performance Issues	T	Artificial Deadlines	P	Weak Commitment of Project Team	P
8	Customer Inability to Undertake Project	S	Failure to Gain User Commitment	S	Communication Breakdown among Stakeholders	S
9	Non-T&M Payment Terms	S	Lack of Frozen Requirements	P	Team Members Lack Requisite Knowledge and/or Skills	P
10	Functionality Gaps	T	Lack of People Skills in Project Leadership	P	Subject Matter Experts are Overscheduled	P

T: Technical Subsystem, S: Social Subsystem, P: Project Management

Table 5. Comparison of risk factor rankings

As Table 5 shows, the risk rankings of ALPHA project managers deviate clearly from the quite similar rankings of Schmidt et al. (2001) and Kappelman et al. (2006). The latter two exclusively consider project management and social subsystem risks and are almost consistent concerning the order[2]. For instance, both rankings deem top management support and effective project management very important. In contrast, ALPHA project managers put considerably more emphasis on risk factors related to the technical subsystem, such as “Inadequate Technical Infrastructure” or “Core Development Dependencies”. In total, only five out of ten risk factors belong to the social subsystem or the project management domain. In general, the mismatch between the ALPHA ranking and the other two is eye-catching: Except for the risk factor “Post Go Live Approach Not Defined” that can be mapped partly to “No Planning or Inadequate Planning”/”Ineffective Schedule Planning”, no similarity between the rankings exist.

[2] To be sure, we also checked against the US and Hong Kong panel rankings in Schmidt et al. (2001): As in the Finnish ranking, the other panels did not include risk factors from the technical subsystem.

4 DISCUSSION OF RESULTS

Two lines of argument may be put forward to explain the identified discrepancies. First, the level of controllability of risk factors might effect a project manager's assessment. Research shows that a project manager will rank risks higher when he has only limited control on mitigating risks. Risks beyond control will be neglected and risks with full control will be ranked relatively lower (March, Shapira 1987; Schmidt et al. 2001). We argue that risk factors from the technical subsystem are beyond the control of the project manager because they are determined prior to the start of the project. Hence, changing the technical subsystem will always require support from outside the actual project. Risk factors from the social subsystem are to some extent within the control of the project manager, e.g. the relationship with the client and the prospected users. Project managers are in full control of risk factors stemming from the project management domain, e.g. project planning or project staffing.

However, in a corporate environment the assessments will be used as organizational and political instruments. Thus, the relative importance assigned by the project manager is subject to micro-political bias (Crozier, Friedberg 1980). Here, project managers will exploit the risk management process to escalate uncontrollable threats to project success. Furthermore, they cover risk factors that stem from shortcomings of their own or of colleagues (Crozier, Friedberg 1980). Thus, we argue that micro-political mechanisms reveal the most important risks from a corporate perspective. Since project managers try to defer responsibility for uncontrollable risks, they report them with the highest importance. In contrast, they do not assign a high importance to risks from the social subsystem and the project management domain in order to avoid negative connotations for colleagues or themselves (Crozier, Friedberg 1980).

Figure 1 shows a conceptual model integrating these two lines of argument. The degree of control increases from the technical subsystem towards the project management domain. So does the potential for micro-political bias.

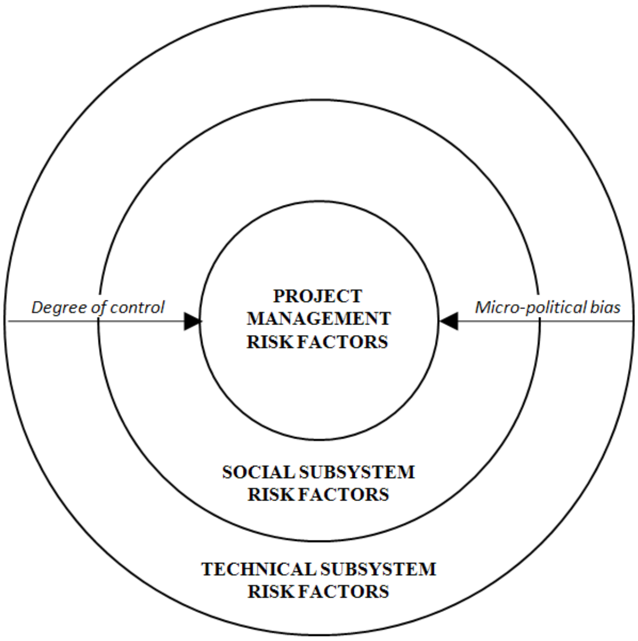

Figure 1. Conceptual model of controllability and micro-political bias in the context of risk domains by Wallace et al. (2004)

As March and Shapira (1987) showed, managers in general tend to focus on risks which they consider controllable. Thus, when interviewed or surveyed, there is a high chance that project managers concentrate on risks they can actively manage. In addition, this bias might be amplified by the way prior studies approached project managers. For instance, Schmidt et al. (2001) asked project managers to identify risk factors they consider "most deserving of their attention and resources" (Schmidt et al. 2001, 11). A closer look at the rankings by Schmidt et al. (2001) and Kappelman et al. (2006) substantiates this thought: Risk factors identified by those studies are either directly controllable, e.g., a lack of effective project management skills can be compensated by training and adequate tool support, or controllable to some extent, e.g., top management support can be encouraged by constant communication efforts.

In contrast, the micro-political bias in the project risk reports of ALPHA amplifies risks that are perceived as uncontrollable by the project manager but pose a significant threat to project success. As can be seen, our ranking predominantly contains uncontrollable risk factors from the technical subsystem, such as "Inadequate Technical Infrastructure", "Complex System Architecture", and "Development Dependencies". Such risks are controllable on a corporate level. For instance, a corporate steering committee may renegotiate a given project or cancel it in time. In the case of an inadequate technical infrastructure the project may be postponed until legacy systems are consolidated. However, such decisions are almost certainly beyond the reach of a project manager. Despite the fact that the project manager is not able to control such risks, escalating them might be essential for project success and releases the project manager from the responsibility for such risks.

Similarly, micro-political bias might also play a role in explaining the low importance of risk factors from the project management domain. For instance, a project manager might face conflicts of interests when assessing his or her own capabilities or the skills and commitment of line managers and team members. In this regard, the most prominent example in the rankings investigated is "Lack of Effective Project Management Skills". Ranked first by Schmidt et al. (2001), this risk factor does not appear at all in our ranking. Other examples include "Lack of Top Management Support" or "Lack of Required Skills in Project Personnel".

In sum, we provide initial rationales that potentially explain underlying mechanisms of risk assessment by project managers. With the dimensions of controllability and micro-political bias, we highlight two candidates for understanding these mechanisms.

4.1 Limitations

There are various limitations to take into account. First, due to the fact, that we analyze risk assessment data of one company only, there might be issues concerning the representativeness of our results. For instance, ALPHA's culture, its organizational context or the particular nature of its projects might influence project managers' perception of risk in such way, that their risk assessments are not comparable to other companies or projects. We especially consider the nature of the analyzed projects an issue. IS projects may range from small internal development projects to implementations of large ERP systems, each with an own risk profile. However, as few details are known of the type of projects investigated in other studies, our comparison might still be valid. Our future research will address these issues.

A potential second limitation of this study relates to our comparison of two different cultural backgrounds. As mentioned before, we compared the risk rankings of Schmidt et al.'s (2001) Finnish panel, whereas most of ALPHA's project managers are of German nationality. Although Finland does not differ considerably from Germany concerning Hofstede's cultural dimensions "Power distance", "Individualism" and "Uncertainty avoidance" (with the latter one supposedly being most influential when assessing risk factors), there is a considerable difference with respect to "Masculinity" for which we do not control (Hofstede 1984). However, as the U.S. and Hong Kong panel in Schmidt et al. (2001) also differ considerably from our ranking we conclude that cultural differences do not render our rationale invalid.

Furthermore, we define risk importance as probability multiplied by impact and do not include risk frequency, which arguably is another dimension of importance. However, in line with prior IS research on risk, we deem impact and probability as the most central factors when assessing risk importance within a specific project (e.g. Alter, Sherer 2004). Another objection to this approach could be March and Shapira's (1987) finding, that executives are more concerned about the impact of a risk rather than its likelihood. Nevertheless, we consider risk exposure as the apt measure for importance: First, our study focuses on project managers who assess risk factors rather than executives who base their decisions on them. Second, risk assessment was done in the knowledge that both values – impact and probability – determine risk importance.

Eventually, a fourth potential limitation concerns the fact that our dataset treats multiple assessments of the same risk as multiple risk factors. Thus, the number of "unique" risk factors is in fact 2020 instead of 4570. However, due to the changing project context, we feel that a new assessment can be regarded as independent risk.

Overall, we argue that these limitations need to be addressed in further research. Since our research is of exploratory nature, they do not affect the initial explanations of the ranking discrepancies.

4.2 Implications for Research

Prior research has somewhat agreed on the overall relative importance of IS risk factors. It seemed clear that risk factors related to the technical subsystem do not pose a severe threat to project success. The ranking compiled from the ALPHA data set contrasts this perspective: Five of the top 10 risk factors are related to the technical subsystem. We indicated two possible reasons for this discrepancy: First, risks related to the social subsystem as well as to project management tend to be more controllable and thus more visible to project managers taking part in surveys or interviews. In practice, however, other dimensions such as the micro-political bias significantly influence the importance of risk factors. Hence, future research needs to control for the social construction of risk factors. Depending on the given context and the purpose of risk assessments risk perception changes.

Furthermore, we argue that different perspectives on IS project risks will enhance the understanding of project risk management. Most of the analyzed studies – including our own – focus on the project manager as central unit of investigation. Including additional perspectives, such as the ones of project team members, members of steering committees, or top management will contribute to the understanding of project risks.

4.3 Implications for Practice

Despite our research being at an initial stage, we see several implications for practitioners. First, project managers may use the compiled ranking as an extension to their own risk factor lists. Our ranking could act as supplementary guideline where to look for software development risks and thus help not to neglect risk factors beyond the control of the project manager. In this regard, we do not only highlight the significance of risk factors related to the technical subsystem but also of environmental risk factors such as contract design ("Non-T&M Payment Terms") or the financial health of the customer ("Customer Financial Obligations"). In addition, our ranking shows the importance of different roles within the risk management process in order to identify as many important risk factors as possible. Finally, our paper highlights the impact of additional dimensions such as the micro-political bias on the risk management process. Project risk management is not the sole responsibility of the project manager alone but has to be supported by management, steering committees, and corporate risk management experts.

5 CONCLUSION

In this paper we compile a relative ranking of risk factors based on an archive of project risk reports and compare it to extant rankings. In contrast to previous research that ranks people and processes as most important risk domains, our analysis emphasizes technology-related risk factors. We suggest that this discrepancy can be resolved by analyzing risk perception based on the two dimensions controllability and micro-politics. We argue that the discrepancy is due to different perspectives on the risk importance in the respective studies.

However, our research presents just a first attempt towards understanding the relative importance of risk factors in IS projects. Our future research will focus on substantiating the presented arguments. It seems likely that micro-political issues influence risk factor assessment. To the best of the authors' knowledge this influence has not been addressed by IS literature so far. Furthermore, we argue that additional domains of risk factors, such as contract, governance modes, and the customer need to be incorporated in the rankings.

In sum, our research contributes to the development of project risk management by proposing alternative explanations that consolidate existing research on risk factors and allows for new attempts to understand the mechanisms of risk perceptions of IS project managers.

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