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Does risk management contribute to IT project success? A meta-analysis of empirical evidence

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Abstract

The question whether risk management contributes to IT project success is considered relevant by people from both academic and practitioners' communities already for a long time. This paper presents a meta-analysis of the empirical evidence that either supports or opposes the claim that risk management contributes to IT project success. In addition, this paper also investigates the validity of the assumptions on which risk management is based. The analysis leads to remarkable conclusions. Over the last 10 years, much has become known about what causes IT projects to fail. However, there is still very little empirical evidence that this knowledge is actually used in projects for managing risks in IT projects.

This paper concludes with indicating new directions for research in the relation between risk management and project success. Key elements are stakeholder perception of risk and success and stakeholder behaviour in the risk management process.

Keywords: Managing risk; Project success; Information Technology

1. Introduction

Does risk management contribute to project success? This question is considered relevant by people from both academic and practitioners' communities already for a long time. Especially in the area of Information Technology (IT), where projects have a long history of failing (The Standish Group International, 1999), there is a great deal of interest in the effects of risk management. This interest goes back as far as the 70's with Alter and Ginzberg (1978), whose article "... suggests that the likelihood of successful MIS implementation can be increased by identifying the key uncertainties at each stage of the development process and devising strategies for coping with the range of possible results" (Alter and Ginzberg, 1978).

However, as Alter and Ginzberg's (1978) use of the word "suggest" indicates, the effects of risk management are hard to establish. The debate during the time of the millennium change, in IT circles known as the Y2K problem, is an example of the general problem that it is difficult to establish the influence of something that is meant to prevent something else from happening. During the late 90's, large sums of money were invested to identify and repair computer software that was assumed to be unable to handle the transition from the year 1999 to 2000. When the transition actually took place, however, there were no major computer failures. The question was then asked whether it had been worth the investment (BBC News Talking Point, 2000). The debate took the form of a controversy between believers and non-believers, because it is impossible to determine what would have happened if this risk management had not been applied. With respect to the use of risk management in projects, professionals therefore state that risk management must be done because the project management handbooks say so, and it should be done in the way the handbooks prescribe it (Association for Project Management, 2006; Project Management Institute, 2004). This normative approach is often found

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in relation to literature that focuses on project management in general (Turner, 1999), and on risk management in IT projects in particular (Ropponen and Lyytinen, 1997).

The purpose of this paper is to structure the ongoing debate, and contribute to it by presenting a meta-analysis of empirical evidence that either supports or opposes the claim that risk management contributes to project success. This paper focuses on IT projects, projects that are aiming at the development and implementation of computer software, because the debate in this area among scientists and practitioners is vivid.

First, we will deal with the various approaches to risk management in the literature on risk management in IT projects. These approaches vary among researchers, while their preference for a certain approach mostly remains implicit. Two approaches are distinguished here: an *evaluation* approach and a *management* approach. Subsequently, the concept of project success in the context of IT projects is surveyed. The traditional *vendor-oriented* definition of project success (Turner and Cochrane, 1993), based on time, budget and requirements criteria, is frequently used in publications that study risk management in relation to IT project success. However, due to incorrect assumptions or claims that are only valid in certain situations, this definition of project success does not fit the context of IT projects very well. Therefore, a more elaborate view on project success, as presented in the more recent literature, will be used in the remainder of this paper.

Next, we will study the relation between the evaluation approach to risk management and its contribution to project success in greater detail. Recent publications are analysed to look for empirical evidence for the contribution of risk management to project success. If this evidence is found, its underpinning data and methods used are carefully investigated. After that the management approach to risk management is studied in greater detail. Attention is then given to the assumptions underpinning the two risk management approaches.

The analysis leads to remarkable conclusions, which are presented in the last section of the paper. Over the last 10 years, much has become known from extensive empirical research about what causes IT projects to fail. However, there is still little empirical evidence that this knowledge is actually used and that the risks in IT projects are really manageable. An analysis of the assumptions underpinning risk management indicates that the risk management instrument may only work under very strict conditions. Therefore, more in-depth empirical work which looks inside the risk management process is necessary.

2. Risk management and project success in IT projects

2.1. How risk management is approached

For quite some time now, researchers have had a common interest in the area of risk and uncertainty in IT projects. Early publications include e.g. Alter and Ginzberg (1978), Zmud (1980) and McFarlan (1981), later followed by Boehm (1991), Barki et al. (1993), Charette (1996) and Lyytinen et al. (1996). These authors consider risk management primarily an ex-post evaluation process. The aim of such a process is to list and quantify the risks and find the causes for software project failure. This information is then used in the next project in order to prevent these risks from occurring. Fig. 1 presents this process graphically, showing that:

- known risk factors are the input for a project;
- the project risk management process collects information about the risks and failure of the project, which leads to new risk factors;
- these new factors are added to the list of known risk factors, together forming the input for the next project.

In the remainder of the paper, this approach is referred to as the evaluation approach. This approach aims at answering the question *what* causes projects to fail. This approach assumes that by knowing the risks and their causes they can and will be managed, which is likely to lead to a positive effect on the project outcomes. The aim is to create project predictability in a new project by using the information regarding the risks and causes of project failure gathered in previous projects. The underpinning assumption is that projects are comparable in the sense that information about risks can be generalised and is used in future projects.

In his paper, Boehm (1991) discusses a list of risks in software projects, as a result of which the paper can be positioned as belonging the evaluation approach. But in the same paper, Boehm describes risk management as a process consisting of identifying, analysing, controlling, and monitoring events that may jeopardise a software project. Risk management then becomes a sequence of activities with the aim to gather information about situations that may or may not occur in a specific project (Chapman and Ward, 1997; Pich et al., 2002). The sequence of activities that characterises project risk management is described in detail by e.g. Del Caño and Pilar de la Cruz (2002). This sequence of activities is executed during the project with the aim to

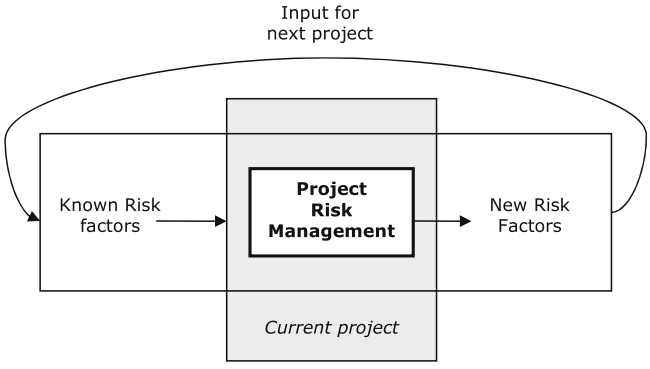

Fig. 1. The evaluation approach to project risk management.

support and improve the project's management by determining which actions should be taken. Fig. 2 presents a graphical representation of this approach. In the remainder of this paper, this will be referred to as the *management* approach of risk management. This approach aims at answering the question *how* to deal with risks in order to prevent a project from failing. In the context of projects and project success, the assumption is that better information leads to better estimates of the amount of time and money needed to complete the project, and that better information leads to a better insight into what should be delivered by the project (Chapman and Ward, 1997). By improving the project planning, budget and design, project risk management is assumed to contribute to the success of the project.

To summarise, there are two approaches in the literature that describe risk management in projects: the evaluation approach and the management approach. The *evaluation* approach considers risk management as an analysis process aimed at determining risk factors. Information about project failure and its causes is collected ex-post and ideally this information is used in checklists for risk identification, or to set up the structure of future projects and manage their risks. The contribution of risk management to project success is indirect, because the information collected is used in future projects. The *management* approach considers risk management to be a management instrument by which information is collected and analysed to support the decision making process in a particular project. This approach does not look for generic risks, but instead focuses on managing the risks that are relevant in the project in question. During risk identification, checklists may be used, but the focus is on project specific risks. Therefore, free-format information generation techniques like e.g. brainstorm sessions are used often. The eventual contribution of the risk management approach to project success is direct. We have used these two approaches to categorise the various research publications. Table 1 presents an overview of the typical characteristics of both approaches.

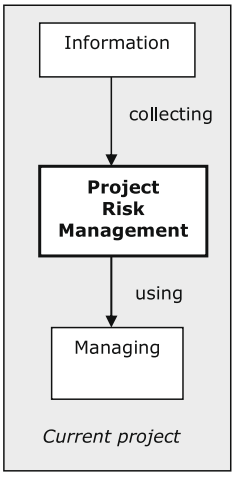

Fig. 2. The management approach to project risk management.

Table 1
Differences between the two project risk management approaches.

The evaluation approach aims at:	The management approach aims at:
Finding generic risks	Finding specific risks
Future projects	Current project
Analysis only	Various activities
Creating general applicable information	Achieving direct results

Fig. 3 shows both risk management approaches combined. The evaluation approach assumes that known risk factors are used in the current project, contributing to the management of the project and as a result to positive project outcomes. This is indicated with the arrow labelled "use is assumed", because the publications reviewed in this paper provide no indications that the relation between project success and the actual use of knowledge on risk factors has been investigated.

2.2. How project success is defined

The success of a project is traditionally measured by time, budget, and requirements criteria. Despite the fact that this manner of measuring project success is currently subject to widespread criticism, these criteria are still often used in publications on project success in IT projects (The Standish Group International, 1999; Royal Academy of Engineering, 2004). The criticism refers to three points, which are related to the assumptions that this definition is based on:

- the amount of time, the budget, and the project's requirements can be set at the beginning of the project;
- the project's success is the same for each project stakeholder;
- the project's success can be determined at the moment the project has produced its deliverables.

Turner and Cochrane (1993) state that the time–budget–requirements definition of project success is solely directed at the interests of the vendor or supplier. Some years earlier, De Wit (1988) already stressed the importance of including various stakeholders' perspectives in defining project success. Setting time and budget limits and defining the requirements always take place at the beginning of the project, when uncertainty is at its maximum (Pinto, 2007), and it is practically impossible to set realistic limits and goals. In our research we have investigated which project success definitions have been used in the various studies in order to determine the extent to which project risk management has contributed to project success, and to compare and categorise the publications.

2.3. How the view on projects influences risk management approaches and project success

With its origin in engineering, project management assumes that the application of processes and procedures

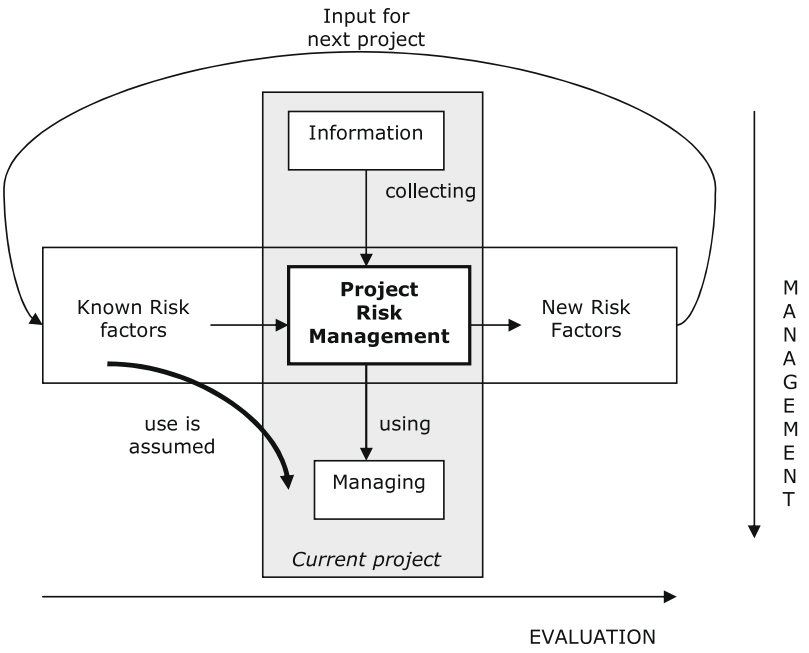

Fig. 3. The two approaches to project risk management combined.

"according to the rules of the handbook" automatically leads to good project results. In case a project fails, the project processes and procedures have to be better executed or improved (Chen et al., 2009). Although this functionalist-instrumental view of projects has been subject to debate (Cicmil et al., 2006), it is clearly present in the investigated literature on risk management and project success in IT projects. This view defines risk as all situations or events that cause disruptions in the plan, and jeopardise the timely delivery of the project results agreed upon within the budgetary limits. This definition implies that there is a plan, and that the path that leads to the result is known (Loch et al., 2006). In addition, it is assumed that project success in terms of time, budget and result, can be set at the start of the project. The evaluation approach, however, tries to learn from past projects, by evaluating the risks that have occurred. This evaluation may result in the adjustment of the use of the methodology, or even in the adjustment of the methodology itself. The management approach to risk management, with its process based on rational decision making, fits in well with the engineering view on project management. It is aimed at identifying the concrete events or situations within a specific project which disrupt the plan, and developing measures to keep the project on track.

3. Methodology

In order to conduct the meta-analysis of the empirical evidence of the contribution of risk management to IT project success, a search and selection was done aimed at peer-reviewed journal publications from 1997 to 2009. The process was supported by the use of electronic tools for the search for and selection of the publications. Our selection includes journals published by Blackwell, Elsevier, Emerald, IEEE, Sage, and Springer. Key elements in the search and selection process were: "software project" and "Information Technology project", "risk management", and "project success". A search was done on the appearance of any combination of these terms, with a result of 790 hits. All hits of two pages or less were left out of the selection; this excludes book reviews and editorials. Then, a second selection was made by evaluating the abstracts of the publications selected in the first round. This second step was necessary to make sure that the publications included all three topics: software/IT project, project success, *and* project risk management (see Fig. 4). The fact that we only selected journal publications may have caused some potentially interesting material to be excluded from the final selection. However, a limited review of this material did not present additional insights.

The search process resulted in a total of 32 journal publications, published between 1997 and 2009. Three of these publications contained no empirical data, and were therefore declared out of scope: Lyytinen et al. (1998), Kumar (2002) and Kwak and Stoddard (2004), which is an overview publication. This finally resulted in 29 publications forming the basis for this investigation. Table 2 presents a detailed overview.

4. Results

4.1. Introduction

This section presents all publications in scope of the meta-analysis of the empirical evidence for the influence of risk management on IT project success. The section is structured as follows. First, we describe how empirical evidence was collected in the various publications. Next,

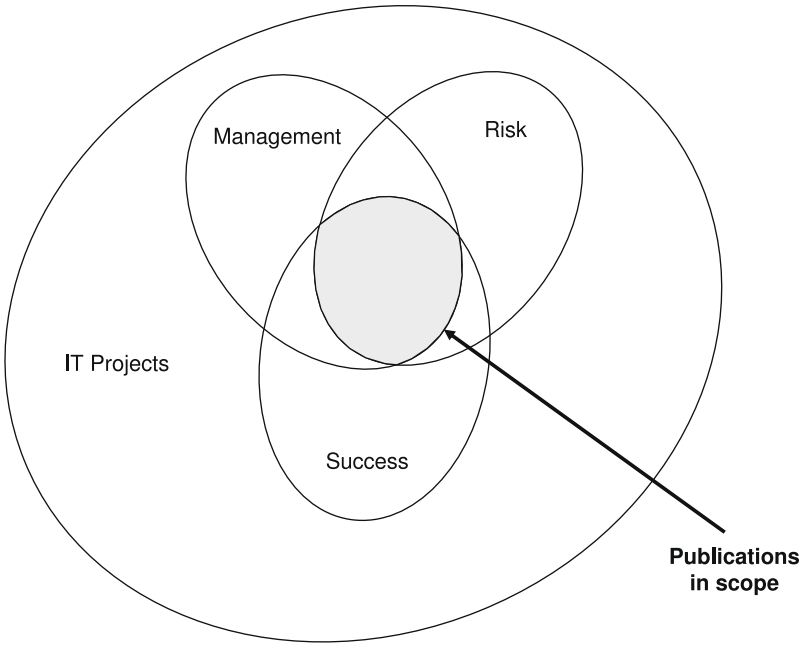

Fig. 4. Journal publications (1997–2009) within the scope of this research study.

Table 2
Characteristics of the various publications in scope.

	Publication	Project risk management approach	Project success approach	Risk management and project success evidence	Research characteristics
1	Conrow and Shishido (1997)	Management	Traditional (T, C, R)	Anecdotal	1 Case
2	Gemmer (1997)	Management	Performance	Anecdotal	1 Case
3	Ropponen and Lyytinen (1997)	Management	Extended	Statistical	Survey, 83 respondents
4	Keil et al. (1998)	Evaluation	Traditional (T, C, R)	Statistical	Delphi, 45 respondents
5	Jiang and Klein (1999)	Contingency	Extended	Statistical	Survey, 86 respondents
6	Whittaker (1999)	Evaluation	Traditional (T, C, R)	Statistical	Survey, 186 respondents
7	Jiang et al. (2000)	Management	Extended	Statistical	Survey, 106 respondents
8	McGrew and Bilotta (2000)	Management	Time	Anecdotal	2 Cases
9	Ropponen and Lyytinen (2000)	Management	Traditional (T, C, R)	Statistical	Survey, 83 respondents
10	Barki et al. (2001)	Contingency	Traditional (T, C, R)	Statistical	Case/survey, 75 projects
11	Akkermans and van Helden (2002)	Evaluation	Performance	Anecdotal	1 Case
12	Aladwani (2002)	Management	Extended	Statistical	Survey, 42 respondents
13	Maguire (2002)	Evaluation	Quality of deliverables	No	1 Case
14	Procaccino et al. (2002)	Evaluation	Extended	Statistical	Survey, 21 respondents
15	Scott and Vessey (2002)	Evaluation	Traditional (T, C, R)	Anecdotal	2 Cases
16	Baccarini et al. (2004)	Management	Traditional (T, C, R)	No	Interviews, 18 respondents
17	Lassudrie and Gulla-Menez (2004)	Management	Traditional (T, C, R)	Anecdotal	1 Case
18	Wallace and Keil (2004)	Evaluation	Traditional (T, C, R)	Statistical	Survey, 500 respondents
19	Wallace et al. (2004a)	Evaluation	Traditional (T, C, R)	Statistical	Survey, 500 respondents
20	Wallace et al. (2004b)	evaluation	Traditional (T, C, R)	Statistical	Survey, 500 respondents
21	Ehie and Madsen (2005)	Evaluation	Traditional (T, C, R)	Statistical	Survey, 36 respondents
22	Kutsch and Hall (2005)	Management	Traditional (T, C, R)	Anecdotal	Interview, 20 respondents
23	Zafiropoulos et al. (2005)	Management	Traditional (T, C, R)	No	1 Case
24	Dey et al. (2007)	Management	Traditional (T, C, R)	No	1 Case
25	Han and Huang (2007)	Evaluation	Extended	Statistical	Survey, 115 respondents
26	Sauer et al. (2007)	Contingency	Traditional (T, C, R)	Statistical	Survey, 412 respondents
27	Tesch et al. (2007)	Management	Traditional (T, C, R)	No	Workshop, 23 respondents
28	Huang and Han (2008)	Evaluation	Time	Statistical	Survey, 98 respondents
29	Bannerman (2008)	Management	Traditional (T, C, R)	No	17 Cases, 23 respondents

we give an outline of how the authors of these studies look upon risk management and project success. Then, a more detailed view is taken on the management approach and the evaluation approach to risk management. To conclude this section, the various assumptions underpinning risk management and the empirical evidence

supporting or undermining these assumptions are dealt with in detail.

4.2. How empirical evidence was collected in the papers

Ropponen and Lyytinen (1997) state that many of the papers published on risk management in IT projects in the period until 1997 are often not based on empirical data. The publications published between 1997 and 2009 which we found, present a different situation. We found only three publications that contained no empirical data out of a total of 32 papers. The remaining selection of 29 papers includes some studies containing a limited amount of empirical data (Dey et al., 2007; Procaccino et al., 2002; Tesch et al., 2007; Zafiropoulos et al., 2005). In general however, empirically collected information forms the basis for the conclusions drawn in the publications. The evaluation approach to risk management mainly includes surveys, whereas the management approach prefers case studies to surveys and other instruments.

4.3. How risk management is approached in the papers

The set of publications presented between 1997 and 2009 that consider risk management from an evaluation perspective (12 publications) almost equals the one that views it from a management perspective (14 publications). This is in contrast with the 1997 findings of Ropponen and Lyytinen (1997). They claim that most papers that were published until 1997 approach risk management from the evaluation perspective, in that they focus on the overall factors or causes of risk. Further study of the publications presented between 1997 and 2009 revealed a relatively small third group of publications in which risk management, project success, and their relationship, was discussed from a contingency perspective (Barki et al., 2001; Jiang and Klein, 1999; Sauer et al., 2007). The contingency approach considers project success to be dependent on how well the project as a whole is able to deal with uncertainties in the project environment. Better fits between project and environment as well as between risk exposure and the project management profile (Barki et al., 2001) increase project performance. Risk management is not considered to be a separate management process in these publications; it is embedded in the various processes and procedures of the project. Because the contingency approach does not consider risk management as a separate process, these three publications were not further investigated.

4.4. How project success is defined in the papers

In the 26 publications on the relation between risk management and project success that were investigated, the traditional manner of defining and determining project success (The Standish Group International, 1999; Royal Academy of Engineering, 2004) is still very common. About two third of the publications dealt with in this paper refer to project success in terms of compliance with time limits, cost limits and meeting requirements (see Fig. 5).

A clear definition of project success, however, often remains rather implicit, as illustrated by e.g. Conrow and Shishido (1997) in the introduction to their paper: "rising costs, falling performance and slipping schedules are common problems …", followed by a reference to a 1994 Standish report on the success and failure of IT projects, and a discussion about risk and risk management. In the remainder of their study, project success is neither mentioned nor defined. Also Kutsch and Hall (2005) and Dey

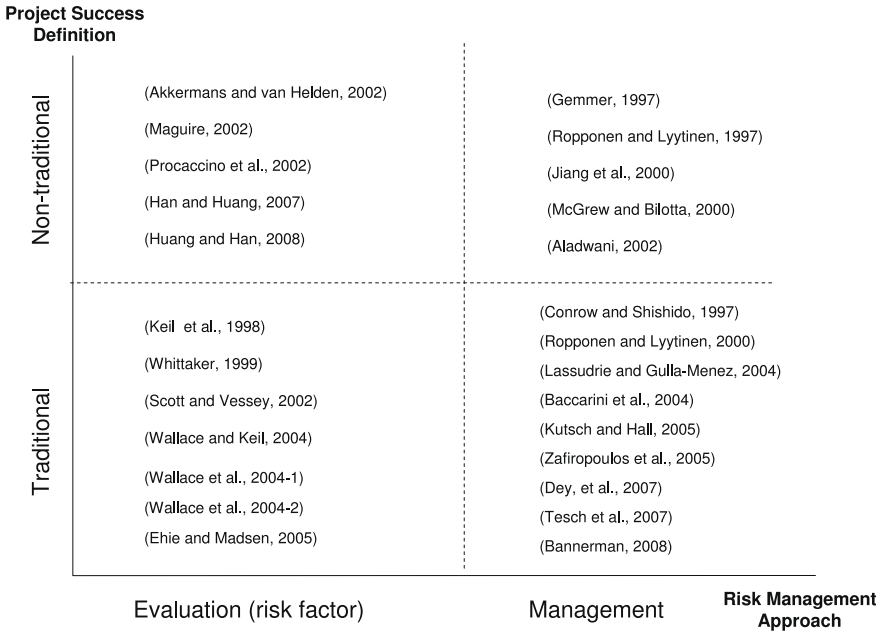

Fig. 5. Risk management approach in relation to project success definition.

et al. (2007) merely refer to time, costs and requirements in their introductions. Two other publications that remain implicit about what is meant by project success are Akkermans and van Helden (2002) and Gemmer (1997), who both use the term "performance" without further defining it. Wallace and Keil (2004) and Wallace et al. (2004a,b) use product performance and process performance, but these terms also refer to time and budget (process performance), as well as requirements (product performance). Further, non-traditional project success definitions partially include features of traditional project success, e.g. McGrew and Bilotta (2000), who investigate the influence of risk management on project planning. Han and Huang (2007) use the concepts of product and process performance (see e.g. Wallace et al., 2004a), but add the impact of risks on team performance as described by Jiang et al. (2000), thereby broadening the definition of project success.

4.5. Papers addressing the evaluation approach to risk management

Building on earlier research by e.g. Barki et al. (1993), the evaluation approach to risk management has increased the lists of risk factors. Publications claim that these new lists of risk factors are better because more so than the old ones, they are based on extensive empirical research, whereas the old lists were mainly based on anecdotal information. This more solid, empirically based investigation into risk factors also enables one to rank the risk factors in order of importance. If ranking is applied, the following risk factors score the highest: top management commitment, user participation, and user commitment (Akkermans and van Helden, 2002; Keil et al., 1998), along with incorrect, incomplete, or changing requirements (Han and Huang, 2007; Keil et al., 1998). In their study of ERP implementations, Ehie and Madsen (2005) found that top management support is the most important risk factor. Further, in relation to project failure, organizational issues seem to be more important than technical ones, a claim that is supported by Scott and Vessey (2002), as well as by e.g. Sarker and Lee (2003).

4.6. Papers addressing the management approach to risk management

Publications that advocate the management approach to risk management often build on practitioner handbooks on project management (Association for Project Management, 2006; Project Management Institute, 2004) or on project risk management (Association for Project Management, 2004). Among other options, rational decision making is promoted, i.e. it is assumed that all risks and uncertainties can be managed. Research has shown that this assumption is not always correct. Uncertainties, risks for which there is no classical or statistical probability distribution available (Holt, 2004), cannot be managed by means of the risk management process (March and Shapira, 1987; Pender, 2001; Pich et al., 2002). Nevertheless, the empirical research on risk management is often based on the assumption that a proper execution of the practices prescribed by the risk management approach will fully mitigate the risk factors (e.g. Conrow and Shishido, 1997; Dey et al., 2007; Lassudrie and Gulla-Menez, 2004; Zafiropoulos et al., 2005). And although a relation between risk management and project success is implied in these publications, they do not provide empirical evidence for the relation between project risk management and project success.

Ropponen and Lyytinen (1997) as well as McGrew and Bilotta (2000) consider the risk management process in more detail, arguing that risk management activities have a positive impact on a timely project delivery. In addition, risk management activities lead to a better estimation of the resources needed to perform a task (Ropponen and Lyytinen, 1997), and decrease the number of task failures (McGrew and Bilotta, 2000). Ropponen and Lyytinen (1997) have also found indications that experience counts, meaning that a frequent and continuous use of risk management measures by project managers in various projects over time contributes positively to the effectiveness of risk management in their own projects.

Further, several other authors have mentioned that the characteristics and behaviour of individual project stakeholders is important in relation to risk management and project success. Gemmer (1997) states that effective risk management requires functional behaviour of the stakeholders, which means that they may not necessarily comply with the risk management procedure. Dey et al. (2007) state that generally stakeholders must be involved in the risk management process, whereas others are more specific by arguing that the involvement of users and top management in particular are crucial for the project's success, e.g. Jiang and Klein (1999), or Jiang et al. (2000). They conclude that building consensus among stakeholders and stimulating communication with external stakeholders adds positively to team performance.

4.7. Assumptions underpinning the approaches to risk management

Empirical findings indicate that the assumptions underpinning risk management are in certain cases not correct. These findings contradict the potential effects of risk management on project success. Kutsch and Hall (2005) show that project managers in IT projects show a tendency to deny the possibility or actual presence of risk and uncertainty; they avoid them, ignore them, or delay their actions until the circumstances have improved. These are the characteristics of behaviour that is not in line with the view presented by the risk management approach that actors behave rationally. Flyvbjerg et al. (2003) have shown that at the start of a project, people deliberately both overestimate the benefits of the project and underestimate its risks and uncertainties. As a result, the stakeholders become

biased; right from the start of the project, their expectations are too high. Project success will, therefore, become much harder to achieve in terms of time and budget requirements.

Besner and Hobbs (2006) as well as others, e.g. Bannerman (2008), Raz et al. (2002) and Voetsch et al. (2004) have investigated the various activities carried out within the risk management process of several types of projects. They have come to the conclusion that the sequence of identification, analysis, responses, and monitoring is often not followed. Risk identification is often included in the process; Voetsch et al. (2004) state that it is done in almost all of the projects. Risk analysis, however, is rarely done. Besner and Hobbs (2006) have observed that project managers do not regard risk analysis as potentially valuable, especially quantitative risk analysis. Therefore, the performance of quantitative risk analyses within IT projects is not expected to increase in the near future. Bannerman (2008) in his research finds that none of the 17 IT projects he investigated used quantitative risk analysis. A reason why quantitative risk analysis is not considered useful may be that many of the risks in IT projects are not aleatoric in nature (they are not based on probability), but epistemic, which means that there is not enough information available to take a decision. In project situations, this often leads to the postponement of the decision (Kutsch and Hall, 2005), or to a request for more information.

5. Discussion

Advocates of the evaluation approach, e.g. Jiang and Klein (1999), Procaccino et al. (2002), Scott and Vessey (2002) and Wallace et al. (2004b), implicitly assume that knowledge of risks means that they can and will be managed, and therefore that the project will be a success. Their strategy is to create a list of relevant risk factors, to rank them in order of importance, and to establish statistical evidence of their impact on project success. Various authors, e.g. Wallace et al. (2004b), have found statistical evidence that risk factors (negatively) influence project success. Han and Huang (2007) focus on risk dimensions and their impact on project success in IT projects. They argue that the risk dimension "requirements" has a strong negative impact on project success in IT trajectories. The claim that poor requirements are an important cause of project failure is, however, almost trivial in the case of IT projects. Setting time and budget limits and defining requirements take place at the beginning of the project, when uncertainty is at its maximum (Pinto, 2007). Especially in IT projects, it is hard to define the project deliverables at the outset of the project (Turner and Cochrane, 1993). Any changes in the project's requirements will almost certainly occur during its course; only then will they influence both the budget and the planning. In most cases, the amount of time and money will need to be increased to complete the project. A traditional project success definition will then easily lead to the conclusion that the IT project has failed (see Fig. 6).

Due to the nature of IT projects, their methods may be well defined, but their goals are not (Turner and Cochrane, 1993), the traditional success definition of meeting time, costs, and requirements, is less useful. The publications investigated in this paper indicate that during the course of an IT project, the requirements originally made will almost certainly change, which will influence the time plan and the project budget (Han and Huang, 2007; Keil et al., 1998). This makes it almost impossible to provide adequate time and budget estimates at the outset of an IT project. Nevertheless, this definition appears to be widely used in the publications investigated in this paper. An adjusted definition of project success, based on the work of e.g. Shenhar et al. (2001), which considers project success in general, and e.g. Agarwal and Rathod (2006) and Procaccino and Verner (2006), which focuses on IT project success in particular is suggested here. Such a definition, in which there is room for additional aspects that define project success as well as room for an individual stakeholder opinion to project success relates better to how project success is experienced.

Literature (e.g. Kutsch and Hall, 2005) indicates that knowledge of the risks does not automatically imply that this knowledge is used for managing those risks. Over the last decade, there appears to have been a growing interest in the development of new methodologies for the management of IT projects, such as e.g. Agile (see e.g. Schwaber and Beedle, 2002) and RUP (see e.g. Kruchten, 2004). These methodologies address issues such as user participation, management buy-in, and user buy-in in a more extensive manner than the traditional project management methodologies. The knowledge obtained by adopting the evaluation approach to risk management may have influenced, or may even have facilitated the development of these new methodologies. Furthermore, the knowledge of the risks generated by the evaluation approach to risk management may have found its way into new or updated questionnaires that are used during risk identification sessions.

The management approach generally considers risk management as a process consisting of well defined steps of identification, analysis, response, monitoring, and control. Only two papers report some positive impact of risk management activities on issues such as a timely project delivery, the estimations of the resources required to perform a task, and the number of task failures. All other papers remain implicit about the contribution to project success, assuming that the well defined steps are taken, and that they contribute to project success in one or another way. Less is known, however, about what happens inside the risk management process; what risk management practices are used within a project, which stakeholders are participating in these practices, how these risk management practices influence stakeholders, and how do these practices influence project success? These are relevant questions, to which the risk management approach so far has not provided satisfactory answers, and neither does it give a truthful representation of how stakeholders actually behave.

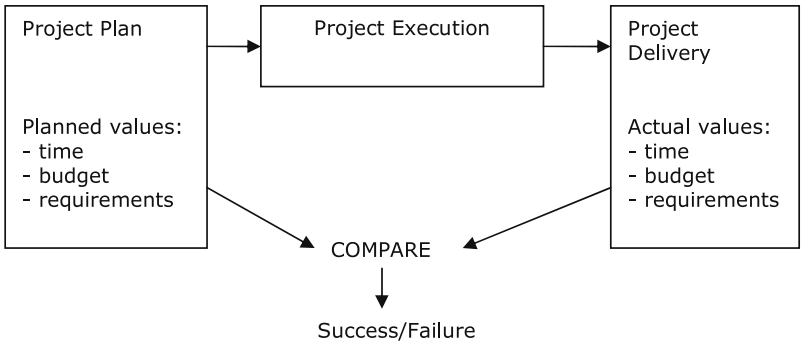

Fig. 6. Traditional view of how project success is measured.

Cooke-Davies (2000) in his dissertation on project management practices (in general, not specifically for IT projects) states that based on empirical evidence, risk management planning has a positive impact on the ability to predict the project duration. Risk management aims at listing the characteristics of the risk management process of a particular project. It involves issues such as: who will participate in the risk identification, which tools will be used, how should the risks be reported, who will receive this information, and what is expected of them. And although risk management planning is described in project management handbooks (Project Management Institute, 2004), the activity itself is not part of the cyclical process of identifying, analysing, managing, and controlling risks. If risk management planning is performed, it is generally performed only once, at the start of the project. Cooke-Davies (2000) does not elaborate in further detail on why there is a relation between risk management planning and project duration. Apparently, the fact that attention is given to the risk management process at the project start, rather than to the actual risks, is enough to create a positive influence on at least one specific project success indicator. The cause–effect of this relation is however an open question, because it may be that the project was already labelled being risky, and because of that it was decided to use risk management, starting with the creation of a risk management plan. Not the risk management plan itself then contributed to the project success indicator, but the fact the project had already been identified as risky, as a result of which it was decided to start risk management planning.

6. Conclusions

The evaluation approach as dealt with in the publications from the period 1997–2009 has provided us with new and valuable insights into the risk factors that have an impact on IT project success. Both technical risk factors and organizational risk factors, such as senior management support and user participation, are highly influential. Many of these insights are based on extensive empirical research. However, we conclude that our central question cannot be answered by using the evaluation approach to risk management as the only instrument to deal with the project success issue, because this approach focuses on finding risk factors rather than on how to manage risks. The contribution of the evaluation approach to project success therefore remains unclear. Literature indicates that knowledge of the risks alone is not enough to contribute to project success.

The management approach to risk management has as yet not led to conclusive evidence either. Based on what is presented in publications from 1997 to 2009, we conclude that the empirical knowledge is still anecdotal and largely based on how risk management is assumed to work instead of how it is actually used in project practice. Considering the assumptions on which risk management is based, it is remarkable that except for Kutsch and Hall (2005), none of the authors comes to the conclusion that risk management may not work as assumed. The literature should at least have recognised that risk management is not being conducted as it should be in order to be effective, according to its basic criteria. This leads to the conclusion that risk management can only be effective in specific project situations. Following the work by Loch et al. (2006), an interesting direction for further research would be to determine these specific conditions in the context of IT projects.

Furthermore, it would be interesting to combine the relation found by Cooke-Davies (2000) between risk management planning and a timely delivery of the project with the work of Weick and Sutcliffe (2007), who discuss awareness creation and attention shaping as conditions for stakeholder behaviour in uncertain situations. In this view, risk management contributes to project success, because the stakeholders are aware of the fact that there are risks, on the basis of which they adjust their expectations and behaviour accordingly.

And finally, the majority of publications that relate risk management to project success refer to the traditional time–budget–requirements definition of project success. However, this approach is not in line with the view presented by other literature that project success entails more than just meeting time and budget constraints and requirements. Project stakeholders may use various project success definitions (Agarwal and Rathod, 2006). Therefore, the contribution of risk management should be considered in

relation to a broader definition of project success. Future research may aim at finding answers to the questions whether and how risk management contributes to IT project success. In the meantime, based on the empirical evidence presented so far we conclude that the fact that project management practitioners pay attention to project risks is likely to have more impact on IT project success than following the steps prescribed in the risk management process.

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