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Dialogue on Risk

Effects of Project Risk Management on Project Success

Karel de Bakker

research

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Published by: University of Groningen
Groningen
The Netherlands

Printed by: Ipskamp Drukkers B.V.

ISBN: 978-90-367-4841-4 (printed version)
978-90-367-4840-7 (electronic version)

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Preface

"My friend, the panda will never fulfil his destiny, nor you yours until you let go of the illusion of control"

(Master Oogway, talking to Shifu, in: Kung Fu Panda, 2008)

Please allow me to write this preface primarily in Dutch. For almost 4 years, all outcomes of this PhD research project have been presented in English. For a good reason, because English is the leading language in the world of science. However, Dutch remains my first language, and it is much easier for me to express myself using Dutch, especially when it comes to saying thanks to the people that have accompanied me on my journey.

Hoewel mijn plannen en inspanningen om promotieonderzoek te doen naar de effecten van projectrisicomanagement stammen uit 2002, is het "project" pas echt van start gegaan nadat ik mijn promotor Hans Wortmann sprak in 2006. Hij was het die het risico met mij aandurfde en die, ondanks de sceptische houding van anderen, overtuigd was van mijn gedrevenheid om te promoveren via het volgen van een traject als assistent in opleiding (aio). Ik ben hem zeer veel dank verschuldigd, niet alleen voor zijn vertrouwen, maar ook voor zijn enthousiasme, zijn creativiteit en zijn tomeloze energie. Hij heeft meer dan eens, op cruciale momenten, het onderzoek een zet in de goede richting gegeven.

Daarnaast komt veel dank toe aan Albert Boonstra, eveneens promotor bij dit onderzoek. Nooit was hij te beroerd om een emmertje sop aan te dragen waarin ik mezelf kon laten gaarkoken. Zijn betrokkenheid, zorgvuldigheid en kritisch-humoristische wijze van begeleiden hebben ervoor gezorgd dat dit onderzoek uiteindelijk helemaal "mijn" onderzoek is geworden (met dank aan de paradox). Ik kijk

met veel plezier terug op onze samenwerking en ik ben blij dat hij door de jaren heen mijn leermeester wilde zijn.

Furthermore, I would like to thank the members of the committee, Prof. Dr Philip Powell, Prof. Dr Piet Ribbers and Prof. Dr Terry Williams for their support and their valuable comments on the manuscript.

Daarnaast zijn tientallen mensen in één of andere vorm betrokken geweest bij de totstandkoming van dit proefschrift. Het is onmogelijk om hen allen bij naam te noemen, maar ik wil hen op deze plaats allen van harte bedanken. Namen die mij te binnen schieten: mijn collega-aio's van de vakgroep Business & ICT, in het bijzonder Nick van Beest, Gerben Meyer, Peter Schuurman en Marco Stuit, voor hun bereidheid om meer dan eens als proefkonijn op te treden in mijn onderzoek, en voor alle momenten van spanning en ontspanning. Overige collega's van de vakgroep Business & ICT en van de faculteit Economie & Bedrijfskunde, met name Fred van Blommestein, Albèrt Kerkhof, Durkje van Lingen, Laura Maruster, Irene Ravenhorst, Cees Reezigt, Peter van Rooij, Dick Schaap, Cees de Snoo en Chee-Wee Tan. Simon "Habermans" Sibum en Ype "Houdoe" van Wijk worden bedankt voor hun altijd geestige visie op de dagelijkse werkelijkheid. De studenten van het vak "Organisatie en Management van Software Projectteams" van de opleiding Technische Bedrijfskunde, in het bijzonder Henk van Ramshorst, voor hun hulp bij de opzet en uitvoering van het experiment. De onderzoeksschool SOM voor hun financiële ondersteuning als gevolg waarvan dit onderzoek mogelijk is geworden. Dank aan Ellen Nienhuis en Martin Land van SOM voor hun praktische en morele ondersteuning.

Verder een woord van dank aan alle stakeholders van projecten die ik heb mogen interviewen en van wie ik de namen helaas niet mag noemen, en aan alle meer dan 200 studenten Bedrijfskunde die hebben meegedaan aan het experiment. Aan Marco Buijnsters, Eric Kemperman en Richard van Ruler voor hun jarenlange supporterswerk dat teruggaat tot ver voor 2006. Aan Ben de Ridder, Jan Vermeijs en Ernst Vuijk voor hun hulp bij het vinden van de case studies.

Dit is ook het moment om Jacquelien “van de overkant” te bedanken. In de afgelopen 24 jaar is door jouw toedoen de universiteit nooit ver weg geweest van mij. Omdat jij wist wat een promotietraject inhoudt, hield je het vertrouwen in een goede afloop, ook op de momenten dat ik het “even” niet zag zitten. Samen met onze zoons Risto en Timo heb je ervoor gezorgd dat de voorwaarden aanwezig waren om dit verhaal tot een goed einde te brengen. Ook de steun van mijn schoonouders is daarbij van groot belang geweest. Jullie allen zijn het bewijs voor de stelling: Project sponsors zijn cruciaal voor project succes!

In de goede traditie van de universiteit mag ook een kritische noot op deze plaats niet ontbreken. Toen ik mijn ex-KPMG collega Wim van Zijp bij aanvang vertelde over mijn aio-traject, zei hij tegen mij: “Let goed op, want de universiteit is een blauwe organisatie, en jij bent geen blauw mens”. En hoewel ik geen expert ben op het gebied van Spiral Dynamics (Beck & Cowan, 1996) en het gedachtengoed van Clare Graves, had ik wel een vermoeden waar hij op doelde. Innerlijke motivatie en creatieve processen verdragen zich nu eenmaal slecht met beheersing en controle door centrale instanties die op één of andere wijze de kwaliteit van de resultaten van die processen willen vaststellen (of die misschien wel, in termen van Habermas (1984), strategisch gedrag vertonen). Het overvloedig gebruik daarbij van spreadsheets en quasi-kwantitatieve meetinstrumenten mag hen dan misschien het gevoel geven dat het proces onder controle is, dit onderzoek dat in het kader van risicomanagement bij IT projecten is uitgevoerd heeft aangetoond dat deze vorm van controle een illusie is. Het spanningsveld tussen creativiteit en controle dat het werken binnen de universiteit kenmerkt, is een spanningsveld dat treffend is beschreven door C. I. Dessaur in haar boek “De droom der rede” (1982). Gelukkig blijft er volgens haar altijd nog wel ruimte voor creativiteit, ondanks alle regels, procedures en controles. Die ruimte heeft mij de energie gegeven om door te gaan. Eén van de stellingen bij dit proefschrift geeft uiting aan mijn ervaringen betreffende 4 jaren werken in een blauwe organisatie.

Symbolisch is misschien het feit dat mijn paranimfen, Peter Schuurman en Peter Traas, als oud-studenten van de Rijksuniversiteit Groningen de twee stromingen van de faculteit, Economie en Bedrijfskunde, vertegenwoordigen. Voor mij zijn beiden over een periode van jaren belangrijk geweest als collega’s die altijd openstaan voor een

constructieve discussie. Ik wil hen daarvoor bedanken, en hen bedanken dat ze me terzijde willen staan bij de verdediging van mijn proefschrift.

Last but not least I would like to say thanks to some people that have supported me tremendously over the years. I want to say thanks to them in English, because they do not read Dutch. First, members of the Board of the Risk Management SIG, especially Charles Bosler and Craig Peterson. They have created an international network of risk management experts in which I could freely explore project risk management. I would like to say thanks to Sheilina Somani (Harambee!), for her collaboration and support on various occasions, either when presenting, for instance in Madrid in 2006 (de Bakker & Somani, 2006), or when writing this thesis. And finally, many thanks to Ashwin Ittoo, who was my room mate for almost 3 years. It was always nice when he was there, but it was even better when he went away on a business trip, because upon his return, there were always chocolate presents in his suitcase.

Groningen, februari 2011
Karel de Bakker

1 Research context

1.1 Introduction

The question as to whether project risk management contributes to project success is, in the context of project management practitioners, essentially a question about the value of an instrument. In the case of a project; an instrument that is employed by project managers during the planning and execution stages of a project. The instrument of risk management is employed in projects in order to secure project success, regardless of all manner of unexpected events and situations that may occur during project execution. Some of the questions that relate to various perspectives on how risk management contributes to project success include:

- What are the elements of the project risk management process?
- What happens when the process is executed or elements of the process are executed?
- How does the process or perhaps the individual process elements influence the project result?

These questions adhere well within the broader context in which an attempt is made to determine the value of project management in general for business (Thomas & Mullaly, 2008). Project risk management activities form a subset of project management. Most organisations participating in the study by Thomas and Mullaly (2008) claim intangible value as a result of the use of project management. More than half of the organisations claim tangible value resulting from project management, although none attempts to quantify this value. Considering the high exposure of the Thomas and Mullaly study and the significant budget of over 1.5 million US dollar assigned to conduct the study, there is apparently a serious need in the practitioners' world to find answers to these and similar questions on the value for business of project management practices in general and project risk management in particular.

There is a second similarity between the search for an answer to the value of risk management and the search for an answer to the value of project management in

general. “Although the holy grail of demonstrable project management value is often discussed and even proclaimed in consulting and practitioner literature, the actual value resulting from investments in project management has been hard to define – let alone measure” (Thomas & Mullaly, 2008:1). The perceptions of project risk management are very similar to the perceptions of project management in general. Although there is a generally accepted belief that risk management contributes to the success of a project, there is little evidence in literature that supports this statement in relation to Information Systems and Information Technology (IS/IT) projects, as this thesis will demonstrate. In addition, a project frequently has a duration of several months during which numerous events occur and numerous interactions between project stakeholders take place. This makes it very difficult to isolate the effect of one particular set of actions, in this case project risk management actions, upon project success. In order to draw valid conclusions about the relationship between project risk management and project success, it is therefore important to pay attention to potentially disturbing effects that are caused by the events and interactions that occur during a project.

It appears that at least two lines of thought that emerged over recent years, have contributed to the recent high ranking of the value question on the research agenda (Thomas & Mullaly, 2008). The first being the discussion to answer the question: “What is project success?”, a question that relates directly to the value question. This discussion commenced at the end of the 1980s with the paper by de Wit (1988) and was later pursued by others including, Turner and Cochrane (1993), Baccarini (1999) and Shenhar et al. (2001). More recently Agarwal and Rathod (2006) and Thomas and Fernandez (2008) contributed to the discussion by investigating project success in the context of IS/IT projects. In this discussion[1], project success has developed from an objective, measurable characteristic, represented by the “iron triangle” of time, cost and quality (Atkinson, 1999) into a concept that includes opinions and perceptions of individual project stakeholders on project success as well as additional dimensions such as the contribution of the project result to business objectives and the potential the project result has to support future potential of the business (Shenhar et al., 2001).

[1] This debate in the context of project risk management is similar to the debate in quality management literature between quality defined as *satisfying the requirements* versus quality defined as *fitness for use* (see for instance Garvin, 1987).

Furthermore, this “iron triangle” of time, budget and quality plays an additional role in relation to risk management and project success. The iron triangle is still often used to determine if a project can be considered a success (Royal Academy of Engineering, 2004; The Standish Group International, 1999). According to these reports, too many projects that involve IS/IT projects deliver too late, they cost too much money, and their results are disappointing. It is therefore tempting to conclude that these projects can be deemed unsuccessful, and that is what these reports conclude. The advice is (Royal Academy of Engineering, 2004) to add additional risk management, in order to improve the project success rate. Conversely, this thesis follows the line of thought that project success is a relative concept that may include more than on time, within budget limits delivery of a pre-defined result. Therefore this thesis relates the effects of risk management on project success in relation to an extended project success definition. Late delivery, for example, in certain circumstances can lead to the conclusion that the project has failed, however in other situations timely delivery plays only a subordinate role, and other aspects are much more important. In the latter examples, late projects can therefore be deemed successful.

The second line of thought, started by Packendorff (1995), recommends a focus upon more diverse theoretical perspectives when doing project management research, and to place more emphasis on empirical research. Projects should be considered more as “temporary organisations” instead of a collection of complex, but in essence predictable and therefore forecastable tasks, controlled by a set of predefined instruments. And although the project practitioners in general retained this traditional definition, new paths of project management research were followed. These new paths became prominent with a special issue of the International Journal of Project Management in November 2006, entitled: “Rethinking Project Management”. Notably, Söderlund some years earlier (2004a) signalled the possibilities of additional perspectives for studying the management of projects, the 2006 International Journal of Project Management special issue presented an overview of new ways on how to conduct project management research. Instead of focusing primarily on scheduling and planning, as being the traditional key aspects of project management (Packendorff, 1995; Söderlund, 2004b), the additional perspectives presented in the International Journal of

Project Management special issue focus upon learning, relations between projects, social processes, uncertainty and the development of the profession from skills orientation to management orientation. These new perspectives indicate a significant shift towards including aspects of human behaviour within the scope of project management.

Underlying these developments is the fact that both lines of thought hold views that differs substantially from what is established as “traditional” project management. This traditional view is most often found among project management practitioners and is based on the various project management Bodies of Knowledge or PMBoK (Association for Project Management, 2006; Project Management Institute, 2008). Establishing its origin in engineering, traditional project management uses an approach in which reality is considered to behave in a predictable way (Söderlund, 2004a). Both the “project success” discussion and the “rethinking project management” discussion challenge the approach that characterizes traditional project management. Project success becomes something that is not objectively measurable, but dependent upon the opinion and position of project stakeholders and the context in which the project takes place. When studying projects, the “rethinking project management” approach includes behaviour, perception and sensemaking by individuals that interact in the context of a temporary organisations’ format, and in the wider context of business (Atkinson et al., 2006; Cicmil et al., 2006; Winter et al., 2006b). A project is no longer considered an impersonal, structured chain of tasks or work packages that, when executed correctly, inevitably leads to the pre-defined result upon which all stakeholders have agreed. In contrast, a project is considered in terms of a temporary organisation format in which people interact to achieve certain pre-defined personal goals.

The proposals for new perspectives on project management research relate directly to ontological issues. Ontology concerns questions about the being (Chia Cua & Garrett, 2009), questions about how an individual interprets reality; as something cognitive in the mind, or as an external physical object. Traditional project management considers reality from a positivist or objectivist (Arbnor & Bjerke, 1997) view. Reality in that view is an external physical object which is “... as concrete and conformable to law from a

structure, independent of the observer." (Arbnor & Bjerke, 1997:27). Building on Söderlund (2004a), Williams (2005) also refers to the ontological stance of project management as: "... effectively positivist … reality is 'out there' and the 'facts' of the situation can be observed; further, the observer is independent to what is being observed and can stand back and observe the 'real' world objectively." (Williams, 2005:500). Cicmil et al. (2006) refer to the positivist view of project management by using the term functionalist/instrumental view. Habermas (1984) in his book "The Theory of Communicative Action" uses the term instrumental action when referring to individuals that act in the real, objective world.

The ontological stance of this research will be discussed in detail later in this chapter. For now it is concluded that the ontological issues that are present in the discussions on project management and project success, also play an important role when investigating the relationship between project risk management and project success. As this research builds on concepts from Habermas (1984), the remainder of this chapter employs the term instrumental view when referring to the positivist, objectivist or functionalist/instrumental view of project management.

Concepts from Habermas (1984) are employed in this research as a theoretical lens (Cicmil et al., 2009; Horner Reich & Yong Wee, 2006) through which the results of this research are viewed and interpreted. This research focuses in particular on the concepts of instrumental action and communicative action. Instrumental action refers to the acts of a human actor in the real or objective world in order to attain a desired state. In communicative action, instrumental actions of human actors take place while actors coordinate their actions through mutual adjustment of the objective, subjective and social worlds of all actors. Coordination takes place through predominantly verbal communication between actors. In the context of a project and project management, in particular IS/IT project management, these human actors who communicate are individual project stakeholders. These individual human actors, in this research, represent a project manager, an IT supplier or a customer.

This research begins from a practitioners' perspective with the central question: "Does risk management contribute to IS/IT project success?" Unfortunately, a relevant,

practical question does not equal a scientifically sound question. The issue of the definition of project success represents just one of the issues that requires further attention and development. For example, as referred to earlier; it is a long chain from the instrument named risk management to its effect on project success. This chain prompts the issue about how it is possible to provide evidence that it was risk management that caused the effect on project outcomes. Perhaps other project management instruments, such as planning or change management, or characteristics of the project or the project environment contribute to project success or failure, with only a subordinate role for risk management, or perhaps no role at all. Projects in general have a duration of several months, and during these months, numerous events take place and numerous interactions between project stakeholders occur. How can we be sure that, given the dynamics and complexity of the project, it is risk management that creates an effect on project success? Furthermore, there exist issues on the assumptions upon which both project management and risk management are based. How do these assumptions influence the way in which project management and risk management are considered, and are these assumptions correct? Does risk management have any effect on project success at all?

This research addresses the issues mentioned above, in order to assure that the answers to the research question, which will be formulated in section 1.4, are reliable and valid. This research succeeds, firstly, by further defining and detailing the key concepts used in this research, being project management, risk management and project success, in order to clarify the subject of this research. In addition, the assumptions that underpin project management and project risk management are explored in depth. Finally, the research uses a multi-method approach in which case studies are combined with an experiment. This combination of methods used in this research further contributes to the validity of the research results.

The structure of the remainder of this introduction chapter is as follows. Section 1.2, further describes and defines the concepts used in this research, and explores the assumptions that underpin the concepts. Attention is then given to the business context in which this research takes place; the IS/IT project context, more specifically the context of Enterprise Resource Planning (ERP) systems. Section 1.3 explains the

research methodology that is used in this research, followed in Section 1.4 by an overview of the detailed research questions this thesis addresses. This chapter concludes with a short description of the content of each of the following chapters of this thesis and an overview of all the deliverables that, in addition to this thesis, represent the output of this research.

Reading guide to this thesis

The core of this thesis consists of four chapters that were originally written as four individual journal papers. The four journal papers represent a logical sequence. In order to create a coherent and complete overview in this thesis, the chapters 2, 3, 4 and 5 which discuss respectively the literature study, the theoretical broadening, the results from the case studies and the results from the experiment, are accompanied by this introduction chapter and by a final chapter in which the synthesis is created and overall conclusions are drawn. The chapters 2, 3, 4 and 5 are still in their original format as submitted or published. Only some minor adjustments were made to the original journal paper texts, in order to improve readability of the texts within the thesis context. Therefore each chapter can still be read in isolation. As a result, the format of presenting four different papers in a PhD thesis inevitably represents some overlap in the text of the various chapters of this thesis.

1.2 Projects; management, success and risks

1.2.1 Projects and the management of projects

In today's business, projects are widespread, influential, important, and are found in a large number of business areas. Building and construction industries, engineering, government, IT and telecom, banking and insurance; all use projects as a way to organise, manage and execute many of their activities. Benko and McFarlan (2003) indicate that about US$ 10 trillion is expended globally on projects each year, representing approximately one quarter of the worlds' yearly gross product. Projects support a variety of change processes in an organisation, ranging from strategic market reorientation or new product development, to the improvement of current production processes (Winter et al., 2006a). Because of this change role, projects contribute to the efficacy of the organisation's operation and the organisations long term continuity.

Recent years have demonstrated a significant growth in project work, which has led to the current situation where project management is considered the dominant model in many organisations for creating change (Winter et al., 2006a).

Projects are endeavours that create unique products, services or results of given specification within constraints of cost and time (Project Management Institute, 2008; Turner, 1993). How projects and the management of projects are viewed upon has developed since the 1950s, when project management started as a sub-discipline of engineering in military and space programs. With its origin in engineering, the emphasis in project management has long been on processes and procedures. It was assumed, and often still is presumed, that the application of processes and procedures "according to the rules of the handbook" automatically leads to better project results. Where a project fails, it is deemed that project processes and procedures should be better applied or improved. As mentioned earlier, this instrumental view of projects is subject of debate (Cicmil et al., 2006), and new directions for investigating projects are currently being explored and expounded.

The question regarding the value of project management for creating products, services or results is relevant for both scientists and practitioners (Besner & Hobbs, 2006; Thomas & Mullaly, 2008), and is investigated by Besner and Hobbs (2006) by asking project managers about the perceived and anticipated value of the various project management practices that project managers can choose from. In their approach, practices are tools and techniques that help project managers in directing and controlling projects. Their research findings show that some project management practices are considered by project managers as having a low value, although these practices are considered by project management theorists as being important and having high value. An example from Besner and Hobbs (2006) to illustrate this: quantitative risk analysis is a project management practice, and part of the series of project risk management practices that is considered by project management theory as having a high value. Project managers on the other hand, do not consider this practice as having high value, nor do they expect that this value perception will change substantially in the near future (Besner & Hobbs, 2006:43). This discrepancy of opinions makes the investigation of the value of risk management an interesting topic.

This research does not take the instrumental project management perspective as a starting point. Although this research acknowledges the importance of instrumental action, it accepts that in addition other, non-instrumental, aspects can also play a substantial role in projects and the management of projects. Action of individual project stakeholders and interaction between project stakeholders are considered to be interesting and important elements to be included in the investigation of projects. By choosing this position, this research places itself in the area of additional perspectives for studying the management of projects (following e.g. Söderlund, 2004a; Winter et al., 2006a).

1.2.2 Projects and their success

The ultimate goal for the project is to be a success. To begin a project is a deliberate action; this decision is taken on the basis of the wish to create a specific change and to improve the current situation within or in relation to an organisation (Association for Project Management, 2006). “To improve the current situation” is a broad concept, and may relate for instance to increasing market share or increasing profitability by developing and introducing new products, or to lowering of production costs. The overview paper presented by Jugdev and Müller (2005) on the evolution of thinking on project success illustrates that the way in which project success is defined has undergone a number of changes through the years. Traditionally, delivering on time, on budget and according to requirements has been considered the criteria by which project success is measured. Turner and Cochrane (1993) state that the time-budget requirements definition of project success focuses solely on the interest of the vendor or supplier, and not on the client. De Wit (1988) some years earlier also stressed the importance of including various stakeholders’ perspectives when defining project success. It is therefore remarkable that the traditional way of defining and determining project success is still very prevalent in reports on project success and its relation to risk management (Chen et al., 2009; Royal Academy of Engineering, 2004; The Standish Group International, 1999). Setting time and budget limits and defining requirements takes place at the beginning of the project, when uncertainty is at its highest (Pinto, 2007) and when it may be relatively impossible to set realistic limits and goals, especially in IT projects (Turner and Cochrane, 1993). Project success may not

be measured accurately by comparing limits of time and budget predicted and set at the beginning, with actual values of these limits at the end of the project.

This research does not regard the project success definition of on time, within budget limits delivery of a pre-defined result, a definition which is closely related to the instrumental project management perspective, as its starting point. Delivery on time, within budget limits of a pre-defined result may play an important role in determining if the project can be considered a success. However, in other situations, project stakeholders may consider other or additional criteria more important in determining if the project can be considered a success. Furthermore, opinions on success may be different for various project stakeholders, depending on the position they have within the project. This research therefore chooses a broader definition of project success, which, depending upon the stakeholder, may include objectively measurable success characteristics such as time, money and requirements, but may also include other characteristics such as stakeholder satisfaction and the future potential of the project result. The broadening of the project success definition is further discussed in chapter 2 of this thesis. This extended project success definition is used in the following chapters that report on the case studies and the experiment.

1.2.3 Projects and their risks

Risk is part of every project (Pinto, 2007; Turner, 1993). A project is: "... a temporary endeavour undertaken to create a unique product, service or result" (Project Management Institute, 2008:5), and project management is: "... the application of knowledge, skills, tools and techniques to project activities to meet the project requirements" (Project Management Institute, 2008:6). Planning and scheduling are key aspects of project management (Söderlund, 2004b), and risks are all events and situations that threaten the undisturbed execution of the project plan. Risk therefore relates to expectations of stakeholders regarding when and how the project will deliver, what the project will deliver and at what cost. Project risks are therefore important factors determining whether the project will be a success.

Project risk management is considered in project management handbooks to be an example of rational problem solving (Koningsveld & Mertens, 1992; Kutsch & Hall, 2005). According to these handbooks (Association for Project Management, 2004;

Project Management Institute, 2008), this problem solving approach indicates that actors in the risk management process, based on an information collection and analysis process, decide upon measures which are taken in order to lower the probability of risks occurring, or minimize the impact of the risks that occur; see figure 1.1. Stakeholder experience with risks in similar situations in the past and other historical information, play important roles in the process of information collection, analysis and decision making. The risk management process as a problem solving process assumes that actors are well informed and behave rationally when making a decision. In addition it is assumed that actors demonstrate instrumental behaviour, meaning that they invest their resources in mitigating the risks identified, not in a discourse on the meaning of these risks for the project's charter, deliverables or success. Risk management is therefore considered to be a "clean" decision making process.

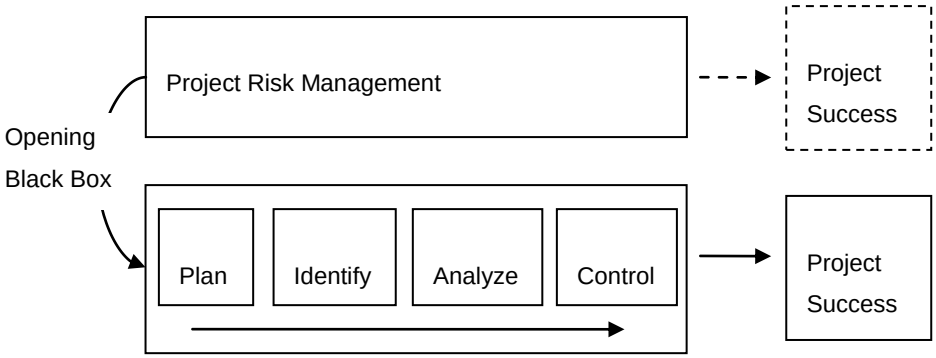


Figure 1.1: First step in opening the black box of project risk management

This perspective on project risk management, like traditional project management, finds its origin in the engineering sciences. Instrumental risk management assumes that the world behaves predictably, following the rules of nature. Risk management from this perspective is primarily the anticipation of events and situations that may occur, causing a negative impact. It may result in adjustments of the project plan documents (Chapman & Ward, 1997).

Risk management science and practitioners' communities have been discussing the differences and relationships between the concepts of risk and uncertainty for a considerable time (Atkinson et al., 2006; Chapman & Ward, 2003; Loch et al., 2006;

Perminova et al., 2008). This thesis does not have the intention to resolve the issues from that discussion, but it does contribute to the discussion by presenting a new viewpoint. This new viewpoint pertains directly to how this thesis considers risk management.

Uncertainty, in existing literature, generally relates to lack of knowledge (Atkinson et al., 2006; Pich et al., 2002) and to the inability to measure (Knight, 1921). Knight (1921) states that risk is something that can be measured. At the same time, risk is not something that is real, or exists in reality (Beck, 2009). A risk is an expression from someone in a specific context, for instance a project. The expression relates an event to a consequence. The event however has yet to happen; in fact it may never happen. Therefore, a risk is a created image, a projection of something that might happen in the future. If the risk occurs, the consequence is a negative one, because the use of the word risk in common language relates risk only to negative things like hazard, bad consequence, loss and chance of injury (Chapman & Ward, 2003). Based on experience and historical data we are able to predict the chances of occurrence of the risk, and because of our comprehension of reality, reflected in our model, being the project plan, we are able to anticipate to the risk.

An uncertainty is a statement, where a speaker expresses there is something we do not know. An uncertainty in itself has no positive (opportunity) or negative (risk) connotation. However, the fact that the speaker expressed the uncertainty means, in the context of why and where the speaker expressed it, that this “something” is considered relevant, otherwise he or she would not have made that statement. Project risk management is based on the probability-based framework (Loch et al., 2006), which assumes reality is known, predictable and measurable. Therefore it could be claimed that uncertainty, which finds its origin in complexity or unpredictability (Holt, 2004) cannot be reduced by project risk management (Pender, 2001), because it is unknown, unpredictable and immeasurable.

The context of project risk management is the project. The key element for the project is the project plan, with its related planning and scheduling documents. A project plan is a written projection of what will happen in terms of specific activities and relationships

or dependencies between activities, leading to one or more deliverables or results[2]. The project plan therefore is a central and important document (Loch et al., 2006). In the context of traditional project management, this project plan is a complete and correct model or image of how reality will behave in the future, that is, during project execution. Reality, and therefore the project plan, behaves predictably, following the instrumental approach that characterizes traditional project management.

Established risk management

Established risk management, is considered to be a rational problem solving process; being, in itself, an example of instrumental action as described in Habermas (1984). It considers the project plan and the underlying reality only in instrumental terms. Established risk management in this sense therefore does not recognize uncertainty as something that exists, because by definition there is no such thing as "lack of knowledge" in the instrumental approach. Risk management is instrumental action or rational problem solving on an instrumental object. An instrumental object is similar to a non-social object (Habermas, 1984); it is an object that follows the rules of nature and behaves predictably. Non-social means that there are no human actors involved in the behaviour of the object. Risk management therefore works well in the technical and engineering context, where the role of human actors is limited and strictly determined by operational procedures and regulations. These procedures and regulations make sure that human behaviour becomes predictable, because actors that are part of the object must comply with these procedures and regulations[3].

Current project risk management

Through investigating the way in which risk management is considered and applied today in the context of projects, this thesis concludes that project risk management itself is still considered primarily as non-social action. At the same time, as a result of

[2] In a traditional project success context, the project plan culminates into predicted values for three parameters; time, money and requirements. To determine the success of a project, the predicted values are evaluated against the actual parameter values at the end of the project.

[3] The role of procedures and regulations in instrumental or non-social objects is the same as in social objects like projects; they create (or at least aim to create) predictable behaviour by the elements of the object (in this case; human actors).

the instrumental view on project management, the project, being the object of risk management, is considered to be a non-social object. It is as if the project behaves like a fully predictable chain of actions that, if executed properly, inevitably will lead to the anticipated results. This approach of risk management being an instrumental action on a non-social object, compared to established risk management, leads to discussions on various issues that cannot be resolved within this approach. The transformation from risk management into uncertainty management (Chapman & Ward, 2003), the claimed effect of risk management on the creation of awareness (Hubbard, 2009) and the problem to include non-rational behaviour within risk management (e.g. Kutsch & Hall, 2005) are examples of these issues or anomalies (Kuhn, 1970). Anomalies are a violation of the "... paradigm-induced expectations that govern normal science" (Kuhn, 1970:52-53). Anomalies appear to exist within the current project risk management approach.

New project risk management

This thesis proposes a shift in the way risk management and projects are considered; from instrumental action on a non-social object to communicative action on a social object (Habermas, 1984). Contrary to current project risk management, this thesis recognizes that the project risk management process is a process in which human actors interact with each other and with their environment. By doing so, human actors influence each other and their environment. Project risk management therefore is not considered to be a “clean” decision making process, but an environment in which perceptions, expectations and inter-actor relations are adjusted and sometimes synchronized. These effects may have an effect on project success, in addition to the traditional instrumental effect. In order to detect these effects it is necessary to consider a project as a social object, an object in which inherently unpredictable human behaviour is present.

This new approach to project risk management is able to address the earlier cited anomalies of uncertainty management, creation of awareness and non predictable behaviour. Furthermore, it addresses the element of communication, which Chapman and Ward (2003) consider an important product of the uncertainty management process: “Critically important, in these (revised) terms we need to move our focus from

the product to the process. ‘Uncertainty management’ is the process which is the focus of our attention. ‘Risk management’ is one of the products. Other products included are enhanced communication, more focus on project objectives, …” (Chapman & Ward, 2003:102).

The following figure presents an overview of the relationship between the current view on project risk management and the object of project risk management and the suggested new view; see figure 1.2.

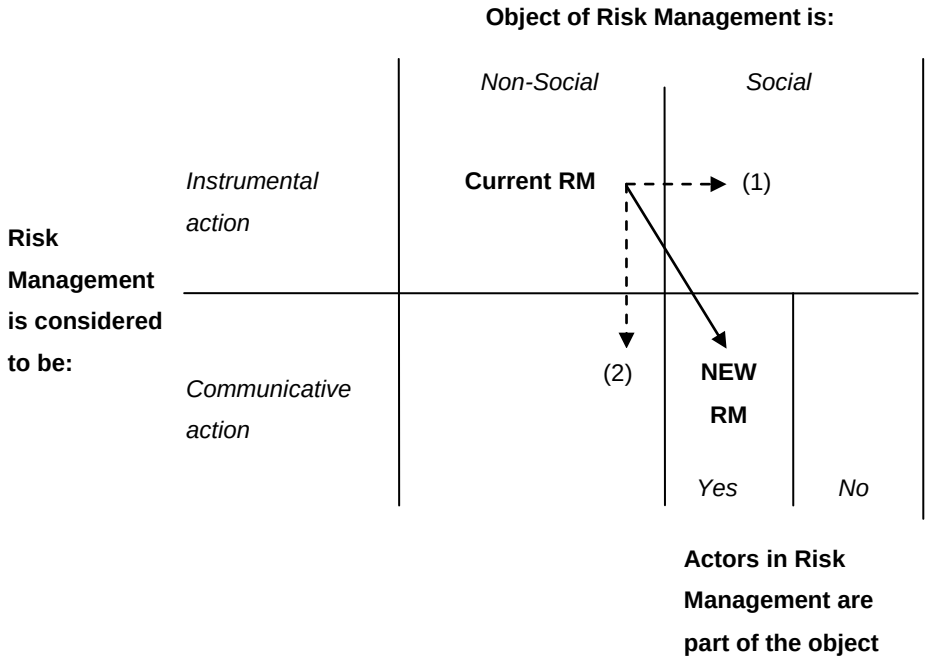


Figure 1.2: Shift from current risk management to new risk management in the context of projects

Anomalies like for instance the creation of awareness (Hubbard, 2009), a concept that does not fit within current risk management, occur firstly (1) because project risk management and project management consider the project as a non-social object, whereas, in fact, the project can also be considered as a social object. Additionally, anomalies occur (2) because current risk management considers risk management as

an instrumental action, where, in fact, it should be considered a communicative action. This thesis proposes a shift towards New Risk Management (New RM) or Communicative Risk Management, in order to be able to accommodate the anomalies. This thesis assumes that at least some of the actors that participate in the project risk management process also are part of the project, for instance in roles such as project manager, project member, supplier of services or materials that are used by the project, customer or user.

1.2.4 Projects in the IS/IT context

This thesis focuses on the use of risk management and its influence on project success in the context of Information Systems/Information Technology (IS/IT) projects, in particular, the implementation projects of Enterprise Resource Planning (ERP) systems. A focus on IS/IT projects was chosen for a variety of reasons. Firstly, because IS/IT projects are well known for frequent failed outcomes. Various reports investigating the success rate of IS/IT projects conclude that between 20% and 30% of these projects can be considered successful in terms of timely delivery of requirements within budget limits. More than 20% of these projects are cancelled completely before completion (Royal Academy of Engineering, 2004; The Standish Group International, 1999). The failure of IS/IT projects attracts significant attention in both the practitioners' and scientific communities, thus making the research topic relevant for both communities. Additionally because of the claim, made for instance by the Royal Academy of Engineering (2004) that a more frequent and more intensive use of risk management is needed in order to improve the success rates of IS/IT projects, and ultimately, a focus on a particular group of projects is necessary in order to draw valid research conclusions.

A refined focus drawing upon ERP implementation projects was made in order to be able to collect comparable research data for determination of the effects of risk management on project success. Although projects generally share certain characteristics, as referenced in the definition of a project (Association for Project Management, 2006; Project Management Institute, 2008), there is still substantial variation between projects that makes it difficult to compare them (Turner & Cochrane, 1993). For example, the design and construction of a new traffic tunnel in a Public Private Partnership relation (PPP) is a project, but its characteristics and dynamics are

substantially different from a project which aims at implementing a customized version of logistics software for the creation of duty rosters (case 3 of this PhD research; see chapter 4). It is acknowledged that IS/IT projects share various elements, examples being: one or more electronic devices or hardware, operating in a network, using software, manipulating data, deployed in an organisational environment, supporting a business process or a business function. However, even within the group of IS/IT projects there remains significant variety between the projects, and therefore the selection of investigated projects was further limited by focussing on ERP implementation projects only.

Enterprise Resource Planning or ERP system is the common terminology for a company wide information system. An accurate description of an ERP system is: "…a packaged business software system that allows a company to automate and integrate the majority of its business processes, share common data and practices across the entire enterprise, and produce and access information in a real-time environment." (Deloitte, 1999). When a company has decided to start working with an ERP system, the system has to be made ready for the company. Often, this also requires that the company has to be made ready for the system. This process is called implementation, and involves both customization of the ERP system to the companies' work processes as well as adjustments of the work processes to the demands of the ERP system. Therefore, ERP implementation projects are projects in which there is a combination of deliberate adjustments by the project to the IT system, consisting of hardware, software, infrastructure and data, in combination with structural adjustments to business processes or business functions. This complexity of combination of adjustments to both the IT system and the organisation defines ERP implementation projects as projects with high risk profiles and makes them therefore interesting for investigating the relationship between risk management and project success.

1.3 Research design

1.3.1 Introduction

Research design issues, including research philosophy issues, have already appeared in the previous section of this chapter. Section 1.2 discussed, at a high level, the

instrumental project management perspective in relation to project success and project risk management. Building on Saunders et al. (2003), this section describes the overall research design of this thesis, of which the research philosophy issues are a subset. The research process "onion" (Saunders et al., 2003:83) provides a clear and comprehensive structure for describing the various choices that were made in this research.

The overall research of this thesis is characterized as exploratory research, aimed at the creation and development of new theoretical insights. Exploratory research is characterized by three basic stages or steps, being: exploration, explanation and testing (van Engelen & van der Zwaan; 1994). In the exploration stage, information is gathered from various sources, either theoretical or empirical, in order to define and describe the problem under investigation, as well as to provide detail to the newly created theoretical insights. The explanation stage develops and presents the newly created theoretical insights. Finally, in the testing stage, the newly created theoretical insights are validated in the empirical context. Figure 1.3 presents an overview for the overall research design.

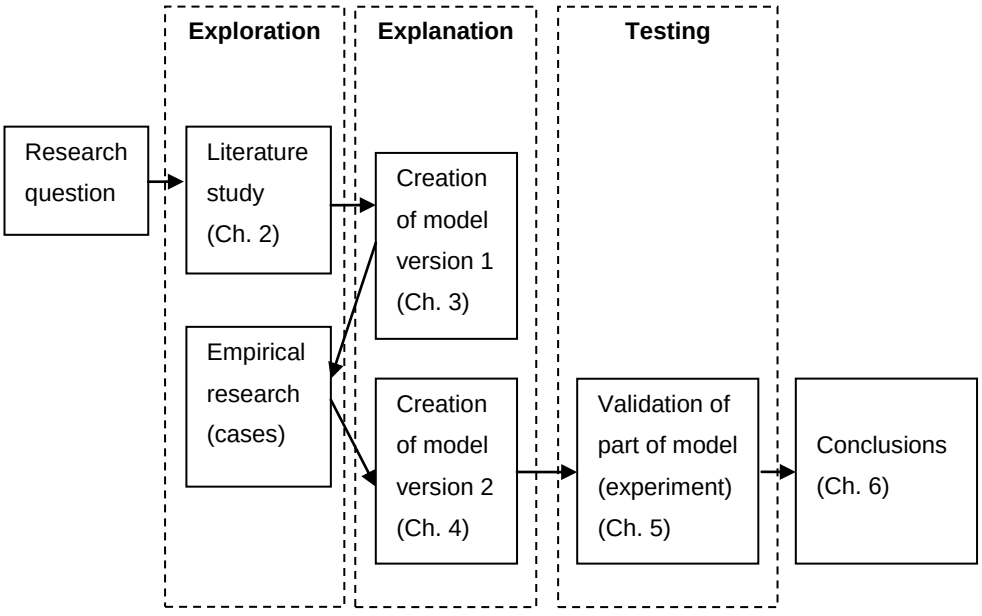


Figure 1.3: Research design for this thesis

In the first step of the research, based on the research question posed, a literature study was conducted. The results of this literature study were reported in a first journal paper, being chapter 2 of this thesis. Chapter 2 builds on the current view on risk management in project management methodology. Current view here means the instrumental view, based on rational problem solving; both the risk management process and the object of risk management are considered in instrumental terms, as was described earlier in section 1.2.3. Although implicit, the view on risk in chapter 2 is aleatoric (der Kiureghian & Ditlevsen, 2009). This follows from the view on risk in risk management and project management methodology, which considers risk in terms of events having a classical or probability distribution (Holt, 2004). The main conclusion from chapter 2, the literature review, is that there limited evidence that current risk management contributes to success in IT projects. In addition, the literature indicates that the assumptions on which risk management in project management methodology is based, are often incorrect for IT projects. IT projects regularly have to deal with epistemic risks, risks for which no classical or probability distribution is available (der Kiureghian & Ditlevsen, 2009; Holt, 2004; Pender, 2001). Nevertheless, risk management, or more precise, specific risk management activities, are still often used in IT projects.

Based on the findings from the literature study, the first version of an additional model was created which describes the influence of risk management on project success in the IT project environment. Results from two case studies were reported to illustrate the model. The first version of the model, including the results from the two case studies were reported in the second journal paper, being chapter 3 of this thesis. As far as risk management activities (e.g. risk identification, risk analysis) are concerned, the view on risk management in chapter 3 builds on the current view on risk management in risk management and project management methodology. However, building on Chapman and Ward (1997) and Rijsenbrij et al. (1993), rational problem solving is no longer assumed in chapter 3. Furthermore, the instrumental effect of risk management is no longer assumed as the only effect of risk management on project success. As a consequence, the approach in chapter 3 assumes that individual risk management activities may have the potential to influence project success through communicative effects. The view on risk shifts from strictly aleatoric in chapter 2, to a format in which

there is also room for epistemic risk or uncertainty in chapter 3. Chapter 3 claims that risk management activities may be able to influence uncertainty, which as a result may contribute to project success.

Based on results from additional five cases, a second version of the model was created. The results were reported in journal paper number 3, being chapter 4 of this thesis. Finally, one of the influence relationships of the new model, the influence of a single risk management activity on project success, was experimentally tested. The view on risk remains the same in chapter 4. Risk management activities as defined in risk management and project management methodology are the starting point for the case studies investigated. Rational problem solving and the instrumental effect being the only effect of risk management are not assumed. In addition to an effect of risk management on aleatoric risk, there is room for an effect of risk management on uncertainty. Finally, the experiment in chapter 5 considers risk from a strictly epistemic or uncertainty viewpoint. The risks mentioned in the prompt list used during the experiment do not have a probability distribution that is known to the participants. The unexpected events that are deliberately introduced in the project during the experiment are not related to, nor mentioned in the prompt list. Results of this part of the research are reported in a fourth journal paper (chapter 5 of this research). Finally, the overall conclusions of this research are reported in chapter 6 of this thesis.

1.3.2 Research philosophy

Saunders et al. (2003) describe three different views about the research process; positivism, interpretivism and realism. The positivist view assumes that reality can be perceived as:"... tangible, concrete, and real with deterministic relations among constituent parts." (Arbnor & Bjerke, 1997:25). As a result: "..., reality becomes an external and objective phenomenon that allows itself to be accurately measured and observed." (Arbnor & Bjerke, 1997:25-26). Interpretivism, being the other extreme of the spectrum, considers reality as: "... a manifestation of human intentionality" (Arbnor & Bjerke: 1997:44) or as socially constructed. Realities, in particular business situations such as projects, are complex and unique, and they are: "... a function of a particular set of circumstances and individuals." (Saunders et al., 2003:84). In between the two extremes of positivism and interpretivism lies realism. Realism assumes a reality exists independently of human thoughts and beliefs, simultaneously realism: "... recognizes

the importance of understanding people's socially constructed and meanings, or subjective reality ..." (Saunders et al., 2003:85).

This research chooses a position aligned with realism, closer to interpretivism than to positivism, because this research acknowledges the necessity to discover "... the details of the situation to understand the reality or perhaps a reality working behind them." (Remenyi, as cited in Saunders et al., 2003). This research clearly states that a project is not an object that behaves according to nature laws. In contrast, it acknowledges that human behaviour, which may be inherently unpredictable, is an important phenomenon to include in the studies of projects. Therefore, this research does not restrict itself in the study of projects to the instrumental (Cicmil et al., 2006; Söderlund, 2004a; Williams, 2005) project management theory tradition. Furthermore it is assumed that human perceptions play an important role in viewing and determining reality, hence the definition used in this research of project success; an opinion of individuals about an achieved result. Risk management, an "instrument" of project managers to identify, analyse and control project risks, is considered in a social context, meaning that interactions between actors in the risk management process may be able to influence perceptions and valuations of the stakeholders regarding reality, particularly in relation to the outcomes of the project.

At the same time, this research states that stakeholders' opinions can be measured in such a way that comparison between opinions is possible. By performing case studies and interviewing project stakeholders, the research seeks to understand the mechanisms determining how risk management influences project success, it seeks to find generalizations across various cases, and it relates these generalizations to the theory on communicative action. By using the research instrument of an experiment, the research focuses upon a very small part of reality, namely the relationship between an individual risk management activity, performed once at the start of a project, and its' influence on objective and perceived project success and aims at investigating a causal relationship.

1.3.3 Research approach

Saunders et al. (2003) make a distinction between a deductive and an inductive research approach. A deductive approach starts with the development of a theory and

hypotheses, after which a strategy is developed to test the hypotheses. One of the important characteristics of the deductive approach is the "... search to explain causal relationships between variables." (Saunders et al., 2003:86). An inductive approach aims at developing a theory from data collected. In practice, the division between approaches is less rigid; it is both possible and often advantageous to combine both approaches within the same piece of research.

The approach of this research cannot be characterized as strictly deductive or inductive. Probably the best characterization for this research is that its format is analytically inductive (Boeije, 2005). Analytical induction, originally described by Znaniecki (1934), consists of six steps that include (Boeije, 2005):

1. Define the phenomenon.
2. Develop a hypothetical explanation for the phenomenon.
3. Investigate a single situation to see if the facts fit with the explanation.
4. If there is no fit, adjust either the hypothesis or the definition of the phenomenon.
5. Investigate additional situations; adjust hypothesis or definition in case of no fit.
6. Repeat this cycle until exceptions are no longer found.

The exploratory character of the research is illustrated by the fact the research is studying relationships between risk management activities and perceived project success. For this relationship, only limited empirical indications and theoretical explanations are available (Besner & Hobbs, 2006; Chapman & Ward, 1997). The theoretical notions from The Theory of Communicative Action (Habermas, 1984) are employed in this research as a theoretical lens through which the results of the research are interpreted. These theoretical notions provide a hypothetical explanation for the phenomenon. The case study results do not aim at testing the theory, but provide more insight into the relationship between risk management and perceived project success. The final step in this research, the experiment, provides additional insight, under strict conditions, into the relationship between one specific risk management activity and perceived project success.

1.3.4 Applied research strategy

The research strategy is the general plan of how, by what means, the research questions will be answered (Saunders et al., 2003:90). Collecting data for answering the research questions takes place at two stages of the research; firstly during exploration and secondly during testing.

The research questions, see section 1.4, are questions considering “how” and “why”, in combination with questions to describe the phenomenon. The research aims at investigating whether risk management activities influence project success, and in the case of an affirmative answer, the question is how this influence takes place. The research is looking for explanations of contemporary events. The events take place in real life environments, IT projects, where there is no control over the behavioural events under investigation. This makes case study the most suitable research strategy for the exploration stage (Yin, 2003). Because of the exploratory character of the research and the research questions aiming at investigating perceptions of various project stakeholders, interview is selected as the primary method of data collection.

During the testing stage the question addressed is if and how one particular risk management activity influences perceived project success. Again the research is focusing on a contemporary event, however during the testing stage the behavioural event can be controlled, hence the choice for an experimental strategy. An experiment is a classical form of research, and it involves typically (Saunders et al., 2003:91):

1. Definition of a theoretical hypothesis.
2. Selection of samples of individuals from known populations.
3. Allocation of samples to different experimental conditions.
4. Introduction of planned change on one or more of the variables.
5. Measurement on a small number of the variables.
6. Control of other variables.

The idea for conducting an experiment in the testing stage is based on the results from the case studies. The case studies demonstrated a consistent image of how stakeholders perceive the influence of risk management activities, in particular risk identification, on project success. Based on this result, the idea was born to demonstrate this perceived influence relationship in an experimental strategy, in order

to provide additional evidence for the existence of the relation between risk identification and project success.

The difference between a true experiment and a quasi-experiment lies in the fact that a true experiment appoints participants in the experiment to an experimental or control group based on randomization (Baarda & de Goede, 2001:119). The experiment conducted in this research can be characterized as a true experiment, because participants are appointed to either experimental or control groups based on randomization. The true experimental strategy contributes to the internal validity. The results of the experiment provide evidence there is a causal relation between conducting a risk identification session and its positive effect on project success. Chapter 5 of this thesis demonstrates there is a relationship between the two variables measured, the independent variable, it being risk identification, occurs in time before the dependent variable, it being project success, and the experimental design does not indicate that other variables are present that determine or influence the relationship (Baarda & de Goede, 2001:135).

1.3.5 Time horizons

Longitudinal studies study a phenomenon over a longer period of time; while cross sectional studies study a phenomenon at a particular time (Saunders et al., 2003:96). The topic of this research, the influence of risk management on project success, is suitable for either a longitudinal or cross sectional study. Risk management activities are easy identifiable, discrete events, taking place on several moments during project execution, which makes them suitable for longitudinal study. At the same time, because they are discrete events, risk management activities can be studied in a cross sectional context. This research has chosen to study the influence of risk management on project success in a cross sectional context for various practical and theoretical reasons.

An important reason that influences the decision for a cross sectional study is because the research investigates the relationship between risk management and project success. Project success can only be determined after the project has delivered its results, being after project completion. It is therefore practical and appropriate to measure after project completion. In addition, this research aims at finding generalizations, which makes a longitudinal approach that often requires significant

time per case, less suitable. Furthermore, a longitudinal approach does not match well with an experimental setting, because it becomes much harder, if not impossible, to keep variables constant that may influence the results. Finally, a longitudinal approach could influence the research findings, because measuring during project execution may cause the results to become influenced, resulting in increased methodological complexity.

1.3.6 Data collection and data analysis methods

This research uses a multi-method approach, combining data from case studies with data from an experiment. Saunders et al. (2003) indicates two major advantages for using a multi-method approach, which both apply to this research. First they state that "... different methods can be used for different purposes." (Saunders et al., 2003:99). This research collects data from case studies in order to find overall patterns of how risk management activities are used in projects, and why, according to various project stakeholders, these activities are used. After finding a consistent pattern in the case studies about the effect of risk identification on project success, this relationship is further investigated in an experiment. As a second advantage, Saunders et al. (2003) states that a multi-method approach enables triangulation.

Mingers (2001) states that different research methods focus on different aspects of reality, which may result in a richer understanding of the research topic. Based on the work of various authors, Mingers states it is possible to combine research methods from different ontological and epistemological paradigms, because the idea of paradigms being mutually exclusive is overstated or incorrect. Furthermore, methods do not belong exclusively to one paradigm; it is possible to use methods within more than one paradigm. The type of multi-method design in this research can be characterized as sequential (Mingers, 2001); methods are employed in sequence with results from one feeding into the later one. Results from case studies with a predominantly interpretive character are fed into an experiment, which is a research method that fits well within a more positivist paradigm. The idea behind this combination of methods is that opinions and perceptions from stakeholders on "how things work" can be further investigated in the concrete setting of an experiment. The experiment is primarily developed as a means to corroborate the case study results, but

at the same time, the experiment has the potential to either further specify the case study results or to oppose the results.

Building on the findings from the literature, reported in chapter 2, and guided by the indications given by Chapman and Ward (1997) and Besner and Hobbs (2006), a first suggestion, or hypothesis in terms of Boeije (2005), was proposed to start the data collection stage of this research (de Bakker, 2008). The suggestion used at the start of the data collection stage is depicted in figure 1.4. Suggested is that individual risk management practices or activities are able to influence project success through their influence on stakeholder communication or collaboration, or may be through other, yet unknown factors.

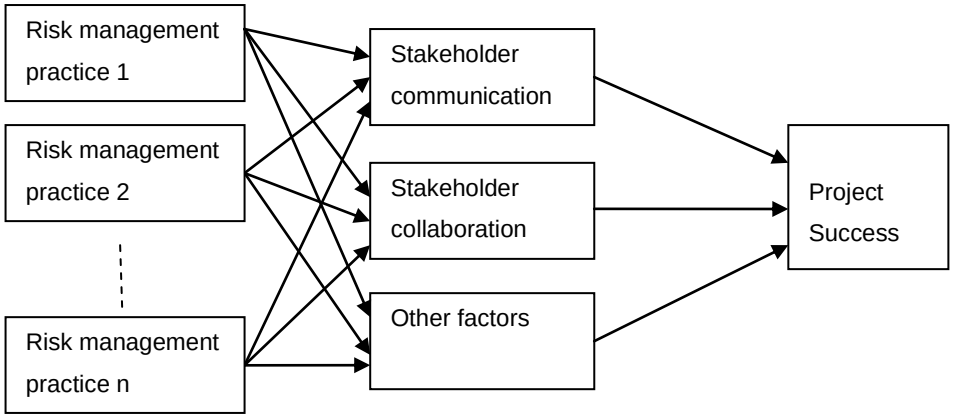


Figure 1.4: First suggestion on how risk management influences project success

In the first two case studies, reported in chapter 3, separate interviews were conducted with the project manager and representatives of the IT supplier and customer organisation in each of the projects. Additional information was obtained from documentation produced by the project. All interviews were recorded and a complete transcription was created. Triangulation (Saunders et al., 2003; Yin, 2003) was done for a second time by comparing the information from the interviews with the information that was obtained from project documentation, and by comparing interview information

provided by different stakeholders from the same project. Data from the first two case studies were analysed using open coding, axial coding (Strauss & Corbin as cited in Boeije, 2005) and pattern matching. Pattern matching is a technique in which empirically found patterns are compared with theoretically described or predicted patterns (Yin, 2003: 116). Concepts from Habermas (1984) were used in order to interpret the empirically found patterns. The process led to a first representation of the influence of risk management activities on project success, based on perception and action, presented in chapter 3. The coding and matching process for the first two case studies is demonstrated in Appendix 1A.

Separate interviews were conducted with the project manager and representatives of the IT supplier and customer organisation in five additional projects. Again, all interviews were recorded and a complete transcription was created. Data from the five case studies were analysed using open coding, axial coding and pattern matching. The data from two earlier analysed case studies were analysed for a second time. Concepts from Habermas (1984) were used in order to interpret the empirically found patterns. The process led to a second representation of the influence of risk management activities on project success, based on action, perception, expectation and relation, presented in chapter 4. The coding and matching process for the additional five case studies is demonstrated in Appendix 1B.

Information in all case studies was collected between one to two months after the go-live of the new ERP system. This timing was chosen for various practical and theoretical reasons. Firstly, due to busy agendas during the go-live period, project stakeholders permit interviews only after go-live is complete. Secondly, only after go-live can stakeholders provide initial opinions on the success of the project. Finally, in the period directly after go-live, projects often perform lessons learned sessions in which the project is evaluated. Interviews on the effects of risk management on project success conform well to this evaluation period.

The case studies provided a consistent and stable image of how, according to various stakeholders, individual risk management activities contribute to project success. Building on the results from the case studies, an experiment was developed in which

one particular influence relation, namely the influence of risk identification on project success, was further explored. Data from the experiment were collected by using standardized forms and scorecards on which all participants could register their answers. All forms and scorecards were processed afterwards by entering the data from the scorecards into SPSS[4] data files.

1.3.7 Credibility of the research findings

Reducing the possibility of getting an invalid answer to the research question starts with a sound research design; attention has to be paid to two particular elements of the design, being reliability and validity (Saunders et al., 2003). In relation to case study research, Yin (2003) identifies four elements that relate to validity and reliability: construct validity, internal validity, external validity and reliability. Yin (2003:34) provides various tactics that can be used in order to establish the validity and the reliability of the research. A selection of these tactics have been applied in this research.

Construct validity involves the establishment of correct operational measures for the concepts being studied (Yin, 2003). The constructs used in the research, e.g. risk management, risk identification and project are well known and well defined constructs for the stakeholders that participated in the interviews of the case studies. Data triangulation was achieved by collecting and comparing multiple sources of evidence. The primary source for data collection was the interview, documentation being the second source. Establishing a chain of evidence was accomplished by referral and comparison of statements from various stakeholders within one case. In addition, method triangulation was applied by following up on the case studies with an experiment that focused on one particular relation identified in multiple cases.

Internal validity relates to research in which investigation of causal relations is part of the research. Pattern matching was used as a tactic in the exploration stage where results from case studies were matched with expected patterns from the concepts of instrumental and communicative action (Habermas, 1984). All interviews were conducted using the same interview script, which further contributes the validity of the results. The interview script contains a combination of open and closed questions. In

[4] SPSS statistics software, by SPSS, an IBM company (www.spss.com).

case of an affirmative answer to the question whether risk management influences the project result, the open question was asked to capture how, according to the stakeholder, risk management influences the success of the project. The format of an open question was chosen to avoid preconditioning of the stakeholders to whom questions were posed. In addition, data collection took place shortly after project completion. Stakeholders' experiences from the project are recent and therefore still "fresh", which contributes to the quality of the collected information, because it lowers the chances for perceptual inaccuracies. Where information is collected significantly after go-live, it is likely this information is influenced or tainted by memory recall bias. In the testing stage, during the experiment, a strict control of the experimental variables and an investigation of alternative explanations for the results from the experiment were used. Potential problems of reflexivity and retrospection, meaning that stakeholders may give answers the researcher wants to hear, or that stakeholders may be too positive in attributing successes to only the independent variable under investigation, cannot be avoided completely in a research context where stakeholder perceptions are investigated. However; the combination of closed and open questions in the interview script, followed by an analysis stage in which attention was paid to cross-case pattern matching and alternative explanations, has ensured the influence of reflexivity and retrospection on the results is limited.

External validity relates to the question if the research results are generally applicable beyond the individual case study. The use of a general theory on communicative action, the use of multiple case studies in the research and the execution of an experiment in the testing stage of the research that had no relation to the IT project environment, contributes to external validity outside the case studies and outside the IT project domain. However, further research in other sectors where project management is used as well as additional experimental research and additional data collection methods, for instance observations, are needed in order to further investigate the relationships found in this research.

Reliability refers to the attempt to minimize the errors and biases in a study, in order to ensure that if another investigator conducted the same case study, following the same procedure, this investigator should arrive at the same findings and conclusions (Yin,

2003). In the stage of exploration, during case studies, all interviews were conducted using the same interview script. The use of the interview script contributes to the reliability of this study. The interview script contains a combination of open and closed questions, focusing on three elements: the project result, how risk management was done and whether risk management influences the project result. In case of an affirmative answer to the latter question, the open question was asked to capture how, according to the stakeholder, risk management influences the success of the project. The format of an open question was chosen to avoid preconditioning of the stakeholders to whom questions were posed (Halo-effects).

1.4 Research questions

This research was guided by the following research question:

Does the use of project risk management practices affect the project success as perceived by stakeholders (project managers, IT service suppliers, and business owners) regarding ERP Implementation projects, and if so, what are explanations for this relationship?

In order to direct the research activities that lead to the answer of the research question, the following sub-questions are formulated. First, the research intends to create an overview of the current knowledge on the relationship between risk management and project success in IT projects. The following sub-question leads this part of the research:

1. What conclusions can be derived from the literature regarding the relationship between the use of risk management and project success in IT projects in general?

The answers to this question are presented in chapter 2 of this thesis. Following this literature overview, the research focuses on ERP implementation projects as a specific type of IT project. Chapters 3 and 4 of this thesis report on the case studies that provide the information for the answers of the following sub-questions:

2. When do stakeholders consider an ERP implementation project successful?

3. Which project risk management practices are applied in ERP implementation projects?
4. Is there, according to stakeholders, a relationship between the applied project risk management practices and perceived project success?
5. Are influences of project risk management practices on stakeholder communication and on stakeholder collaboration explanations for the effect on perceived project success?

In order to create additional information on the effects of a specific risk management practice on project success, independently from various stakeholders' perceptions and the IT project context, this research answers the following sub-question:

6. Does the use of a specific risk management practice influence objective project success and project success as perceived by project members?

The answer to this question is presented in chapter 5 of this thesis. Finally, chapter 6 presents the overall conclusions of this research, including the answer to the final sub-question on the implications of the research findings for practitioners in the field of IT project management, particularly for ERP implementation project management:

7. What are the implications of the research findings for the use of project risk management in ERP implementation projects?

1.5 Overall structure and contents of this thesis

Chapters 2, 3, 4 and 5 of this thesis present the core of this research. These four chapters were originally written as journal papers, and have been submitted to various journals. The four papers together follow the logical and well known sequence of reporting research results. Chapter 2 presents an overview of the literature in the field of risk management and IT project success. Building on these results, chapter 3 describes the development of an additional approach, based on inter-stakeholder interaction, in order to investigate the effects of risk management on project success. Results from two case studies illustrate this new approach. Chapter 4 further develops the new approach, and results from seven case studies are presented in order to demonstrate a robust version of the model that describes how risk management influences project success in the context of IT projects. Chapter 5 reports upon an

experiment that was conducted in order to find additional evidence for the results from the case studies. Finally, chapter 6 discusses the overall results of this research, and presents the integration of all materials as well as the final conclusions.

Chapter 2 presents the results of the research of literature. The key question of this part of the research is: Is there evidence presented in the literature that demonstrates there is a positive effect of risk management on the success of IS/IT projects? A total of 29 journal papers, published between 1997 and 2009 were found and investigated. The main conclusion was that there is little evidence in literature that demonstrates a positive effect of the use of risk management on IS/IT project success. Most papers assume that risk management contributes to IT project success, without presenting substantial evidence for this claim.

Chapter 2 presents some important additional findings resulting from the research of literature. These findings have had a substantial impact on the direction of the remainder of the research. First, there is no clear definition of risk management presented in literature. The paper identified and analysed two different approaches to risk management; the *evaluation approach* and the *management approach*. 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. Second, the paper identified differences in the definition of project success used in various papers. The traditional success factors of timely delivery of specified functionality within budget limits appear to be closely related to the traditional instrumental view of project management. This traditional instrumental view also influences the way on how the effects of risk management are defined. Third, findings indicate that the assumptions underpinning risk management are in certain cases incorrect.

As stated previously, the issues related to the additional findings mentioned have influenced the direction of the research substantially. Although the essence of the research question, namely the influence of project risk management on project success, remained unchanged, the primarily functionalist-instrumental view to consider project risk management and project management was abandoned and was replaced

by a more interpretative view. In the interpretative view, project success has both an element of objective success, but also an element of perceived success. Project success in this research is considered to be an individual and multidimensional evaluation of a situation by a project stakeholder. Project risk management, in the traditional functionalist-instrumental view is considered to be rational problem solving leading to instrumental effects. This was more broadly defined by adding the element of stakeholders interacting during the risk management process, and assuming this interaction causes additional effects on project success.

Chapter 3 and 4 describe the development of an approach that in addition to the traditional management approach of risk management describes how risk management may influence IT project success. Chapter 3 begins by making a distinction between instrumental action and communicative action as two possible ways for stakeholders to act in the context of the risk management process. Instrumental action leads only to instrumental effects, communicative action leads, in addition to instrumental effects which may be a result from communicative action, to communicative effects. The two case studies in chapter 3 demonstrate two communicative effects resulting from the execution of risk management. The first effect is related to perception; as a result of risk management, project stakeholders influence other stakeholders' perception. The second effect is action related; risk management stimulates people to take action and makes their actions more effective.

Chapter 4 builds further on the results presented in chapter 3, and focuses upon one of the elements of communicative action, namely the creation of a situation definition. Interaction between project stakeholders during risk management provides opportunities for the stakeholders to develop a definition of the environment on which they all agree, and in which they all act. This definition of the situation is one of the pre-conditions for effective stakeholder action. In addition to the two communicative effects that were found in chapter 3, action and perception, the seven case studies revealed two new communicative effects; expectation and relation. Expectation refers to the effect stakeholders want to establish by using risk management activities, in order to influence expectations of other stakeholders in relation to their behaviour during the execution of the project and the expectations of other stakeholders regarding the final

project result. Relation refers to the effect that stakeholders are building and maintaining their relationships, for instance in terms of trust and professionalism, with other project stakeholders.

The seven case studies provide evidence that, in addition to an assumed instrumental effect of risk management on project success, there is also a communicative effect that influences project success. This communicative effect is generated by stakeholders interacting during the execution of risk management activities. The main issue with these research findings is that the findings are based upon what stakeholders report on what they think is the effect of risk management on project success. Various tactics and actions were employed that contribute to the validity of the research findings, however the fact that the results are based upon self-reports from stakeholders remains an issue. In order to provide additional evidence for the communicative effect, an experiment was developed aimed at measuring the communicative effect.

The experiment and its results are reported in chapter 5. Fifty-three project groups were formed, each of four people. Each group conducted the same project. Some groups conducted risk identification before project execution, other groups did not. Results from the experiment indicated project groups that communicate with each other during risk identification perform significantly better than project groups that do not communicate during risk identification or project groups that conduct no risk identification at all. Furthermore, project groups that used risk identification plus communication value their result significantly higher than other groups. The results of the experiment provide additional evidence that a communicative effect exists.

Chapter 6 of this thesis reflects on the results of the results presented in this thesis and presents the overall conclusions and recommendations.

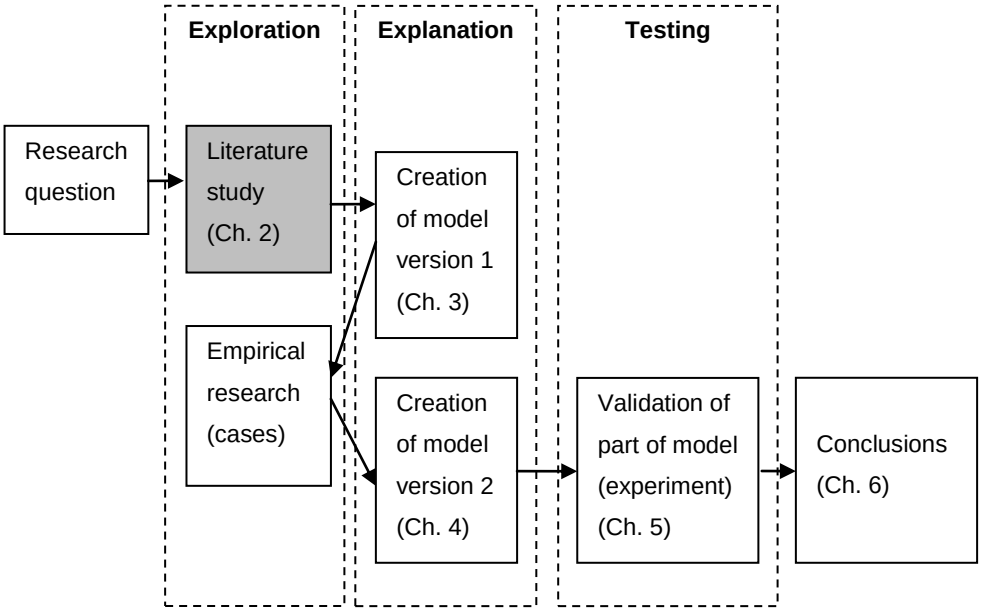
1.6 Research deliverables

In addition to this PhD thesis, the following deliverables are the results of this research:

1. de Bakker, K., Boonstra, A. & Wortmann, H. (2010). Does Risk Management Contribute to Project Success? A Meta-Analysis of Empirical Evidence. *International Journal of Project Management* 28(5), 493 – 503.
2. de Bakker, K., Boonstra, A. & Wortmann, H. (2011). Risk Management Affecting IS/IT Project Success Through Communicative Action. *Project Management Journal* 42(3), 75-90.
3. de Bakker, K., Boonstra, A. & Wortmann, H. (invited to resubmit). Risk Managements' Communicative Effects Influencing IT Project Success. *International Journal of Project Management*.
4. de Bakker, K., Boonstra, A. & Wortmann, H. (submitted). The Communicative Effect of Risk Identification on Project Success. *International Journal of Project Organisation and Management*.
5. de Bakker, K. (2008). Exploring the Effects of Project Risk Management on Project Success, poster presentation, *PMI Research Conference*, Warsaw, Poland, July 13-16.
6. de Bakker, K. (2009). Risk Management Does (Not) Contribute to Project Success. In: *Proceedings of PMI EMEA Conference*, Amsterdam, The Netherlands, May 18-20.
7. de Bakker, K., Boonstra, A. & Wortmann, H. (2009). How Risk Management Influences IT Project Success. In: *Proceedings of 9th IRNOP Project Research Conference*, Berlin, Germany, October 11-13.

2 Literature study

The text of this chapter was previously published as a paper in *International Journal of Project Management* 28(5), p. 493 – 503, under the title: ”Does Risk Management Contribute to Project Success? A Meta-Analysis of Empirical Evidence”.



Position of this chapter in the overall research context

2.1 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 1970s 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 & Ginzberg, 1978:23).

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 1990s, 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, 2008). This normative approach is often found in relation to literature that focuses on project management in general (Turner, 1999), and on risk management in IT projects in particular (Ropponen & Lyytinen, 1997).

The purpose of this chapter 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 chapter 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 & 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 chapter.

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 chapter. Over the last ten 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.

2.2 Risk management and project success in IT projects

2.2.1 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. Figure 2.1 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 chapter, 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.

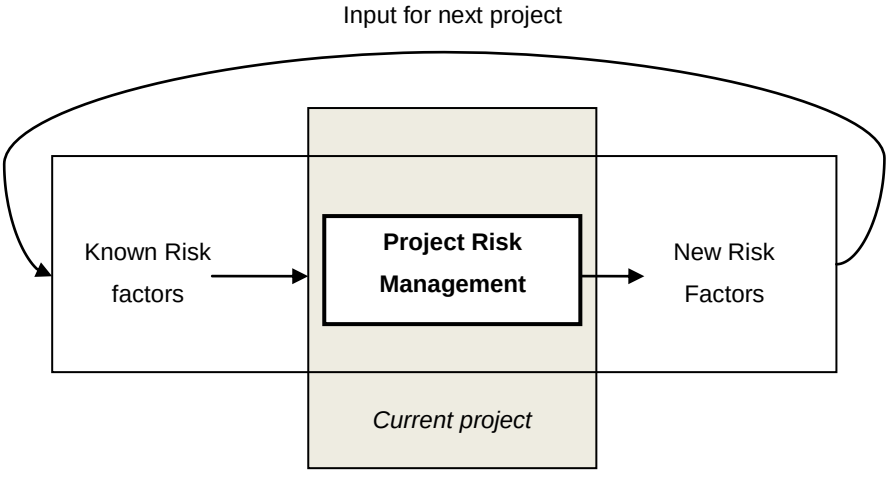


Figure 2.1: Evaluation approach to Project Risk Management

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 & 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 support and improve the project's management by determining which actions should be taken. Figure 2.2 presents a graphical representation of this approach. In the remainder of this chapter, 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 & Ward, 1997). By improving the project planning, budget and design, project risk management is assumed to contribute to the success of the project.

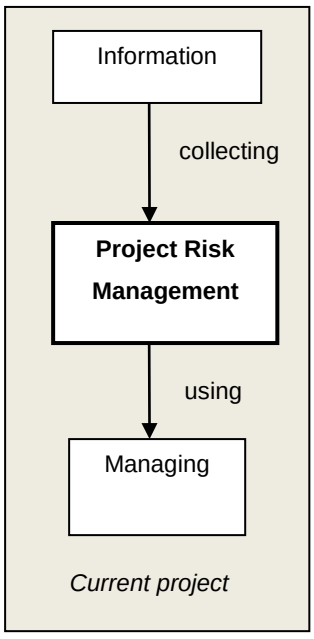


Figure 2.2: Management approach to Project Risk Management

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 2.1 presents an overview of the typical characteristics of both approaches.

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

Table 2.1: Differences between the two project risk management approaches

Figure 2.3 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 chapter provide no indications that the relation between project success and the actual use of knowledge on risk factors has been investigated.

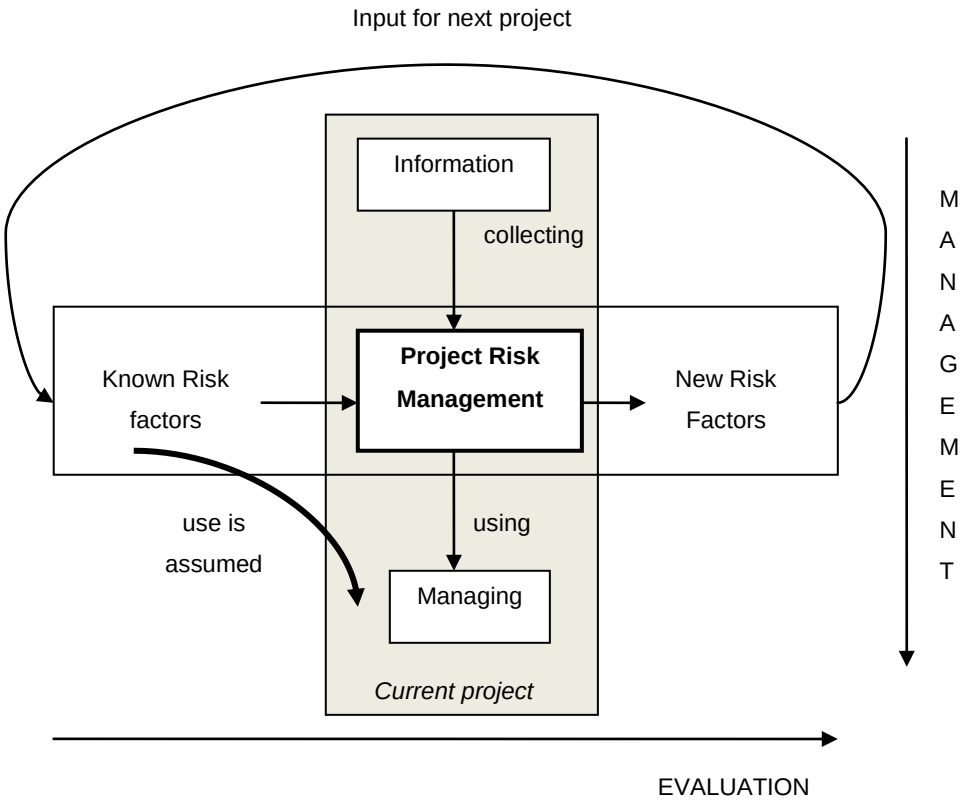


Figure 2.3: Two approaches to Project Risk Management combined

2.2.2 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 (Royal Academy of Engineering, 2004; The Standish Group International, 1999). 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.

2.2.3 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 "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.

2.3 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 fewer 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 figure 2.4). 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.

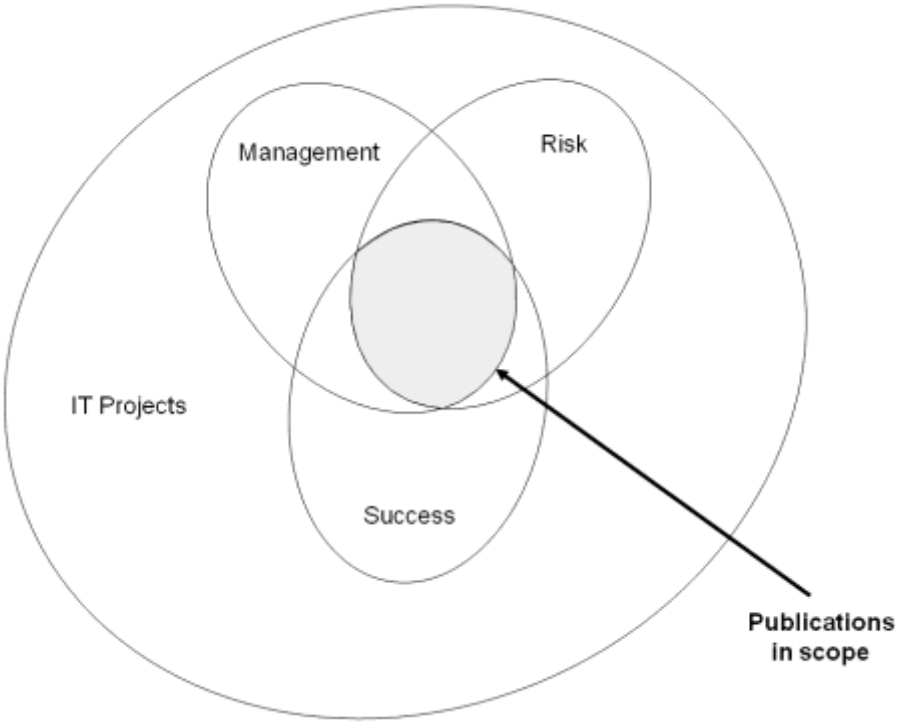


Figure 2.4: Journal publications (1997 – 2009) within the scope of this research study

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 2.2 presents a detailed overview.

	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

Table 2.2: Characteristics of the various publications in scope

2.4 Results

2.4.1 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, 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.

2.4.2 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.

2.4.3 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 & 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.

2.4.4 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 (Royal Academy of Engineering, 2004; The Standish Group International, 1999) is still very common. About two third of the publications dealt with in this chapter refer to project success in terms of compliance with time limits, cost limits and meeting requirements; see figure 2.5.

A clear definition of project success, however, often remains rather implicit, as illustrated by e.g. Conrow and Shishido (1997:83) 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 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, 2004b) 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.

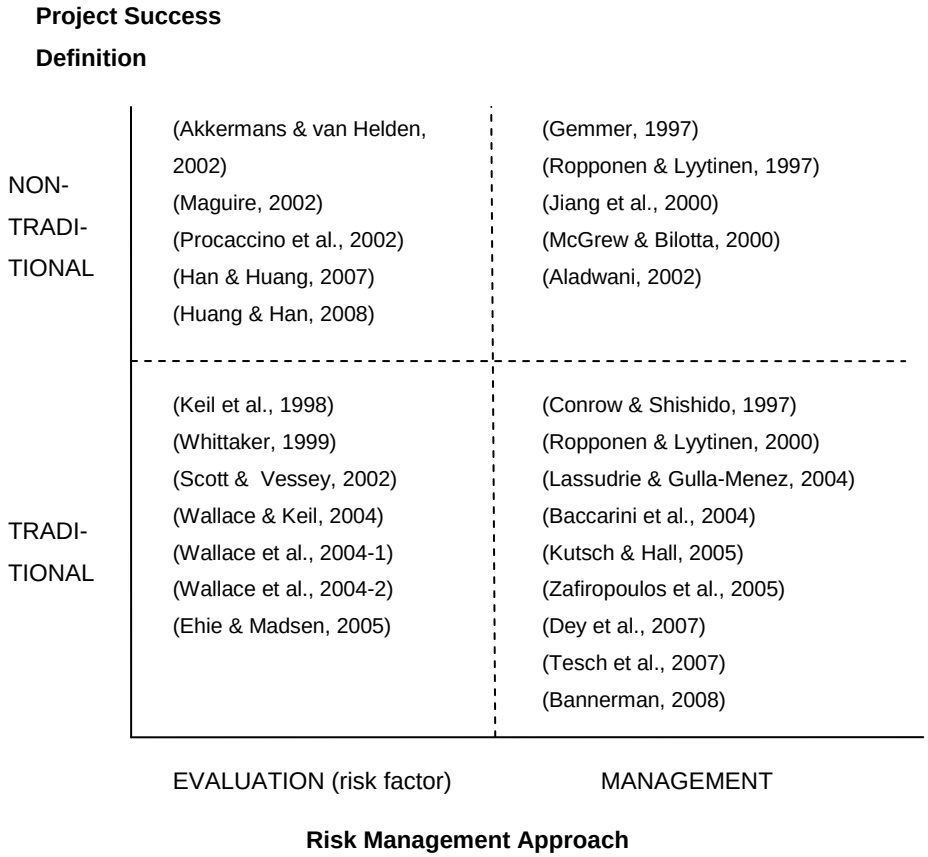


Figure 2.5: Risk management approach in relation to project success definition

2.4.5 Papers addressing the evaluation approach to risk management

Building on earlier research e.g. by 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 & van Helden, 2002; Keil et al., 1998), along with incorrect, incomplete, or changing requirements (Han & 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, organisational 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).

2.4.6 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, 2008) 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 & 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 & Lyytinen, 1997), and decrease the number of task failures (McGrew & 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.

2.4.7 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 & Hall, 2005), or to a request for more information.

2.5 Discussion

Advocates of the evaluation approach, e.g. Jiang and Klein (1999), Procaccino et al. (2002), Scott and Vessey (2002), 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 & 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 figure 2.6.

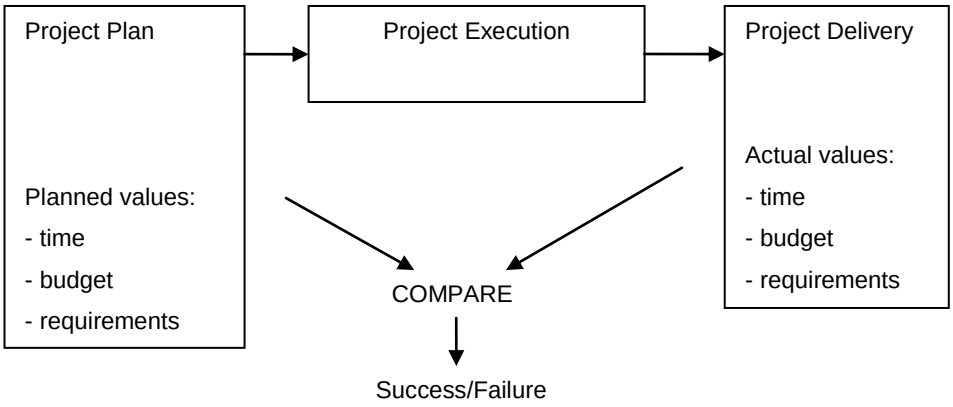


Figure 2.6: Traditional view of how project success is measured

Due to the nature of IT projects, their methods may be well defined, but their goals are not (Turner & Cochrane, 1993), the traditional success definition of meeting time, costs, and requirements, is less useful. The publications investigated in this chapter 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 & 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 chapter. An adjusted definition of project success, based on the work of Shenhar et al. (2001), which considers project success in general, and on for instance 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 of project success, better relates to how project success is experienced.

Literature (e.g. Kutsch & 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 Agile (see for instance Schwaber & Beedle, 2002) and RUP (see for instance 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.

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 the risks should 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, 2008), 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.

2.6 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 organisational 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

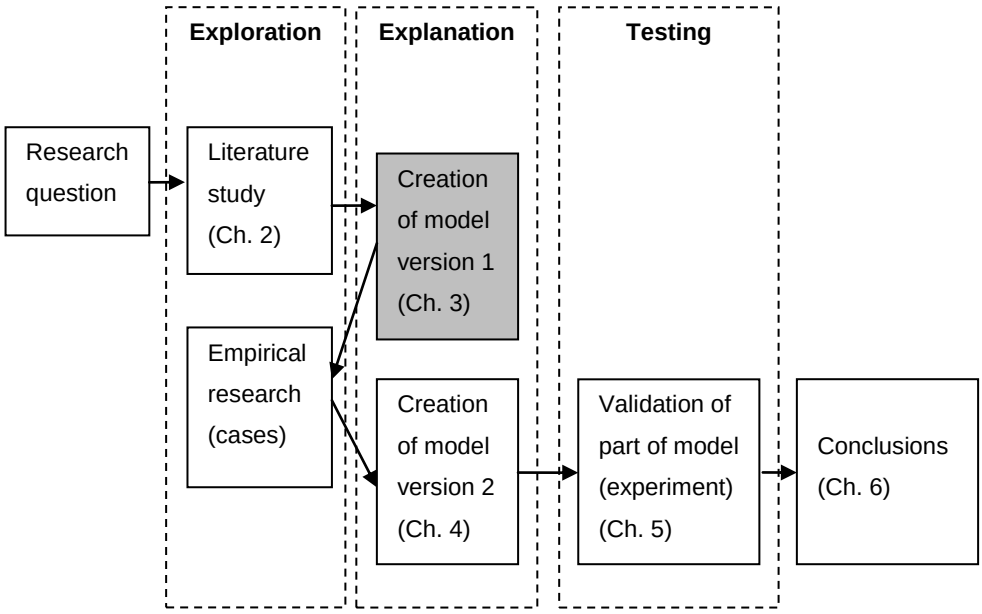
effective, according to its basic criteria. This leads to the conclusion that risk management can only be effective in specific project situations. Following the work by Loch et al. (2006), an interesting direction for further research would be to determine these specific conditions in the context of 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 & 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.

3 Theoretical model, phase 1, illustrated with results from two case studies

The text of this chapter was previously published as a paper in *Project Management Journal* (2011), 42(3), p. 75-90, under the title: ”Risk Management Affecting IS/IT Project Success Through Communicative Action”: http://wileyonlinelibrary.com.



Position of this chapter in the overall research context

3.1 Introduction

Project risk management has a prominent position in the framework of project management theory and methodology (Association for Project Management, 2006; Project Management Institute, 2008). The reason is that unexpected events will usually occur during a project (Pinto, 2007; Turner, 1993). Risk management is considered to be a tool to limit the impact of these unexpected events, or even to prevent these

events from happening. Accordingly, it is generally assumed that risk management contributes to the success of the project (Olsson, 2007). However, empirical evidence regarding the contribution of risk management to Information Systems/Information Technology (IS/IT) project success thus far is not convincing. This empirical evidence is often based on assumptions about how risk management is supposed to work, assumptions that emerge as incorrect for most IS/IT projects (de Bakker et al., 2010).

According to Chapman and Ward (1997), project risk management positively influences project performance by *instrumental* effects: through creation of a contingency plan or by influencing project time, budget or design plan. These authors also mention a *social* effect: influencing stakeholders and stakeholder motives. In relation to the social effect, Chapman and Ward (1997) indicate three factors which potentially influence project performance in a positive way: better communication between stakeholders, better collaboration between stakeholders, and more creative thinking. Rijsenbrij et al. (1993) mention the creation of project team spirit as an additional effect of the project risk management process. Unfortunately, neither report elaborates on the presence, the causes or on the strength of this social effect. This makes the social effect of risk management on project success an interesting topic for current research. If the social effect exists, it may have important implications for IS/IT project practitioners. Practitioners may become aware that risk management helps them not only to collect information and support their decision making process, but also helps them to tune stakeholder perceptions and expectations, creating a commonly defined environment in which stakeholder actions are more effective. This may also contribute to the success of the project.

This chapter addresses the following research question: “How do project stakeholders perceive the effects of project risk management on IS/IT project success?” This chapter acknowledges the potential of instrumental effects of project risk management (Chapman & Ward, 1997). In addition to these instrumental effects, our approach studies the interactions between project stakeholders during the execution of project risk management activities and the effects of these interactions on project success. To be able to do so, building on the work of various authors, we will first investigate and define the project risk management process and the concept of IS/IT project success. A

distinction is then made between risk management as *instrumental action* and risk management as *social action* by using concepts from the Theory of Communicative Action (Habermas, 1984; Habermas, 1987) as a theoretical lens for the research (Cicmil et al., 2009; Horner Reich & Yong Wee, 2006). This theoretical lens facilitates greater understanding of what happens during risk management activities and how this may influence IS/IT project success.

In order to explore the theoretical concepts of this study in practice, the relationship between project risk management and project success is studied through investigation of two Enterprise Resource Planning (ERP) system implementation projects. ERP projects are chosen because they consist of deliberate adjustments to the IT system (hardware, software, infrastructure and data) in combination with substantial changes of business processes. These projects contain a considerable amount of risk and uncertainty (Akkermans & van Helden, 2002; Ehie & Madsen, 2005), which makes the subject of project risk managements' impact on project success especially relevant. Project risk management is usually based on the probability-based framework (Loch et al., 2002), which assumes reality is known, predictable and measurable. Therefore it could be claimed that uncertainty, which finds its origin in complexity or unpredictability (Holt, 2004) cannot be reduced by project risk management (Pender, 2001), because it is unknown, unpredictable and immeasurable. The results of this chapter however demonstrate that certain project risk management activities may be able to reduce uncertainty, because the effects from project risk management activities may lead to increased predictability of stakeholder behaviour.

The contribution of this chapter is two-fold. First, analysis of the research data shows that project stakeholders deliberately use risk management activities to convey messages to other stakeholders, with the aim to influence other stakeholders' behaviour. Second, risk management activities influence the stakeholders' perception of the situation by synchronising their perception and making them more conscious of the context and of their responsibilities. Weick and Sutcliffe (2007) call this effect awareness and attention, or mindfulness. In addition to the instrumental effect of project risk management that is generally considered to positively influence project success, this study finds that project risk management influences project stakeholders'

perceptions and behaviour. Based on in-depth stakeholder interviews, it is concluded that stakeholders perceive these effects as contributing significantly to project success.

3.2 Theoretical background

3.2.1 Traditional view on risk management and project success

3.2.1.1 Risk management in the positivists' tradition

In this chapter, project risk management is aligned with project management Bodies of Knowledge or BoKs (Association for Project Management, 2006; Project Management Institute, 2008), which are considered to describe the core knowledge of project management (Williams, 2005). According to these BoKs, project risk management consists of a sequence of related activities to make decisions based on information gathered about situations that may or may not occur (Boehm, 1991; Chapman & Ward, 1997; Pich et al., 2002). The sequence of activities that characterises project risk management consists of identifying risks, analysing risks, defining action, implementing action, and monitoring the situation (Association for Project Management, 2004; Del Caño & Pilar de la Cruz, 2002; Project Management Institute, 2008). Project management methodology presumes that the actions taken, as a result of risk management, contribute to the success of the project. The Project Management Body of Knowledge states it as follows: "Risk is an uncertain event or condition that, if it occurs, has an effect on at least one project objective. Objectives can include scope, schedule, cost and quality" (Project Management Institute, 2008: 275), and: "The objectives of Project Risk Management are to increase the probability and impact of positive events, and decrease the probability and impact of negative events in the project" (Project Management Institute, 2008: 274).

The project risk management process, as described above, is an example of an instrumental problem solving method. Project risk management (as with project management in general) has its origin in the positivist tradition, where the world around us is assumed to be objective (i.e. factual, rather than opinionated) and can be explained by causal relationships (Cicmil, 2006; Williams, 2005). The project risk management process assumes that stakeholders act as one actor. This one actor

influences the world, is fully informed and behaves rationally when making decisions aimed at project success. By taking the right actions following the decisions, also known as instrumental action (Koningsveld & Mertens, 1992), risk management is accordingly able to influence project success.

As an example, consider the following statement found in a project risk register as a result of a risk identification activity: "If the department that will be using the new ERP system will remain as busy as they currently are, they will not be able to deliver real life test cases to the project, as a result of which the tests of the new ERP system cannot be performed and the project will be delayed by at least one month". This statement follows the standard structure of a risk description in terms of: cause (busy department), risk (no test data available) and effect (project delay) as described e.g. in Bartlett (2002). After performing the risk analysis, determining how serious this risk is perceived to be, and after the development of proper responses, instrumental action will be taken to try to ensure the unwanted situation will not occur. An instrumental action could be to hire temporary personnel in order to lower the departments' work pressure and to ensure the test data will be delivered on time.

The example illustrates that the risk management process is considered *instrumental* and data-oriented, i.e. it aims at collecting information to take a decision, followed by an instrumental action, and that it focuses on the completeness and correctness of the information, both influencing the effectiveness of the action. The process of how the data was collected, or by whom the data was collected, is, in this view, only relevant in relation to the quality of the collected data. *Social effects* are not considered; it is irrelevant how this process of data collection influences the way in which project stakeholders, including members of the department concerned, perceive the situation or how they respond to the risk individually or as a group.

3.2.1.2 Project success in the positivists' tradition

Closely related to this positivist view on risk management is the notion of project success. Success of a project is, in this context, objectively measurable by looking at time, budget and requirement parameters, which were defined at the outset of the project. Further, success of a project is assumed to be consistent for every project stakeholder, and success can be determined at the moment the project has produced

its deliverables. A project plan is a written projection of what will happen in terms of specific activities and relations between activities, culminating into predicted values for three parameters; time, money and requirements. To determine the success of a project, it is evaluated against the actual parameter values at the end of the project. Research on the relationship between risk management and project success generally uses this project success approach (de Bakker et al., 2010). This view on risk management and project success, and their relation is presented in figure 3.1.

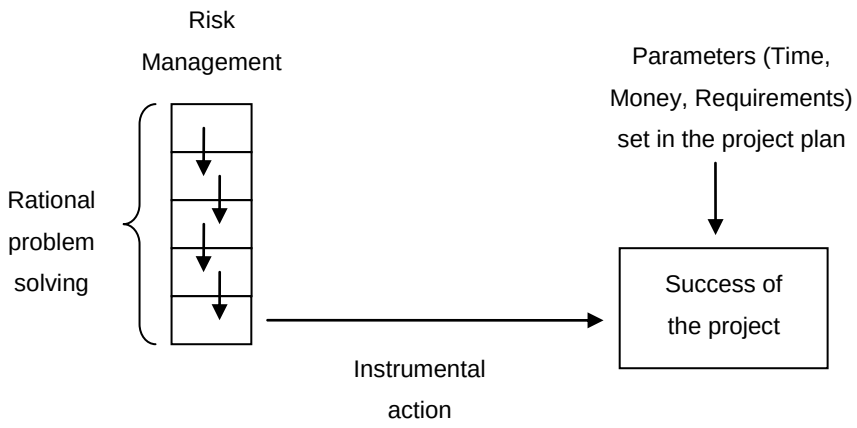


Figure 3.1: Traditional (positivist) view on the relation between risk management and project success

The discussion thus far has been restricted to risk management as instrumental action and project success as an objective result. It is argued below, that a broader view on risk management and project success is also possible. In particular, Habermas' theory of communicative action (Habermas, 1984, 1987) provides a theoretical framework which enables us to interpret risk management activities more broadly. These activities are also seen as ways to influence stakeholders' behaviours and opinions. Accordingly, project success is more broadly defined.

3.2.2 Broader view on project success and risk management

Various authors (for instance de Wit, 1988; Wateridge, 1998; Agarwal and Rathod, 2006) have pointed out the limitations of the approach to determine project success as an objective result of three parameters. Baccarini (1999) states that time, money and

requirements are subsets of project success and may contribute to success. Thomas and Fernandez (2008) stress the difficulties related to defining project success. Based on their research, they propose a broader definition for the measurement of project success, in which success characteristics are determined by stakeholders themselves. Building on this, the use of project risk management and its influence on project success is investigated here, by adopting a broader project success definition. Project success is the outcome of a personal, individual evaluation of project characteristics by each stakeholder. This may include objectively measurable characteristics such as time, money and requirements, but may also include other characteristics such as stakeholder satisfaction and the future potential of the project result.

The project risk management process, as described in project management handbooks, is an example of a rational problem solving method (Koningsveld & Mertens, 1992; Kutsch & Hall, 2005), based on an instrumental view. For this process to be effective, it is necessary that all prescribed steps are followed. For example Voetsch et al. (2004) and Bannerman (2008) have shown that the prescribed sequence of risk identification, risk analysis, planning actions and executing actions is rarely followed. Building on Besner and Hobbs (2006), this chapter takes a further perspective on risk management, through identification of various risk management practices. These practices, or risk management activities, may or may not be used in a particular project, may or may not be executed in a fixed sequence, and these practices may individually, or in combination, have an effect on project success. Table 3.1 presents an overview of the differences between the traditional and the broader view on risk management and project success.

As a result of the broadening, we reject the assumption that effects of project risk management on project success are only caused by the results of rational problem solving methods. Instead, we propose that actions taken by participants in one or more risk management activities can have their own effects on project success. Further, based on the distinction made by Habermas (Habermas, 1984; Habermas, 1987) we propose that, in addition to instrumental action, social action may also influence project success.

	Traditional view	**Broader view**
Risk management	Rational problem solving by related risk management activities (Chapman & Ward, 1997; Association for Project Management, 2004)	Single or related risk management activities influencing project stakeholders
Project success	Objectively measurable in terms of Time, Money, Requirements (Ropponen & Lyytinen, 2000; Association for Project Management, 2006)	An opinion of a project stakeholder on various project characteristics (e.g. de Wit, 1988; Turner & Cochrane, 1993)
Influence relation	Responses in an objective world, based on information resulting from the risk management process (Koningsveld & Mertens, 1992)	Risk management activities individually or in combination influencing the perception or behaviour of the stakeholder in relation to perceived project success

Table 3.1: Differences between the traditional and the broader view on risk management and project success

3.2.3 Habermas' concepts of instrumental and social action

3.2.3.1 Instrumental action

A project is an organisational format to create change (Association for Project Management, 2006). In the context of an organisation, change means transforming the current situation, which is identified as being problematic, into a new, non-problematic situation. Project management plans, executes and controls this process, and it is considered to be: "the dominant model in many organisations for strategy implementation, business transformation, continuous improvement and new product development" (Winter et al., 2006a:638). The result of a project, being its deliverable or deliverables, is the solution to transform or change the problematic situation into the desired situation. In order to be able to create the project deliverables, a project plan is

developed. A project plan is an action plan; a group of related actions that will produce the project deliverable(s) when collectively executed. In essence, a project plan provides direction and coordination for actions to be taken by individuals working towards project success.

Actions, executed by an individual with the aim of reaching success, which are based on the assumption that the actions will inevitably lead to the result (success), is what Habermas (1984) calls *instrumental action*. A project plan therefore is an instrumental action plan, which coordinates the actions by aiming at a pre-set goal (see paragraph 2.1.2). Project risk management, being a rational problem solving method (Koningsveld & Mertens, 1992; Kutsch & Hall, 2005), is *in itself* an example of instrumental action. It assumes one actor who bases his or her instrumental actions in an objective world on rational decisions that are the result of the project risk management process. Habermas (1984) calls this decision theory, a term that is also used often in project risk management handbooks and literature to describe risk management in general (see for instance Bernstein, 1996).

3.2.3.2 Social action: strategic action and communicative action

Instrumental action assumes that one actor controls the situation (other actors present are assumed to have no personal goals and therefore their behaviour is completely predictable). Instrumental action is “non-social”, meaning that there is no interaction between actors. In addition to instrumental action, Habermas describes two situations of social action; strategic action and communicative action. Social action assumes more than one actor in the process, each having their own motives. The behaviour of the other actors is no longer entirely predictable for a particular actor, because actors anticipate actions of other actors’ and respond to these actions. If an actors’ actions are coordinated by the intention to achieve this actor’s own goal (similar to instrumental action), the action is named *strategic action*. Habermas (1984) calls this game theory, where goal achievement by one or more actors may be realised at the expense of others.

Where the actions of the actors are coordinated through seeking consensus instead of pursuing their own individual goals, Habermas (1984) refers to this type of action as *communicative action*. Communicative action is the action of an individual actor to

create common understanding of the situation and seek collaboration with other actors. Language, Habermas refers in his work predominantly to spoken language, is the key element to reach understanding and consensus between actors. Communicative action can be applied to risks and the management of risk.

A risk, by definition, is not something that is real. “Risk is not the same as catastrophe, but the anticipation of the future catastrophe in the presence. As a result, risk leads a dubious, insidious, would-be, fictitious, allusive existence: it is existent *and* non-existent, present *and* absent, doubtful *and* real.” (Beck, 2009:3). Risk is not an absolute situation, it is something that may happen; something which an actor predicts may take place. The exact meaning of the risk must be agreed upon through discussion between actors. Actions can be taken after this discussion has concluded. This makes project risk management a process to control the physical environment of a project, it also makes it a process to create and influence relations with other project actors, to communicate and to influence equally their perceptions and behaviour.

3.2.4 Research question

This chapter addresses the following question: “Does project risk management contribute to IS/IT project success?” Literature considers project risk management as being instrumental action, based on rational problem solving. In addition, the effect of project risk management is considered to be instrumental action. As mentioned earlier, research (de Bakker et al., 2010) has demonstrated there is limited evidence that project risk management contributes to IS/IT project success. Literature (Bannerman, 2008; Besner & Hobbs, 2006; Voetsch et al., 2004) demonstrates that project managers selectively apply certain project risk management activities, because in their view, not all risk management activities are considered to be effective. Therefore, the research question for this chapter was rephrased as: “How do project stakeholders perceive the effects of project risk management on IS/IT project success?” Habermas’ concepts of *instrumental action* and *communicative action* work as theoretical lens to seek to understand the effects that may be found.

At this point, we do not deny the fact that *strategic action* may also play an important role within the context of project risk management and project success. Strategic action is a topic that requires more research attention, especially in relation to the contracts

that underpin the project. These contracts divide the project risks among various project stakeholders, creating different stakeholders' interests, which as a result also may influence stakeholders' behaviour. To avoid an excessively wide scope for this chapter, strategic action within the context of project risk management will be discussed in a separate paper (not included in this thesis). This chapter focuses only upon communicative action as the concept to better understand the effect of risk management on IT project success.

3.3 Research method

This research is exploratory in nature, as it seeks to define and understand relationships between risk management and project success as perceived by project stakeholders. The research approach is primarily inductive, as the research question is based on indications given in the literature regarding the use of project risk management (Besner & Hobbs, 2006), and the potential influence of project risk management on project success (Chapman & Ward, 1997; Rijsenbrij et al., 1993). Further, we are investigating contemporary events where there is no control over the environment. This makes case study the most suitable research strategy (Yin, 2003). Because of the exploratory character of the research and the research question aiming at investigating perceptions of various project stakeholders, interview is selected as the primary method of data collection.

Two ERP implementation projects, Project 1 (completed in October 2008) and Project 2 (completed in March 2009), provide the data for this study. Project 1 took place in a large, international operating company in the food industry headquartered in the Netherlands. Worldwide, the company operates from more than 100 locations, has over 17 000 people and net turnover close to US$5 billion. The ERP system was implemented in two geographic locations in four organisational units (two production units, a sales unit and a financial unit) within the sector Consumer Products. The system is used to support a number of different food production processes and various financial activities. The project duration was 13 months.

Project 2 took place in the public utility housing sector. With around 100 employees, this public housing organisation owns and maintains around 6500 rental properties.

Partly regulated and subsidised by central government, this organisation offers affordable housing for people with a low income. This project duration was 12 months. Both organisations decided to implement SAP, an ERP software solution, to support the organisations' primary processes. The cases Project 1 and Project 2 are literal replications (Yin, 2003).

For each project, three types of stakeholders are identified, a stakeholder being: "any group or individual who can affect or is affected by the achievement of the organisations' objectives" (Freeman, 1984). We identified and interviewed stakeholders representing the project viewpoint (P), the IT supplier viewpoint (S) and the customer viewpoint (C). All three are important stakeholder groups, as each will be affected by the project result and they are each in a position to influence the project result (Pinto, 2007). In terms of Mitchell and Agle (1997) they all possess: power, legitimacy and urgency. All identified stakeholders have personal views on project success and each has its own role in the risk management process. This confirms why it is important to collect information from each stakeholder individually.

Separate interviews were held with the project manager and representatives of the IT supplier and customer organisation in each of the projects. Additional information was collected from documentation produced by the project, e.g.: project plans, progress reports, documentation from the risk management process and project newsletters. All interviews were recorded and a complete transcription was created. Triangulation (Yin, 2003) was done by comparing the information from the interviews with the information that was collected from project documentation, and by comparing interview information provided by different stakeholders from the same project. Interviews varied in duration from 1 to 1.5 hours.

All interviews were conducted using the same interview script (see Appendix 3A). The use of the interview script contributes to both consistency and reliability of this study. The interview script contains a combination of open and closed questions, focusing on three elements: the project result, how risk management was done and whether risk management influences the project result. In case of an affirmative answer to the latter question, the open question was asked to capture how, according to the stakeholder,

risk management influences the success of the project. The format of an open question was chosen to avoid preconditioning of the stakeholders to whom questions were posed.

Information was collected between one to two months after the go-live of the new ERP system. This timing was chosen for various practical and theoretical reasons. Firstly, due to busy agendas during the go-live period, project stakeholders are permitting interviews only after that go-live was complete. Secondly, only after go-live can stakeholders provide initial opinions on the success of the project. Finally, in the period directly after go-live, projects often perform lessons learned sessions in which the project is evaluated. Interviews on the effects of risk management on project success conform well to this evaluation period. Stakeholders' experiences from the project are recent and therefore still "fresh", which contributes to the quality of the collected information. Where information is collected significantly after go-live, it is likely this information is influenced or tainted by memory recall bias.

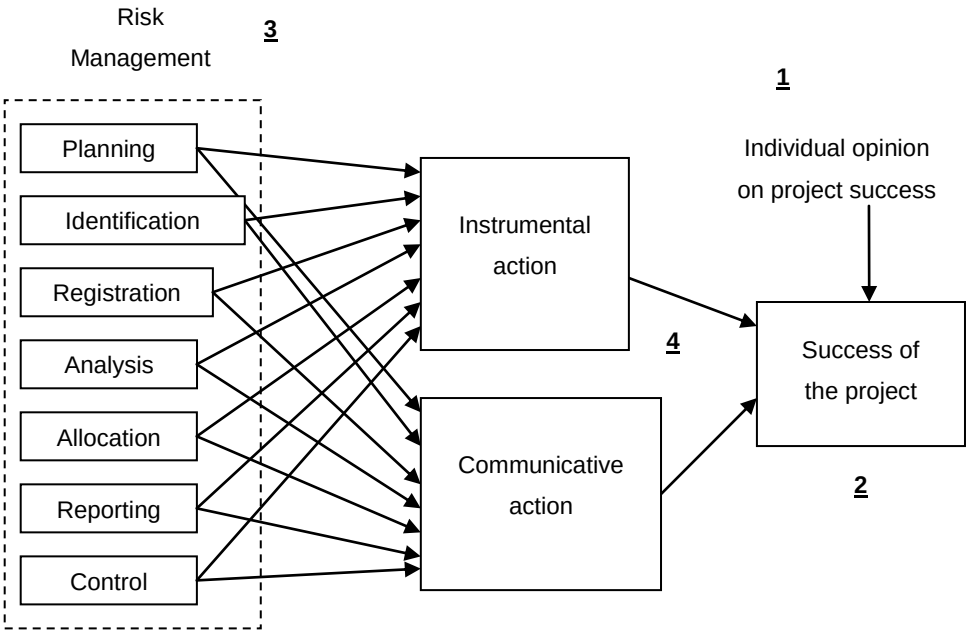


Figure 3.2: Broader view of risk management in the empirical research situation

In the first step of the interview (indicated by 1, figure 3.2), the project stakeholder is asked what determines project success for this stakeholder personally. We approached IS/IT project success, building on previously mentioned literature, as an opinion of a project stakeholder, which may include more items than timely delivery, delivery within budget limits and delivery according to requirements. In the second step (2, figure 3.2), the stakeholder is asked to evaluate the project result, and to elaborate on the result in relation to his personal success definition.

In the third step (3, figure 3.2) we present a list of seven risk management activities (Besner & Hobbs, 2006; Project Management Institute, 2008) and we ask each stakeholder which risk management practices (activities) were used, and if so, how they were used (Appendix 3B). In the fourth step (4, figure 3.2) we asked each stakeholder if the employed risk management practice contributed to the result of the project, and if so, how this practice contributed to the project result. The question how the practice contributed to the project result was an open question; the stakeholder had to answer without any additional information or guidance from the interviewer. The analysis of the interview data focuses upon the information given by the stakeholder to this question, because it may provide a better understanding of how risk management influences project success. The analysis is done by means of pattern matching (Yin, 2003).

3.4 Results

Below are the results from the interviews with project stakeholders from the two projects. P1 and P2 represent the project managers' view of Project 1 and Project 2, S1 and S2 represent the IT supplier view and C1 and C2 represent the customer view.

3.4.1 Project success

Stakeholders from these two projects generally share the same opinion on what is important in relation to project success. Stakeholders from both projects agree upon stakeholder satisfaction being the most important success criterion. A project is a success if all stakeholders are happy with the outcome of the project. This is followed by requirements (deliver what you have promised) and long term contribution of the project result for the organisation, both being important criteria for project success.

Project fun was generally considered the least important success criterion. The traditional success criteria of time and money score relatively poorly in these projects. The two projects studied were not time critical, nor had they any incentives in the contract for timely delivery. Both projects also had no incentives in their contracts in relation to delivery within budget. Time may be a more important success criterion in certain projects, for instance if the new ERP system replaces an old system for which the software licence is expiring on a specific date, or where contractual clauses are included to provide incentives for timely delivery. In such cases, timely delivery is much higher in the stakeholders' ranking of success criteria, as follows from preliminary results from other case studies.

Although individual opinions vary to some extent, all stakeholders considered their project successful. The reasons why stakeholders considered the project a success are broader than indicated by the project success criteria mentioned above. Furthermore, some stakeholders stated the success of their project "… depends on how you look at it." (C2). Table 3.2 presents an overview of the statements stakeholders gave in relation to the success of the project.

The stakeholder statements illustrate that project success is an individual and multidimensional evaluation of a situation, because project success may:

- relate to effects caused by the project, instead of project characteristics (P1);
- depend on the position of the stakeholder (S2);
- be related to the expectations of the stakeholder (C1, S1);
- depend on the position the stakeholder chooses to take (P2, C2).

These findings support the claims made by various authors, e.g. (Baccarini, 1999; Turner & Cochrane, 1993; Wateridge, 1998) that project success is not solely related to complying with pre-set levels of time and money and delivery according to specifications. For instance stakeholder satisfaction (P2) and future business opportunities (S2) also determine if individual stakeholders consider the project successful.

Stakeholder	Quotes on why the project was considered a success
Manager Project 1 (P1)	"The organisation resumed its original level of production just one week after the go-live of the new ERP system"
Manager Project 2 (P2)	"To my knowledge, the stakeholders are happy with what the project has achieved, so I consider it a big success. But if I include the fact we had to re-plan and recalculate the project, and that we used more time and money than we thought at the beginning, the project is not a big success. However, to me it is still a success."
IT Supplier Project 1 (S1)	"We had to work in a changing environment, a change of customer during the project, at a certain point we had 3 customers to report to, and we managed to deliver more or less on-time and on-budget. But the quality of the technical solution is not as good as it could be; we used quite a lot of shortcuts and workarounds, too many to my opinion".
IT Supplier Project 2 (S2)	"I say it is a success. The stakeholders are happy, and the customer has asked us to do the work in phase 2 of the project. And the first phase was not delivered on-time, nor on-budget. So, I'm happy, also because this (= working on phase 2) is good for our business and for our position in the market."
Customer Project 1 (C1)	"We did this in a little over a year, where normally this kind of project takes at least two years."
Customer Project 2 (C2)	"Well, it depends on how you look at it. The organisational change part, which was very difficult, was successful, and I'm very happy with that. But if you look at the quality of the delivered technical solution, you could consider the project a small failure."

Table 3.2: Quotes from stakeholders on project success

3.4.2 How was risk management used?

Both project managers tried to make the project as predictable as possible by using experiences from earlier projects, and applying them to their projects. This *evaluation approach* to project risk management (de Bakker et al., 2010) states that experiences from earlier projects are evaluated and fed back into new projects with the aim "not to make the same mistake twice". Ropponen and Lyytinen (1997) state 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. Therefore, application of previous experiences may have contributed positively to the success of these two projects.

In addition, various project risk management activities from the risk management process as described in the project management BoKs (Association for Project Management, 2006; Project Management Institute, 2008) were used in both projects, but its use and intensity varies per project. Detailed information on the use of the various risk management activities according to this *management approach* to risk management (de Bakker et al., 2010) can be found in Appendix 3B. Project 1 applied risk management by executing the complete sequence of risk management practices four times during the implementation phase of the project (the phase preceding go-live with a total duration of 14 weeks). Project 2 did not follow the sequence of risk management practices and executed risk management practices only ad-hoc and primarily during the phase of the project (re)start-up.

3.4.3 (How) did risk management contribute to project success?

Where stakeholders indicated during the interview that a certain risk management practice influenced the success of the project, the open question was asked how, in their opinion, the risk management practice influenced the success of the project. Table 3.3 presents an overview of the statements that interviewed stakeholders made about the relationship between the risk management practice that was used on the project and the influence on the success of that project.

Risk Management Practice	**Influence on project success (statement by stakeholder)**	**Statement made by:**
Risk management planning	- “By doing risk management planning, you inform project members you want to do risk management; you indicate risk management is important” - “A planning is a tool to communicate the actions you (= the PM) want to take”	Manager Project 1 (P1)

Risk Management Practice	**Influence on project success (statement by stakeholder)**	**Statement made by:**
Risk identification	- "I have used it more often like the way we used it here, and I use risk identification (in combination with analysis) to create awareness" - "Create a common view about the risk, and make it more objective" - "If you have a common view, you are better able to focus your energy on lowering the risks"	Manager Project 1 (P1)
	- "If you do this in a larger group, people become more aware of what is going on around them" - "As a result, people become more committed" - "Awareness and openness have given people direction" - "People believe their concerns are heard, which improves their involvement" - "You are able to share your concerns with others"	IT Supplier Project 1 (S1)
	- "We took some risky things out of the scope of the project and communicated that to everybody, so that expectations were clear"	Manager Project 2 (P2)
	- "The brainstorm sessions create the effect that people become aware of risks, and it initiates action"	Customer Project 2 (C2)
Risk registration	- "We did not write down all the risks in a register, but we wrote down what our plan was. And the plan was written, based on the risks we had identified. That helped a lot, because now it was clear for everybody what they could expect and what was expected from them"	Manager Project 2 (P2)
Risk analysis	- "Defining impact is important because then people realise the consequences and knowing the consequences triggers them in starting action"	Manager Project 1 (P1)

Risk Management Practice	**Influence on project success (statement by stakeholder)**	**Statement made by:**
	- "Results from analysis may create agreement and acceptance among project members. If analysis shows that something might go wrong, but impact is limited, all members might say: OK, let's accept it as it is. No big deal if it goes wrong" - "Results from analysis may direct actions from members, because actions are taken only on important risks (priority)"	IT Supplier Project 1 (S1)
	- "It was analysis including a direction for the solution. The project board and general management took decisions based on this information; this worked well"	Customer Project 2 (C2)
Risk allocation	- "This is effective if it is combined with analysis and control. It is hard to allocate a risk to somebody who is not part of the project organisation; he is not responsible for the risk; the project is. But if you show them by analysis what the impact is, they might start working. And monitoring and control makes sure you can ask somebody about the status"	Manager Project 1 (P1)
Risk reporting	- "risk reporting has been used to show the project board during the implementation, so risk could be seen diminishing throughout the project, not just before go-live" - "risk reporting is either used to establish trust, or to ask for decisions from the board in relation to time, cost, scope of the project, decisions based on the risks" - "these sessions also provides opportunity for reflection; during implementation you are so busy that now and then it is good to reflect on your actions and your position, and to determine what is really important" - "it is about creating a overall feeling that we are heading in the right direction" - "it is used to create commitment for collaborative resolution of one or more risks" - "it is to make people aware of the risk" - "it is to show you take the risk seriously, and you are working to resolve it"	Manager Project 1 (P1)

Risk Management Practice	**Influence on project success (statement by stakeholder)**	**Statement made by:**
Risk control	- "If somebody reported a problem, including a request for the management of the project to take action, it was clear to everybody this was a serious problem" - "The general management understood that something had to be done, that action was necessary. As a result, people were willing to take an extra step" - "The action was assigned to the person who was able to take the action" - "Because the action owner stated in the group he would take the action, he had a problem if there was no action taken; shame is an effective management instrument" - "Now you are able to manage individuals"	Manager Project 2 (P2)

Table 3.3: Examples of stakeholders' statements on the effect of risk management practices

3.5 Analysis and discussion

The results presented in table 3.3 demonstrate various statements about how, according to stakeholders, risk management practices influence project success. As mentioned we are using the concepts by Habermas (1984, 1987) as a theoretical lens, about risk management influencing project success through better collaboration and communication. In order to be able to match the statements with the preliminary indications by Chapman and Ward (1997) and Habermas (1984, 1987), we first bring back all stakeholder statements to the essential claim or claims they make. For instance, the statement by S1, in relation to risk identification: "If you do this in a larger group, people become more aware of what is going on around them" is transferred into: "create awareness". Statements containing two claims were split into two separate statements. For instance the statement on risk identification by C2: "The brainstorm sessions create the effect that people become aware of risks, and it initiates action" was split into: "create awareness" and "initiate action". A conditional statement on risk identification like e.g. P1: "If you have a common view, you are better able to focus your

energy on lowering the risks" was simplified: "IF common view THEN better focus energy". Following this, we group the claims based on if they refer to action (collaboration) or to perception (common understanding). See Appendix 3C for an overview of the list of effects.

A closer inspection of the list of effects demonstrates that we can group both the perception and the action statements into two subgroups. Some of the perception effects refer to influencing the individual perception of a stakeholder, e.g. "create positive feeling", where other effects refer to the synchronisation of stakeholder perceptions, e.g. "sharing concerns". Action effects can be divided in effects that prepare for action, e.g. "initiate action", where other effects refer to increasing the effectiveness of the action, e.g. "setting priorities". A drawing of the relations between risk management practices and project success through action and perception is presented in figure 3.3.

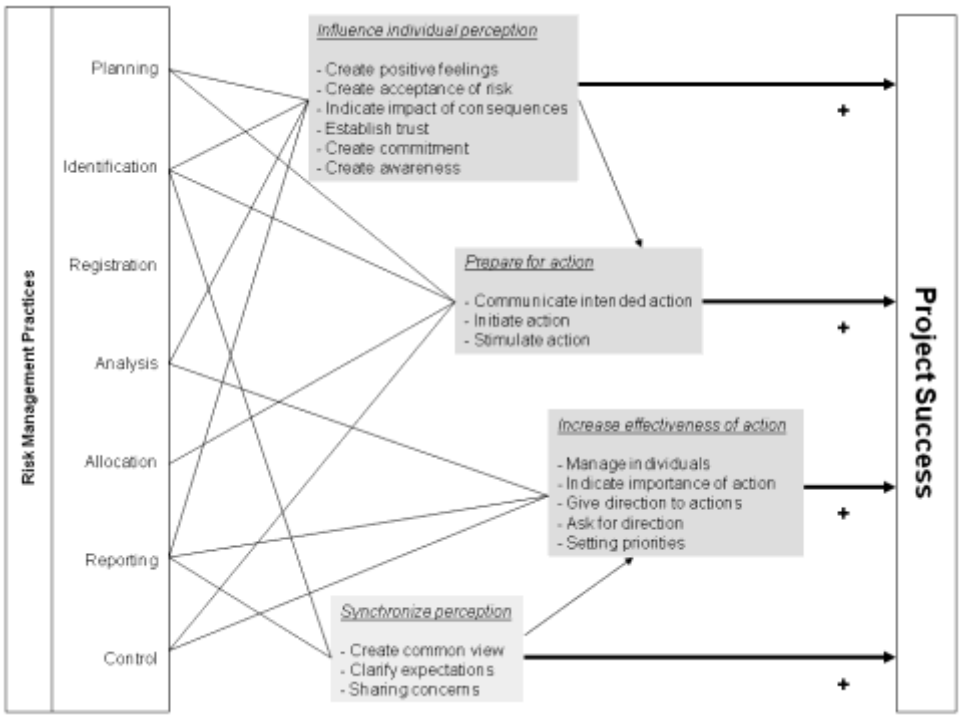


Figure 3.3: Relations between risk management practices and project success from Project 1 and Project 2

By traditional project management standards, neither of the two projects can be considered a success. For Project 1, the quality of the result is a serious issue, as is stated by S1 in the following way: "… the quality of the technical solution is not as good as it could be; we used quite a lot of shortcuts and workarounds, too many to my opinion". In terms of functionality provided by the new system, in some cases functionality regressed. For example, C1 explained that in the original state there was an EDI (Electronic Data Interchange) solution for the communication between the production sites and a transport company delivering the goods to customers. In the post project state people reintroduced the use of facsimile machines to communicate (C1: "… like we did 10 years ago …"), because SAP does not yet support the EDI solution. For Project 2, time, budget and the quality of the result all are serious issues.

In contrast with the remarks made above on the success of the projects, all stakeholders consider their projects successful. In addition, stakeholders indicate that various risk management activities that were performed did contribute to the success of their project. Stakeholders from the two projects indicated risk identification, risk analysis and risk allocation as being the most influential risk management activities. Risk identification primarily creates awareness and a common view among project stakeholders. Actions taken by stakeholders are considered to be more effective in this commonly defined environment. Risk analysis relates to taking action. For example: if the outcome of the risk analysis indicates that probability of occurring and impact of the risk are high, this information is used by the project manager to convey the message to the risk owner that proper and immediate action is required. To conclude, the risk management practice "risk allocation" creates a control instrument for the project manager, because a person is made responsible for a risk.

3.6 Conclusions

By investigating the effect of project risk management on IS/IT project success, it was concluded that project risk management is defined in the literature as being an instrumental action based on rational problem solving. Research has demonstrated that this instrumental action has a limited positive effect on success in IS/IT projects (de Bakker et al., 2010). Therefore, we propose extending the instrumental view on project

risk management through communicative action. Based on Habermas (1984, 1987), communicative action was defined as the action of an individual actor to create common understanding of the situation and collaboration with other actors. In order to get empirical corroboration of this theoretical broadening a case study approach was used. Stakeholders from two different ERP implementation projects were interviewed about the success of the project, the use of risk management in the project and the relationship between risk management and project success.

As a result of the case studies, the research question this research began with, namely: "How do project stakeholders perceive the effects of project risk management on IS/IT project success?" can now be described more precisely as: "How do project stakeholders perceive the effects of *individual* project risk management *activities* on IS/IT project success?" Project stakeholders are clearly able to mention effects from individual risk management activities, such as risk identification or risk allocation, on project success. Results suggest that risk management activities not only lead to action, but also have effects on risk perception. These changes in perceptions influence the relationship between risk management and project success. Risk management practices influence the perception of the individual stakeholder within the situation by creating positive feelings, creating acceptance of risks and through establishing trust. Risk management practices are also able to synchronise the perception of stakeholders. In the projects investigated, these changes in perception both lead to stakeholder action, i.e. they stimulate action, and they increase the effectiveness of actions.

Risk management practices e.g. risk control, risk allocation and risk analysis also contribute to the stimulation of actions and/or the effectiveness of actions. Adjusted stakeholder behaviour and adjusted stakeholder perceptions, both originating from project risk management activities in which the same stakeholders participated, may be able to synchronize stakeholders' actions and perceptions, making the situation more predictable, in effect leading to less uncertainty. Stakeholders indicate all of these effects contribute to the success of the project.

Limitations

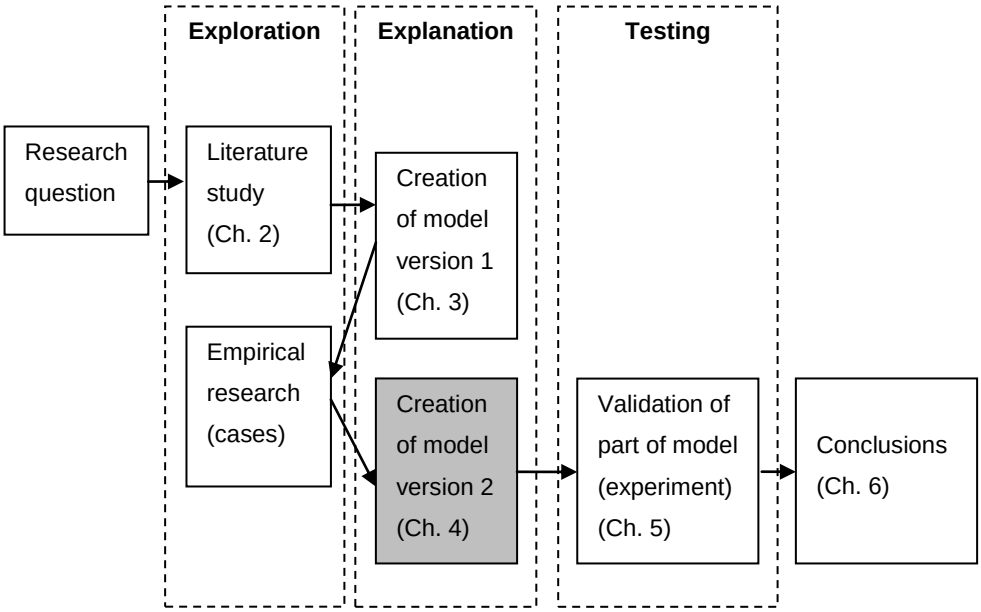
Evaluating the current status of this research, we identify the following actions that address the current limitations of the research and that will lead to further improvement. Firstly, there is currently a limited amount of research data that underpin the conclusions. Collection of data from additional case studies may be able to contribute to the stability and strength of the indicators presented in this research. Secondly; the collected research data represent the opinion of stakeholders, enhanced with information from project documentation. This means that the effect of risk management on project success is directly attributable to those effects as perceived by stakeholders. Given the case study research setting, the possibilities for "objective" validation of these perceptions are limited. Research in an experimental setting may provide additional support for the stakeholders' claim that risk management contributes to project success through influencing perceptions and actions of project stakeholders. Moreover, there is reason to presume that these effects are also apparent in non IS/IT project environments. Risk management activities influencing stakeholders' perceptions and actions could readily occur in other kinds of projects, e.g. in construction, in engineering and in product development.

Further research opportunities

Habermas' theory of communicative action appears to be a powerful theory to investigate effects of risk management practices on project success. In addition to the communicative effects that are mentioned in this chapter, attention should be given to strategic action in relation to risk management. Further, the theory creates opportunities for in-depth analysis of project communication. This in-depth analysis may include the analysis of communication between stakeholders during a risk identification session.

4 Theoretical model, phase 2, and results from case studies

This chapter is submitted for publication in *International Journal of Project Management*.



Position of this chapter in the overall research context

4.1 Introduction

According to project management theory (Pinto, 2007; Turner, 1993), project risk management has a positive effect on project success in terms of "on time, within budget delivery" of a pre-defined result. Project management handbooks and methodologies (Association for Project Management, 2006; Project Management Institute, 2008) therefore stress the importance of the use of risk management techniques, and provide project managers with guidelines on how to apply risk

management within their projects. However, despite the recommendation to employ risk management, there are indications in literature that risk management used in Information Systems/Information Technology (IS/IT) projects only occasionally contributes to project success; see de Bakker et al. (2010) for an overview. Nevertheless, project managers often choose to execute various risk management activities in their projects (Bannerman, 2008; Voetsch et al, 2004). These activities require time and cost money, therefore they consume part of valuable project resources. In order to improve the success of the project, these resources could be expended elsewhere, for instance to perform additional testing of the IS/IT system. Despite the indications in literature that risk management only occasionally contributes to project success, project managers decide to execute risk management activities. Is this because risk management, in their opinion, has a positive effect on the success of their projects?

The preliminary question to be answered in this chapter is: *Does risk management contribute to the success of IS/IT projects, and if so, how?* So far, the evidence answering this question in academic literature has proven inconclusive. There is the finding that project managers apply certain risk management activities in their projects. Conversely, current literature indicates that risk management only occasionally contributes to project success. In order to answer the question, this research takes a case study approach in which the use of risk management in various Enterprise Resource Planning (ERP) implementation projects is investigated. ERP implementation projects are chosen because they consist of deliberate adjustments to the IT system (hardware, software, technical infrastructure and data) in combination with substantial changes of business processes. These projects illustrate a considerable amount of risk (Akkermans & van Helden, 2002; Ehie & Madsen, 2005), which makes the subject of risk managements' impact on project success especially relevant. The primary sources of information for answering the research question are semi-structured, in-depth interviews with various project stakeholders, representing the project viewpoint, the IT supplier viewpoint or the customer viewpoint. This research investigates which particular risk management activities are executed, and determines if and why these activities, according to the stakeholder groups, contribute to the success of the ERP project.

This chapter makes the following contributions. Firstly, it demonstrates that according to project stakeholders, *individual* risk management activities are able to contribute to project success. This substantially changes the view on how both theory and practice consider the effects of risk management, and this may have implications upon the frequency and intensity of the use of risk management in projects. Secondly, this chapter provides insight in *how* risk management activities contribute to project success. This provides indications for adjustments to the guidelines for risk management as described in handbooks and methodologies for project management and project risk management, as well as the specific use of risk management in projects. And thirdly, based on this new perspective, this chapter provides new directions for further research into the mechanisms on how risk management contributes to project success.

The structure of the chapter is as follows. Firstly, the theoretical background for this chapter is discussed. Building on earlier work (de Bakker et al., 2011) in which an influence model for risk management on project success was developed by using concepts from the Theory of Communicative Action (Habermas, 1984) as a theoretical lens (Cicmil et al., 2009; Horner Reich & Yong Wee, 2006), this chapter takes a further step in the development of the influence model. The main focus of this step is on project stakeholders, during the execution of risk management activities, developing a common definition of the situation in which action takes place. After discussing the research methodology, results are presented from seven case studies. All case studies reflect recently completed ERP implementation projects in a variety of business sectors including food industry, government and the energy sector. Data from the case studies are used in an exploratory context, meaning that the data are used in order to find indications for the process of common situation definition. Based on the results from this research, the discussion and analysis section presents a summary of how various risk management activities influence the stakeholders' situation definition and consequently how this influences project success.

4.2 Theoretical background

4.2.1 Introduction

Project management, finding its origin in the positivist scientific tradition (Cicmil et al., 2006; Söderlund, 2004a; Williams, 2005), considers risk management, the effects of risk management on project success and project success itself all in an instrumental context. The instrumental context considers reality as objective and factual instead of opinionated, and assumes that reality behaves in a predictable way (Arbnor & Bjerke, 1997; Koningsveld & Mertens, 1992). Consequently, project success is an objectively measurable state, describing how well the project performed in relation to success indicators, time, budget and requirements, indicators that were set during the project planning process. In this instrumental context, project risk management is considered to be a rational problem solving process, in which actors are able to know and measure reality unambiguously (Del Caño & Pilar de la Cruz, 2002; Loch et al., 2006). Actors will demonstrate predictable behaviour during the execution of the risk management process, during the execution of the risk control measures and during execution of the project in general. As a result of this instrumental view, there is no reason to provide a dimension for actors having their own perception of the situation, a perception that may differ from the perception from other actors. Nor is there a reason to highlight the fact that actors may adjust their opinions and consequently their behaviours as a result from interaction with other actors.

Research on project risk management (Kutsch & Hall, 2005; Pender, 2001) and on project success (Agarwal & Rathod, 2006; Atkinson, 1999; de Wit, 1988; Turner & Cochrane, 1993) which demonstrates this instrumental approach, is unable to describe and explain certain characteristics of the risk management process and its dynamics in relation to the influence on project success. Building upon Chapman and Ward (1997) and Habermas (1984), de Bakker et al. (2011) proposed to extend this instrumental view on risk management with a communicative component. The authors state that, in addition to an instrumental effect, risk management is able to contribute to project success through communicative effects, see figure 4.1. Communicative effects occur as a result of interaction between project stakeholders during the execution of risk management activities, for instance during risk identification or risk analysis.

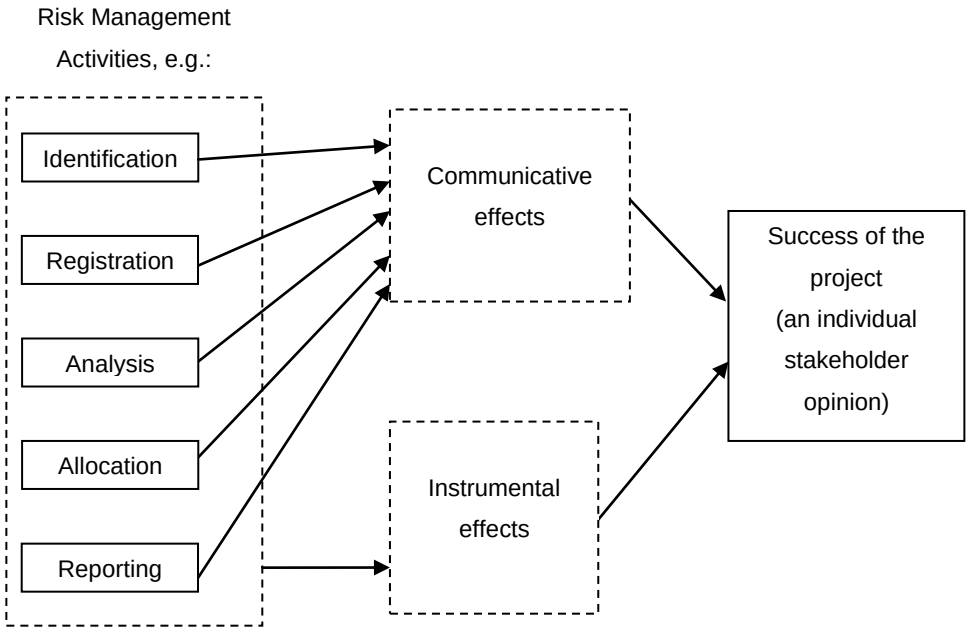


Figure 4.1: Adjusted model of the influence of risk management on project success

In order to create the context for the analysis of the results from seven case studies, the earlier proposed extension of the instrumental view is further developed in section 4.2.2 and 4.2.3 of this chapter with an in-depth description of the creation of communicative effects through communicative action. Particular emphasis is given to the creation of a common situation definition by project stakeholders. Building on the results from this extension, the preliminary research question is refined in section 4.2.4.

4.2.2 Investigating communicative action

In his book "The Theory of Communicative Action", Habermas (1984) begins by describing instrumental action as action by one actor, oriented to success: "The actor attains an end or brings about the occurrence of a desired state by choosing means that have promise of being successful in the given situation …" (Habermas, 1984:85). Success is considered to be: "… the appearance ... of a desired state, which can, in a given situation, be causally produced through goal-oriented action …" (Habermas,

1984: 285). Instrumental action is considered to be non-social, because there is no interaction between actors during the action.

Communicative action on the other hand is considered by Habermas to be social action, because there is more than one actor involved in the action: “In communicative action participants are not primarily oriented to their own individual successes; they pursue their individual goals under the condition that they can harmonize their plans of action on the basis of common situation definitions” (Habermas, 1984:286). Although these actors continue to perform instrumental actions, their actions are performed within a definition of the situation which the actors have collectively defined and agreed upon. This creation of the common situation definition takes place through verbal communication in terms of the objective world, the subjective world and the social world (Habermas, 1984:100); see below at the end of 4.2.3. The instrumental actions of the actors are coordinated by so called regulative speech acts (Habermas, 1984:309); verbal communication between actors in which they establish agreement, after which the actor or actors will execute the instrumental action. Execution of the instrumental action will occur if actors agree on the common definition of the situation and on the validity claims that are made by the regulative speech acts on facts (objective world), on roles and responsibilities (social world) and on actors’ desires and feelings (subjective world). Habermas (1984:75) refers to these claims respectively as propositional truth, normative rightness and subjective truthfulness.

4.2.3 Towards a communicative context for project risk management

Communicative action distinguishes itself from “pure” instrumental action through two additional elements; the common situation definition and regulative speech acts. The focus of this chapter is upon the creation of the common definition of the situation. This chapter does not address regulative speech acts in-depth, for two reasons. Firstly, because it would broaden the scope of this chapter substantially. Secondly, and perhaps more importantly; to investigate the regulative speech act would demand an in-depth analysis of the communication between project stakeholders during the execution of risk management activities. Such data can only be collected by observing and recording the communication of project stakeholders during the execution of risk management activities. The data for this chapter are collected in interviews with project stakeholders after project completion. These data are suitable for the analysis of the

creation of the common situation definition, but not for an in-depth analysis of speech acts. However, the investigation of regulative speech acts remains an important topic, certainly within the context of project risk management. For instance because a risk is a predictive expression by an actor of an event or situation that might happen (Association for Project Management, 2004), consequently a risk is something ambiguous (Beck, 2009) of which the propositional truth is hard to establish.

As a consequence of our decision to broaden the view on risk management with communicative action, we assume that actors of the risk management process try to reach consensus about the situation definition, in order to achieve their individual goals. NB: This attempt by actors to try to reach consensus is the coordination mechanism for communicative action (Habermas, 1984; Koningsveld & Mertens, 1992) and distinguishes communicative action from strategic action. In strategic action, actors pursue their own goals at the expense of other actors (Habermas, 1984; Koningsveld & Mertens, 1992). Although strategic action may play an important role within project risk management, this chapter focuses only upon communicative action in order to avoid an excessively wide scope for this chapter.

Actors define the common situation in terms of three “worlds”; the objective world, the subjective world and the social world (Habermas, 1984:100). The objective world is the world of objects and events (Koningsveld & Mertens, 1992). In order to enable effective instrumental action, the actors must agree on the objective world in which instrumental actions will take place. The subjective world is the world of desires and feelings of the actors. This world is personal, and only accessible by each individual actor. Through communication of each actor with other actors, the actors’ subjective world is revealed for the other actors, as a result of which actors may come to an agreement about the situation in which action takes place. Finally, actors must agree on the social world, the world of the interpersonal relations. The relationships between actors must be established in terms of expectations and obligations they have towards each other, in order to make instrumental action possible. Instrumental action, being the action in the real world in which actors try to transform the problematic state into the desired state (Habermas, 1984), will not occur as long as actors do not agree on the definition of the situation in terms of these three worlds.

4.2.4 Refining the research question

Building on the aforementioned results of research on risk management and project success and the relation between these two concepts (de Bakker et al., 2010), we can now refine the question: “Does risk management contribute to the success of IS/IT projects, and if so, how?” into a more precise research question. Building upon these results, in combination with theoretical developments from this chapter and from de Bakker et al. (2011), in which risk management is positioned in the context of the Theory of Communicative Action (Habermas, 1984), the research question for this chapter becomes: “How do project stakeholders perceive the communicative effects of individual project risk management activities on IS/IT project success?”

4.3 Research method

In this research, an initial assumption is made on the additional effect of risk management on project success, based on remarks by Chapman and Ward (1997). The initial assumption is that, in addition to instrumental effects, risk management is able to contribute to project success through communicative effects. The exploratory nature of the research is illustrated by the fact that the research is seeking evidence for relations between individual risk management practices (Besner & Hobbs, 2006) or activities and project success as perceived by project stakeholders. The research question is founded on indications both from theoretical insights and empirical indications; (Besner & Hobbs, 2006; Chapman & Ward, 1997) on the existence of communicative effects relating risk management activities to project success. The theoretical notions from The Theory of Communicative Action (Habermas, 1984) are employed in this research, as a theoretical lens through which the research results are interpreted in order to find answers to the questions of how and why individual risk management activities contribute to project success. Furthermore, this research investigates contemporary events where there is no control over the environment. This makes case study the most suitable research strategy (Yin, 2003). The interview is selected as the primary method of data collection, because the research question is aimed at investigating perceptions of various project stakeholders.

Case study data collection took place between one and two months after delivery of the project result. This timing was chosen for various practical and theoretical reasons. Firstly, due to busy agendas during the go-live period, project stakeholders permitted interviews only after the go-live was complete. Secondly, only after go-live can stakeholders provide initial opinions on the success of the project. Finally, in the period directly after go-live, projects often perform lessons learned sessions in which the project is evaluated. Interviews on the effects of risk management on project success conform well to this evaluation period. Stakeholders' experiences from the project are recent and therefore still "fresh", which contributes to the quality of the collected information. Where information is collected significantly after go-live, it is likely this information is influenced or tainted by memory recall bias.

Separate interviews were held with various stakeholders from projects, being the project manager, a representative of the IT supplier or a representative of the customer organisation. Additional information was collected from documentation produced by the project. Documentation gathered included project plans, progress reports, risk management process records and project newsletters. All interviews were recorded and a complete transcription was created. Triangulation (Yin, 2003) was performed by comparing the information from the interviews with information collected from project documentation, and by comparing interview information provided by different stakeholders from the same project. Interviews varied in duration from 1 to 1.5 hours. The use of an interview script (Emans, 2004), see Appendix 4A, which was used in all interviews, contributes to both the consistency and reliability of this study. The interview script contains a combination of open and closed questions, focusing on three elements: the project result, how risk management was done and whether risk management influences the project result. In case of an affirmative answer to the latter question, an open question was asked to capture how, according to the stakeholder, risk management influences the success of the project. The format of an open question was chosen to avoid preconditioning of the stakeholders to whom questions were posed.

The process of coding the research data was done in accordance with the analytical induction approach. Analytical induction consists of six steps that include (Boeije, 2005):

1. Define the phenomenon.
2. Develop a hypothetical explanation for the phenomenon.
3. Investigate a single situation to see if the facts fit with the explanation.
4. If there is no fit, adjust either the hypothesis or the definition of the phenomenon.
5. Investigate additional situations; adjust hypothesis or definition in case of no fit.
6. Repeat this cycle until exceptions are no longer found.

For this research it means that concepts emerge from the research data, while simultaneously elements of the concept of communicative action (Habermas, 1984) are used as structuring elements. These elements are employed as a theoretical lens through which the data are interpreted; they provide a hypothetical explanation for the phenomenon. The case study results do not aim at testing the theory, but they provide more insight in the relationship between risk management and perceived project success.

4.4 Results

4.4.1 Cases overview

Presented here is a table (table 4.1) with an overview of the seven ERP implementation projects in scope of this research, including their main characteristics.

Results from the seven cases will be presented in the following sections. Section 4.4.2 presents an overview of all seven cases upon the level of project success, and section 4.4.3 presents an overview of the use of the various risk management activities. Section 4.4.4 presents the results of three different indicators on if, and how, risk management activities in these seven cases have influenced project success.

Case	**1**	**Sector**	Food industry
Project description	SAP system implemented on two geographic locations in four organisational units. System used to support a number of different food production processes and financial activities.		
Duration	13 months		
Additional information	Use of method for organisational change, not for project management. Time & Material project contract. External project manager, hired by the customer, and not related to the IT supplier.		
Case	**2**	**Sector**	Government
Project description	SAP system implemented on 40 locations. System used for production, issuing and administration of personalized cards that provide access to office buildings. SAP linked on all 40 locations to peripheral equipment (photo equipment, specialized card printers)		
Duration	17 months		
Additional information	Internal project with internal project manager. Limited number of external personnel. No formal project contract. Limited Prince2 methodological approach, combined with organisation specific procedures and templates.		
Case	**3**	**Sector**	Government
Project description	SAP system implemented on four locations. System used for scheduling duty rosters of around 3000 employees. Time critical project because of expiring licences of previous scheduling system.		
Duration	24 months (including feasibility study), 21 months excl.		
Additional information	Internal project with internal project manager. Limited number of external personnel. No formal project contract. Limited Prince2 methodological approach, combined with organisation specific procedures and templates.		
Case	**4**	**Sector**	Energy
Project description	Creation from scratch of a new company, being part of a larger company. SAP designed and implemented to support all business processes of the new company. SAP system with high level of customization.		
Duration	9 months (for stage 1; time according to original plan, but with scope limited)		

Additional information	The ERP project was part of a much larger project. Fixed price, fixed time, fixed scope contract with financial incentives. Project manager from IT Supplier. Project restarted and re-scoped after failure of first attempt. Strict use of (internal) project management methodology, procedures and templates		
Case	**5**	**Sector**	Public utility (social housing)
Project description	ERP system based on Microsoft Dynamics Navision. Implemented to support various primary business processes, for instance: customer contact, contract administration, property maintenance		
Duration	12 months		
Additional information	Time and material contract. Project restart after failure of first attempt. Project manager from IT supplier organisation. Limited Prince2 methodological approach.		
Case	**6**	**Sector**	Public utility (social housing)
Project description	ERP system based on Microsoft Dynamics Navision. Implemented to support various primary business processes, for instance: customer contact, contract administration, property maintenance		
Duration	11 months		
Additional information	Time and material contract. External project manager, hired by the customer organisation and with no formal relation to the IT Supplier. No formal project management methodology used		
Case	**7**	**Sector**	Petro-chemical industry
Project description	Divestment project. Selling all activities of one specific country to a new owner. Existing ERP systems related to the sold activities carved out of the company wide ERP system (mainly SAP) and handed over to the new owner.		
Duration	14 months (ready for hand-over as planned)		
Additional information	The ERP project was part of a larger project. The ERP project budget was low (less than 5%) compared to the overall deal (approx. 400 million EUR). Internal project manager. Fixed time project, but delayed several times because of external factors. Internal project management guidelines and templates used		

Table 4.1: Overview of the seven projects

4.4.2 Objective and perceived success of case projects

Building on literature on project success (Agarwal & Rathod, 2006; Atkinson, 1999; de Wit, 1988), this chapter identifies projects being a success from a traditional standpoint, which means the on time, within budget delivery of a pre-defined result, and additionally, projects being a success from the standpoint of individual stakeholders. For an overview of the success scores of the various ERP project cases, see table 4.2.

	Project success Objective			Project success Stakeholders' grade (scale: 1 – 7)			
	Time	Budget	Quality	Project Manager	IT Supplier	Customer	Case average
Case 1	+/-	+/-	+/-	7	6	6	6.3
Case 2	+	?	+	6	6	6	6
Case 3	+	?	+	6	6	6	6
Case 4	-	-	-	4	4	NA	4
Case 5	-	-	-	5	6	3	4.7
Case 6	+	+	+	6	6	6	6
Case 7	+	+/-	+	7	6	NA	6.5

Legend: + = no issues, +/- = minor issues, - = serious issues, ? = unable to determine
NA = not available

Table 4.2: Objective and perceived project success per case

From a traditional project success standpoint (see table 4.2), only case 6 can be considered a success, because it delivered on time, within budget limits and according to specifications. For cases 2 and 3 the objective project success cannot be determined, because respondents indicated there were no clear budget limits set. The project plans of both projects contained estimates of the amount of hours needed to complete the project, but the customer of case 2 indicates that the project is not accountable for its budget, because project budgets are monitored and controlled centrally in the organisation. Cases 4 and 5 had serious issues regarding budget and

delivery according to specifications; both cases had a restart after an initial failure. Cases 1 and 7 had minor issues on one or more of the three traditional project success indicators.

From the standpoint of all stakeholders combined per case regarding the perceived success score on a scale of 1 ("a big failure") to 7 ("a big success"), all projects score on or above 6 (6 meaning: "a success"), except cases 4 and 5; see column 'case average' in table 4.2. There is little difference in the individual opinion per stakeholder per case regarding success, except for case 5. Cases 4 and 5, cases that score lowest on the objective success scale, also score lowest on the perceived success scale. In case 5, the customer (C) considers the project "a small failure" (score: 3), whereas the IT supplier scores it "a success" (score: 6). The IT supplier (S) motivates the success by saying that he is happy because the customer offered his company additional work, following the completion of the case study project. The customer in case 5 motivates the small failure by stating: "Well, it depends on how you look at it. The organisational change part, which was very difficult, was successful, and I'm very happy with that. But if you look at the quality of the delivered technical solution, you could consider the project a small failure."

4.4.3 Use of risk management activities

The case studies focused upon seven different risk management activities, namely: risk management planning, risk identification, risk registration, risk analysis, risk allocation, risk reporting and risk control; for a detailed description of the activities, see Appendix 4B. These activities are elements of the risk management process as described in handbooks for project management (Project Management Institute, 2008) and project risk management (Association for Project Management, 2004). During the data collection stage validation was sought to confirm if and how these risk management activities were used in a particular project.

Risk management planning was mentioned only in case 1 as a separate activity. In case 1, the risk management plan was a separate paragraph in the project plan. Cases 4 and 7 mention risk management planning as a subset of project management methodology and guidelines, but not as a separate activity. The guidelines prescribe how certain elements of the risk management process, for instance the risk log, should

be created or used. Other cases do not mention the use of risk management planning on their projects.

Risk identification was done on all seven investigated projects. There is a high variety in frequency and format of use of risk identification as well as stakeholder participation. The following table presents an overview; see table 4.3.

Case	Format	Frequency	Participants
1	Brainstorm sessions	4 times during implementation phase (13 weeks)	Project manager and team leads
2	1. Brainstorm sessions	Ad-hoc, linked to the creation of various plan documents (e.g. overall, design, test)	Project manager and team leads
	2. Informal discussions	Ad-hoc and during progress meetings	Project management team and in workgroups
3	Meeting	Once, during creation of the overall project plan	Key project members plus additional experts
4	Meetings		
	1. with project stream leads	Ad-hoc and on two-weekly basis	Project management with stream leads
	2. with risk board	Monthly (review)	Project management with internal experts
		Ad-hoc (audit)	Project management with external experts
	3. with customer	Ad-hoc on various occasions	Project management with customer
5	1. Brainstorm session	Once only at creation of the (new) project plan	Project management team
	2. Moderated sessions	Ad-hoc on various occasions	Team leads with members of project team and users

Case	Format	Frequency	Participants
6	1. Brainstorm session	Ad-hoc, 3 times, at the start of the project	Project board
	2. Meetings	Weekly, during progress meetings	Team leads with team members
7	1. Meetings	Ad-hoc, several times at the start of the project	Project management with external experts
	2. Meetings	Weekly, during progress meetings	Project management

Table 4.3: Risk identification in seven cases; format and frequency of use and stakeholder participation

Risk registration is executed through the use of spreadsheets, sometimes based on templates, or by registering the risks in project progress reports. The use of spreadsheets was mentioned in cases 1, 4 and 7. Case 2 and 5 mentioned registration of risks in progress reports. Cases 3 and 6 mentioned the use of action lists. Cases 2 and 5 indicated that information from the risk identification process was used in creating an updated version of the project plan.

Risk analysis was done in five of the seven projects. Although the project manager of case 4 stated: “The spreadsheet based on the template forces you to think about probability, urgency, cost of occurrence and cost of mitigation”, both the project manager and IT supplier indicated that quantitative analysis was not performed on the project. The IT supplier of case 4 stated: “Risk analysis is not a mathematical formulae. Probability times impact does not equal the mitigation budget. In general it is not money. Most responses mainly cost time, being management attention.” The other four cases that applied risk analysis also chose a qualitative approach. The project manager of case 7 states this: “All risks were quantified in terms of likelihood and impact, but nothing formal. Ranking and impact were done in terms of high-medium-low.”

Risk allocation was applied in six projects. In some situations, for instance in case 2, 3 and 6, risks were allocated to departments or teams involved in the project, subsequently allocated to individuals internally. The use of a risk registration template

forces projects to allocate the risks to an individual, team or department; because the template prescribes that every risk must have an owner. Case 3 allocated risks to tasks. The person responsible for the task automatically became responsible for the risk.

Risk reporting was executed by all investigated projects, although in a variety of ways. "Upstream" risk reporting is reporting from the project management team to the project board or steering committee. "Downstream" risk reporting is reporting to teams or workgroups within the project. The following table presents an overview of the various ways of risk reporting that took place in the various case projects; see table 4.4.

Case	**"Upstream"**	**Frequency**	**"Downstream"**	**Frequency**
1	Reporting was part of the progress report	Every 3 weeks	No downstream	NA
2	Reporting was part of the progress report; a separate risk paragraph	Monthly	In workgroups, for instance in technical meetings	Informally on ad-hoc basis
3	1 Reporting was part of the progress report 2 To project sponsor/ general management	Every 2 weeks Ad-hoc	Mostly on an individual basis, seldom in progress meetings	Informally, ad-hoc
4	1 To IT supplier management 2 To steering committee	Every month Ad-hoc for specific risk	With stream leads; part of regular progress meetings	Every 2 weeks
5	Limited, part of highlight report	Ad-hoc	No downstream	NA
6	Part of the regular highlight report	Every 3 weeks	1 With team leaders 2 In workgroups	Weekly Weekly
7	Explicit attention in progress report to steering committee	Every 2 weeks	With team leaders	Weekly

Table 4.4: Format and frequency of risk reporting per case

Risk control is mentioned in six cases. Case 4 is the only project that organised dedicated risk control meetings on a two-weekly basis, apart from progress meetings, in which risks were also discussed. Cases 1, 2, 5, 6 and 7 applied risk control only as part of their project progress meetings. In some situations related to case 2 and 7, risk control was also performed on an ad-hoc basis, or by interpersonal communication. The IT supplier from case 2 states: "We do this (risk control, *red*.) in combination with risk reporting during progress meetings and in reports. It is almost always linked to concrete issues or problems that have appeared, and we do not do it in a structured way". Project managers of cases 6 and 7 make similar remarks: "There is no specific risk control activity, as this is part of the general management and reporting cycle with all project workgroups and project board", and "Part of the weekly project progress meetings, and on an individual basis with team leads during the week".

4.4.4 Indicators for the influence of risk management activities on project success

This research uses three indicators in order to determine the effects of risk management activities on project success, namely:

1. The number of individual stakeholders indicating that a risk management activity that was used on the project in their view contributed to project success;
2. The number of statements from individual stakeholders in which they indicate how a risk management activity contributes to project success, and
3. The types of effects that stakeholders attributed to the use of a risk management activity.

The following sections discuss these three indicators in detail.

4.4.4.1 The number of stakeholders indicating an effect of an employed risk management activity

The following table, table 4.5, presents an overview of the effect of a risk management activity on project success in terms of how many stakeholders mentioned that an employed risk management activity had an effect on project success. The column "stakeholder score" indicates how many stakeholders during the interview mentioned a positive effect, related to the number of projects in which the activity was used. For

instance: risk analysis. Stakeholder group P (project managers) mentioned this activity was used in five projects, and a positive effect of this activity was mentioned by three project managers, hence 3-5 (or "3-out-of-5") in the table. The relative effect over all stakeholders is calculated by summing up scores per risk management activity, and then dividing the number of stakeholders that mentioned a positive effect by the total number of times a risk management activity was mentioned.

Risk Management Activity	**Stakeholder (score)**			**All (P+S+C)**	**Relative**	**Rank**
	P	**S**	**C**			
Planning	1-1	0-0	0-0	1-1	NC	NC
Identification	7-7	5-6	4-4	16-17	.94	1
Registration	5-6	1-5	1-2	7-13	.54	4
Analysis	3-5	1-4	1-2	5-11	.45	5
Allocation	6-6	3-6	2-2	11-14	.79	2
Reporting	5-7	2-5	2-4	9-16	.56	3
Control	2-6	1-5	1-2	4-13	.31	6

Legend: P = Project manager, S = Supplier (IT), C = Customer. NC = Not Calculated.

Table 4.5: Overall level of influence (max. 7 cases) of various risk management activities on project success based on answers from interviewed stakeholders

Based on the overall responses from all interviewed project stakeholders on the effects of risk management activities on project success it is concluded that risk identification and risk allocation are considered by stakeholders as contributing most often to project success with relative high relative scores (above .75). Other risk management activities contribute less often to project success, with medium relative scores (ranging between .25 and .75), except for risk management planning. This sample is considered too small to draw conclusions from and is therefore excluded from the results and analysis section.

4.4.4.2 The number of statements that relate to effects of a risk management activity

During the interview, individual stakeholders answered the following question from the interview script: “Can you elaborate on how the risk management activities have influenced the results of the project?” Statements given by stakeholders in relation to a particular risk management practice were recorded. Presented here are some examples of statements in relation to risk identification.

- “The fact you recognize the risk already influences how you act. It creates side-effects” (IT Supplier, case 4).
- “The brainstorm sessions create the effect that people become aware of risks, and it initiates action” (Customer, case 5).
- “It is my intention to give people insight in the situation and what may be ahead of them” (Project Manager, case 6).

From the interview transcripts, a total of 127 statements from stakeholders were identified in which they state how a certain risk management practice relates to project success. A breakdown of the statements is presented in table 4.6.

	Number of statements relating to success by:			
	All stakeholders	Project Manager	IT Supplier	Customer
Risk Management Activity:				
Risk Management Planning*	2	2	0	0
Risk Identification	48	20	17	11
Risk Registration	19	8	7	4
Risk Analysis	7	3	2	2
Risk Allocation	14	6	5	3
Risk Reporting	26	11	9	6
Risk Control	11	7	3	1
Total:	127	57	43	27

* = excluded from analysis because of limited sample size

Table 4.6: Number of statements on the relation between risk management activities and project success per stakeholder group in seven cases

The table indicates that all stakeholders from all seven cases express in total 48 statements in which they indicate how risk identification contributes to project success. This score puts risk identification on the first position in the ranking. Risk reporting with 26 statements scores on the second position, followed by risk registration, risk allocation, risk control and risk analysis. There is a high level of similarity between the rankings of the three individual stakeholder groups.

The 127 statements are composite statements, meaning that in some statements, stakeholders refer to more than one effect of a risk management activity on project success. For instance, the customer in case 5 states in relation to risk identification: "The brainstorm sessions create the effect that people become aware of risks, and it initiates action", indicating two effects in one statement, namely creation of awareness and initiation of action. Decomposition of all statements into single indications of risk management activities influencing project success led to a total of 177 indications. The 48 statements from various stakeholders about the influence of risk identification on project success led to a total of 70 indications. For the other risk management activities, the numbers are as follows: risk registration; 19 statements, leading to 26 indications. Risk analysis; 7 statements, 11 indications. Risk allocation; 14 statements, 19 indications. Risk reporting; 26 statements, 38 indications and finally risk control; 11 statements, 11 indications.

4.4.4.3 Types of effects that were mentioned by stakeholders

Following the decomposition of the statements into single indications, a process that can be labelled as open coding (Strauss & Corbin as cited in Boeije, 2005); the indications are grouped and subsequently placed in different categories. This process leads to the following seven categories on how risk management activities contribute to project success, namely:

1. the ability to trigger, initiate or stimulate action taking;
2. make actions that are being executed more effective;
3. the ability to influence the perception of an individual stakeholder;
4. the synchronisation various stakeholders' perceptions;
5. the expectations of stakeholders towards the final project result;
6. the expectations on stakeholder behaviour during project execution;

7. the process of building and maintaining a work and interpersonal relation between project stakeholders.

In the final step, elements from the concept of communicative action (Habermas, 1984), in particular the elements of instrumental action and creation of a common situation are used as structuring elements for the seven categories that were identified based on the empirical data. This leads to the identification of four effects of how risk management influences project success, namely Action, Perception, Expectation and Relation. The Action effect consists of the ability of risk management to trigger, initiate or stimulate action taking, or making actions more effective, and this relates to instrumental action; the acts that stakeholders perform in the real world. The Perception effect consists of the ability to influence the perception of an individual stakeholder and the ability to synchronize various stakeholders' perceptions. The Expectation effect consists of the expectations of stakeholders towards the final project result or on expectations of stakeholder behaviour during project execution. Finally, the Relation effect is the effect caused by the process of building and maintaining a work and interpersonal relation between project stakeholders. The Relation effect relates to the attempt of stakeholders to agree on the common situation in terms of the social or interpersonal world, one of the three worlds distinguished by Habermas (1984), where the Perception and Expectation effect relate to the two other worlds that Habermas distinguishes; the objective and subjective world.

As a result of structuring the elements, it is now possible to relate individual risk management activities to project success by labelling the effect of the risk management activity. Based on the coding process, each statement made by a stakeholder can be labelled A (Action), P (Perception), E (Expectation), R (Relation) or a combination of effects in case of multiple or composite statements. An overview of all categories of effects mentioned by various stakeholders in relation to risk management activities is presented in the following table: see table 4.7.

The ranking of effects, the last column in table 4.7, is based upon the number of times the effect is mentioned, in combination with the variety of effects mentioned. The ranking indicates that both risk identification and risk reporting are the activities that,

according to all stakeholder groups, generate a wide “spread” of effects. Other risk management activities either have a narrower spread, meaning that these activities do not generate all effects, or stakeholder groups to a lesser extent agree on the effects of the activity.

Risk management Activity:	**Stakeholder group indicating category of effect:**			**Overall rank**
	Project Manager (P)	*IT Supplier (S)*	*Customer (C)*	
Planning*	A, P	-	-	NC
Identification	A, P, E, R	A, P, E, R	A, P, R	1
Registration	A, E	P, R	A, P, R	3
Analysis	A, P	A, P, E	A, P	4
Allocation	A, P, E	A, E	A	5
Reporting	A, P, E, R	A, P, E, R	A, P, R	1
Control	A	A, E	E	6

* = excluded from analysis because of limited sample size

Table 4.7: Categories of effects of risk management activities on project success, per stakeholder group

4.5 Analysis and discussion

Results from the seven case studies demonstrate that individual risk management activities are able to contribute to project success. This is the general opinion among the various groups of project stakeholders, although the stakeholders in case 4 also mention that the complete risk management process has a positive effect on project success. In their view, all risk management activities are related, and they must all be executed in order to create an effect. However, stakeholders from case 4 also cite various effects of individual risk management activities on project success.

Stakeholders indicated that in their view, risk identification and risk allocation are most influential on project success. More than 75% of the stakeholders that referenced the use of risk identification and risk allocation on their projects stated that these activities contribute to project success, which is substantially higher than for the other risk

management activities, which score from 31% to 56%. The effect of risk management planning on project success could not be determined, because it was only used in one project. The project manager of case 1 indicated that in his opinion, risk management planning had a substantial positive effect on project success; “By doing risk management planning, you inform project members you want to do risk management; you indicate risk management is important ...” Cooke-Davies (2000) in his research also found a positive effect of risk management planning on project success. In addition, the statement made by the project manager of case 1 fits well within the context of the comments made by stakeholders regarding the influence of other risk management activities on project success; risk management planning influences the perception of other stakeholders and it stimulates them to take action.

Risk identification, together with risk reporting, is used in all the investigated projects, and therefore, it is the most used risk management activity. This conforms to earlier results found by Voetsch et al. (2004) and Bannerman (2008), who found that the use of risk identification in projects is widespread. Risk identification is used in various formats; brainstorm sessions, moderated sessions, and meetings either with project members or experts. Risk identification is not only the most utilised activity, it is also the activity to which stakeholders attribute the highest number of effects on project success. Stakeholders of the seven cases gave 70 indications of risk identification influencing project success, giving it a ratio of 10 indications per case. Risk reporting, which was also used in all projects, had 38 indications, giving it a ratio of 5.4. Other risk management activities scored a ratio ranging from 4.3 for risk registration to 1.8 for risk control.

The result from the coding of 177 indications on the relation between risk management activities and project success leads to the following four effects: Action, Perception, Expectation and Relation. By placing the four effects found in the context of communicative action (Habermas, 1984), the following perspective emerges on how risk management influences project success. Various risk management activities are able to create Action effects, meaning that stakeholders are stimulated to take action, or that actions taken by stakeholders become more effective because they become more synchronized. This relates to the concept of instrumental action as described by

Habermas (1984). The IT supplier in case 7 states in relation to the action effect of risk identification: "... people work better, they work on the same problem together...", and in relation to risk registration: "...if you know the risk, people are able to focus on what is important..." In relation to risk allocation, the IT supplier in case 1 mentions: "...It also gives opportunity for collaboration, because the discussion also involves: can you solve it, do you need any help from others?" Finally, the project manager in case 5 stated in relation to risk identification: "Finding the real risks and taking action to remove those risks really makes the difference."

Another element of communicative action is the creation of the common situation definition in terms of the objective world, the subjective world and the social world. According to Habermas, instrumental action will only take place effectively if stakeholders agree on the definition of the situation in terms of the three worlds. The various risk management activities contribute to the creation of the common situation definition, thus making instrumental action on the project possible. The identified Relation effect relates to the social or interpersonal world of the common situation definition. The identified effects of Perception and Expectation relate to the attempt of stakeholders to agree on the common situation in terms of the objective and the subjective world. Illustrative examples follow.

The fact that a risk is an expression of something that might happen and therefore something being not real (Beck, 2009; Habermas, 1984), drives importance of stakeholders agreeing upon what they together consider the objective world, because the risk must be defined and positioned in the objective world. By influencing other stakeholders' perceptions and expectations, risk management activities seek to create a common view of the risk in the context of the objective world. Various stakeholders refer to this activity, for instance: "What should happen is they should collectively understand and agree on the key risks" by the IT supplier of case 7, and "Risk identification takes care of getting focus; do we have the same idea about the urgency of the risk, are we on the same track?" by the project manager of case 4. In addition, perception and expectation effects of risk management activities influence the subjective world of stakeholders. The following statements illustrate this: "The steering committee needs information ... so they are able to take a decision ... they must know

what is expected from them ...” stated by the project manager of case 6, and: “We took some of the project risks and communicated them to everybody, so that expectations were clear.” stated by the project manager of case 5. Finally, the relation effect of risk management activities influences the social world of stakeholders, by creating and maintaining interpersonal relations, as can be demonstrated by the following statement on risk registration from the project manager of case 7: “It adds to trustworthiness, people believe you have the situation under control, ... we are trying to communicate to stakeholders we are working in a professional way.” Together, the effects from the risk management activities contribute to the creation of a common situation definition.

Based on the overall responses from all interviewed project stakeholders on the effects of risk management activities on project success it is concluded that *risk identification* and *risk reporting* are considered by stakeholders as the two risk management activities that have the widest “spread” of effects on project success. All stakeholders groups mention at least three effects of the execution of the risk management activity on project success, namely Action, Perception and Relation. In addition, project managers and IT suppliers mention the effect of Expectation as an effect of risk identification and risk reporting on project success. Customers hardly mention Expectation as an effect of risk management activities on project success, whereas the two other stakeholder groups do see risk identification, allocation and reporting as influencing project success through Expectation effects. The relatively passive role of customers in the context of a project, compared to the more active role of the other stakeholders may provide an explanation for this result. There is a higher need for project managers and IT suppliers to influence expectations of other stakeholders than there is a need for customers to do so.

In contrast with risk identification and risk reporting, risk control covers a narrow spectrum of Action and Expectation effects. The IT supplier in case 2 state this Expectation effect as follows: “By taking the risks seriously, discussing them with the customer, it contributes to stakeholder satisfaction”. Risk control is clearly the management of the situation as-is, in which there is hardly any room for managing perceptions. Apparently, the IT supplier feels that by showing to the customer that the risk is taken care of, it contributes to project success. The customer of case 2 makes

some interesting statements relating to this: “Well, although I do not like the idea, but it can be used as a cover up; if something goes wrong, the project can say; we did everything we could, but unfortunately it still went wrong.”, and “A cover up can be important, especially if you can claim damage with third parties.” This is clearly an indication that risk management activities are sometimes used in terms of strategic action (Habermas, 1984; Koningsveld & Mertens, 1992).

Risk management activities generally relate directly to action. This indicates that risk management activities are first and foremost considered to be management instruments. Stakeholders apply risk management activities because they want things to get done and they want to make sure that actions are executed and not forgotten. They want to be able feel in control of the situation, by making somebody responsible for the action. The project manager of case 5 states: “Because the action owner stated in the group he would take the action, he had a problem if there was no action taken; shame is an effective management instrument”. Furthermore, stakeholders want to make sure that actions are done in an effective way: aligned and synchronized, and being executed by the person who is in the best position to execute the action.

Finally we investigate the relation between the number of indications regarding how risk management activities influence project success, mentioned by the stakeholders of their project, with the success of that project. This relation is presented in figure 4.2. The X-axis of figure 4.2 presents project success on a scale of low-medium-high. Low success projects are projects that scored low on both objective and perceived project success. Intermediate success projects score high on either objective or perceived project success, and finally high success projects score high on both objective and perceived success. The final ranking of projects within the group of low success and medium success projects is based on the average stakeholders’ grade for project success. The Y-axis presents the number of positive indications that were mentioned by the stakeholders of the project. Plotting the data demonstrates there is a relation between the number of indications and project success, as two clusters appear. The first cluster in the lower left corner consists of three projects that are considered not, or only moderately successful. Stakeholders of these projects mention on average 14 indications for communicative effects of risk management activities on project success.

The second cluster consists of four projects that are considered moderately to highly successful. Stakeholders of these projects have a substantially higher number of indications of communicative effects, namely 34 indications on average.

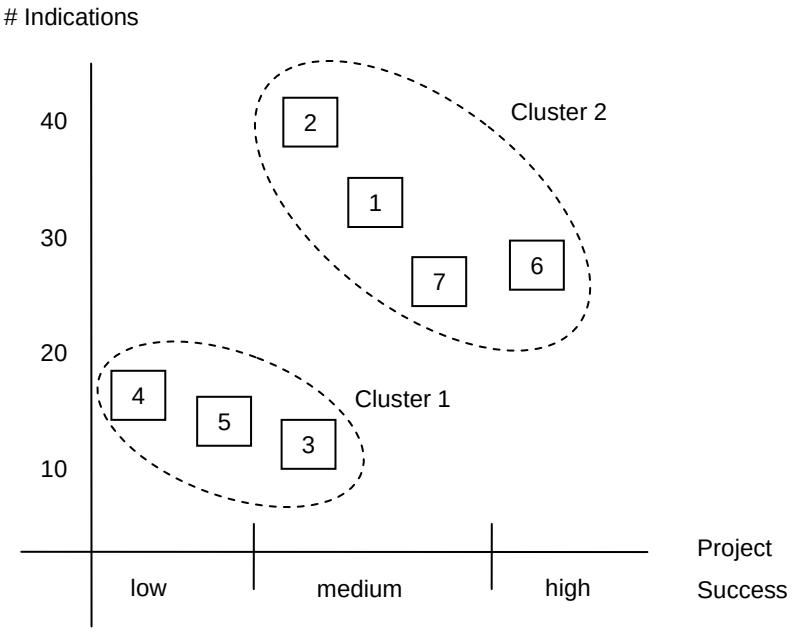


Figure 4.2: Relation per case between numbers of indications of effects and project success

In addition to the difference in the average number of indications between the two clusters, there is also a difference in the types of communicative effects that are present within the clusters. In all cases of cluster 2, the four effects Action, Perception, Expectation and Relation are present. In all cases of cluster 1, Action, Perception and Expectation effects are present, but the Relation effect is missing, meaning that none of the stakeholders from case 3, 4 and 5 mentioned any Relation effects resulting from risk management activities. This finding provides an indication that stakeholders of the cluster 1 projects have been unable to create a complete common situation definition; they created agreement regarding the objective and subjective world, but they did not

create agreement regarding the social world. As a result, their instrumental action was less effective than it would have been with a complete common situation definition.

4.6 Conclusions

This study investigated the potential influence of various risk management activities on project success in the context of ERP implementation projects. Three indicators were used in order to determine the influence, namely:

- The number of individual stakeholders indicating that a risk management activity that was used on the project in their view contributed to project success,
- The number of statements from individual stakeholders in which they indicate how a risk management activity contributes to project success, and
- The types of effects that stakeholders attribute to the use of a risk management activity.

Based on the scores on these indicators, this study concludes that according to project stakeholders, individual risk management activities contribute to the success of an ERP implementation project. Risk identification is, by all stakeholders, considered to be the most influential risk management activity of all, followed by risk reporting, risk registration and risk allocation, risk analysis, and finally risk control. Risk management planning was omitted from the reporting on results and the analysis because of the limited number of data points in the study.

Based on the findings of this study, the research question: “How do project stakeholders perceive the communicative effects of individual project risk management activities on IS/IT project success?” is answered as follows. Stakeholders attribute various effects to various risk management activities that are used in their projects. In their opinion, risk management activities contribute to project success through these effects. Stakeholders mention four different effects. Firstly; Action effects, meaning that risk management activities stimulate other stakeholders to take action, and make these actions more effective. Furthermore, stakeholders mention effects that contribute to the creation of a common situation definition. According to Habermas (1984), a common definition of the situation is a prerequisite for effective instrumental action. Stakeholders

mention effects of risk management activities that relate to the three other effects Perception, Expectation and Relation. Perception and Expectation effects relate to the attempt of stakeholders to agree on the common situation in terms of the objective world and the subjective world, and Relation effects relate to the social or interpersonal world. This research demonstrates that a common situation definition in which all three worlds are addressed by risk management activities, contributes to project success. Compared to successful projects, risk management activities in less successful projects do not generate Relation effects, as a result of which the common situation definition is not fully established.

Limitations

Evaluating the current status of this research, we identify the following limitations of the research; addressing these will lead to further improvement. Although there is currently a substantial amount of research data that underpin the conclusions, collection of data from additional case studies, in other business areas or other kinds of IS/IT projects, may be able to contribute further to the stability and strength of the indicators presented in this research. Secondly; the collected research data represents primarily the opinion of stakeholders, which means that the effect of risk management on project success is directly attributable to those effects as perceived by stakeholders. Given the research setting of this study, the possibilities for “objective” validation of these perceptions are limited. Research in an experimental setting may provide additional support for the stakeholders’ claim that risk management activities contribute to project success.

Practical implications

In order to create positive effects of risk management on project success, it is not necessary to execute the complete risk management process as described in the various Bodies of Knowledge of project management and project risk management. This study demonstrates that individual or isolated risk management activities are capable of contributing to project success. Within the group of risk management activities that are part of the project risk management process, the activities of risk identification and risk reporting contribute most to project success. Both activities influence the specific actions that people take in the context of the project, as well as the common view that people have on the project. Practitioners are therefore

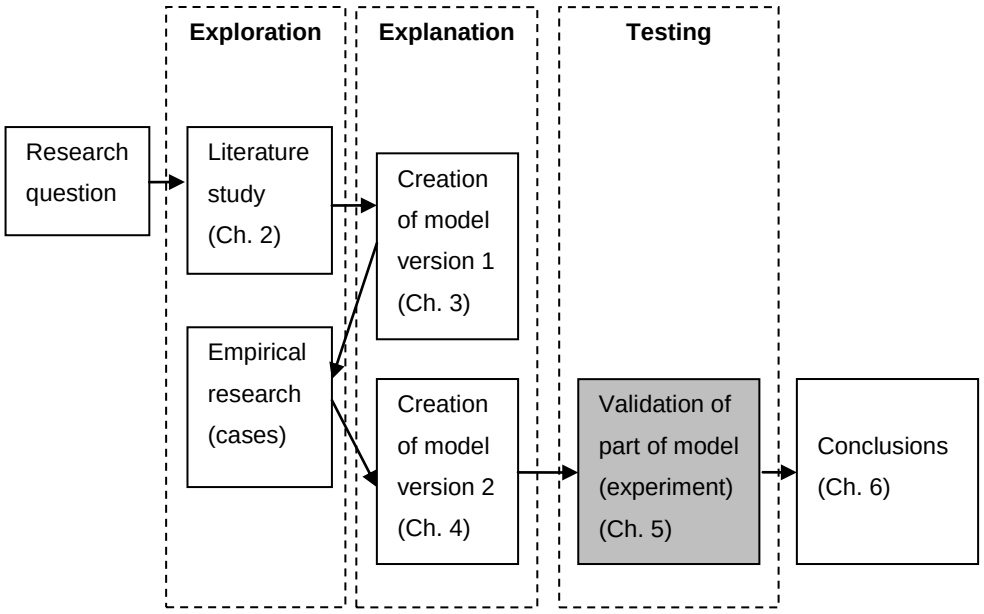
recommended to focus their attention in the first instance on risk identification, preferably in a setting that enables people to exchange information on risk, through a brainstorm setting, or on risk reporting when doing risk management on their projects. Other risk management activities, such as risk registration or risk analysis, may be necessary or helpful to support risk identification and risk reporting. In addition, these other risk management activities generate their own effects, which further contributes to project success.

Further research opportunities

Additional ERP implementation case studies and the opportunities to investigate the relations in an experimental setting are two directions for further research. Habermas' theory of communicative action appears to be a powerful theory to investigate effects of risk management activities on project success. The theory creates opportunities for in-depth analysis of project communication. This in-depth analysis may include the analysis of communication between stakeholders during a risk identification session. Furthermore, there is reason to presume that the effects found in this study are also apparent in non IS/IT project environments. Risk management activities influencing stakeholders' perceptions and actions could readily occur in projects in other sectors, e.g. in construction, in engineering and in product development. Replication studies in these sectors are advised. An investigation of the statement that the more the risk management process succeeds in addressing the three worlds of the common situation definition, the higher the success rate of the project, is also an interesting topic for further research. Finally, this research found some interesting indications that risk management, in particular risk identification in which experts participate, led to a negative effect on project success. New research could focus particularly on the question under which conditions and how risk management contributes to project failure.

5 Experiment on risk management

This chapter is submitted for publication in a special issue on project risk management in *International Journal of Project Organisation and Management*.



Position of this chapter in the overall research context

5.1 Introduction

Project managers use various instruments to execute, monitor and control their projects to assure that project outcomes are aligned with the project plan. Risk management is one of these instruments, referred to in the various project management Bodies of Knowledge or BoKs (Association for Project Management, 2006; Project Management Institute, 2008). Although these BoKs assume risk management is contributing to project success, published literature for this contribution is not convincing (de Bakker et al., 2010). Various sources, for instance Pender (2001), Flyvbjerg et al. (2003), and

Kutsch and Hall (2005) demonstrate that the assumptions on which risk management is founded are incorrect, in particular regarding the rational problem solving behaviour of people during execution of the risk management process. Conversely, literature demonstrates that specific risk management activities, for example the capture of risks in an activity called ´risk identification´, are used in projects regularly (Bannerman, 2008; Voetsch et al., 2004). According to project stakeholders, performing risk management activities contributes to the success of a project (de Bakker et al., 2011). Research by Cooke-Davies (2000) also provides indications that individual risk management activities positively influence project outcomes.

Consequently, the answer to the question: “Does risk management contribute to the success of a project?” is inconclusive. Despite the limited evidence pointing towards affirmation of the question, people working in projects deliberately choose to perform certain risk management activities. They choose to do so, because they share the belief that these risk management activities contribute to the success of a project. For instance, stakeholders indicate that the activity `risk identification`, when it is performed in a brainstorm setting, is able to create awareness and a common view among project stakeholders, which results in actions that are synchronized and therefore more effective (de Bakker et al., 2011). However, this evidence for a positive relationship between the execution of risk management activities and the project outcomes remains rather weak, primarily due to being solely based upon project stakeholder opinions. Furthermore, projects are chains of actions, consisting of numerous interactions between stakeholders over a longer period of time. It is therefore impossible to isolate and investigate the effects of one particular activity on project outcomes in the setting of a real project.

In order to overcome the limitations of earlier research on the relationship between risk management and project success and to further investigate the effect of a specific risk management activity on project success, an experiment was performed with 53 project groups of four members each. In this experiment, some project groups do not conduct any risk identification before executing their project. Other project groups identify the risks with the support of a risk identification prompt list (Association for Project Management, 2004). Within the contingent of project groups that perform risk

identification supported by a prompt list, project members of some groups discuss the risks with each other, while other project groups have no internal discussion about the risks. Project groups are measured based upon how they perform a set of tasks described in a project plan. Measured are the number of correctly performed tasks and the amount of time used for performing these tasks. In addition, the experiment measures the opinion from individual project members on project performance, by asking them to grade the performance of their own project.

The contributions of this study are threefold. Firstly, the experiment provides evidence for the statements from project stakeholders done in case studies that an individual risk management activity, risk identification, contributes to objective project success, which is measured in terms of correct and timely delivery of project tasks. Secondly, the experiment demonstrates, by capturing the grade project members assign to their project outcomes, that risk identification influences project success as perceived by project members. And finally, the experiment confirms that interaction through discussion between project members during risk identification has a positive impact on both the objective and the perceived success of the project.

Results from this study have various implications for both scientific and practitioner project management communities. The experiment provides evidence that a single risk management activity is able to influence project success, hence the execution of the complete risk management process is not necessary for the effect to occur. This may shorten the duration and limit the costs of the risk management process, which is important in the context of project management. Experimental results also indicate there is an effect in addition to the assumed effect of risk management that is based on rational problem solving. We refer to this additional effect of risk management as the `communicative effect`. This study provides evidence that interaction between project stakeholders during a risk management activity has a positive effect on the effectiveness of this activity. It could lead to recommendations on how to employ certain risk management activities during project execution, for instance a more extensive use of brainstorming and Delphi sessions (Linstone & Turoff, 2002) during risk identification.

5.2 Theoretical background

Project managers use risk management (Association for Project Management, 2004; Project Management Institute, 2008) as one of the instruments to execute, monitor and control their projects to assure that project outcomes are aligned with the project plan. Traditionally, the project management Bodies of Knowledge define risk management as being a rational problem solving process (Kutsch & Hall, 2005; Project Management Institute, 2008). It is assumed that the positive effects on project success are caused by executing the well known activities of the risk management process in a fixed sequence. The sequence of risk management comprises the following activities. First: the identification of risks, then analyzing and quantifying the risks, thereafter developing responses, followed by choosing and implementing the best response. Empirical findings (Flyvbjerg et al., 2003; Kutsch & Hall, 2005) indicate that the assumptions underpinning project risk management are in some cases incorrect. These findings contradict the assumed effects of risk management on project success (Pender, 2001). Others (Bannerman, 2008; Besner & Hobbs, 2006; Raz et al., 2002; Voetsch et al., 2004) investigated the various activities carried out within the risk management process, concluding that the fixed sequence of risk management activities is often not followed in projects. At the same time, their findings indicate that risk identification is one of the activities that is often executed during the project. Despite the limited evidence for a positive effect of risk management on project success, people working in projects deliberately choose to perform certain risk management activities. They choose to do so, because they share the belief that these risk management activities contribute to the success of a project (de Bakker et al., 2011).

Risk identification is a project activity in which, before the project is executed, participants generate a list of events and situations that may occur during project execution. This information provides the input for the remainder of the risk management process, where risks are analyzed and responses are developed and executed (Project Management Institute, 2008). The PMBoK (Project Management Institute, 2008) suggests various formats for risk identification, including filling out generic or specific questionnaires or checklists, using a “prompt list” in order to stimulate thinking during the identification process (Association for Project Management, 2004), interviewing experts, performing brainstorming sessions or a combination of these formats.

Brainstorming sessions are typically group discussions in which project stakeholders collect and exchange information on the project risks. Other suggested formats focus primarily on individual information gathering only.

According to Chapman and Ward (1997), project risk management positively influences project performance through the creation of a contingency plan or by influencing project time, budget or design plans. Better communication between stakeholders, better collaboration between stakeholders and more creative thinking are also mentioned by Chapman and Ward (1997) as being influenced by risk management and potentially influencing project performance in a positive way. Unfortunately, the rational problem solving approach of risk management does not address these kinds of effects, and there is no further elaboration of these effects in their book.

Risk management activities in general, and risk identification in particular, are activities in which interaction between human actors occurs frequently. In a risk identification brainstorm, various project stakeholders, sometimes only representing the project team, but in other situations also including representatives from the customer or the suppliers, exchange information on what they individually see as the potential dangers for the project. Such an exchange of information may lead to adjustments of the expectations of individual actors and the creation of mindfulness (Weick & Sutcliffe, 2007). Mindfulness includes awareness and attention; actors become sensitive to what is happening around them, and they know when and how to act in case of problems. A risk identification in the format of a brainstorm session may be able to make project stakeholders more aware of the situation around them, and more alert to respond effectively in case of problems. In case studies (de Bakker et al., 2011), project stakeholders spontaneously mentioned `creation of awareness` as one of the effects of risk identification that in their view contributes to project success.

An experiment provides the means to investigate the relationship between a single risk management activity and its effects on project outcomes in a controlled way (Cook & Campbell, 1976), creating new insights, in addition to the knowledge provided by earlier research which is predominantly based on case studies and surveys (de Bakker et al., 2010). The experiment reported here does not assume the complete process of risk

management has to be executed in order to influence project success. In contrast, the approach states that every risk management activity can individually contribute to project success (Cooke-Davies, 2000). Risk identification was chosen because it is often used in projects (Bannerman, 2008; Voetsch et al., 2004) and it is easy to plan in an experimental setting because of its position at the start of the project and the risk management process. Building on the concept of mindfulness (Weick & Sutcliffe, 2007), this research assumes that the effect of risk identification on project success occurs through influencing project stakeholders' perceptions and influencing the effectiveness of their actions.

Building on literature (Agarwal & Rathod, 2006; Baccarini, 1999; de Wit, 1988; Turner & Cochrane, 1993; Wateridge, 1998), project success is measured in two complementary ways. Factual or objective project success is measured in this experiment by measuring the traditional project success indicators of delivering the correct result and the timely delivery of the result. However, due to the subjective aspect that also defines project success, project success is also measured by asking individual project members for their opinions on the outcomes of their project. The research investigates if risk identification affects objective project success, perceived project success, or both. Risk identification is supported by a so called prompt list. A prompt list is a list of project and risk related topics, its purpose being: "… to stimulate lateral thinking and encourage a broad perspective to risk identification" (Association for Project Management, 2004:127). The prompt list is used by some project groups in the context of a brainstorm session as well as individually in some of the other project groups.

To summarize, the research question central to this chapter is: Does risk identification influence the outcomes of a project? This experiment tries to provide additional affirmative evidence for this question and focuses on three sub-questions. First: Does risk identification contribute to project success in terms of correct delivery and timely delivery? Second: Does risk identification contribute to project members' perceived project success? Third: Does communication between project members during risk identification contribute to correct and timely project delivery and to perceived project success? In order to determine the effect of communication during risk identification on project success, the experiment distinguishes between risk identification without group

discussion, in which project members individually identify project risks, and risk identification in which project members operate as a group to discuss risks during the risk identification activity.

5.3 Research method

5.3.1 Experimental setup

In this experiment, we define risk identification as being the independent variable, and we introduce two types of risk identification and control groups. “Type 1” groups are the control groups, because they do not perform any risk identification before project execution. “Type 2” groups perform risk identification by generation of information on an individual project member base. During this type of risk identification, the four members of the project group individually think about risks related to the project, without discussion or other formats of interaction with members of their project. “Type 3” groups perform risk identification by generation of information in combination with discussion between project members about project risks. A risk identification prompt list (Association for Project Management, 2004) supports the risk identification activity of type 2 and type 3 groups.

The experimental project consists of a set of tasks to be performed in groups. The tasks are exercises which lead to a solution that can either be right or wrong. The experiment used three types of exercises; (1) mental calculations, being arithmetical calculations that must be solved with no help from a calculator or pen and paper, (2) verbal logic puzzles and (3) simple, logic based combinatorial number-placement puzzles (Sudoku). We define and measure project success in this experiment, being the dependent variable, by measuring three project outcome characteristics:

1. The number of correct solutions provided by the project group, indicating the objectively measured delivered project quality.
2. The amount of time used by the project group, indicating the objectively measured time.
3. A grade for the project result, given by each project member individually, indicating the *individually perceived overall quality* of the project result.

Planned and actual project outcomes are measured in three moments in time, on which the following measuring takes place (see table 5.1):

When?		**Topic measured:**		**What is measured and how?**
t=1	Before Risk Identification	Q1	How many good solutions the project will deliver	Expression of an expectation of an individual project member
		T1	How much time is needed for solving all tasks	Expression of an expectation of an individual project member
		G1	A grade for the overall result, if the outcomes (Q1, T1) become true	Indicated by the individual project member
t=2	After Risk Identification	No measuring		
t=3	After Project Execution	Q3	The actual number of correct solutions	Check the number of correct solutions
		T3	The actual time used	Measure/check time used with a stopwatch
		G3	A grade for the overall result, given by the individual project member	Based on individual experience from project execution (actuals are unknown to project members)
		P3	Indicator if changes had been made to the original project plan	Project teams are asked if they have adjusted the project plan
t=4	After announcement of the actuals	G4	A grade for the overall result, given by the individual project member	Based on individual experience from project execution (actuals of their own project are known to project members)

Table 5.1: Measuring dependent variables on various moments during the experiment

Following the theoretical discussion in which is stated that the effect of risk identification on project success is caused by collecting and using information on project risk and, in addition, by communication between project group members about project risk, we define three hypotheses:

- H1: Project groups that identify risks before project execution will score better on the number of correct results than other project groups;
- H2: Project groups that identify risks before project execution will do their project faster than other project groups;
- H3: Individuals from project groups who identify risks before project execution will value their project result more highly than individuals in other groups.

Hypotheses H1 and H2 relate to objective project success, hypothesis H3 relates to perceived project success.

5.3.2 Execution of the experiment

5.3.2.1 Introduction

To simulate a project, a set of 20 exercises was developed. The set of 20 exercises mimics a group of tasks (Project Management Institute, 2008) or work packages (Office of Government Commerce, 2009) in a project. Presented in the following figure (figure 5.1) are the Work Breakdown Structure (Project Management Institute, 2008, p.118) and Precedence Diagram (Project Management Institute, 2008, p.139) of the simulated project as how the project was communicated towards the members of the project groups during the preparation of the groups.

All exercises were tested in pre-experiments, to make sure the level of complexity of the exercises matched with the capabilities of the experimental population. In this experiment, a project group consists of four randomly selected project members. All project members are business administration students from the faculty of Economics and Business, University of Groningen, the Netherlands. The initial project plan of all groups assigns five tasks to each project member. However, groups are instructed that they are allowed to deviate from the original project plan and create their own plan. In addition, examples are presented of the three types of tasks that can be expected in the project. During preparation of the project groups, all project members of all project

groups receive the same information about their tasks. The target given to all project groups is to complete the tasks correctly while using a minimum amount of time. All groups are informed that the amount of time for completing all the allotted tasks is limited to 20 minutes. In order to motivate the project groups and to stimulate competition between them, they are informed beforehand that the three best groups will win a prize of substantial value.

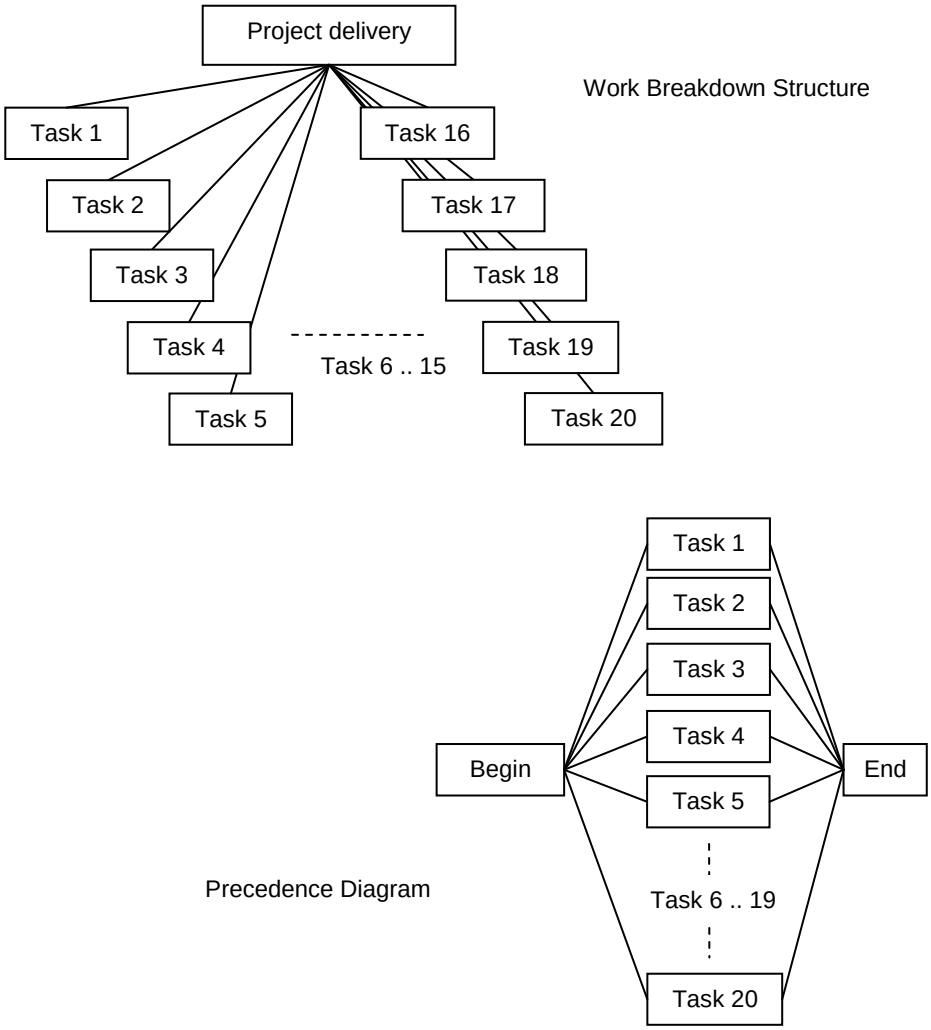


Figure 5.1: Work Breakdown Structure (WBS) and Precedence Diagram (PD) of the experimental project as communicated during preparation of the project groups

5.3.2.2 Deliberately introduced unexpected events during the project

All 20 tasks for the project group were similar to the examples that were presented during preparation of the project groups, with two types of exceptions:

- A dependency was created between some tasks, while the complexity of the individual tasks remained the same. In three tasks, the solution to the task was made dependent upon the solution of another task. For instance: the solution on task 7 was found by solving task 7 and adding the solution from task 18. The project plan had assigned task 7 and task 18 to two different project members. This dependency between tasks mimics interdependency between project tasks.
- Tasks 10 and 20, being two verbal logic puzzles, were substituted for tasks for which the solution could only be estimated or guessed. As a result, project members cannot be sure if the solution to the question is correct. This situation mimics the situation in a project when the team is unsure about the quality of the delivered product.

Project groups were not briefed beforehand on the introduction of these events. Because of the introduction of the unexpected events, the Work Breakdown Structure of the project remains the same, but the projects' Precedence Diagram changes in the following way: see figure 5.2. The precedence diagram does only show the influence of the introduction of interdependency between tasks; the influence of substituting of logic puzzles for another type of puzzles cannot be made visible in a precedence diagram.

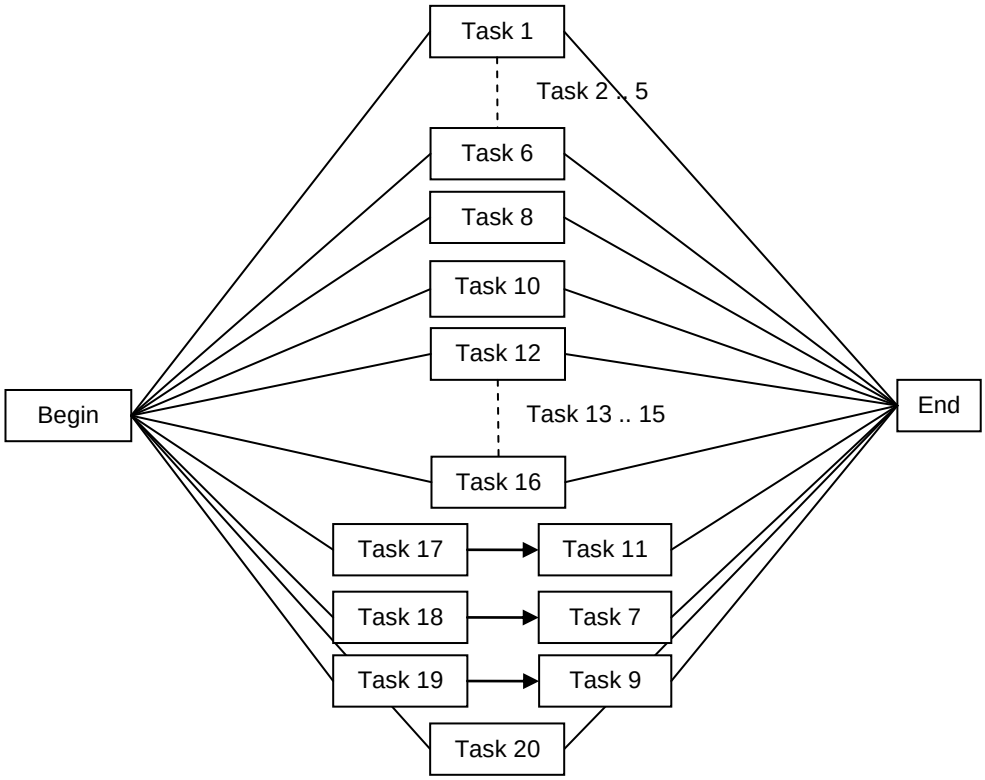


Figure 5.2: Precedence diagram of the project resulting from the introduction of unexpected events

5.3.2.3 Use of risk management as the independent variable

After formation and briefing of the project groups, groups are placed in one of three types. Project members within a type 3 project discuss risks before the actual project execution takes place. They interact and exchange information, their discussion is led by a risk identification prompt list. Project members of a type 2 project individually think about the project risks. The prompt list leads the individual process, but there is no interaction or exchange of information with other project team members. Type 1 projects do not identify risks; they start immediately with project execution. Project groups are unaware of the fact that different project types exist. See figure 5.3.

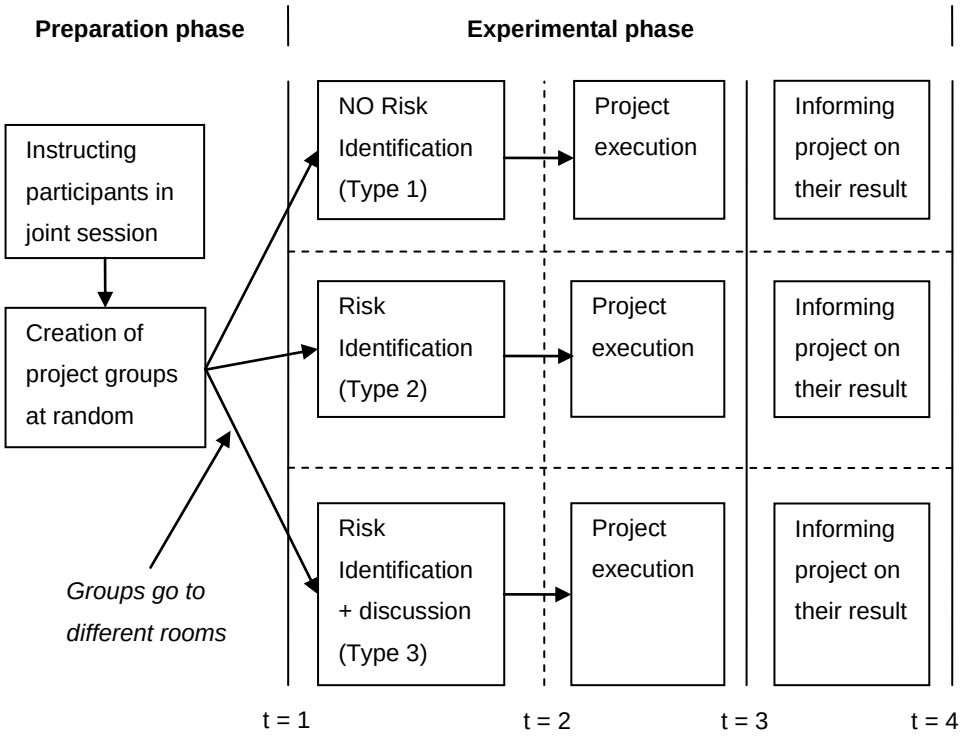


Figure 5.3: Setup of the experiment for 3 types of project execution

The risk identification prompt list, which is identical for type 2 and type 3 projects, contains five statements that relate to risks that may be present in the project. However, none of the risk topics mentioned in the prompt list are deliberately introduced in the project.

5.3.3 Limitations of the design

The experimental design is an approximation of the situation as it may occur at the start of a real project, and therefore it has its limitations. First, the duration of the complete project is limited to a maximum of 25 minutes, or 20 minutes for the control groups. Second, the project consists of 20 tasks, where in many real projects the number of tasks is larger and variety and complexity of the tasks varies significantly. The population consists of people who do not have experience with working in real projects.

The project groups are homogeneous and they do not have a person appointed formally as the project manager. During the experiment there is a single period where project members interact and discuss project risks, where in real projects there are more interaction moments. And finally, because the experiments were not all held concurrently, project groups have the opportunity to influence each other.

To overcome these limitations, measures were taken where possible, or checks were done to determine the severity of the limitations. To prevent groups from reporting results to others, groups were only informed about the number of correct results they had given, but the solution itself was not reported. Furthermore, group members were asked not to discuss the experiment with others. To stimulate competition between project groups, groups were informed before the experiment that the best groups would win a prize of substantial value. And finally, although the experimental group may not be used to working in real projects, they do have experience with working in groups, as this work format is regularly used during their education.

In order to determine the effects of risk identification on project success, it is necessary to create a rigid environment in which the effects of risk identification can be measured without the influence of disturbing factors. It is impossible to measure such effects in a real project, because of a variety of factors that may disturb the determination and measurement of the net effects of risk identification. A strict measuring of the effects can also be accomplished more successfully in an experimental setting than for instance in the setting of a project simulation or a project management game, where more attention can be given to longitudinal effects. It is obvious that the choice for an experiment sacrifices relevance for rigour, but rigour is necessary in order to be able to draw valid conclusions.

5.4 Results

5.4.1 Introduction

A total of 53 project groups participated in the experiment, indicating a total of 212 participants. 18 project groups did no risk identification (type 1), 18 project groups did an individual risk identification (type 2), and 17 project groups did risk identification plus

discussion (type 3) before project execution. The important experiment measurements of Q3 (number of correct results given by the project group), T3ts_remain (seconds remaining for the project group from the initial 20 minutes available), G3 (grade for the result, given by project group members directly after project execution) and G4 (grade for the result, given by project group members after informing them of their project result) demonstrated no normal distributions for the data, except for Q3 on type 1. Test statistics from the Kolmogorov-Smirnov normality tests are presented in Appendix 5A. Based on these results it was decided to analyze all experimental data by using non-parametric tests, using SPSS (Field, 2005).

5.4.2 Pre-checking the data

Pre-checking the data was done to assure that the effects found in the experiment are the effects of the stimulus only, the stimulus being risk identification (with or without discussion). To check if the populations of the types 1, 2 and 3 are similar at the start of the experiment (see table 5.1 and figure 5.3), we checked the values of Q1 (expected amount of correct results), T1 (expected amount of time that will be used) and G1 (grade if the expected values for Q1 and T1 are met) for each type. Although with n = 212 the Central Limit Theorem applies, which states that the distribution can be considered normal (Field, 2005), the scores for Q1, T1 and G1 demonstrate serious deviations from normal distributions as can be demonstrated in the Kolmogorov-Smirnov normality tests. See Appendix 5B. As a result of these distributions being non-normal, a Kruskal-Wallis test was done to determine the similarity of the distributions. Based on the H-values for each of the dependent variables Q1, T1 and G1 (see Appendix 5C), we conclude that the populations of the types 1, 2 and 3 are similar at the outset of the experiment.

5.4.3 Project group outcomes after project execution

5.4.3.1 Number of correct results

Our first indicator for project success is the number of correct results (Q3) produced by the project groups. Our prediction from theory is that groups that conduct risk identification before project execution perform better than groups that do not conduct risk identification. Performing a Mann-Whitney test for the influence of risk identification on the number of correct results (Q3), demonstrates a difference for Q3 between type 2

groups that did risk identification (Median = 20.4) and control groups (Median = 16.6), meaning that groups that conducted risk identification score better than the control groups, but this difference is not statistically significant, (*U= 127.50, r = .18, p > .05, $n_1 = n_2 = 18$*).

Communication during risk identification, meaning that group members discuss risks in their own project group before project execution, has a significant moderating effect on the relationship between risk identification and the number of correct results. A Mann-Whitney test for the influence of risk identification plus discussion demonstrates a difference for Q3 between type 3 groups that did risk identification and discussion (Median = 22.6) and control groups (Median = 13.7). This difference is highly significant, (*U = 75.00, r = .44, p < .01, $n_1 = 18$, $n_3 = 17$*). Project groups that conducted risk identification plus discussion scored on average 1.3 more correct results than the control groups who did not conduct risk identification.

5.4.3.2 Amount of time used for the project

The second indicator for project success is the amount of time used by the project group to answer all 20 assignments. For an easy interpretation of the results, for the analysis we do not use T3, being the amount of time used, but T3ts_remain, which stands for the number of seconds the project group has remaining after their decision to finish the project. The higher the value for T3ts_remain, the quicker the project finished, the more successful the project is. Our prediction from theory is that groups that conduct risk identification before project execution perform better than groups that do not conduct risk identification; T3ts_remain is higher for groups that conducted risk identification. Performing a Mann-Whitney test for the influence of risk identification on the number of seconds left after project execution (T3ts_remain), demonstrates a small difference for T3ts_remain between type 2 groups that did risk identification (Median = 20.6) and groups that did no risk identification (Median = 16.4), but this difference is not statistically significant (*U = 125.00, r = .23, p > .05, $n_1 = n_2 = 18$*).

Communication during risk identification, meaning group members discuss risks in their own project group, has no effect on the relationship between risk identification and the number of seconds left after project execution. A Mann-Whitney test for the influence of risk identification plus discussion, demonstrates no differences between these groups

(Median = 18.1) and control groups (Median = 17.9); ($U = 152.00$, $r = .07$, $p > .05$, $n_1 = 18$, $n_3 = 17$).

5.4.3.3 Grading the project by individual project members

When presenting the data for the grading of the project result by participants it is important to distinguish between G3 and G4. Project members individually grade the performance of their own project by giving it a grade between 1 and 10, with 1 being lowest and 10 being highest. When project members grade their own result, they have no knowledge about the results of other project groups or about the grades given by other project members. The grade G3 is given by project members directly after finishing the project, when project members are still unaware of the results of their own project. Grade G4 is given by project members after they have been informed about the results of their own project, being the number of correctly performed tasks (Q3) and the time used (T3). When project members grade their project at t=4 (G4), they have no information about the results of other projects.

The grades G3 and G4 are indicators for perceived project success. Our prediction from theory is that project members from groups that conduct risk identification before project execution give themselves a higher grade than project members from groups that do not perform risk identification. The results are presented in table 5.2:

Directly after project execution, before project members know the results of their project, the grade (G3) given by members who conducted risk identification plus discussion (type 3) is higher than the grade (G3) given by the other groups (type 2 and type 1). Although the difference is small, 7.2 being the average grade for type 3 versus 6.9 for type 1 and type 2, this difference is statistically significant, as is demonstrated in table 5.2. After informing the members about the result of their project, the average grades (G4) drop to an equal level for all types; 5.0 for type 1 and 2, and 5.1 for type 3.

		Grade difference Type 1 projects (no RI) and Type 2 projects (RI)	**Grade difference Type 1 project (no RI) and Type 3 projects (RI + comm.)**
t = 3	Project members not informed about their own project results (G3)	Not significant U= 2440.50, r = .05, p > .05, ($n_1 = n_2 = 72$)	Significant U = 2061.00, r= .14, p < .05, ($n_1 = 72$, $n_3 = 68$)
t = 4	Project members informed about their own project results (G4)	Not significant U= 2363.50, r = -.03, p > .05, ($n_1 = 68$, $n_2 = 72$)	Not significant U = 2168.50, r = .05, p > .05, ($n_1 = n_3 = 68$)

Table 5.2: Grade difference on t=3 and t =4 for project groups who did no risk identification (type 1), risk identification (type 2) and risk identification + communication (type 3)

5.4.4 Rejection or confirmation of the hypotheses

Table 5.3 presents an overview of the status of the hypotheses, following the results of the experiment:

Hypothesis:	Result:	Comment:
H1: Project groups that identify risks before project execution, will score better on the number of correct results than other project groups.	Partly confirmed	Only the situation in which project members identify *and discuss* the risks before project execution has a positive influence on the number of correct results.
H2: Project groups that identify risks before project execution will do their project faster than other project groups.	Rejected	This experiment demonstrates no relationship between risk identification and timely project delivery.
H3: Individuals from project groups who identify risks before project execution will value their project result more highly than individuals in other groups.	Partly confirmed	Only the situation in which project members identify *and discuss* the risks has a positive influence on the valuation of their own project result. This positive effect is only present in the situation when project members are unaware of their own actual project result (t = 3). There is no effect after project members have been informed on the results of their own project.

Table 5.3: Rejection or confirmation of research hypotheses

5.5 Discussion

A risk identification session in which a project group identifies *and discusses* the risks leads to two positive effects on project outcomes. In this experiment both the *objective* performance and the *perceived* performance are significantly better than in control groups, the most remarkable probably being the valuation of the project result by individual project members, indicated by the grade the project members give their own project result. In addition, the results of this experiment demonstrate that risk identification in which project members identify the risks with the help of a prompt list has a significant, positive influence on the number of correct results, only if the project members also discuss the risks during the risk identification session. For this effect to

occur, it is not necessary that the risk topics that are listed in the prompt list also occur during project execution, nor is it necessary to complete the full sequence of risk management activities, as is defined in the project management BoKs (Association for Project Management, 2006; Project Management Institute, 2008). Building on the results of this experiment we can therefore state that in order to manage the result, it is not necessary to measure the risks first.

These experimental findings concur with results from case studies by Cooke-Davies (2000), in which is stated that an individual risk management activity is able to contribute to project success. The findings also concur with research by Weick and Sutcliffe (2007) in which is stated that the creation of a general awareness for the risks by project members is important in order to be able for them to respond to the risks. The prompt list that is used by project groups during risk identification contains five risk topics that are realistic to the project. However, the chances of these risks occurring are either zero because they are controlled by the experiment (although the project group is unaware of this), or very low because the risks can be controlled by the project group itself. Despite this list with realistic but not occurring risk topics, the project group is able through general awareness to increase their quality with on average 1.3 more correct results.

The general awareness for risks is created through communication, and this communication between project members during risk identification plays an important role for the effect of risk identification on project success. This concurs with case studies (de Bakker et al., 2011), in which is concluded, based on Habermas (1984), that communication between individuals that work on a commonly defined and agreed upon goal, improves the effectiveness of the individuals' actions. Through communication, project members create a common definition of the situation (Habermas, 1984) in which they adjust and synchronize their actions. Risk identification then is not just a tool to collect factual information about risks on which decisions are founded; it is also a tool to influence project members' perceptions and behaviour. According to the experimental results, this so called communicative effect of risk identification enhances the strictly instrumental effect of risk management.

The experiment demonstrates no effect from risk identification on the time of delivery of the project. Although the instructions to project groups stated that prize winning projects are the projects who deliver a maximum number of correct results in a minimum amount of time, most of the project groups focused on delivering a maximum number of correct results only. This may be an example of Parkinson's Law: "Work expands so as to fill the time available for its completion." (Parkinson, 1958). It is also possible that homogeneous composed project groups as exist in this experiment, aim primarily at the delivery of maximum functionality and scope (Agarwal and Rathod, 2006). Risk identification sessions in which various stakeholder roles are represented may lead to different results, because additional success criteria may be introduced, as a result of which the project team will also focus on these additional criteria.

After project members have been informed about their own project result, all project members value their project result equally. There is no difference in grades assigned by project members from any of the groups. However, the result of project groups that conducted risk identification plus discussion is *objectively* better with on average 1.3 more correct fulfilled tasks. Apparently this better result is not reflected *in the opinion* of the project members who conducted risk identification plus discussion. The grade given by them demonstrates they are disappointed by the final result. Directly after project execution, before project groups are informed about their project result, project members who conducted risk identification plus discussion, are significantly more positive about their result than groups that conducted no risk identification or risk identification without communication. The experiment demonstrates that their opinion is correct, because project groups who conducted risk identification plus discussion deliver more correct results. However; when confronted with the concrete project result, the opinions of these groups change. This result concurs with the finding from the case studies (de Bakker et al., 2011) in which project stakeholders say they believe risk identification in which communication is included, contributes to project success. This belief is supported by the *objective* results from their project, but finally negatively influenced by their *perception* of the project result.

Where the experiment demonstrates that communication between project members during the risk identification session is crucial for the effect on the number of correct

results and on the valuation of the result by project members, the question arises regarding what was discussed during risk identification and how this discussion influenced the project performance. Did project groups for instance adjust their project plan as a result of the discussion during risk identification? The answer to this question is: no. The original project plan stated that every project member should answer the five assignments that were designated to him or her. During the preparation it was stated that project groups were free to make changes to the original project plan. To investigate if project groups did adjust their plans, the groups were asked at t = 3 if they had adjusted the plan; did all members answer the assignments that were originally given to them? 13 out of 53 groups (25%) confirmed they had adjusted the plan; only three groups who conducted risk identification plus discussion (type 3) stated that they had adjusted the plan, together with five groups each of the other two types (types 1 and 2). Furthermore, test results indicate that project groups that adjusted the project plan do not score better on the number of correct results. We can therefore conclude that adjustment of the planning has no influence on the results, and this supports the statement that risk identification plus communication is responsible for the better project result.

5.6 Conclusions and further research

In this study it is demonstrated that risk management does affect project success in a positive way. A specific risk management activity, namely a prompt list supported risk identification session, improves the results of the project team significantly. This effect only occurs if project members discuss the risks with each other during the risk identification session. Furthermore the study demonstrates that, based on their experience on how the project went, project members who communicate during risk identification agree that risk management contributes to the *perceived* project success. They grade their project result significantly better than the control group. However, when project members are informed of the actual result of their project, this difference in the positive feeling that exists between project members that conducted risk identification plus communication and the control group disappears completely. Apparently they are disappointed about the contribution of risk identification, although

their result is significantly better than the result of the control group who did no risk identification.

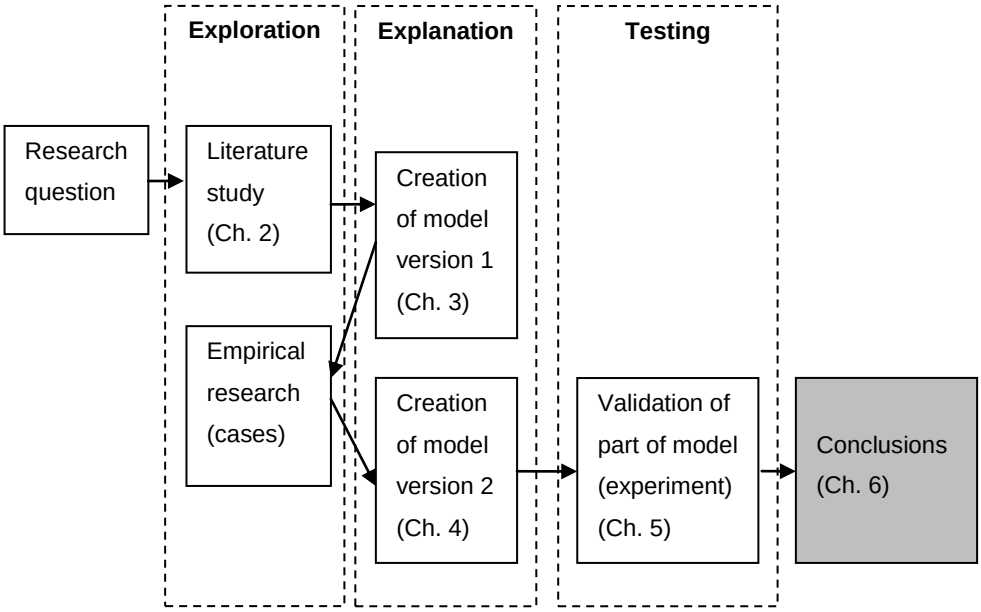
An experiment is a powerful instrument to investigate the relation between variables, because it enables the researcher to isolate the relation under investigation from various disturbing factors. Much of the literature on the relation between risk management and project success, even if this literature addresses topics like for instance “attention shaping” (Du et al., 2006; Lyytinen et al., 1998), assumes an effect of risk management on project success, but only rarely provides evidence for this relation. Neither in real world projects, nor in project simulations or management games is it possible to investigate this kind of relations, because it is impossible to isolate the net effect of risk management, and furthermore it is impossible to control for longitudinal effects. The experiment reported in this research does not resemble the real world of project risk management, but the results strongly support that the “communicative effect” as it was indicated by project stakeholders in case studies actually does exist.

The experiment has generated new questions and directions for further research. For instance, it would be interesting to know what is actually discussed by the project group during risk identification. Project members state they have not adjusted the project plan as a result of risk identification, but what are the topics that were discussed, and how does this influence project execution? Will the result be the same if project members are informed beforehand of the risks that will happen during project execution? What if project members do not identify risks during the session, but instead, for example, relate anecdotes about their greatest project success or failure? Answering these questions would imply the introduction and measuring of additional variables, followed by additional analysis. Although experiments are rarely used in project management research, they are powerful instruments to create additional insights, for instance on the relationship between risk management and project success, and a more frequent use is recommended by the authors.

Achieving better project results requires time investment. Groups that conducted risk identification spent more time on their project (5 minutes more) than the control groups.

During this period they had no possibilities to work on the assignments, despite having had time to discuss the project. According to the results, project groups did not adjust the project plan as a result of the risk identification more often than control groups. Risk identification plus discussion leads in this experimental setting to an increase of the number of correct results of 7%. If risk identification is “worth the investment” is something that has to be determined on a case to case basis by stakeholders responsible for the project. Project managers are advised, if they decide to conduct risk identification before the execution of their projects, to identify the risks in a format that allows project members to discuss project risks with each other, because it increases the effectiveness of the risk identification process.

6 General discussion and conclusions



Position of this chapter in the overall research context

6.1 Introduction

The question as to whether project risk management contributes to project success is, in the context of project management practitioners, essentially a question about the value of an instrument. This chapter, being the final chapter of this thesis, places the value question, with which the introduction of this thesis began, in a central position. Building on the results from this thesis, has it become possible to illustrate what is the value of project risk management in relation to project success? Or, alternatively stated: whether the results presented in this thesis provide insight to if and how project risk management contributes to project success?

In order to answer the question, this research was divided into four stages. The first stage being a study of recent literature on the relationship between risk management and Information Systems/Information Technology (IS/IT) project success. IS/IT projects, Enterprise Resource Planning (ERP) implementation projects were specifically chosen, because they are well known for their frequent failure (Akkermans & van Helden, 2002; Ehie & Madsen, 2005; Royal Academy of Engineering, 2004; The Standish Group, 1999), and because of the recommendation to use risk management more frequently in order to increase the success rate (Royal Academy of Engineering, 2004). The results from the study of recent literature are reported in chapter 2 of this thesis. For a complete overview of the relationship between research stages and thesis chapters, see figure 6.1.

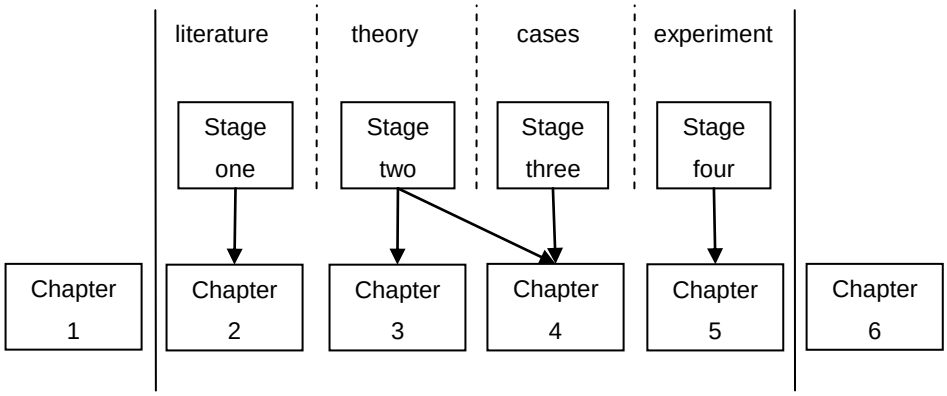


Figure 6.1: Relation between research stages and thesis chapters

From the literature study it appeared that in order to answer the question about the contribution of project risk management to IS/IT project success, an additional view on project risk management and project success is necessary. This additional view is developed in the second stage of the research, building on the results from the literature study, and establishing its basis in Habermas' Theory of Communicative Action (Habermas, 1984). A substantial part of the additional view on risk management is described in chapter 3 of this thesis. A further in-depth theoretical development of the additional view is described in chapter 4 of this thesis. Exploration of the additional view is done in the third stage, by means of case studies of ERP implementation projects.

The results from the case studies are also reported in chapter 4 of this thesis. Finally, in stage four, an experiment in which the influence of a single risk management activity on project success is investigated. This experiment builds on the results from the case studies. Results from the experiment are reported in chapter 5 of this thesis.

The structure of this final chapter embodies the stage approach previously described. The first section reports on the results and conclusions from the literature study, including a discussion about the assumptions found in literature on the contribution of risk management to project success. The second section presents a complete summary of the development of the additional view on how risk management may be able to contribute to project success. The reason this has been done, is that within the thesis, the development of the additional view is described in two different chapters (chapters 3 and 4). By presenting the additional view in one section, a compact and complete summary is created. Insights gained from the additional view, in combination with findings from the literature study, have led to adjustments in the main research question, and this adjusted research question is presented in the section immediately following the complete summary of the additional view. Empirical results are presented in the sections on the results from case studies and the experiment. Sections on implications for practitioners and presentation of theoretical implications, limitations and further research conclude this chapter.

6.2 Stage one: Literature study

Results from the literature study are reported in chapter 2 of this thesis. The literature study was guided by the following question:

1. *What conclusions can be derived from the literature regarding the relationship between the use of risk management and project success in IS/IT projects in general?*

The investigation of 29 journal papers, published between 1997 and 2009, reporting on the relationship between risk management and project success in IS/IT projects, demonstrates two main approaches on how risk management is defined in the literature. The first approach, the *evaluation* approach, considers risk management as an ex-post analysis activity, in which causes for the failure of IS/IT projects are

detected. The survey (Saunders et al, 2003) is the most frequently used research strategy, and evidence is generated primarily through statistical analysis. The literature assumes that the information from the statistical analysis is applied in future projects, but evidence for this use is not presented. The second approach is the *management* approach, which is an example of a rational problem solving process in which risks are identified, analysed, and responses are developed and implemented, based on the idea of choosing the best response option. The case study (Saunders et al., 2003) is, in this approach, the most frequently used research strategy. Evidence for the relationship between risk management and project success found in the papers is primarily anecdotal or not presented at all.

Empirical findings indicate that the assumptions underpinning the *management* approach to risk management are in certain cases incorrect. Firstly, IS/IT projects contain risks for which there is no classical or statistical probability distribution available. These risks cannot be managed by means of the risk management process (March & Shapira, 1987; Pender, 2001; Pich et al., 2002). Secondly, Kutsch and Hall (2005) show that project managers in IT projects show a tendency to deny the actual presence of risk; they avoid it, ignore it or delay their actions. This behaviour is not in line with the assumed rational behaviour of actors. Thirdly, Flyvbjerg et al. (2003) demonstrate that project stakeholders in general, at the start of the project, deliberately overestimate the benefits of the project and at the same time they underestimate the project risks. Project success will therefore become much harder to achieve in terms of time and budget requirements. Finally, various authors including Bannerman (2008), Besner and Hobbs (2006) and Voetsch et al. (2004), indicate that the complete sequence of risk management activities is often not followed in projects, consequently that the assumption of rational problem solving is incorrect.

Discussion

Not only is there little evidence from recent literature that risk management contributes to IT project success, empirical findings thus far indicate it is also unlikely that risk management is able to contribute to IT project success. Only under strict conditions is project risk management able to contribute to project success, meaning that risk management has a positive influence on the quality of the various project plans; the

project time plan, the project budget plan and the project requirements plan (Chapman & Ward, 1997). Taking into consideration the remarks made by various authors about the limitations of IT projects, risk management is able to contribute to IT project success if the project has clear and fixed requirements, uses a strict method of system development, and has historical and applicable data available, collected from previous projects. Although the combination of the three mentioned criteria will rarely be met in IS/IT projects, especially true of ERP implementation projects, which combine deliberate adjustments to the IT system (hardware, software, infrastructure and data) with substantial changes of business processes. There may be IS/IT projects in which these criteria are met, in these circumstances risk management may have a positive impact on project success. As an example we can consider the development of a software module of known functionality and function points (Parthasarathy, 2007), by a software development organisation, certified on CMM level 4 or 5 (Jalote, 2000). CMM level 4 or 5 requires from the software development organisation that it uses a strict system development method as well as the collection of data about previous project activities.

However, it remains remarkable that there is such a large gap between project risk management in theory and project risk management in practice. Project management Bodies of Knowledge (Association for Project Management, 2006; Project Management Institute, 2008) advocate the use of the complete risk management process, including identification, analysis and taking action. Findings from research (Bannerman, 2008; Raz et al., 2002; Voetsch et al, 2004) indicate that the complete risk management process is often not followed, or even that practitioners do not see the value of executing particular steps of the risk management process (Besner & Hobbs, 2006). In addition, it is remarkable that so many papers that investigate the relationship between project risk management and IS/IT project success claim that risk management contributes to project success, without presenting evidence for this claim. And finally, it is remarkable that both project management Bodies of Knowledge (Association for Project Management, 2006; Project Management Institute, 2008) and established current literature ignore the results from research which indicate the assumptions and mechanisms that underpin project risk management only work in specific situations, or do not work at all (Pender, 2001, Kutsch & Hall, 2005). Findings contained herein

should at least lead to a discussion about the validity of certain elements of the Bodies of Knowledge, and to the adjustment of the project risk management process, of which it is claimed it is founded on good practice (Project Management Institute, 2008) or even Best Practice (Office of Government Commerce, 2009).

6.3 Stage two: Development of an additional view to risk management

An important assumption in the current literature underpinning both project management and the way risk management influences the project and consequently project success, is the assumption that projects are taking place in a reality that is known, and that reality is responding according to the laws of nature the project stakeholders either know or may be able to know (Arbnor & Bjerke, 1997; Söderlund, 2004a; Williams, 2005). This so called instrumentalism assumption defines project risk management, its effects and the object on which project risk management works, i.e. the project, in instrumental terms. Figure 6.2 depicts the relation between risk management and the project in traditional terms, in other words under the assumption of instrumentalism.

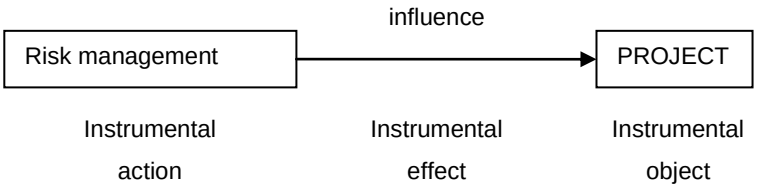


Figure 6.2:Traditional view on risk management and its relation to the project

If a project is considered to be an instrumental object, it implies that the behaviour of the project is essentially predictable. A project plan, made at the start of the project, is then considered to be an image, a prediction of the behaviour of the project in the future. Project success in terms of timely delivery within budget limits of agreed upon requirements, becomes equal to a post evaluation of how well the project planning process has been able to create a correct image of the behaviour of the project. Project

failure, defined as the difference between the estimated values in the project planning and the actual project results, is explained by stating that the planning was apparently not a correct image of reality. Traditional risk management contributes to project success, because it improves the project planning by adding information about events that happened in past projects, and that, because of the causal or probabilistic character of the events, will or may happen again in the future. By adding that information to the project planning, the project plan will more closely resemble the actual project behaviour.

Risk management may work well in situations in which the object of risk management can be described in terms of predictable behaviour (the instrumental context), for instance controlling an airplane or a nuclear power plant, or a piece of well defined software that must be created as part of an IS/IT project. Risk management is then an analytical process in which information is collected and analysed on events that may negatively influence the behaviour of the object of risk management. However, projects, and particularly IS/IT projects, generally consist of a combination of elements that contain both predictable and human behaviour; the latter of which is not always predictable. The presence of human behaviour makes a project a social object, an object which does not behave completely predictably.

Furthermore, human behaviour, together with human interaction, plays a role in the risk management process itself. During the various activities of the risk management process, participants in these activities interact with each other. Risk management can then no longer be considered instrumental action, but should be considered social action instead. These interactions between participants in the risk management process may be able to create effects in addition to the assumed instrumental effects of risk management. Figure 6.3 presents this adjusted view on the relationship between risk management and the project.

This adjusted view, which considers risk management as being social action working on a social object, instead of instrumental action working on an instrumental object, leads to various changes in model definitions and assumptions compared to the traditional view regarding project success, the execution of the risk management

process and the effects of risk management on project success. In addition to the broadening of the definition of project success in literature, Jugdev and Müller (2005) provide an overview, and Agarwal and Rathod (2006) a more IS/IT project specific discussion on project success. The adjusted view considers project success to be the result of a personal evaluation of project outcome characteristics by each stakeholder individually. Timely delivery, delivery within budget limits and delivery according to requirements, being the traditional objective project success criteria, may play an important role in this stakeholder evaluation process, but they are no longer the only outcomes that together determine if the project can be considered a success. Therefore, project success becomes opinionated project success, and is no longer considered as something that can be determined and measured only in objective terms.

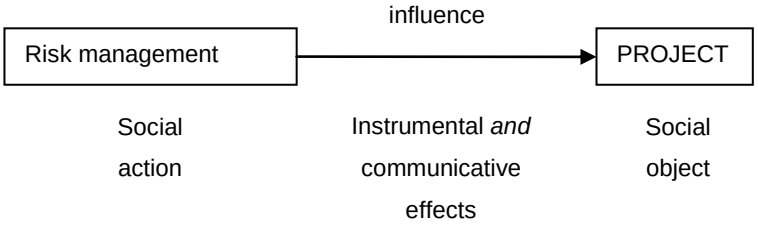


Figure 6.3: Adjusted (or new) view on risk management and its relation to the project

The adjusted view, considering risk management in terms of social action, implies that risk management is a process in which participants interact with each other. In addition to the traditional view, which considers risk management only in terms of instrumental action and instrumental effects, the additional view assumes that interaction between participants or social interaction exists, which may lead to additional effects on the project and its success. This research refers to these effects resulting from interaction as “communicative effects”, and the research assumes that each risk management activity individually may be able to generate communicative effects and may therefore individually contribute to project success.

The adjusted view, being a theoretical broadening of the instrumental view on risk management, builds on the results from the literature study, and finds its basis in

Habermas' Theory of Communicative Action (Habermas, 1984), in which Habermas distinguishes instrumental action from social action. Instrumental or non-social action is an action by an actor in a world that is behaving according to the laws of nature, and is therefore predictable. In this world, other actors are not present, or in cases where they are present, their behaviour is predictable. Social action on the other hand is defined by Habermas in terms of actors who act in a world where other actors are also present; these actors may have their own goals they want to achieve, and as a result their behaviour is not completely predictable. Social action is split by Habermas into two types of action; strategic action and communicative action. The difference between the types of social action is the coordination mechanism. In strategic action, all stakeholders try to achieve their own goals, if necessary at the expense of other stakeholders. In communicative action, stakeholders seek to reach consensus about the situation definition, in order to collectively achieve their individual goals.

In order to avoid an excessively wide scope, this research focuses only upon communicative action and communicative effects to explore if and how risk management influences project success. Strategic action, meaning that stakeholders during the execution of risk management activities use information with the aim of creating a relative advantage over other participants in the process (strategic use of information) is something that may and will occur. Even the decision regarding if and how risk management will be used in a project can be a strategic decision. This can be illustrated by comments made during introductory talks by the risk management practice leader of a large IT supplier who indicated that if the project is a fixed price or fixed date project, an extensive risk management process will be in place, but if the project is a so called T&M (time and material) contract, there will be no risk management process in place, unless the customer has explicitly asked for it. In other words; if the project contract determines that the consequences of project failure will be carried by the IT supplier, the IT supplier will make sure he manages the risks by implementing a risk management process. However, if the consequences of project failure are carried by the customer, a risk management process is only implemented if the customer explicitly requests such a process.

Both regulative speech acts and the definition of the common situation are elements that play an important role in Habermas' communicative action. Regulative speech acts are not within the scope of this research, although they may provide interesting additional insights in risk communication between project stakeholders. Habermas states that all communication between actors is accompanied by three validity claims, being propositional truth, normative rightness and subjective truthfulness. Instrumental action will only occur if actors agree on the three validity claims. In relation to risks and risk management, the propositional truth is particularly interesting. In a situation in which one actor expresses a risk, the actors' statement is an expression of something that the actor thinks will probably happen. Hence, a risk is an expression of a situation or event in the future, consequently the propositional truth of the expression cannot be established, because there is no relationship between the risk expressed and the present, being reality as experienced by actors (project stakeholders). Effective instrumental action, needed to manage a project and its risks, may be negatively influenced by the fact the propositional truth of a risk statement cannot be established. Historical data on risks, how often they occurred and how severe the consequences were are often used in risk management. In this context they may play an important role, because these historical data support the propositional truth of the expressed risk, by connecting the risk to past reality.

However, this research focuses on stakeholders executing risk management activities, and through that, creating a common definition of the situation in which they act. The common situation definition is a prerequisite for effective instrumental action; stakeholders must agree with each other on three elements of the situation before instrumental action will occur. They must agree together on the objective world, the subjective world and the interpersonal world. The objective world is the world of objects and events. In order to enable effective instrumental action, the actors must agree on the objective world in which instrumental actions will take place. The subjective world is the world of desires and feelings of the actors. This world is personal, and only accessible by the actor itself. Through communication of the actor with other actors, the actors' subjective world reveals itself to the other actors, as a result of which actors may come to an agreement about the situation in which action takes place. Finally, actors must agree on the social world, the world of the interpersonal relationships. The

relationships between actors must be established in terms of expectations and obligations they have towards each other, in order to make instrumental action possible.

Habermas' Theory of Communicative Action (1984) is utilised within this research as a so called theoretical lens (Cicmil et al., 2009; Horner Reich & Yong Wee, 2006). This means that the theoretical notions are used as a lens through which the research results are interpreted, in order to find answers to the questions of how and why individual risk management activities contribute to project success. The character of the research is exploratory, and the research does not have the intention to test the theoretical notions of Habermas' Theory of Communicative Action.

Discussion

Building consensus between project stakeholders as a result of a risk management activity, for instance risk identification, may be able to contribute to project success, because actions from stakeholders may become more effective when stakeholders agree on the common definition of the world in which their action takes place. Building consensus between project stakeholders is an effect of risk management which can only be noticed if risk management is considered in terms of social action. That is why for instance the book "The Failure of Risk Management" (Hubbard, 2009) does not recognize or appreciate building consensus as an effect of risk management; the book considers risk management only in terms of instrumental action, and in that view there is no room for interaction between stakeholders.

Generally speaking, this additional view on risk management creates an environment in which human behaviour and perception play central roles in terms of describing the effect of risk management and the final result, being the success of the project. The additional view acknowledges the influence of stakeholders interacting with each other, and influencing each other through communication. By doing so, this additional view, together with this research, positions itself outside of the strict instrumental or "traditional" project management approach that can be found in project management Bodies of Knowledge (Association of Project Management, 2006; Project Management Institute, 2008) or among practitioners in general. However, the additional view does

not deny the fact that risk management may influence project success in an instrumental way; it only states that in addition to the potential effect of risk management, there is a communicative effect. And given the limitations of the effectiveness of the instrumental effect, the influence of the communicative effect of risk management on project success may probably be larger than the influence of the instrumental effect.

6.4 Research question

This important theoretical broadening of the concept of the project, risk management and its influence on project success, has led to a further precision of the overall research question. The initial research question: “Does risk management contribute to IS/IT project success” was redefined into:

- *Does the use of project risk management practices affect the project success as perceived by stakeholders (project managers, IT service suppliers, and business owners) regarding ERP implementation projects, and if so, what are explanations for this relationship?*

A number of sub-questions were developed in order to provide guidance to answer the research question. To answer the sub-questions, and consequently the research question, the research strategies of case studies and an experiment were chosen. This multi-method approach (Brewer & Hunter, 2005; Mingers, 2001) in which two different research strategies are applied, contributes to the validity of the research results.

Discussion

The use of case studies and experiments as research strategies for investigating one particular phenomenon is not very common, although the combination of strategies has been used previously in research. For instance Bachrach et al. (2006) have investigated, in an experimental setting, the relationship between a specific type of helping behaviour by individuals and group performance, after investigating the same relationship in field studies. Bendoly and Swink (2007), Pennington and Tuttle (2007) and Bendoly et al. (2008) use experiments in the context of project management, software development or software risk assessment. However, none of these papers were published in project management research journals. It appears that experiments

are only rarely reported in project management research journals. For instance: a search of International Journal of Project Management with the word “experiment” in the title, abstract and keyword fields demonstrates that in the period 2000-2010 on a total of 989 papers there were only six papers published that use experiment as a research strategy. Because experiments are able to contribute to the knowledge of people dealing with uncertainty, decision making and communication (see for instance Ganzach et al., 2008; Jones & Roelofsma, 2000; McGuire & Kiesler, 1987; Sitkin & Weingart, 1995), elements that all play an important role in project management in general and project risk management in particular, a more intensive use of experiments in future project management research is recommended.

6.5 Stage three: Case studies

Chapter 4 of this thesis presents in-depth reports on the case studies that provide the information for the answers of the following sub-questions:

2. *When do stakeholders consider an ERP implementation project successful?*
3. *Which project risk management practices are applied in ERP implementation projects?*
4. *Is there, according to stakeholders, a relationship between the applied project risk management practices and perceived project success?*
5. *Are influences of project risk management practices on stakeholder communication and on stakeholder collaboration explanations for the effect on perceived project success?*

When do stakeholders consider an ERP implementation project successful?

Building on the literature (including Agarwal & Rathod, 2006; Baccarini, 1999; de Wit, 1988; Turner & Cochrane, 1993; Wateridge, 1998), this research considers project success an individual and multidimensional evaluation of a situation (opinionated project success) in which the traditional project success criteria of time, budget and requirements (objective project success) may or may not play an important role. The researcher interviewed 19 stakeholders from seven projects, leading to seven conclusions on objective project success and 19 conclusions on opinionated project success. Two projects score low on objective project success because of serious

issues with time, budget and requirements; both projects had a restart. Four projects score medium on objective project success, all having minor issues with one or more of the objective success criteria. One project scores high on objective project success. Variation on opinionated project success is low. Stakeholders from the two low objective success projects score lower on opinionated project success than stakeholders from the other five projects, but based on the objective success scores, the difference is less than expected. Overall, there seems to be a shift in success scores; low objective success projects score “medium” or “high” on opinionated project success, and medium objective success projects all score “high” on opinionated project success.

Which project risk management practices are applied in ERP implementation projects?
ERP implementation projects that participated in the research were selected based on the criterion that they had done “something” on risk management. The sample of projects therefore does not include projects that performed no risk management at all. Research findings from the seven case studies concur with earlier findings (e.g. Bannerman, 2008; Besner & Hobbs, 2006; Voetsch et al., 2004). Risk identification is conducted on all projects, in various formats including brainstorm sessions, moderated sessions and expert sessions. Risk analysis is carried out on five projects, but only in a rather basic way; none of the projects used techniques for quantitative risk analysis. Besner and Hobbs (2006) reported that project managers doubt the value of quantitative risk analysis techniques, and therefore they often decide not to use them at all. Other risk management activities for which the use was investigated in the projects are: the planning of the risk management process, the registration of risks, the allocation of risks to groups or individuals, the reporting of risks to stakeholders or stakeholder groups and the control of risks. With exception of risk management planning, which was used on only one project, most projects perform the risk management activities previously mentioned, although the formats vary.

Is there, according to stakeholders, a relationship between the applied project risk management practices and perceived project success?
In order to answer this question, the research data from the seven case studies were investigated by analysing the answers on the following three questions:

- The number of individual stakeholders indicating that a risk management activity that was used on the project in their view contributed to project success;
- The number of statements from individual stakeholders in which they indicate how a risk management activity contributes to project success, and
- The types of effects that stakeholders attributed to the use of a risk management activity.

The case studies' results demonstrate that, according to stakeholders, project risk management activities contribute to the perceived success of the project. Risk identification is, by all stakeholders, considered to be the risk management activity that contributes most to project success. All stakeholders indicating that risk identification is used on their project, state that risk identification contributes to project success. Furthermore, stakeholders provide a large number of indications on how risk identification, in their view, contributes to project success. For risk identification, this number is on average 10 indications per project. For risk reporting, ranked second, this number is on average 5.4 indications per project. Finally, risk identification is, by stakeholders, considered to be able to contribute to project success through a number of different effects; Action, Perception, Expectation and Relation effects.

Risk identification triggers, initiates or stimulates action taking or making actions more effective (Action effect). It influences the perception of an individual stakeholder and synchronizes various stakeholders' perceptions (Perception effect). It influences the expectations of stakeholders towards the final project result or the expectations on stakeholder behaviour during project execution (Expectation effect). Finally, it contributes to the process of building and maintaining a work and interpersonal relationship between project stakeholders (Relation effect). Risk reporting is another risk management activity that influences project success through these four effects. All other risk management activities generate less than the four effects mentioned. The Action effect found in the research, relates to the concept of instrumental action as described by Habermas (1984). By executing risk management activities, stakeholders are triggered or stimulated to take action. The Perception, Expectation and Relation effect that result from risk management activities, relate to the common situation

definition, which is an element of communicative action. According to Habermas (1984), a common definition of the situation is a prerequisite for effective instrumental action. Perception and Expectation effects relate to the attempt of stakeholders to agree on the common situation in terms of the objective world and the subjective world. Relation effects denote the social or interpersonal world. By building a common situation definition through risk management, stakeholders create a shared reality in which their instrumental actions are more effective.

Are influences of project risk management practices on stakeholder communication and on stakeholder collaboration explanations for the effect on perceived project success?
In order to answer this question, it is necessary to focus upon a particular part of the analysis of the case study data. These data are presented in the following figure which is discussed in detail in chapter 4 of this thesis (figure 6.4).

The first cluster in the lower left corner consists of three projects that are considered unsuccessful, or only moderately successful. Stakeholders of these projects mention on average 14 indications for communicative effects of risk management activities on project success. The second cluster consists of four projects that are considered moderately to highly successful. Stakeholders of these projects have a substantially higher number of indications of communicative effects, namely 34 indications on average. In addition there is a difference in the types of communicative effects that are present within the clusters. In all cases of cluster 2, the four effects Action, Perception, Expectation and Relation are present. In all cases of cluster 1, the Relation effect is missing. This finding provides an indication that stakeholders of the cluster 1 projects have been unable to create a complete common situation definition; they focused upon creating agreement regarding the objective and subjective world, but they did not focus on creating agreement regarding the social world. As a result, their instrumental action seems less effective than it would have been with a complete common situation definition. The research finding also provides an indication that risk management activities are able to influence project success through communicative effects, leading to more effective instrumental action.

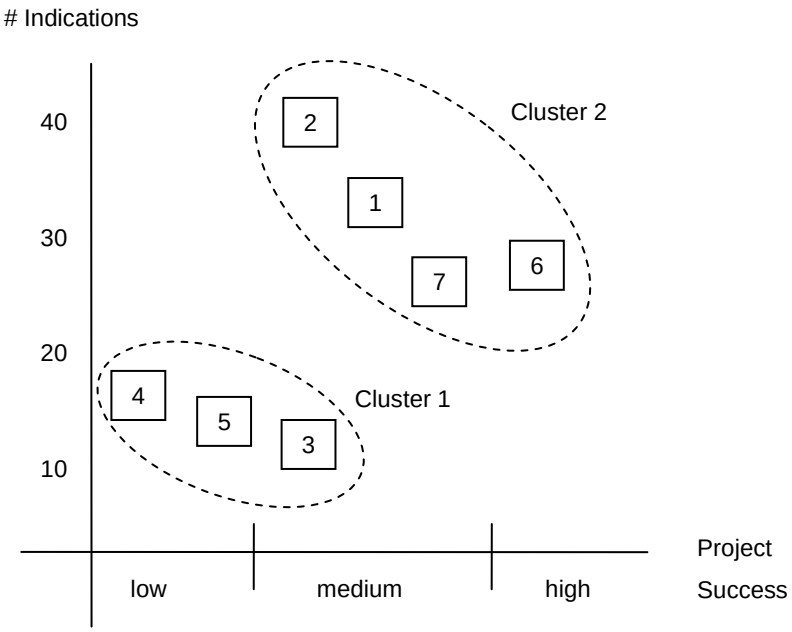


Figure 6.4: Relation per case between numbers of indications of effects and project success

6.6 Stage four: Experiment

Although it can be concluded from the results of the case study projects that individual risk management activities contribute to project success, this conclusion is based upon the opinions of individual stakeholders. This means that the effect of risk management on project success is directly attributable to those effects as perceived by project stakeholders. Given the case study research setting, the possibilities for "objective" validation of these perceptions are limited. In order to create additional information on the effect of a specific risk management practice on project success, independently of various stakeholders' perceptions, an experiment was developed with the aim to answer to the following sub-question:

6. *Does the use of a specific risk management practice influence objective project success and project success as perceived by project members?*

Chapter 5 of this thesis reports on the results of the experiment. Building on the results of the case studies, risk identification was chosen as the risk management activity for the experiment. Risk identification is the activity which, according to the results from the case studies, has the most impact on project success. Furthermore, a project generally starts with a risk identification session, which makes risk identification relatively easy to implement in an experimental setting. The experiment was conducted with 212 participants in 53 project groups. All participants were members of a project group where, in the project, each member had the same role. The project team had a common goal, which diminished the chances for strategic behaviour of participants. The common goal situation provided the conditions for open communication and therefore for communicative effects, generated by the risk management activity. Communicative behaviour was further stimulated by offering prizes of substantial value to the best performing project groups.

Project groups that performed risk identification before project execution used a risk prompt list to support the risk identification process. Half of the groups did risk identification by discussing the risks with team members (type 3 groups); the other half that did risk identification did not discuss risks with team members (type 2 groups). The control group projects (type 1 groups) conducted no risk identification at all before project execution. Results from the experiment demonstrate that project groups that conducted risk identification plus discussion perform significantly better in the number of correctly completed tasks than the control groups that did not conduct risk identification at all. The number of correctly performed tasks is, in this experiment, one of the indicators for objective project success. The Jonckheere-Terpstra test, which is used to test for a pattern to the medians of different types (Field, 2005) demonstrates a highly significant result *($J = 625$, $r = .36$, $p < .01$, $N = 53$),* indicating that the number of correctly performed tasks increases when groups perform risk identification, but increases further when groups do risk identification plus discussion. Figure 6.5 illustrates this trend. Types of projects are on the X-axis. The Y-axis presents the average number of correctly performed tasks (Q3).

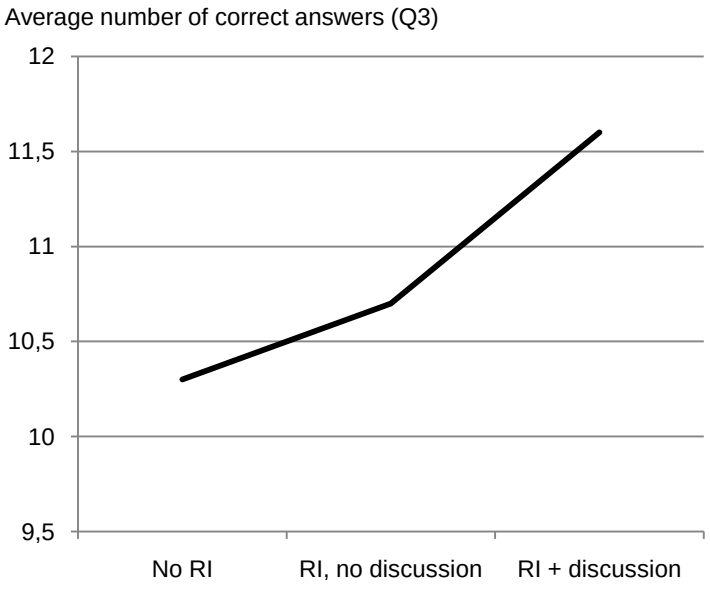


Figure 6.5: Trend line, demonstrating the influence of risk identification with or without group discussion on the number of correctly performed tasks.

Perceived project success was measured by asking project members to grade the project result. The analysis of grades demonstrates some remarkable research findings. Project groups that did risk identification plus discussion (type 3) score significantly better on the number of correctly performed tasks than control groups (type 1). After project members have been informed about their own project result, all project members value their project result equally. There is no difference in grades assigned by project members from any of the group types. However, the result of project groups that conducted risk identification plus discussion is objectively better, but apparently this better result is not reflected in the opinion of the project members who conducted risk identification plus discussion. It is remarkable to see that, directly after project execution, before project groups are informed about their project result, project members who conducted risk identification plus discussion are significantly more positive about their result than groups that conducted no risk identification or risk identification without communication. Risk identification leads to objectively measurable

better results, but this is not reflected in stakeholders' opinion on the result. However, the grades for project success given by stakeholders directly after project execution indicate that stakeholders attribute positive effects to risk management in relation to project success.

Discussion and integration

Empirical results from both the case studies and the experiment provide strong indications that risk management contributes to project success. This combination of research methods from different ontological and epistemological paradigms results in a richer understanding of the research topic (Mingers, 2001). In this research, a sequential multi-method design is applied. Results from case studies with a predominantly interpretive character are fed into an experiment, which is a research method that fits well within a more positivist paradigm. The results from the experiment support the results from the case studies; an individual risk management activity is able to influence project success through influencing actions of project members. Furthermore, the results from the experiment demonstrate that a risk management activity is able to influence epistemic risk (der Kiureghian & Ditlevsen, 2009). This was predicted in the conclusions section of chapter 3, in which is stated that risk management activities may be able to make the situation more predictable, in effect leading to less uncertainty.

This research started with a literature review, in which papers were studied that investigate the relation between risk management and success of IS/IT projects. A remarkable conclusion from this literature review is that risk management does not contribute to project success in the way assumed in current project risk management theory. Current theory assumes that by collecting and analysing information, followed by adding this information to the project plan, the project plan improves, meaning that the project plan becomes a better description of what will happen during project execution. This better description, which can also be considered a prediction of project execution, contributes to project success, because by definition this plan is a better description of how much time and money it will take to create the requested project deliverable.

This thesis has demonstrated that according to the current project risk management literature, which is based on the so called instrumentalism assumption, project risk management only occasionally contributes to project success. Nevertheless, project stakeholders use various risk management activities on their projects, and they attribute various effects to the use of the activities. Project stakeholders indicate that various risk management activities are used to influence other stakeholders' behaviour, perceptions and expectations. Stakeholders also indicate that risk management activities are used in order to create and maintain inter-stakeholder relationships. According to stakeholders, these effects contribute to the success of the project, hence their decision to use these risk management activities on their projects. The question now is: How does the contribution of current risk management theory to project success relate to the contribution as viewed by project stakeholders?

The similarity between the two views lies in the aim of both views to create predictability. The current project risk management theory does so by assuming that the project is behaving according to the laws of nature which we know or are able to discover, as was earlier discussed here as the instrumentalism assumption. By collecting and analysing information from earlier experiences and adding this information to the project plan, current risk management theory tries to create a project plan, being a prediction of project execution. In the additional view, project stakeholders aim at creating predictability, but they do not assume that the project is behaving according to laws that are known. Instead of an objective approach which is a typical characteristic of the current project risk management theory, such as the quantification of risk, the additional view creates a commonly shared definition of reality in which stakeholder actions take place. By adjusting and synchronizing stakeholders' perception of the situation, expectations and the relationships between stakeholders, stakeholders seek to influence each other's actions and behaviour, consequently making them more predictable.

The results from the experiment support the claim made in this research that the positive effect of risk management on project success is not by making project execution more predictable based on collected and analysed information from past stakeholders' experiences. In contrast, positive effects of risk management on project

success occur because when people communicate on risks, they create a common situation in which their actions are synchronized and aimed towards goal attainment. A discussion on risks during a risk identification session is enough to create the positive effect. Furthermore, it is not necessary that the discussion is about risks that will actually occur during project execution, and there is no need to quantify the risks. The risk identification session in the experiment was done by all four project members of the project team, which means that the group was homogeneous; there was no role difference between project members. The fact there was a competitive element, being the best project groups winning a prize, further contributed to creation of a project group in which all project members have a clear, shared idea on what is expected from them. As a result, project groups who discussed risks during risk identification performed better than other groups.

6.7 Implications for practitioners

To conclude, the answer to the final sub-question on the implications of the research findings for practitioners in the field of IT project management, particularly ERP implementation project management:

7. *What are the implications of the research findings for the use of project risk management in ERP implementation projects?*

Based on the research findings the main implication or recommendation for practitioners is to continue the use of risk management on IS/IT projects. However, this research provides some important recommendations that should be taken into account when risk management is used on IS/IT projects. Practitioners should be aware that the assumptions underlying the project risk management process as described in handbooks for project management (the instrumental view) are often not correct. Hence, only in specific situations, for instance when requirements are fixed and well described, a well developed methodology for software development is used and relevant quantitative data on software development processes is available, is the risk management process able to contribute to project success in terms of “on-time, on-budget” delivery of a predefined IS/IT system. If project risk management is used in a situation in which the assumptions are not met, it will inevitably lead to a situation in

which project stakeholders think that the project risks are under control, were in fact they are not.

However, individual risk management activities such as risk identification or risk allocation generate non-instrumental effects, possibly in addition to instrumental effects. These non-instrumental or communicative effects occur as a result of interaction (discussion, exchange of information) between project stakeholders during the execution of risk management activities. Communicative effects stimulate instrumental action taking by stakeholders, and the effects create a common view among project stakeholders about the project situation by influencing stakeholders' perceptions and expectations and shaping the inter-stakeholders' relationships. Practitioners should be aware that the creation of communicative effects can be stimulated by providing capacity for interaction during risk management activities. For instance; a risk identification brainstorm session or moderated meeting will generate more communicative effects than a risk identification session in which only checklists or questionnaires are used. For the communicative effects to occur it is not necessary that the complete risk management process is executed as described in handbooks for project management. Individual risk management activities each have their own effect on project success through the various communicative effects they may generate. The communicative effect contributes to project success, not only in terms of time, budget and quality, but also in terms of perceived success.

At the same time, practitioners should be aware that communicative effects with an effect on project success will not occur in every project situation, nor that the effect is, in all situations, a positive effect. If, for instance during risk identification, certain information about risks is labelled as being important for the project, where in fact these risks were relevant in an earlier project, but not in the forthcoming project, the risk communication can lead to project members to focus upon (what later will appear to be) the "wrong risks". By focussing upon the wrong risks, project members are unable to detect and respond to risks that have not been identified; case 7 of this research provides an example of this type of problem. Furthermore, communicative effects with a positive effect on project success occur predominantly in situations where information is not used strategically. In situations in which information on risks is not shared openly,

the positive communicative effect may not occur. Case 4 of this research provides some indications that not sharing risk related information between customer and IT supplier leads to lower communicative effects, resulting in lower project success.

6.8 Theoretical implications, limitations and further research

The experiment from chapter 5 demonstrates that, in concurrence with the results from the case studies, an individual risk management activity is able to contribute to elements of project success. For this effect to occur, it is not necessary to measure or to quantify the risk. For instance in a risk identification brainstorm, project stakeholders exchange information on what they individually see as the potential dangers for the project. Such an exchange of information may lead to adjustments of the expectations of individual actors and the creation of mindfulness (Weick & Sutcliffe, 2007). Mindfulness includes awareness and attention; actors become sensitive to what is happening around them, and they know when and how to act in case of problems. This leads to a remarkable conclusion, which can be described as “the quantum effect” of project risk management, because its appearance is somewhat similar to what Werner Heisenberg in quantum mechanics described as the uncertainty principle (Ortoli & Pharabod, 1988).

Firstly; in order to influence the risk, it is not necessary to measure the risk. The experiment demonstrated that a risk prompt list, in which five risks were mentioned that were realistic, but all of which had very low probability of occurring, is enough to make project members aware of potential project risks and to influence their behaviour. As a result, the project groups who talked about the risks before project execution performed better and gave themselves a higher grade for the performance of their project. Secondly, as a result of this communicative effect*, it is impossible to measure risk without changing its probability*. The moment the risk is discussed, stakeholders become influenced and this consequently leads to an effect on the probability of the risk. The fact that in order to influence the risk it is not necessary to measure the risk, provides an explanation for the research finding (Ropponen & Lyytinen, 1997) that project managers learn from their own mistakes. 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. If they have become aware of the risk, for instance by their earlier experiences, their individual perception has changed. If this perception is transmitted to other stakeholders during the risk management process in a process of communicative action, then the probability of the risk is influenced.

Limitations

Projects in general, and IS/IT projects in particular, are dynamic processes, consisting of numerous events and interactions during a longer period of time. The success of the project can only be determined some time after the project has delivered its results. It is therefore a long chain to progress from an individual risk management activity, to its effect on the success of the project in which the activity was performed. Because of the long chain between activity and project result, there are many opportunities for various factors to interfere and influence the project result. It then becomes almost impossible to conclude that risk management activities contributed to a successful project; perhaps some other activities or conditions caused the success or failure of the project.

The research dealt with this issue by investigating the relation between risk management and project success through measurement of the opinions of stakeholders. However, their answers that risk management activities contribute to project success, as well as their explanation on how the risk management activity contributes remain the opinions of individuals. It may be that stakeholders have been led by the introduction to the research in which was stated that the topic of the research was the influence of risk management on project success. The case study research strategy does not provide the opportunities for “objective” validation of the results, and in order to address this issue, an experiment was developed in which one of the relations found in the case studies was further investigated.

The theoretical concepts from the Theory of Communicative Action, used for the interpretation of the results from the case studies, created valuable insights in how risk management activities are able to contribute to project success. Results from the experiment are in alignment with results from the case studies. However; the results from the experiment provide only limited insights to what occurred during the discussion

of the project group. Based on the results from the experiment it is not possible to conclude that one or more of the effects of Action, Perception, Expectation or Relation contributes to project success. The results from the experiment do provide support for the claim of project stakeholders that individual risk management activities are able to contribute to project success.

To conclude, some scoping issues have created limitations for this research. Firstly, the focus was on ERP implementation projects only. Communicative effects may be relatively strong in ERP implementation projects, compared to more technically oriented software development projects, because ERP implementation projects experience relatively more non-technical risks. Communicative effects are less present in projects where the focus is on strict methodological software development. Secondly, the sample of ERP implementation projects contained only projects in which, according to the project manager of the project, some risk management had been used. The research is therefore unable to draw any conclusions for projects in which no risk management was used. Do these projects perform poorly in comparison to projects in which risk management was used, is there no difference, or are they doing better? Finally, the experiment was not a project, but its structure fitted the purpose, namely to investigate a mechanism that might be at work during risk management. Such a research strategy is less common in project management research than for instance in psychological research. Additional data collection, both in case studies and in experiments or extended experiments (simulations or games) might overcome the scoping issues raised here.

Further research opportunities

Although the research provides indications that communicative effects are generated by risk management activities, and that these communicative effects have a positive influence on project success, there are a number of opportunities to further explore this line of research. Additional research could further strengthen the relations found in this research or modify and improve the current results. An issue that must be overcome in all subsequent research, is the issue of the isolation of the effect of risk management on project success. Projects are dynamic processes of stakeholders interacting during

a longer period of time, and it is important, as well as challenging, to try to isolate the effect of a single management instrument on project success.

This research investigated seven ERP implementation projects in which at least some risk management was used. The sample did not contain any projects in which there was no risk management used. An interesting line for further research is to include projects where no risk management was used, and relate these to project success. It may then also be interesting to investigate whether other project management activities such as kick-off meetings, progress reports or planning sessions are able to generate communicative effects. In chapter 5 it is suggested to let project members at the start of the project, instead of doing a risk identification, relate anecdotes about their greatest project successes or failures. This may have positive effects on project success, similar to what Ramirez and Beilock (2011) found in their research on the effects of people writing about testing worries before an exam, which has a positive effect on peoples' exam performance. Another possibility is to investigate the effectiveness of different formats of one risk management activity. For instance: is risk reporting more effective when it is done as a separate activity than when it is part of the progress report?

Two concepts from The Theory of Communicative Action (Habermas, 1984) have not yet been investigated: strategic action and regulative speech acts. Both concepts seem to have the potential to provide valuable additional insights in the relation between risk management and project success. Some of the case studies provide indications that strategic action is playing a role in the way stakeholders communicate about project risks. It seems that strategic action depends on the type of contract that underpins the project; fixed time, fixed budget contracts stimulate strategic behaviour, creating a less open environment in which risks are discussed. With that, strategic action and communicative action relate to the creation of partnership relations between customers and IT suppliers. The creation of partnerships is a long felt wish of IT suppliers and customers, but the creation of such relationships may be seriously hindered by project contracts influencing the way contract partners discuss the project risks. Regulative speech acts are of special interest in relation to risk and the creation of the common situation definition, because talking about risk is essentially talking about events that may or may not happen in the future. The challenge for risk management is to project

potential future events onto a current reality that is defined by stakeholders, in order to make sure that current actions are effective in managing the risk, and with that contributing to project success.

6.9 Answer to the overall research question

Does the use of project risk management practices affect the project success as perceived by stakeholders (project managers, IT service suppliers, and business owners) regarding ERP implementation projects, and if so, what are explanations for this relationship?

A very short answer to this question is: “Yes, often because of communicative effects”. A somewhat more protracted answer is: Project risk management as described in handbooks for project management and project risk management (Association for Project Management, 2004; Association for Project Management, 2006; Project Management Institute, 2008) only occasionally contributes to project success if project risk management is considered solely in terms of instrumental action working on an instrumental object. If, on the other hand, project risk management is considered a set of activities in which actors interact and exchange information, also known as communicative action, working on a social object, individual risk management activities contribute to project success because the activities may generate Action, Perception, Expectation and Relation effects. These effects directly affect the instrumental actions taken by the stakeholders, and the effects define and shape the common situation in which project action takes place. A shared definition of the common situation is a prerequisite for effective instrumental action.

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Appendices

Appendix 1A: Data from two case studies and coding

How risk management activities contribute to project success. All statements made by various stakeholders from two ERP implementation projects. The table includes the results from the coding process.

Legend: Type P = Project Manager, Type S = IT Supplier, Type C = Customer
Effect cat. P = Perception, A = Action, E = Expectation, R = Relation

Remarks: Case 2 in Appendix 1A is equal to case 5 in Appendix 1B. Effect categories in Appendix 1A are only P and A, in Appendix 1B the category P* is subdivided into E and R. The quotes from stakeholders are literal translations from the original interviews, which were held in Dutch.

Case	Type	Risk Man. Practice	Quote from stakeholder how RM contributes to project success	Coding	Effect cat.
1	P	Planning	By doing risk management planning, you inform project members you want to do risk management; you indicate risk management is important	Indicate RM is important	P
1	P	Planning	A planning is a tool to communicate the actions you want to take	Communicate intended action	A
1	P	Identifica-tion	I have used it more often like the way we used it here, and I use risk identification (in combination with analysis) to create awareness	Create awareness	P
1	P	Identifica-tion	This has worked very well for me in earlier projects	Earlier experience	P*
1	P	Identifica-tion	Create a common view about the risk, and make it more objective.	1 Create common view 2 Make more objective	P P

Case	Type	Risk Man. Practice	Quote from stakeholder how RM contributes to project success	Coding	Effect cat.
1	P	Identifica-tion	If you have a common view, you are better able to focus your energy on lowering the risks	If common view - better able to focus energy	A
1	S	Identifica-tion	If you do this in a larger group, people become more aware of what is going on around them	create awareness (when done in group)	P
1	S	Identifica-tion	You are able to share your concerns with others	Share concerns	P
1	S	Identifica-tion	As a result, people become more committed	People become more committed	A
1	S	Identifica-tion	Awareness and openness have given people direction	1 Awareness 2 Openness 3 Give people direction	P P* A
1	S	Identifica-tion	People have the idea their concerns are heard, which improves their involvement	1 Listen to concerns 2 Improving involvement	P* A
2	P	Identifica-tion	Finding the real risks and taking action to remove those risks really makes the difference.	1 Take action 2 Find real risks	A A
2	P	Identifica-tion	We took some of the project risks out of the scope of the project and communicated them to everybody, so that expectations were clear	Clarify expectations	P*
2	C	Identifica-tion	The brainstorm sessions create the effect that people become aware of risks, and it initiates action	1 Create awareness 2 Initiate action	P A
2	P	Registra-tion	We did not write down all the risks in a register, but we wrote down what our plan was. And the plan was written, based on the risks we had identified	Register risks in plan	A
2	P	Registra-tion	That helped a lot, because now it was clear for everybody what they could expect and what was expected from them	1 project the future 2 Clarify expectations	P* P*
1	P	Analysis	Indicating what the impact is, is important because then people realize the consequences and knowing the consequences triggers them in starting action	1 Inform people about consequences 2 Trigger to start action	P A

Case	Type	Risk Man. Practice	Quote from stakeholder how RM contributes to project success	Coding	Effect cat.
1	S	Analysis	Results from analysis may create agreement and acceptance among project members. If analysis shows that something might go wrong, but impact is limited, all members might say: OK, let it be that way. No big deal if it goes wrong	1 Create agreement 2 Create acceptance	P P*
1	S	Analysis	Results from analysis may direct actions from members, because actions are taken only on important risks	1 Setting priorities in action 2 Direct actions	A A
1	P	Allocation	You can ask somebody about the status	Ask status	A
1	S	Allocation	If you make somebody responsible for the risk, and you ask him 3 times a week if it is already solved, than he will start running	Stimulates action if owner can be asked	A
1	S	Allocation	It also gives opportunity for collaboration, because the discussion also involves: can you solve it, do you need any help from others?	1 Opportunity collaboration 2 Synchronize action	A A
1	P	Reporting	Risk reporting has been used to show the project board during the implementation, so not only right before the go-live, that risk was diminishing	Create confidence	P*
1	P	Reporting	Risk reporting is either used to establish trust, or to ask for decisions from the board in relation to time, cost, scope of the project, decisions based on the risks	1 Establish trust 2 initiate action	P* A
1	P	Reporting	These sessions also provides a possibility for reflection; during implementation you are so busy that now and then it is good to reflect on your actions and your position, and to determine what is really important	1 Reflect on actions 2 Determine what is important 3 Direct actions	A A A
1	P	Reporting	It is about creating a overall feeling that we are heading in the right direction	Create good feeling	P*
1	P	Reporting	It is used to create commitment for solving together one or more risks	Create commitment	A
1	P	Reporting	It is to make people aware of the risk	Create awareness	P
1	P	Reporting	It is to show you take the risk seriously, and you are working to resolve it	Demonstrate commitment	P*
2	P	Control	If somebody reported a problem, including a request for the project management to take action, it was clear to everybody this was a serious problem.	Stimulate action	A

Case	Type	Risk Man. Practice	Quote from stakeholder how RM contributes to project success	Coding	Effect cat.
2	P	Control	The general management understood that something had to be done, that action was necessary	Stimulate action	A
2	P	Control	As a result, people were willing to do an extra step	Stimulate action	A
2	P	Control	The action was assigned to the person who was able to take the action	Manage individuals	A
2	P	Control	Because the action owner stated in the group he would take the action, he had a problem if there was no action taken; shame is an effective management instrument	Manage individuals	A
2	P	Control	Now you are able to manage individuals	Manage individuals	A

Appendix 1B: Data from five case studies and coding

How risk management activities contribute to project success. All statements made by various stakeholders from ERP implementation projects. The table includes the results from the coding process.

Legend: Type P = Project Manager, Type S = IT Supplier, Type C = Customer
Effect cat. P = Perception, A = Action, E = Expectation, R = Relation

Remarks: Results from case 1 and case 5 are reported in Appendix 1A. The quotes from stakeholders are literal translations from the original interviews (held in Dutch).

Case	Type	Quote from stakeholder how RM contributes to project success	Coding	Effect cat.
1		Results from case 1 are reported in Appendix 1A		
5		Results from case 5 are reported in Appendix 1A (case is numbered “case 2” in Appendix 1A)		
Risk management practice: Risk Identification				
2	P	Identification shows you the potential issues, it influences your project plan	1 potential issues become known 2 influences plan	A A
2	P	Important is tuning the risk with other stakeholders and parties	tuning the risks with others	P
2	P	If you share your risks with the customer, the customer may become willing to help and becomes able to help	1 stakeholder willing to help 2 stakeholder able to help	R A
2	C	Risk identification makes everybody alert for a while	create alertness	P
2	C	If things go wrong later, you can at least indicate you tried to do something about them	demonstrate activity in case of failure	R
2	C	It gives a stakeholder a good feeling if he or she knows that the project has thought about the risks, and that responses are available in case something goes wrong	1 good feeling for stakeholder 2 responses are available	R A
2	C	It is a feeling of security that the project gives to the stakeholders, especially the customer	feeling of security for stakeholder	P

Case	Type	Quote from stakeholder how RM contributes to project success	Coding	Effect cat.
2	C	I asked people to identify their risks because I wanted them to know the openness was appreciated	1 give message 2 openness is appreciated	A R
2	C	I asked people to identify and discuss risks, because I wanted to know if my risks were real risks, or only my personal ideas	to check idea about risk is congruent with other stakeholders	P
3	P	To find out what it is we can expect, and to respond to that early	1 to find out what can be expected 2 create possibility to respond	E A
3	P	You create acceptance, everybody sees and understands the risks	create acceptance for risks	E
3	C	To keep an eye on the situation continuously, and to decide if action is necessary	1 to monitor situation 2 decide for action	A A
3	C	Keep your eyes open, report risks, take action based on the information. The information will be discussed in project progress meetings	1 stay alert 2 decide for action	P A
4	P	Risk identification sessions trigger to refresh the list and status of all risks	1 refresh the list of risks 2 refresh the status of risks	A A
4	P	Risk identification takes care of getting focus; do we have the same idea about the urgency of the risk, are we on the same track.	1 getting focus 2 synchronize perceptions on risk 3 and urgency	A P P
4	P	With risk identification you create awareness amongst all people involved	create awareness	P
4	S	The fact you recognize the risk already influences how you act. It creates side-effects.	it influences action	A
4	S	Although in some cases you did not yet take a formal step, you have become more alert.	become more alert	P
4	S	You manage the situation while being more aware of the situation	1 become more aware 2 manage the situation	P A
6	P	You make people aware of the choices they are about to make	create awareness for choices	A
6	P	It is my intention to give people insight in the situation and what may be ahead of them	create insight in future	E
6	P	Awareness and a check on completeness	1 create awareness 2 check completeness	P A

Case	Type	Quote from stakeholder how RM contributes to project success	Coding	Effect cat.
6	P	By naming and identifying the risk together with others, followed by a joint action, the ideas of people become more synchronized	synchronize perceptions	P
6	P	Even if everything is going smoothly, I keep planning this sessions, just to keep attention and to remain focused	1 keeping people alert 2 remain focused	A A
6	S	It is about being aware of what can go wrong	create awareness	P
6	S	Creating awareness for the customer and the steering committee	create awareness	P
6	S	Sending a message to the steering committee; the project marks this as important, please manage this topic	1 communicate urgency 2 stimulate action	P A
6	S	Create clear expectations	clear expectations	E
6	C	Identification gave us the opportunity to define actions for managing the project	define actions	A
6	C	These meetings were quite informal, but they really helped in day to day management of the people	helped to manage people	A
7	P	it kept us alert	keeping people alert	A
7	S	You have less surprises	less surprises	E
7	S	People work better, they work on the same problem together	1 people work better 2 work on common goal	A A
7	S	You try to bring alignment between groups of people to a common goal	alignment to a common goal	P
7	S	What should happen is they should collectively understand and agree on the key risks	1 collectively understand and 2 agree on key risks	P P
7	S	You make them aware of things	create awareness	P
Risk management practice: Risk Registration				
2	C	Well, it is a weak relation, but you could say that if you give others a good feeling, because you demonstrate you think about the risks, and they are under control	1 give good feeling 2 think about risks 3 therefore they are under control	P P A
2	C	Well, although I do not like the idea, but it can be used as a cover up; if something goes wrong, the project can say; we did everything we could, but unfortunately it still went wrong.	use as cover up	R
2	C	Cover up can be important, especially if you can claim damage with third parties	use as cover up	R

Case	Type	Quote from stakeholder how RM contributes to project success	Coding	Effect cat.
2	C	A list, we did not call it a risk list, was used to keep the overall view, and was used not to forget things that were important for the project	1 keep overall view 2 prevent forgetting things	A A
4	P	If you do not register the risks, you have to remember them all. If you register them in a structured way, this helps you in managing the risks and solving them	1 keep overall view 2 help in managing	A A
4	P	It is about continuous attention for the risks	keep continuous attention	A
6	P	To make sure that risks are not overlooked or forgotten	1 prevent forgetting 2 prevent overlooking	A A
7	P	The aim is to create an overview	create overview	A
7	P	Also to keep that view updated	keep view updated	A
7	P	To make sure that everybody stays alert	to keep everybody alert	A
7	S	If you know the risk, people are able to focus on what is important	focus people on what is important	P
7	S	It adds to trustworthiness, people believe you have the situation under control	1 adds to trustworthiness 2 people think you have situation under control	R P
7	S	If people are aware of the problems, you get better outcomes	If people are aware then you get better outcomes	P
7	S	It is about trust you have with your stakeholders	create trust	R
7	S	If you can give stakeholders the confidence that risks are under control, they are less worried about the future	take away worries with stakeholders	P
7	S	We share the information to let see we have done the work	show that action was taken	R
7	S	We are trying to communicate to the stakeholders we are working in a professional way	show that work is professional (credibility)	R
Risk management practice: Risk Analysis				
2	P	Through analysis you find out what is really important, and this influences how you will do things	1 determining importance 2 format actions	A A

Case	Type	Quote from stakeholder how RM contributes to project success	Coding	Effect cat.
2	C	You are able to value the risks and decide if action is necessary. Sometimes we have decided to do nothing	decide if action is necessary	A
2	C	People talk to each other about what they individually think are the real risks, some people are optimistic, others not, but the result of the discussion is that they find a solution to which everybody agrees	synchronize perceptions on risks	P
4	P	One quantifies the risk to get a feeling about the magnitude of the risk. But it is an informal way of quantification, because some risks are hard to estimate	get a feeling about the magnitude or severity of the risk	P
Risk Management Practice: Risk Allocation				
2	P	You make people responsible for the action and you tell them it's risky, you give them the tools they need and then you say to them: go for it	1 make people responsible 2 provide them with information 3 stimulate and direct their action	E P A
2	C	If you link the risk to a name, you take the risk out of the anonymity, which lowers the chance the risk is forgotten	to lower the chance the risk is forgotten	A
3	P	People know they have to do something about a particular risk; it is their action	people are stimulated to take action	A
3	C	Allocate the risk to somebody who knows how to deal with it, and knows how to communicate it.	use the best resource for solving the risk	A
3	C	Keep your eyes open, report risks, take action based on the information. The information will be discussed in project progress meetings	feedback from the risk owner on the risk	A
4	P	This has to do with the awareness of people that risks should be addressed and managed. Not a very strong influence, because it was already clear for the individual	contribute to awareness that a risk must be managed	P
6	P	If I allocate the risk to somebody, I expect this person to solve it, or else that he finds the assistance to solve it; this person is responsible.	if the risk is allocated, it is expected that it is taken care of	A
6	S	It makes clear to the person to whom the risk was allocated that he or she must do something; it must have their continuous attention	1 stimulate action 2 make sure the risk gets attention	A A

Case	Type	Quote from stakeholder how RM contributes to project success	Coding	Effect cat.
6	S	It is also to make clear that some risks do not belong to the scope of the project; the project does not feel responsible	to clarify some risks are not the responsibility of the project	E
7	P	You are able to manage people based on the fact you know who is responsible for the risk	1 manage people 2 direct action	A A
7	S	Then you can be more sure that something will be done to manage that risk	stimulate action	A
Risk management practice: Risk Reporting				
2	S	Risk reporting is part of project progress meetings and provides transparency, or it is used to share problems. Others are invited to contribute by thinking or taking action	1 create transparency 2 share problems 3 stimulate action	R P A
2	S	Risk reporting signals if certain actions become delayed and become part of the critical path	create insight (expectations)	E
2	S	Progress meetings were used to present and discuss certain risks and to explain the consequences of doing nothing; it supports uniformity	1 create insight in consequences 2 creates uniformity of view (synchronize)	A P
2	C	Risk reporting informs other people about what is important and what actions will be taken	1 setting priorities 2 determine actions	A A
2	C	To take away feelings of fear, uncertainty by others	1 create confidence 2 take away fear	R P
2	C	If I see the list is diminishing during the project, this gives me a safe feeling	creates safe feeling (confidence)	P
2	C	If the list is diminishing during the project, both myself and other project members can concentrate on project progress and the quality of the project that must be delivered	create focus	A
2	C	If you communicate the risks, you make sure that people act with care	1 direct action 2 people act with care	A A
3	C	Short communication lines, prompt action; everybody stayed alert	1 staying alert 2 contributes to effectiveness of action	A A
4	P	It works as a reminder, it forces you to keep paying attention to the risks. It is so easy just to forget the risks	1 create focus 2 prevents forgetting risk	A A

Case	Type	Quote from stakeholder how RM contributes to project success	Coding	Effect cat.
6	P	The steering committee needs information from the project to stay involved	create involvement	A
6	P	They need the information from the project, so that in certain situations they are able to take a decision	stimulate decisions	A
6	P	They must know what is expected from them	set expectations for action	E
6	S	Based on the report, you expect that after the decision that somebody takes action	stimulate action	A
6	S	It is also about explaining what choices you have made; clarification and justification	1 clarification of choices 2 giving insight	R R
6	S	It is to indicate on what topics you expect support (from the steering committee)	stimulate action	A
7	S	It is to signal to the team that things are getting better	communicate status	E
7	S	You then get more confidence in the team	create confidence	R
7	S	The management can show they have the project under control	establish trust	R
Risk management practice: Risk Control				
2	S	By taking the risks seriously, discussing them with the customer, it contributes to stakeholder satisfaction	contributes to stakeholder satisfaction	E
2	C	It contributes to my own state of happiness when I have the feeling the project is in control	personal satisfaction or happiness	E
6	P	Control is part of the management and reporting cycle which is used to keep people involved	create involvement	A
6	S	It is to make sure that people take action	stimulate action	A
7	S	If the risk stays red, you need to escalate, if it turns green you can stop worrying	stimulate action	A

Appendix 3A: Interview script questions

Question 1

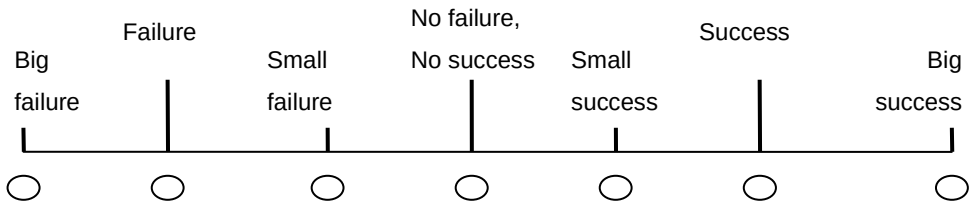
Please, consider the following six statements:

1. The project must finish on the date that is agreed upon
2. The project must comply with its financial limits
3. The project must deliver what is agreed upon in the project requirements document
4. People that work on the project must enjoy working on the project
5. Project stakeholders must be satisfied with the overall project result
6. The project result must have potential to support future organisational developments

Relate these statements to **this project**. Please rank the statements in order from "most important" to "least important". Can you elaborate on why you chose this ranking in relation to this project?

Question 2

How can **this project** according to your opinion be considered? This project to me is a…



Can you elaborate on your answer? In answering this question, please take into consideration how this answer relates to the mentioned statements of:

1. The project must finish on the date that is agreed upon
2. The project must comply with its financial limits
3. The project must deliver what is agreed upon in the project requirements document
4. People that work on the project must have enjoyed working on the project
5. Project stakeholders must be satisfied with the overall project result
6. The project result must have potential to support future organisational developments

Question 3

In front of you, you see a list of risk management activities. Together we will walk through the activities. Can you indicate which of the following activities have been used during the project? Can you give characteristics for each of the activities about:

- **when** these activities were done, and how often?
- **what** was done?
- if **you were actively involved** in these activities?

Question 4

To your opinion, have the following activities influenced **the results of the project**:?

Activity	**Influence**
Risk Management Planning	Yes / No / NA
Risk Identification	Yes / No / NA
Risk Registration	Yes / No / NA
Risk Analysis	Yes / No / NA
Risk Allocation	Yes / No / NA
Risk Reporting	Yes / No / NA
Risk Control	Yes / No / NA

NA = Not Applicable (is based on the answers on question 3)

Can you relate the risk management activities that were used to the following statements: <Risk management activity name> was of influence on:

1. The project must finish on the date that is agreed upon
2. The project must comply with its financial limits
3. The project must deliver what is agreed upon in the project requirements document
4. People that work on the project must enjoy working on the project
5. Project stakeholders must be satisfied with the overall project result
6. The project result must have potential to support future organisational developments

Question 5

Can you elaborate on **how** these activities have influenced the results of the project? Please elaborate each used risk management activity individually.

Question 6

Do you have any additional remarks to make, or where there things not discussed that are relevant for this project or for this research?

<end>

Appendix 3B: Risk management practices (activities) in scope of this research

Risk Management Practice	**Description of the practice**	**Tools or appearance of the practice**	
		Project 1	**Project 2**
Risk Management Planning	Writing a plan or writing a paragraph in the project plan *about how risk management will be executed* on the project (NOT an initial list of risks!)	A paragraph in the implementation plan	<none>
Risk Identification	Naming and identifying risks with the use of e.g. filling out questionnaires, consulting experts, doing brainstorm sessions, conducting interviews	Brainstorm sessions with project management team	A limited amount of interviews and brainstorm sessions, mainly during project restart-up
Risk Registration	Recording and maintaining the list of risks in e.g. a database, one or more documents, spreadsheets	Spreadsheet, maintained by the project manager	A list, not maintained during the project
Risk Analysis	Analysing risks, e.g. by estimating probability and impact, doing simulations (e.g. Monte Carlo), root cause analysis	Estimation of probability and impact in terms of high – medium - low by the project management team	Once, during project (re) start-up, in combination with proposals for directions to solve the risks
Risk Allocation	Appointing a person to be responsible for taking care of a particular risk	Allocation to individuals within the project management team	Risks are considered to be owned by the project management

Risk Reporting	Distributing information about risks and the status of risks to other people, e.g. by dedicated risk status reports or as part of project progress reports	Only from project management team to project board	Not specifically on risk. Risk was part of the progress reports.
Risk Control	Holding meetings with various people in which status and actions of risks are discussed	Integrated in the risk sessions of the project management team	Not specifically on risk. Risk was part of the overall project control.

Appendix 3C: Effects on project success by various risk management practices

Risk Management Practice	**Effect contributing to project success**
Referring to action (collaboration)	
Risk Management Planning	Indicate importance of actions
Risk Management Planning	Communicate intended actions
Risk Identification	Initiate action
Risk Control	Initiate action
Risk Allocation	Initiate action
Risk Reporting	Setting direction
Risk Analysis	Direction of actions
Risk Control	Direction of actions
Risk Reporting	Setting priorities
Referring to perception (common understanding)	
Risk Identification	Create awareness
Risk Reporting	Create awareness
Risk Identification	Create common view
Risk Identification	Create commitment
Risk Reporting	Create commitment
Risk Identification	Sharing concerns
Risk Reporting	Clarify expectations
Risk Identification	Clarify expectations
Risk Reporting	Create positive feeling
Risk Analysis	Create acceptance of risk
Risk Reporting	Establish trust
Risk Analysis	Indicate impact
Conditional statements	
Risk Identification	IF common view THEN focus energy
Risk Identification	IF awareness THEN direction
Risk Identification	IF express concerns, THEN improve involvement
Risk Analysis	IF indicate impact THEN know consequences
Risk Analysis	IF know consequences THEN trigger action

Appendix 4A: Interview script questions

For interview script questions, see Appendix 3A.

Appendix 4B: Risk management practices (activities) in scope of this research

Risk Management Activity	**Description of the activity**
Risk Management Planning	Writing a plan or writing a paragraph in the project plan *about how risk management will be executed* on the project (NOT an initial list of risks!)
Risk Identification	Naming and identifying risks with the use of e.g. filling out questionnaires, consulting experts, doing brainstorm sessions, conducting interviews
Risk Registration	Recording and maintaining the list of risks in e.g. a database, one or more documents, spreadsheets
Risk Analysis	Analysing risks, e.g. by estimating probability and impact, doing simulations (e.g. Monte Carlo), root cause analysis
Risk Allocation	Appointing a person to be responsible for taking care of a particular risk
Risk Reporting	Distributing information about risks and the status of risks to other people, e.g. by dedicated risk status reports or as part of project progress reports
Risk Control	Holding meetings with various people in which status and actions of risks are discussed

Appendix 5A: Normality tests at t=3 and t=4

Kolmogorov-Smirnov (normality) test for results after project execution (t=3 and t=4)

		Type 1 (no RI)	**Type 2 (RI)**	**Type 3 (RI + comm.)**
Variable:				
Q3	Quality	D(18) = .15, p > .2	D(18) = .22, p < .05	D(17) = .23, p < .05
T3ts_remain	Time	D(18) = .41, p < .001	D(18) = .32, p < .001	D(17) = .44, p < .001
G3	Grade	D(72) = .22, p < .001	D(72) = .24, p < .001	D(68) = .19, p < .001
G4	Grade	D(68) = .16, p < .001*	D(72) = .17, p < .001	D(68) = .18, p < .001

*: 4 missing values

Appendix 5B: Normality tests at t=1

Kolmogorov-Smirnov (normality) test results before risk identification (t=1)

		Type 1 (no RI)	**Type 2 (RI)**	**Type 3 (RI + comm.)**
Variable:				
Q1	Quality	D(72) = .13, p < .05	D(72) = .14, p < .05	D(68) = .14, p < .05
T1	Time	D(72) = .19, p < .001	D(72) = .15, p < .001	D(68) = .16, p < .001
G1	Grade	D(72) = .18, p < .001	D(72) = .24, p < .001	D(68) = .22, p < .001

Appendix 5C: Differences between groups at t=1

Test of the difference between the scores of various groups for the expected number of correct results (Q), the expected time used (T) and the grade (G) at t=1

	Q1			**T1**			**G1**		
	Type 1	**Type 2**	**Type 3**	**Type 1**	**Type 2**	**Type 3**	**Type 1**	**Type 2**	**Type 3**
Mean rank (K-W)	102,7	103,2	114,0	107,5	101,4	110,6	106,8	104,4	108,4
Mean	16,1	16,1	16,5	17,0	16,6	17,0	8,2	8,2	8,3
SD	2,2	2,2	2,4	2,6	2,9	2,6	1,1	1,0	1,1
# resp.	72	72	68	72	72	68	72	72	68
	H(2) = 1.55, ns			H(2) = .88, ns			H(2) = .16, ns		

Nederlandstalige samenvatting

Draagt projectrisicomanagement bij aan het succes van een project, in het bijzonder het succes van een informatietechnologie (IT) project? Deze vraag staat centraal in dit proefschrift. Gezien de grote aandacht die er is voor de vaststelling van de positieve bijdrage van projectmanagement aan de bedrijfsvoering in het algemeen (Thomas & Mullaly, 2008), en van risicomanagement als één van de instrumenten binnen het projectmanagement in het bijzonder, is deze vraag relevant vanuit het perspectief van zowel de wetenschapper als de beroepsbeoefenaar. Weliswaar wordt in de praktijk aangenomen dat een positieve bijdrage aanwezig is voor wat betreft risicomanagement (Royal Academy of Engineering, 2004), maar duidelijke aanwijzingen over de hoogte van het effect en de wijze waarop risicomanagement bijdraagt aan projectsucces blijven veelal achterwege. Dit proefschrift beantwoordt de vraag vanuit 3 verschillende invalshoeken; door het uitvoeren van een literatuurstudie, door middel van case studies en door middel van een experiment.

Literatuurstudie

In de literatuurstudie worden in totaal 29 artikelen bestudeerd die betrekking hebben op de relatie tussen risicomanagement en het succes van IT projecten. De artikelen zijn gepubliceerd in wetenschappelijke tijdschriften in de periode 1997-2009. De literatuurstudie sluit wat de periode die deze bestrijkt aan op een artikel van Ropponen en Lyytinen (1997), waarin zij de literatuur op het gebied van risicomanagement en IT projectsucces bespreken die is verschenen in de periode tot 1997. Een opvallend verschil met de literatuur van voor 1997 is, dat de literatuur die na 1997 is gepubliceerd veel vaker gebruik maakt van empirische gegevens (met name surveys en case studies) ter onderbouwing van de conclusies. Toch blijkt dat er in de literatuur van na 1997 weinig aanwijzingen zijn dat risicomanagement een bijdrage levert aan het succes van IT projecten. Met uitzondering van een tweetal artikelen die enige positieve invloed vaststellen van risicomanagement op respectievelijk het schatten van de benodigde hoeveelheid resources voor het uitvoeren van een taak (Ropponen & Lyytinen, 1997) en op het aantal gemaakte fouten tijdens de uitvoering van taken

(McGrew & Bilotta, 2000), zijn de aanwijzingen voor het positieve effect van risicomanagement anekdotisch en voornamelijk gebaseerd op aannames over de werking van risicomanagement.

Onjuiste aannames

Verschillende bronnen in de literatuur geven echter aan dat de aannames waarop de werking van risicomanagement is gebaseerd in vele gevallen onjuist zijn. Ten eerste geldt in relatie tot IT projecten dat een groot aantal risico's die daarin een rol spelen geen klassieke of statistische kansverdeling kennen. Als gevolg daarvan zijn deze risico's niet met het risicomanagement proces te beheersen (March & Shapira, 1987; Pender, 2001; Pich et al., 2002). Ten tweede blijkt uit de literatuur (onder andere Kutsch & Hall, 2005) dat projectmanagers de neiging hebben om het bestaan van risico te ontkennen en besluiten omtrent maatregelen uit te stellen. Dit is in tegenspraak met de aanname dat actoren rationeel handelen in het risicomanagement proces. Ten derde blijkt uit onderzoek van Flyvbjerg et al. (2003) dat project stakeholders bij de aanvang van een project de projectrisico's onderschatten en de projectbaten overschatten. Als gevolg daarvan is het vrijwel onmogelijk om een project succesvol op te leveren in termen van tijdige oplevering, binnen budget en volgens specificaties (de traditionele projectsucces kenmerken). Tenslotte blijkt uit onderzoek van onder andere Bannerman (2008), Besner en Hobbs (2006) en Voetsch et al. (2004) dat de volledige cyclus van risicomanagement activiteiten in de praktijk niet wordt uitgevoerd, hetgeen inhoudt dat de aanname van rationele probleemoplossing die ten grondslag ligt aan het risicomanagement proces in die gevallen onjuist is.

Een beperkt effect?

Als gevolg hiervan is het niet duidelijk in hoeverre risicomanagement een effect heeft op het succes van een IT project. Of, preciezer geformuleerd: wetenschappelijk is slechts aangetoond dat risicomanagement alleen onder strikte condities een positieve invloed heeft op het succes van een IT project. Als voorbeeld kan worden gedacht aan de ontwikkeling van een softwaremodule waarvan de functionaliteit en omvang, bijvoorbeeld in termen van functiepunten (Parthasarathy, 2007) bekend is, door een software ontwikkelingsafdeling die bijvoorbeeld gecertificeerd is op CMM (Capability Maturity Model) niveau 4 of 5 (Jalote, 2000). Dit laatste houdt in dat de software

ontwikkelafdeling een strikte, duidelijk vastgestelde systeem ontwikkelingsmethode volgt, en data gebruikt betreffende de performance van voorgaande, vergelijkbare projecten. Deze data zijn bruikbaar bij het inschatten en vervolgens managen van de risico's van de ontwikkeling van de software. Enterprise Resource Planning (ERP) implementatieprojecten, het onderwerp van dit proefschrift, bestaan naast het ontwikkelen van softwaremodules uit een groot aantal andere activiteiten, die deels uniek zijn, en waarvoor geldt dat de methodische aanpak slechts in beperkte mate werkt, en waarvoor geldt dat historische data niet beschikbaar zijn. Als gevolg daarvan levert het risicomanagement proces slechts in beperkte mate informatie die gebruikt kan worden bij het plannen en sturen van het ERP implementatieproject.

Aanvullend model omtrent de werking van risicomanagement

Hoewel risicomanagement dus alleen in speciale gevallen aantoonbaar een bijdrage levert aan IT project succes, wordt risicomanagement op brede schaal toegepast binnen IT projecten, ook op momenten en in projecten waar het effect op project succes niet waarschijnlijk is. Uit interviews met project stakeholders, uitgevoerd in deze studie, blijkt dat zij bewust risicomanagement activiteiten uitvoeren omdat ze van mening zijn dat deze activiteiten een positieve bijdrage leveren aan het succes van het project. De vraag is dan op welke wijze risicomanagement een bijdrage levert aan project succes. Om deze vraag te kunnen beantwoorden is het noodzakelijk om de wijze waarop risicomanagement, project en projectsucces en de relatie tussen risicomanagement en projectsucces wordt beschouwd, verder uit te breiden. Bij deze uitbreiding wordt gebruik gemaakt van concepten uit "The Theory of Communicative Action" van Jürgen Habermas (1984).

Van instrumentele actie naar sociale actie

Projectrisicomanagement heeft zich ontwikkeld vanaf de jaren 50 als onderdeel van projectmanagement vanuit de construerende wetenschappen zoals bijvoorbeeld bouwkunde, weg- & waterbouw en werktuigbouwkunde. Risicomanagement legt hierin de nadruk op de inventarisatie en analyse van technische problemen die mogelijk kunnen optreden bij de ontwikkeling van het door het project op te leveren product, en maakt hierbij gebruik van een methode van rationeel probleem oplossen. Risicomanagement gaat hierbij uit van de impliciete aanname van instrumenteel

gedrag bij zowel het risicomanagement proces als bij het object van risicomanagement. Instrumenteel gedrag houdt volgens Habermas (1984) in dat het gedrag van derden (zijnde: actoren in de zin van personen) niet van invloed is op de uitvoering van het proces of het resultaat van het proces. Instrumenteel gedrag alleen is echter onvoldoende in staat om het proces van risicomanagement binnen IT projecten, in het bijzonder ERP implementatieprojecten, te beschrijven. In dit type projecten speelt interactie tussen project stakeholders gedurende het project, en dus ook tijdens de uitvoering van risicomanagement, een belangrijke rol. Daarom wordt in dit proefschrift de benadering van risicomanagement als instrumentele actie uitgebreid met risicomanagement als sociale actie (Habermas, 1984). Hierdoor ontstaat de mogelijkheid om te erkennen dat interactie tussen stakeholders een rol van betekenis speelt in zowel het project zelf als in het risicomanagement proces dat zich afspeelt binnen het project.

Case studies – toepassing van risicomanagement

In totaal 19 stakeholders (projectmanagers, IT leveranciers en opdrachtgevers) van zeven verschillende ERP implementatieprojecten zijn geïnterviewd over de wijze waarop zij risicomanagement toepasten binnen hun project, en of (en zo ja; hoe) dit een effect had op het succes van het project. In overeenstemming met de bestaande literatuur (Bannerman, 2008; Besner & Hobbs, 2006; Voetsch et al., 2004) gaven zij in overgrote meerderheid aan dat niet alle onderdelen van het risicomanagement proces werden toegepast. Een activiteit als risico-identificatie werd in alle projecten toegepast, terwijl een strikt kwantitatieve analyse van de risico's, zoals bijvoorbeeld beschreven in handboeken voor projectmanagement (Project Management Institute, 2008) en projectrisicomanagement (Association for Project Management, 2004) in geen van de projecten werd toegepast. De geïnterviewde stakeholders gaven diverse redenen aan waarom ze bepaalde risicomanagement activiteiten uitvoerden. Zo werd bijvoorbeeld bij de activiteit risico-identificatie door stakeholders aangegeven dat dit volgens hen leidt tot de creatie van risicobewustzijn bij anderen, tot het afstemmen van beelden betreffende de projectsituatie, tot de mogelijkheid om risico's uit te ruilen en tot de mogelijkheid om betrokkenheid van individuele stakeholders bij het project te creëren.

Case studies – invloed risicomanagement op project succes

Tijdens de interviews gaven project stakeholders in totaal 177 indicaties over hoe naar hun mening risicomanagement invloed had op project succes. Een analyse van deze resultaten, waarbij concepten uit de “Theory of Communicative Action” van Habermas (1984) werden gebruikt als een zogenaamde theoretical lens (Cicmil et al., 2009; Horner Reich & Yong Wee, 2006) leidde tot de volgende inzichten. De uitvoering van risicomanagement activiteiten leidt tot een viertal effecten, die elk een bijdrage leveren aan het succes van een IT project. Allereerst is dat een Action-effect; risicomanagement zorgt ervoor dat handelingen (acties) worden geïnitieerd en uitgevoerd. Als gevolg van synchronisatie door risicomanagement activiteiten worden handelingen daarnaast ook effectiever. Tevens genereren risicomanagement activiteiten zogenaamde Perception, Expectation en Relation effecten. Deze effecten dragen bij aan de creatie van een gezamenlijke situatiedefinitie, omdat ze ervoor zorgen dat percepties en verwachtingen die stakeholders hebben omtrent het project en het project resultaat worden beïnvloed en op elkaar worden afgestemd. Daarnaast levert het Relation-effect een bijdrage aan de gezamenlijke situatiedefinitie omdat daarmee de onderlinge verhoudingen en relaties tussen stakeholders worden vastgesteld. Een definitie van de situatie waarover de stakeholders gezamenlijk overeenstemming hebben bereikt is in termen van Habermas een voorwaarde voor effectief handelen. Uit de analyse blijkt verder dat de vier ERP projecten die als meer succesvol worden beschouwd, een hoger aantal indicaties (34 gemiddeld) hebben over hoe risicomanagement activiteiten project succes beïnvloeden dan de drie projecten die minder succesvol zijn (14 indicaties gemiddeld). Tenslotte blijkt dat bij de drie projecten die minder succesvol zijn, het Relation-effect volledig ontbreekt. Dit is een aanwijzing dat deze projecten minder goed in staat zijn gebleken om met behulp van risicomanagement activiteiten te komen tot een volledige gezamenlijke situatiedefinitie, waardoor het handelen van actoren binnen die projecten minder effectief is.

Experiment – invloed van risico-identificatie op project succes

Een van de resultaten uit de case studies, namelijk dat geïnterviewde project stakeholders aangeven dat de activiteit “risico-identificatie” volgens hen een sterke invloed uitoefent op projectsucces, is de aanleiding geweest voor de uitvoering van een experiment waarin de relatie tussen een specifieke risicomanagement activiteit en

projectsucces is getoetst. Met behulp van het experiment kan een resultaat uit case studies, een resultaat dat gebaseerd is op de meningen van stakeholders, nader worden onderzocht en worden geobjectiveerd in een gecontroleerde omgeving. In totaal 53 projectgroepen met elk vier leden participeerden in het experiment. De resultaten van het experiment geven aan dat projectgroepen die voorafgaand aan de projectuitvoering een risico-identificatie uitvoeren waarin ze als groep gezamenlijk over de risico's discussiëren, significant meer taken goed uitvoeren dan de groepen die geen risico-identificatie uitvoeren, of groepen waarvan de leden individueel een risico-identificatie uitvoeren. Projectgroepen die gezamenlijk een risico-identificatie hebben uitgevoerd zijn ook significant meer tevreden over het eindresultaat van hun project dan de andere groepen. De resultaten van het experiment geven ondersteuning aan het vermoeden dat een individuele risicomanagement activiteit een positieve invloed heeft op het succes van een project. Uit de opzet van het experiment kan worden afgeleid dat deze betere prestatie niet is terug te leiden tot het feit dat de projectplanning is aangepast, de projectgroep meer tijd heeft gehad voor de projectuitvoering of meer feitelijke kennis over de projectrisico's had. Daarmee geven de resultaten een indicatie dat het gezamenlijk spreken over risico voorafgaand aan een project er toe bijdraagt dat de projectgroep beter presteert, en dus dat een risico-identificatie in de vorm van een groepsdiscussie bijdraagt aan projectsucces.

Consequenties voor de praktijk en aanbevelingen

Uit de literatuur die het vertrekpunt vormt voor dit onderzoek blijkt dat er weinig aanwijzingen zijn dat projectrisicomanagement een bijdrage levert aan het succes van een IT project. Een belangrijke reden daarvoor is dat de aannames waarop de werking van projectrisicomanagement is gebaseerd, onvolledig en mogelijk zelfs onjuist zijn in de context van IT projecten. Ondanks dat worden bepaalde risicomanagement activiteiten uitgevoerd op IT projecten, en zijn stakeholders van mening dat deze activiteiten bijdragen aan het succes van het project. Dit onderzoek laat zien dat risicomanagement activiteiten er voor zorgen dat handelingen van stakeholders worden geïnitieerd en worden gesynchroniseerd. Daarbij is er sprake van de creatie van een gezamenlijke handelingssituatie, waarbinnen het handelen van stakeholders effectief kan plaatsvinden. Als zondanig levert dit een bijdrage aan het projectsucces. Het vermoeden dat een individuele risicomanagement activiteit een bijdrage kan leveren

aan project succes wordt bevestigd door het uitgevoerde experiment. Op basis van de bevindingen uit het onderzoek wordt geadviseerd om de uitvoering van risicomanagement activiteiten in de praktijk van IT projecten voort te zetten. Daarbij moet echter worden meegenomen dat het positieve effect van risicomanagement op project succes beperkt aantoonbaar is voor wat betreft het instrumentele, op rationele besluitvorming gebaseerde effect van risicomanagement. Voor het bereiken van een positief effect van risicomanagement op project succes via communicatief handelen is het niet nodig dat het volledige risicomanagement proces wordt doorlopen. Individuele activiteiten binnen het proces hebben elk hun eigen effect op project succes. Het positieve effect van risicomanagement activiteiten op project succes treedt in dat geval met name op wanneer project stakeholders met elkaar in contact zijn en interacteren. Daarom wordt aangeraden om daar waar de keuze is, bijvoorbeeld de keuze tussen risico-identificatie in de vorm van het individueel invullen van een vragenlijst, of in de vorm van een brainstormsessie, te kiezen voor een brainstormsessie. Dat is namelijk een vorm waarin stakeholder interactie groter is dan bij het invullen van een vragenlijst.

Verder onderzoek

Hoewel uit het onderzoek blijkt dat individuele risicomanagement activiteiten een positieve invloed kunnen hebben op project succes vanwege het genereren van zogenaamde communicatieve effecten, is verder onderzoek gewenst. In de eerste plaats om het model met de genoemde effecten (Action, Perception, Expectation, Relation) verder te valideren of zo nodig te modificeren. Ten tweede, om te proberen de relatie tussen risicomanagement en project succes verder te isoleren, om daarmee precies te kunnen vaststellen wat het effect van risicomanagement is, zonder de invloed van diverse verstorende factoren. Ten derde kan overwogen worden om nieuwe cases te zoeken waarin geen risicomanagement is toegepast, om vervolgens vast te stellen of deze projecten wel als succesvol kunnen worden aangemerkt, of eventuele communicatieve effecten aanwezig zijn, en zo ja, waardoor deze dan worden gegenereerd. Ten vierde kan worden gekeken naar de verschillen in effect van verschillende vormen van één bepaalde risicomanagement activiteit. Tenslotte kan vanuit de theorie van Habermas nader worden gekeken naar hetgeen zich binnen

risicomanagement afspeelt. Bijvoorbeeld: in hoeverre speelt strategisch gedrag[5] een rol, en wat is de invloed daarvan op project succes, en hoe kan de communicatie gedurende bijvoorbeeld een risico-identificatie (brainstorm)sessie worden geduid in termen van de door Habermas genoemde “regulative speech acts”. Voor de beantwoording van deze vragen is een breed scala aan onderzoeksstrategieën benodigd, bijvoorbeeld case studies, experimenten en observaties.

[5] Strategisch gedrag in termen van Habermas (1984) houdt in dat actoren hun eigen doelen nastreven ten koste van de doelbereiking van andere actoren. Actoren stemmen hun doelen en beelden dus niet op elkaar af, zoals in communicatieve actie.

Biography

Karel de Bakker (1965) received his Master (MA) in Public Administration from the University of Twente, Enschede in 1989. He continued for two further years at the same university as a contract researcher, working in the field of decision support systems. This research led to his first paper in 1991: “Development, Implementation and Impact of the TESSEC Expert System” (de Bakker & Wassink, 1991). At this juncture, rather than pursuing a PhD, Karel chose to leave the university and began working in IT and project management consultancy.

Working for organisations including Ordina and KPMG Management Consulting, and from 2001 as a self-employed consultant, assignments brought him in contact with various organisations. These included ABN AMRO Bank, ING Bank, Interpay (today: Currence), KLPD (Netherlands Police Agency), KPN Telecom, NS (Dutch Railways), Robeco and various government organisations. Over the years, risk management became an important element in his assignments, and on a significant assignment in 2006, Karel was responsible for the risk management process on a large IT improvement programme in the banking industry.

Throughout this time, reflection on work situations remained important to him, and in 2001 Karel started publishing again, this time predominantly for the Annual Project Management Institute Congress (de Bakker & de Roode, 2001; de Bakker, Stewart & Sheremeta, 2002; de Bakker & Somani, 2006). In 2000 he became a member of the board of the Risk Management Specific Interest Group (Risk SIG), and in 2004 he received his project management certification (PMP). In 2006, Karel accepted a position as a full time PhD student, to study the relationship between project risk management and project success. “Going back” to the university with 15 years of work experience led to a dynamic, sometimes challenging combination of fulfilling, concurrently, the roles of student, teacher, researcher and practitioner. He hopes he will be in a position to continue this combination of roles in the future.

about deB

research

Does risk management contribute to project success; more specifically to success in Enterprise Resource Planning (ERP) implementation projects? This book seeks to find a scientific answer to that question; a question that finds its origin in the IT project management environment in which the author has worked for over 15 years.

The answer to this question is provided by conducting a combination of literature investigation, case studies and an experiment. This combination of research strategies ensures a comprehensive overview of the research problem and the answers to it. Research findings indicate that individual risk management activities, for instance risk identification, risk allocation or risk reporting, have a positive effect on project success. However, contrary to general risk management theory, it is unnecessary to execute the complete risk management process in order to create the positive effect.

The author has worked for over 15 years as project manager, project management consultant and project risk manager, predominantly in IT industry. A selection of his scientific work has been published in International Journal of Project Management and Project Management Journal. He has presented his work at both scientific and practitioners conferences, including London, Madrid, Amsterdam, Berlin, and most recently in Hong Kong.

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