

**RISK MANAGEMENT PRACTICES
IN THE MAIN INDUSTRIES
OF GERMAN
SMALL TO MEDIUM-SIZED ENTERPRISES
AN EMPIRICAL INVESTIGATION**

Volume I

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ABSTRACT

The business management literature has largely neglected the theme of risk management for SMEs. So the aim of this research was to explore the current state of risk management in German SMEs and to reveal the problems which firms have with implementing a risk management system.

Risk management is a relatively new discipline. Thus until now no general standard has been developed what to understand by a holistic risk management. Based on an extensive literature analysis, this study – besides risk management in the stricter sense – also sees the following components as essential for a holistic risk management: business planning and modern instruments of performance measurement. The present investigation places a special focus on these subsystems.

Because of lacking empirical data a nationwide postal questionnaire has been chosen to obtain a broad picture of current risk management practices in German SMEs. A validation and further deepening of the results has been carried out by a larger number of research interviews.

Derived from a comprehensive analysis of the questionnaire and the interview results, a scoring approach to assess the risk management sophistication of SMEs has been developed. The approach does not, as usual, evaluate one single scoring figure. Instead it allows a differentiated assessment by evaluating separate scoring figures for each component of a holistic risk management system. The scoring approach presented is very transparent and thus can easily be adapted for similar research problems of risk management.

Based on the scoring approach, this study introduces a new typology of risk management practices, derived from the empirical findings. It extracts three types of firms' risk management practices: reactors, defender/prospectors and analysers. The typology draws on the well-established approach of Miles and Snow who developed their types for classifying business organizations. The present study develops the Miles and Snow typology and makes it applicable for the purpose of risk management practices.

Each of the three risk management types is described by its determinants with respect to the components of a holistic risk management. Then recommendations are formulated which actions a firm of the respective type should take to improve its risk management, thus contributing to the firm's further positive development.

DECLARATION

This thesis is submitted to Napier University for the Degree of Doctor of Philosophy. The work described in this thesis was carried out under the supervision of Dr Morrison Handley-Schachler and Prof. Simon Gao. The work was undertaken in the School of Accounting, Economics and Statistics, Napier University, Edinburgh, UK.

In accordance with the regulations of Napier University governing the requirements for the Degree of Doctor of Philosophy, the candidate submits that the work presented in this thesis is original unless otherwise referenced within the text.

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* Multiple selection allowed

1 Introduction

The present PhD thesis presents an empirical approach to risk management practices in selected industries of German small to medium-sized enterprises (SMEs). Section 1.1 of this introductory chapter discusses risk management in Germany. SMEs are of great importance in Germany. Therefore it is surprising that they have been neglected in empirical investigations on risk management (Section 1.1.1). Currently (2006), legal and other regulations with their effects on the handling of risks are making insecure German SMEs (Section 1.1.2).

Section 1.2 classifies the terms of risk and risk management and presents the reactive and proactive risk management paradigms. When facing the management of individual projects companies have to deal with both local and global risk considerations, which means the consolidation of single project risk assessments into the company-wide risk management.

Section 1.3 distinguishes SMEs with respect to quantitative and qualitative criteria. Here a variety of definitions exist, in the national as well as in the international context of SME research.

Section 1.4 outlines the research aims and objectives of this thesis. Finally, Section 1.5 summarizes the research approach and the outline of the subsequent chapters.

1.1 Background: Risk Management in Germany

1.1.1 Risk Management Deficiencies in Small to Medium-sized Enterprises

In 2004, there were a total of 2,915,482 companies in Germany, 99.7% of them being SMEs (according to calculations made by the IfM Institut für Mittelstandsforschung – Institute for SME Research). These SMEs employed 20.1 million people or around 70.5% of all employees in the Federal Republic (Günterberg and Kayser, 2004). The percentage indicates very clearly the significance which SMEs have for Germany.

But apart from constituting the overwhelming majority of all enterprises, German SMEs have a high value in other national economic functions. For example, during periods of high unemployment the employment function of SMEs becomes one of the main supporting columns of the national economy. Over 80% of the dual

training of qualified workers is carried out by SMEs as well. Moreover, because of their flat structures and the resulting flexibility and speed of decision-making, SMEs are extremely innovative and capable of growth. Further, the diversity of the sectors in which SMEs are active represents an opposite pole to the regional mono-structures (De, 2005, p. 242).

It is therefore all the more surprising that in Germany SMEs have so far been largely ignored in empirical business management research (see Ossadnik et al., 2004; Berens et al., 2005). Concerning the current state of risk management in Germany there are no substantial findings (Kessler, 2000, Kirchner, 2002). The national and international literature also offers only a few proposals how a risk management suitable for SMEs could be designed (Consultation and Research Centre of the Institute of Chartered Accountants in England and Wales – briefly: ICAEW, 2005). This fact is often explained by risk management being a very young branch of business management theory which has yet not developed standards (see, for example, Alquier and Tignol, 2006, p. 277).

According to the IfM and the present author's own calculations based on the 2002 Value Added Tax (VAT) statistics (Federal Statistical Office, 2004), 71.9% of the German SMEs are to be found in the following industry sectors:

- construction
- engineering
- information technology
- auditing, consulting and training
- trade, service and logistics

The present work will deal with just these five main industries.

It is noticeable that the first four of the above industry sectors concern companies which primarily offer project-based services. Since there are no empirical results on project risk management in SMEs (Guserl, 1996; Troßmann and Baumeister, 2004; Alquier and Tignol, 2006) the characteristics of risk management in project-oriented companies will be given special consideration.

1.1.2 Legal Regulations Concerning Risk Management, Basel II

In Germany, the theme of risk management (not only for SMEs) has moved back into the centre of focus over the years from 1998 until now (2006). The cause was the German Control and Transparency Act (KonTraG, 1998) which came into

effect on the 1 May 1998. The background to the act was a number of spectacular company crises which have occurred over the last few years and which, in the opinion of the lawmakers, were caused by a lack of risk awareness and insufficient control and information mechanisms (see Hornung et al., 1999, p. 317). To safeguard the shareholders' interests in the continuing success and development of the company, the federal German lawmakers, in passing the KonTraG law for the first time, gave legal emphasis to the general management task incumbent on directors of listed joint stock companies and to their duty of care with regard to risk management (see KonTraG, 1998).

Among other things the extension of § 91 of the Joint Stock Companies Act (AktG) requires the board of directors of a joint stock company to ensure the existence of an appropriate risk management system. The board must

“... take appropriate measures, in particular that of setting up an internal control system, so that developments which put at risk the continuing existence of the company can be identified at an early date.” (§ 91 para. 2 AktG)

However, neither the wording of the act nor its reasoning gives information on how the required risk management is to be shaped in detail.

When considering its practical implementation the members of the board of directors, who must exercise the prudence shown by a correct and conscientious director called for by § 93 para. 1-1 AktG, have to orient themselves towards economic aspects (see for example Hornung, et al., 1999, p. 318). Following § 93 para. 2 AktG, should a claim for damages arise any breach of this duty of organization can lead to a sharply increased situation of liability. If no adequate control system has been established, the board of directors may therefore be made personally liable through having violated their responsibility. According to § 317 para. 4 of the German Commercial Code (HGB), from the 1999 financial year onward, the chartered accountants must assess and qualify in their annual audit as to “whether the board of directors has fulfilled the measures incumbent upon them under § 91 para. 2 of the AktG in a suitable form and whether the control system to be set up as described by the act is capable of fulfilling the tasks required of it.”

It is noticeable that in very large firms, while having implemented the risk management requirements according to the KonTraG law, risk management is nevertheless seen more as a compulsory exercise and is therefore not coherently integrated into the current management. It is also in most cases seen as a reactive type of risk management (Federation of European Risk Management Associations

et al., 2004; Ernst & Young, 2005). The study by the Federation of European Risk Management Associations et al. (2004) in three European countries (the United Kingdom, France and Germany) revealed that in terms of the implementation of a company-wide risk management the very large UK companies are significantly more advanced than companies in Germany and France.

Managers in Germany still do not properly appreciate the actual benefits which risk management have for the company itself. That is, that risk management can contribute in particular to the company's value creation and preservation. Thus risk management has already been integrated into the planning and management system in only around a half of the companies investigated (Ernst & Young, 2005, p. 16).

In contrast to the explicit regulation for joint stock companies, no corresponding regulation has been provided for the other enterprises. Based on the reasoning behind the KonTraG law, the prevailing opinion assumes that the law also has a spill-over effect on the duties and obligations of a "prudent businessman" of a any company. According to the governmental substantiation of the KonTraG law, each company has to establish a risk management being in accordance with its size, structure and complexity. Naturally this has strongly made insecure many SMEs how such a risk management should be designed and implemented (Gleißner et al., 2004, p. 10; Münzel and Jenny, 2005; KonTraG, 1998)¹.

Further uncertainty in SMEs has been provoked by Basel II, the new international equity capital regulations on lending by banks (coming into force on 1 January 2007; Basel Committee on Banking Supervision, 2003). In connection with the evaluation and rating process borrowers are subject to, Basel II demands from the banks to make an assessment as to how the companies deal with the opportunities and risks presented by their development.

The Basel II regulations do not explicitly demand to establish a comprehensive and strictly formalized risk management system (see Basel Committee on Banking Supervision, 2003). Nevertheless, when rating an SME, the lending bank will assess the management accounting instruments and the abilities of management.

¹ For example the Higher Regional Court in Düsseldorf required the director of a private limited company to pay damages because – in breach of the legal obligation arising from § 43 para. 1 Private Limited Company Law (GmbHG; "due care and diligence of a prudent businessman") – he had not introduced a risk management system (see judgement of the 26.04.2001, OLG Düsseldorf, file ref. 6 U 94/00). An appeal against this decision was submitted to the German Federal Supreme Court (BGH, II ZR 168/01), although with its decision of 23.06.2003 the German Federal Supreme Court rejected the appeal so that this judgement has since become legally effective.

This covers to determine whether a risk management system has been implemented to a certain extent and whether replacement regulations have been fixed (see Füsser and Heidusch, 2002, p. 61).

Many of the small to medium-sized enterprises surveyed by a recent study on management accounting were also directly questioned about the existence of a risk management system. Because of Basel II, they want to introduce improvements, in particular to their management accounting techniques and reporting procedures (Flacke and Siemes, 2005). For SMEs the establishment of a risk management system therefore becomes essential to their survival, since it affects their ability to continue to receive credit from the banks (Wildemann, 2005).

A risk management system is, however, necessary for SMEs, not only because it is required by law or by the Basel II regulations, but rather because it is in the essential interest of the SMEs. The reason is that such enterprises have a high potential to become insolvent and the most frequent causes of insolvency are management errors and weaknesses in the company structure. This is especially true during the first 7 years following the establishment of the company (Dutta and Evrard, 1999; Watson and Everett, 1999; Bretz, 2003; Günterberg and Kayser, 2004).

1.2 Classification of Risk and Risk Management

The discipline of management studies contains no single definition for the term risk. There is agreement that risk is to be seen as something negative and thus should subjectively convey the idea of uncertain developments. The spectrum of definitions² to be found in management studies ranges from risk as a synonym for quantifiable or measurable uncertainty (see Knight, 1921, p. 20) up to complex measures of risk such as Leitner's measure of "speculative risk" (see Leitner, 1915, p. 95). In the following notes risk is to be understood as the danger of losses resulting from a decision. In this respect, risk is also described in a narrower sense as a "speculative risk," (cf. Figure 1.1). Losses are taken to mean net reductions in assets (see Baetge and Jerschensky, 1999, p. 171).

² For a detailed summary and delimitation of the terms for risk applied in literature on management studies see Kessler (2000, p. 40).

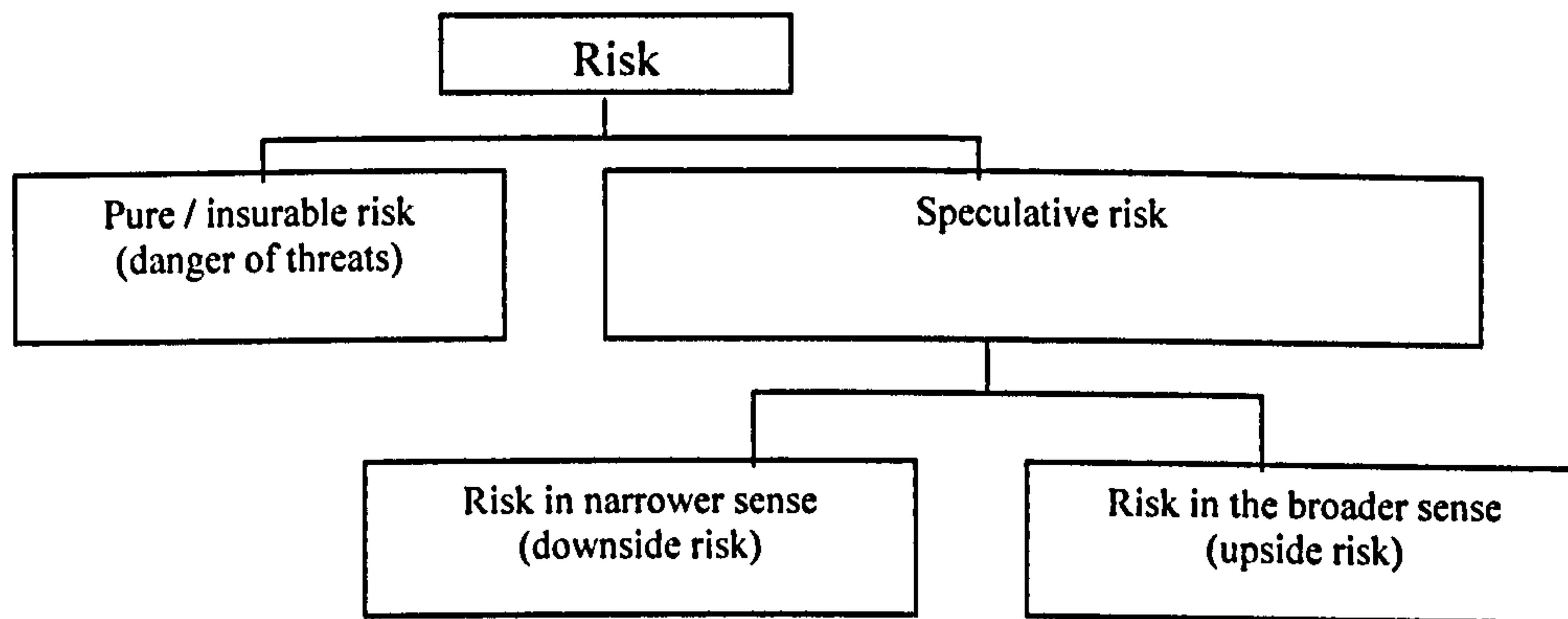


Figure 1.1 Classification of the Term Risk

Source: adapted from Kless (1998, p. 93) and Münzel and Jenny (2005, p. 29)

The acceptance of risk in the latter sense is a feature which is part of the existence of every entrepreneurial activity. A business must identify the risks which it has already entered into and measure, control and adjust them if it wants to ensure its long-term existence (see Hahn, 1987, p. 139). As shown by Figure 1.1, the KonTraG law strictly speaking only covers the pure/insurable risk and from the speculative risk only the downside risk. Of course, as has already been mentioned, entrepreneurial decisions are always associated with risks and opportunities. This clarification has now also been adopted by the lawmakers through § 289 of the German Commercial Code, i.e. that a director's report must include a report on the main risks and opportunities involved in the entrepreneurial development.

The aim of risk management is therefore to control and manage the existing and future risks of a company so that, given reduced risks and continuing opportunities for earnings, the value of a company increases and that there is an assurance that the risk position of a company (i.e. the sum of the risks entered into by a company) does not exceed its risk-bearing ability (Baetge and Jerschensky, 1999, p. 172). The risk-bearing ability is the ability of the company to bear losses arising from the risks it has entered into without becoming insolvent. Risk management is thus an important aspect of value-based management (see Baetge and Jerschensky, 1999, p. 172; Dickinson, 2001, p. 360).

The risk management process basically consists of the following four steps (see Vaughan and Vaughan, 2001):

- identification of risks
- quantification and thus evaluation of risks
- management and control of risks
- continued reporting on the development of risks

As part of the organization of risk management the company management therefore has to set out the basic strategies for risk management and to nominate the personnel in the company to be responsible for risk identification, evaluation and control.

According to Oehler and Unser (2001) the following four strategies are available as measures for managing and controlling the risk in a company:

- risks can be avoided.
- risks can be reduced.
- risks can be transferred.
- risks can be borne by the company itself.

As Smallman (1996, p. 14) states, the first two of the above strategies can be combined into a cause-related risk policy, which is directed at the risks themselves (proactive risk management). The remaining two can be combined into an effect-related risk policy, which limit the effects of risks entered into (reactive risk management).

In most companies that operate a proactive risk management, all four instruments referred to are employed, although they are given different weightings (Baetge and Jerschensky, 1999, p. 173; Smallman, 1996, pp. 14-15). The structure of such a mix of risk strategies depends on the company's risk preferences, its management and the type of business it is engaged in (see Baetge and Jerschensky, 1999, p. 173).

Once the risk strategy for a company has been fixed the risk fields or risk categories (for which the individual types of risk are to be investigated) must be determined. The general opinion of the literature is that the risk categories can be classified in terms of their sources into direct and indirect risk categories (Hahn, 1987, p. 138; Smallman, 1996, p. 14; Münzel and Jenny, 2005, p. 69).

As Figure 1.2 displays, the direct risks include organizational risks; they can be directly responsible for critical developments because they are directly connected

with the company. The direct risks cover for example operational risks, business risks and financial risks.

The indirect risks include the political and economic environment in which the company is embedded, and they primarily involve legal and statutory risks. These risks are described as indirect risks because they work as crisis accelerators and can further increase the critical development of the company caused by the direct risk fields.

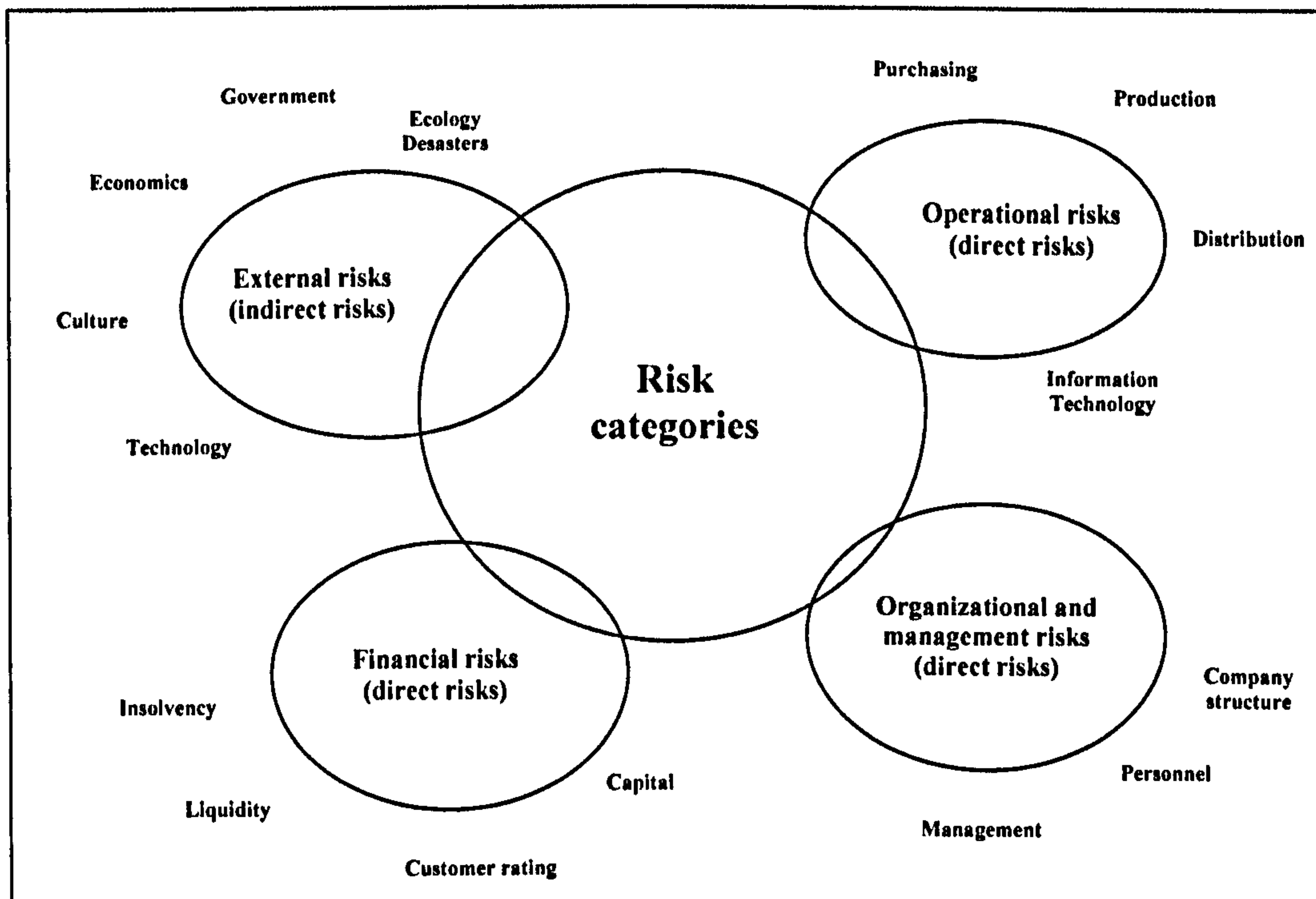


Figure 1.2 The Enterprise's Risk Categories

According to Smallman (1996, p. 15), the various risk fields makes it necessary to operate a holistic risk management system. Smallman argues that a holistic risk management is characterized by three main aspects.

The first aspect is a continuous monitoring of all the sources of risk referred to in Figure 1.2. Here special attention should also be given to what are termed weak signals. Information on risks should be gathered together from the most diverse sources and in particular from the customer and market perspectives. Since to some extent non-financial (i.e. qualitative risks) also play a large role in the risk fields, it is not possible to concentrate only on probability theory and actuarial models. Just as equally must qualitative techniques such as scenario planning or other qualitative techniques be applied here. Nowadays (2006) the literature on

modern performance measurement techniques (such as Balanced Scorecard or shareholder value) emphasizes their application for risk management purposes (see for example, Wolf, 2003, p. 85; Romeike, 2005, p. 277; Scholey, 2006; Hudson-Smith and Hudson, 2006).

The second aspect is the combination of qualitative and quantitative techniques on risk assessment and management. The third aspect concerns the organizational learning where one learns from past errors and disasters and where a culture is established in the company allowing for a positive approach to dealing with mistakes and does not punish employees for mistakes. In this way a knowledge management within the company can also be employed for the purposes of risk management.

A specific feature of a project-based organization is that the management of single projects, the management of a network of internal and external projects and the relationships between the company and the single projects must be co-ordinated (Andersen and Jessen, 2003, p. 457).

Utilizing the existing organizational structures and resources, it seeks to manage the project by applying a collection of tools and techniques. It includes defining the requirement of work, establishing the extent of work, allocating the resources required for the execution of the work, monitoring the progress of the work and correcting deviations from the plan (Munns and Bjeirmi, 1996, p. 81-82).

The development of a single project is divided up into 4 phases, forming the so-called project life cycle:

- conceptualization: identifying and defining possible projects, feasibility study to determine whether a project can be worked on with the existing personnel, know-how and resources
- planning: decomposing the project into its constituent parts, in terms of cost, quality, time, activity duration
- execution: successful completion of the project, ongoing monitoring of project, evaluation process
- termination: project close down and hand over, post-project review

According to Ward and Chapman (1995), the project life cycle is a convenient way of conceptualizing the generic structure of projects over time. During each phase the resources employed, the conflicts with other projects and the rate of

expenditure can be tracked. For risk management purposes, breaking down the four phases into detailed stages may highlight sources of project risk.

Project-based businesses exhibit the special feature of “local” and “global” risk management. In these companies the risk fields discussed in Figure 1.2 are to be identified at the level of each individual project as well as for the overall business. As a rule, the indirect risks do not play such a strong role in the individual projects. But instead there is the problem of combining the observations of the individual project-related risks into an overall risk position for the entire company (what is known as the duality of risk management, see also Guserl, 1999, p. 428). This situation is displayed in Figure 1.3.

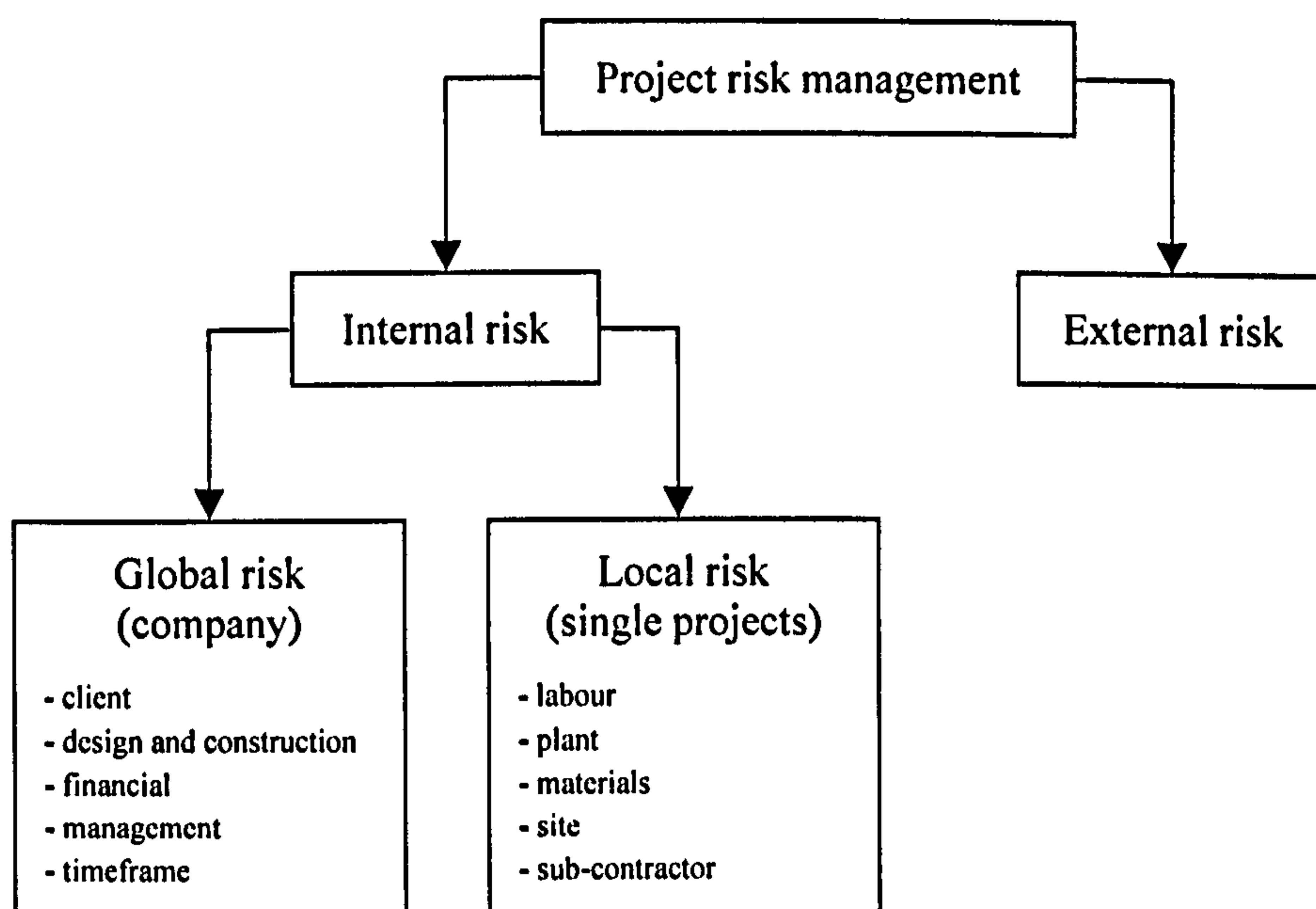


Figure 1.3 Breakdown of Project-based Risk Management

Source: adapted from Tah and Carr (2000, p. 109)

1.3 Definition of Small to Medium-sized Enterprises (SMEs)

In commerce and politics the term “Mittelstand” or “the German Mittelstand” is often applied – what exactly does it mean?

In Germany, the term Mittelstand is very widespread. Interestingly, there are no direct equivalents in English or French for the expression. This fact is due to the situation that in the German economy an understanding of Mittelstand is more qualitative than associated with certain size classes (De, 2005, p. 236).

In order to bridge the gap to actually specified criteria the term *Mittelstand* can be covered by the English language expression “SME – small and medium-sized enterprise.” Thus in the present thesis the term *Mittelstand* will be taken as synonymous with SME and with the companies which fulfil the corresponding criteria.

In terms of the definition of SME the literature distinguishes between theoretical (qualitative) and operational (quantitative) criteria for definitions (Curran and Blackburn, 2001, p. 22; Krämer, 2003, pp. 8-11; De, 2005, pp. 172-176). In the economic sector therefore there is no common definition for small and medium enterprises. The most precise definition for small and medium-sized enterprises would be a multidimensional definition based on qualitative and quantitative limiting criteria.

If any qualitative aspects are taken into account at all, theoretical definitions consider criteria of SMEs such as the autonomy of a company, its personal comprehensibility and the financial and personal engagement of at least one owner (Krämer, 2003, p. 9). Such a definition is scarcely appropriate if one wishes to approach SMEs in empirical terms. Regarding SME research, it fails in practice due to the heterogeneity of enterprises and of the measurability of these criteria. In empirical work therefore precedence is usually given to the more operational quantitative criteria (Curran and Blackburn, 2001, p. 10; Krämer, 2003, p. 9).

Workable definitions for quantitative criteria primarily focus on annual turnover and/or the number of employees. Often a certain criterion of legal independence is also included (Curran and Blackburn, 2001, p. 22; Krämer, 2003, p. 10; De, 2005, p. 238).

The European Union utilizes the following definition to group SMEs (Table 1.4):

Table 1.4 Small and Medium-sized Enterprises: EU Subclasses

Subclass	Number of employees	Annual turnover (million Euros)	Balance sheet total (million Euros)
Micro firm	< 10	≤ 2	≤ 2
Small firm	< 50	≤ 10	≤ 10
Medium-sized firm	< 250	≤ 50	≤ 43

Source: Commission of the European Communities (2003)

To belong to one of the classes micro, small and medium-sized, a firm must fulfil the following conditions:

1. The number of employees lies below the respective threshold in Table 1.4. Furthermore, at least one of the thresholds for annual turnover and balance sheet total is met.
2. The “legal independence criterion” must be fulfilled: A maximum of 25 percent is owned by one or more companies which themselves do not match the threshold conditions of No. 1.

The above definition has been valid since 2005 and is updated in terms of annual turnover and balance sheet total at longer intervals of time (Commission of the European Communities, 2003).

From the international perspective there are major differences in the meaning of the criterion number of employees. While for example in the United Kingdom a company with fewer than 250 employees is considered to be an SME, in the United States of America the figure increases to 500 employees (see van der Horst et al., 2005, p. 31; Dana, 2006, p. 3). This is another clear indication of the problems which exist in defining thresholds, even for the quantitative criteria.

Considering the national viewpoint, Germany has no official definition of an SME. There do exist individual regulations such as those in the German Commercial Code § 267 (HGB) which can be applied for special purposes, specifically for the preparation of accounts. For more general purposes there is a recommendation from the IfM in Bonn which sets values for the limiting criteria of number of employees and of annual turnover (see Table 1.5).

Table 1.5 Small and Medium-sized Enterprises.
Definition Prepared by the IfM Bonn (since 1 January 2002)

Subclass	Number of employees	Annual turnover (million Euros)
Small firm	up to 9	less than 1
Medium firm	10 to 499	1 to 50

Source: Günterberg and Kayser (2004)

The EU and the German definitions on the value of the upper threshold of annual turnover are identical, but the definitions for the limiting value for maximum number of employees vary greatly. According to Krämer (2003, p. 11), it is rather due to historic reasons, since the division into size classes used by official statistics utilizes a different breakdown of the size classes. However, the IfM refers to the EU definition and notes that the EU definition will probably be adopted in Germany too at some time in the future (Kayser, 2006). According to research carried out by the Institute for employment research of the German Federal Labour Agency together with calculations made by the IfM (Kayser, 2006, p. 6), there is

little difference in the frequency of SMEs between the size classes of 250 employees and 500 employees. What is also noteworthy is that the IfM definition does not expressly refer to the legal independence criterion.

In order to ensure comparability with other research results, the EU size class definitions for SMEs will be taken as a basis in this thesis. Further, an additional class from 250 to 499 employees will be included as size measure.

As the theoretical definitions addressed, the company structure of SMEs reveals special characteristics which should also be considered.

The owner is present in the enterprise as an entrepreneur. He is directly and indirectly liable for all decisions, so that his entrepreneurial risk therefore is linked with the loss of wealth. The owner therefore has a personal as well as a professional interest in all procedures and decisions involving the company. But again SMEs can often reach a size and complexity which require the owner to delegate decision-making to his employees.

An investigation carried out by the IfM in 2001 indicated that for companies with up to 20 employees only around 25% of the decisions relevant to the company were delegated, while for companies with more than 200 employees this figure rises to 60%. SMEs of the latter size have available an appropriate company culture and appropriate management principles which allows them to address the problem of delegating responsibility appropriately.

The owner is therefore liable as an entrepreneur not only for his own decisions but also for the decisions which he has delegated. This requires, on the one hand, trust in his employees and, on the other hand, opportunities for control. A company culture should be established which is marked by trust but which also allows control mechanisms to be employed.

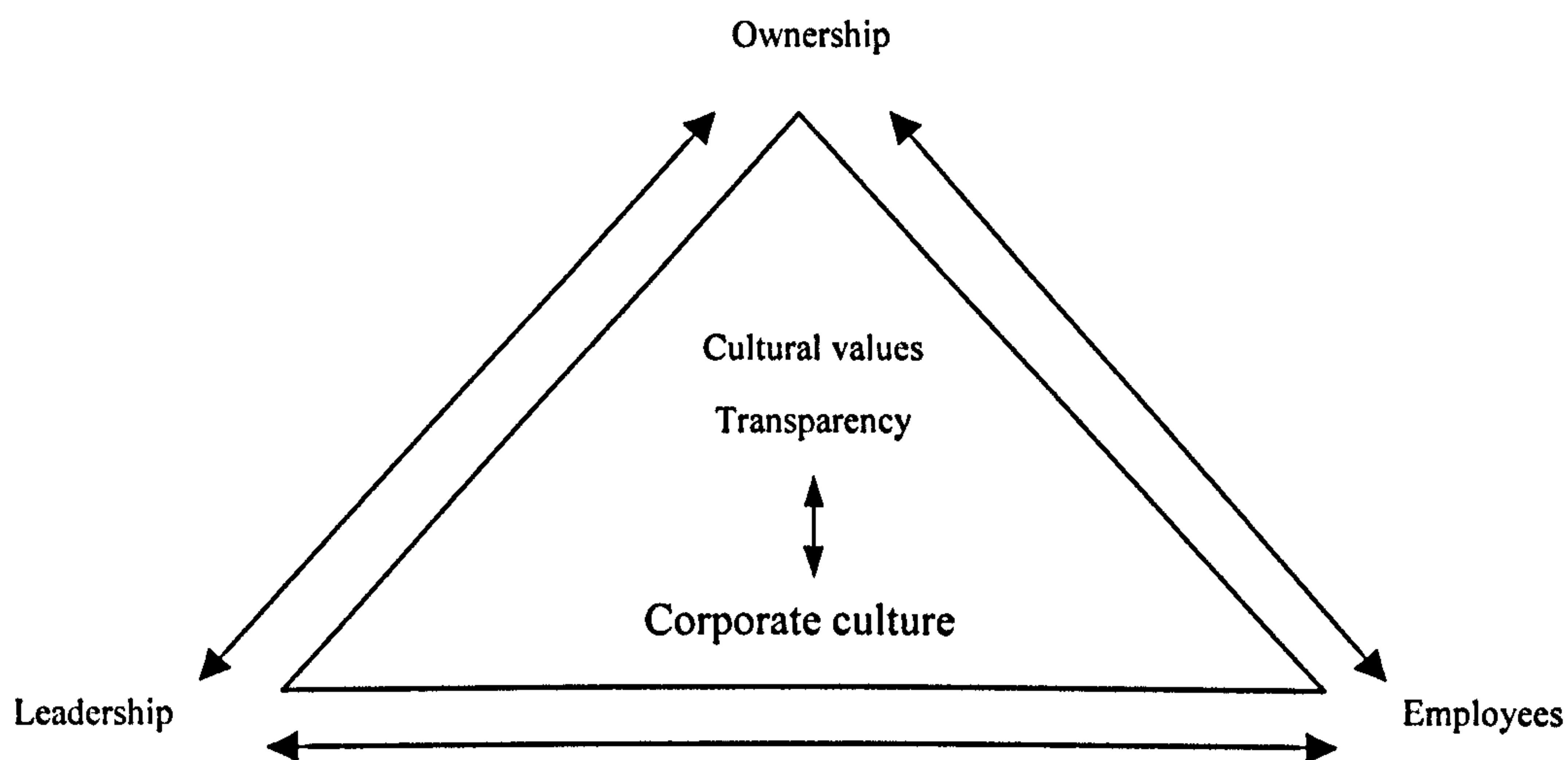


Figure 1.6 Factors Influencing the Culture of SMEs

Source: De (2005, p. 252)

As can be seen from Figure 1.6, leadership is one of the factors which influences the company culture. Due to the risk which has already been described the owner needs a management structure which allows him to have an overview of the company in detail at any time, or in other words: transparent decision-making processes and structures. In general, as company size grows the company activities expand, so that the introduction of further levels of hierarchy may be needed. This in turn extends the decision-making paths and reduces transparency so that the checks by the owner become more difficult. As his company develops the owner must therefore always make sure that the size of the enterprise still allows him to have a detailed overview, and he must develop his management structure appropriately. An appropriate company structure provides the SME owner with an important basis for the management and control of the company and thus almost serves as an instrument of risk management (De, 2005, p. 253).

1.4 Research Aim and Objectives

The aim of this PhD thesis is to investigate the current state of risk management practices in German SMEs and to give an increased understanding of what the main barriers are that stand in the way of implementing such a system. The thesis will establish which constituents are essential for the successful development of a risk management framework for SMEs.

A fundamental step in assessing the quantitative empirical findings is the construction of a set of scoring variables reflecting the various aspects of a holistic

risk management approach. As there is no common understanding in the literature (see Section 1.2) which components a holistic risk management for SMEs should include, an extensive literature survey (see Chapter 2) was necessary. The literature analysis has indicated that a risk management being practicable for SMEs must give particular attention to the sophistication and linking of the existing subsystems for business planning and control. This is due to the fact that – compared to larger firms – SMEs lack the special knowledge to apply elaborate risk management technologies (see Section 2.1).

The analysis of the own empirical data from the questionnaire and the research interviews has impressively confirmed the importance of the subsystems of business planning and control for risk management purposes in SMEs. So the scoring variables to be constructed will first cover the subsystems business planning and Balanced Scorecard or similar instruments. They will then be completed by variables for the aspects of risk management in the stricter sense (see Figure 2.1), namely risk management process, risk management organization and – in the case of project-oriented firms – the additional characteristics of project risk management. The construction of the scoring variables for risk management in the stricter sense takes into account the relations found by the analysis of the empirical data. In a transparent, comprehensible and flexible way these scoring variables together represent the aspects of what, in the author's opinion, makes up a holistic risk management. Such a "multidimensional" scoring approach, allowing to evaluate risk management practices in a comprehensive and compact way, is a new contribution.

Based on the set of scoring variables, a typology to characterize risk management practices will be introduced. The new approach follows the well-known typology of Miles and Snow (1978), originally developed to describe the organizational behaviour of companies. The Miles and Snow typology will be made applicable and operationalized for the purpose of the aspects of risk management.

The findings from the investigation lead to the formulation of propositions how to overcome the deficiencies of risk management practices that had been detected. Some of the propositions are specific to the respective type of risk management sophistication, other apply to all types.

As a result of the intensive review of literature sources and the findings of this study a framework for a holistic risk management in SMEs will be sketched (being independent of the types formerly introduced).

All considerations are directed toward being practicable for SMEs. They aim at supporting them in their day-to-day operations, taking into account their restricted personnel and financial resources and lacking knowledge of business management techniques.

In detail, the objectives of the empirical research are as follows:

- To reveal what are the critical factors (demographic variables such as enterprise size or industry sector, the managing director's personal attitudes or knowledge) that effectively define a company's approach to managing risk.
- To study the formal techniques of risk management, in particular the techniques that are employed in the various phases of the risk management process of risk identification, risk evaluation and risk monitoring.
- To investigate the organization of risk management, such as the responsibilities for implementing and maintaining it or regulations on contingency, replacement and succession.
- To focus on links between risk management and business planning.
- The application for risk management purposes of modern instruments of performance measurement, such as the Balanced Scorecard.
- To examine the handling of single projects with respect to their contribution to the risk profile of the entire enterprise. Specifically, the question will be investigated as to which techniques are applied for risk identification and the evaluation of project risks.
- To derive from the quantitative results a set of five scoring variables. Each scoring variable will reflect the companies' sophistication with respect to one of the aspects of a holistic risk management in the author's sense: business planning, performance measurement, risk management organization, risk management process and (if it applies) project risk management.
- To develop a risk management typology for the assessment of the risk management sophistication of SMEs. This typology will be based on defining groups of companies having similar sets of scoring values.
- To provide recommendations on how SMEs can improve their risk management practice and on the development of a framework for their risk management.

1.5 Outline of the Thesis

The subsequent sections briefly outline the chapters of this study.

Chapter 1: Introduction

The first chapter addresses deficiencies of risk management in German SMEs. It discusses legal and other regulations that currently put pressure on risk management activities in German SMEs. General remarks on the topics risk and risk management and on the problem of classifying SMEs follow. Finally, the introduction outlines the aim and objectives and presents the general approach of this investigation on current risk management practices in German SMEs.

Chapter 2: Literature Review

The second chapter reviews the literature dealing with the topics that, in the author's opinion, make up a holistic risk management, namely:

- business planning
- Balanced Scorecard and similar instruments
- risk management process
- risk management organization
- project risk management process and organization

Since management behaviour affects many risk management aspects, the literature review will also cover it, in particular concerning the topics of uncertainty in the business environment and attitude to risk.

In addition, the literature on classification approaches regarding organizational behaviour and strategy formulation will be analysed. Sources on these topics come closest in supporting one of the main aims of this thesis: to develop a typology for classifying risk management practices.

Chapter 3: Research Methodology and Research Design

This chapter presents the research method as a combination of a questionnaire survey and research interviews.

In a first step, to gain a general overview, the research approach uses a postal questionnaire survey. Research interviews will then deepen and expand the results

of the questionnaire topics. The development and the design of the questionnaire and the research interviews will be presented.

A central role in both the questionnaire and interview surveys will play the construction of scoring variables. They will be the pivotal element in developing a typology classifying a company's risk management practices.

Chapter 4: Questionnaire Results

This chapter analyses the (quantitative) results of a postal questionnaire. It had been sent out in two waves in the years 2002 and 2004, leading to a total of 314 usable responses.

Selected questionnaire issues, i.e. all questions being relevant for a holistic risk management approach, will be discussed, essentially in a bivariate form with respect to the company's demographic variables. Whenever a chi-square test indicates a dependency on some demographic variable, this will be examined.

For each aspect of a holistic risk management (business planning, performance measurement, risk management organization, risk management process and project risk management) the associated variables will be used to construct a scoring variable for the respective aspect.

To validate the scoring approaches, the multivariate methods of factor and cluster analyses will be applied. The constituents of the scoring variables will be undertaken a factor analysis, and the resulting factors will be the input of a cluster analysis.

Chapter 5: Interview Results

This chapter presents the results of 38 in-depth research interviews which were held in 2005 and 2006. Nearly one third of the interviewed firms had also previously participated in the questionnaire survey.

For bivariate examinations, apart from an extended set of demographic variables, some additional variables are available, describing uncertainty in the business environment.

With a slight modification; based on the variables being available in the interview context; a scoring approach similar to that of the questionnaire results will be introduced, reflecting the same five aspects of a holistic risk management.

Specific for the interview approach is the possibility to go into qualitative issues in-depth. The interview findings will be supported by numerous direct quotations of the interviewed managing directors. Special emphasis will be on examining their management behaviour.

Chapter 6: Types of Risk Management Practices Derived from Questionnaire and Interview Scoring

Based on the scoring results in the questionnaire and the interview cases, a typology for the companies' risk management practices will be derived. For this purpose, the typology of Miles and Snow will be adopted for the risk management aspects dealt with in this thesis. The typology of Miles and Snow is widely accepted as being useful to assess the organizational behaviour of SMEs. It should be underlined that their approach does not refer to any risk management considerations.

The scoring variables in the questionnaire and the interview case both allow to characterize a company by a set of scoring attributes, each having a range of low/medium/high. By grouping similar outcomes of such scoring "patterns", three types of risk management practices will be extracted: the reactor type, the defender/prospector type and the analyser type.

The resulting distribution of risk management types will be examined with respect to possible dependencies on demographic variables and (in the interview case) dependencies on variables describing uncertainty in the business environment.

Each type of risk management practices will be illustrated by examples of firms of that type, with a detailed description of their organizational structure and business strategy and their risk management efforts. All these firms come from the research interviews, with some of them having also taken part in the questionnaire survey.

Chapter 7: Practical Implications

Referring to the three types of risk management practices, implications specific to the respective type will be presented that are essential for the company's successful development. General implications being independent of the underlying risk management type will also be summarized; they will concern improvements of the management behaviour.

Leaving the discussion on details of deficiencies derived from the questionnaire and interview results, this chapter then turns to sketching the outlines of a holistic

risk management system for SMEs to overcome the deficits and restrictions having been detected. It also offers how such a system could be implemented step by step. All propositions pursue the aim of being practicable for SMEs.

Chapter 8: Conclusion

This chapter summarizes the major research findings. It points out certain limitations of the study and gives indications for further research.

2 Literature Review

This chapter assembles literature on various aspects of risk management which together may constitute a comprehensive approach to the topic. Although this study focuses on German SMEs, the international literature has also been reviewed. Moreover, the review has not been restricted to SME research; findings on larger firms have been incorporated, to evaluate whether instruments for larger firms may also be useful for smaller ones and because for some issues there is no SME literature available.

Section 2.1 briefly introduces into the current state of the literature on risk management and related topics. The issues dealt with are centred around what is called by this thesis the “holistic risk management approach.” Section 2.2 analyses the research into management behaviour and the attitude to risk, and it describes the special characteristics of SMEs. Section 2.3 reviews business planning activities and the consideration of risk figures within planning systems. Section 2.4 examines the importance of performance measurement systems – such as the Balanced Scorecard – and their application for risk management purposes. Risk management in the stricter sense is discussed in Section 2.5, with its aspects of risk management process (Section 2.5.1), risk management organization (Section 2.5.2) and project risk management (Section 2.5.3). In Section 2.6 typologies to assess business strategies are critically reviewed, whether they already cover risk management considerations or whether they can be adopted to evaluate the companies’ risk management capabilities. Section 2.7 then summarizes the findings of the literature review which have shown to be of particular relevance for the approach of this thesis.

2.1 Holistic Risk Management Approach

Although risk is pervasive throughout society, this thesis narrows its focus by concentrating on business risk management in SMEs. The Faculty of Finance and Management of The Institute of Chartered Accountants in England and Wales (2002) states about SMEs:

“... risk management has become established as a core business activity. However there is still little guidance on how companies should best manage risk, who should be responsible and where to turn to for advice.” (p. 3)

This clearly reveals that risk management is still in an early phase of development and that no standard for SMEs has yet become established which would describe how a comprehensive risk management should appear (cf. Alquier and Tignol, 2006, p. 277; Troßmann and Baumeister, 2004, p. 80). There is also little in the existing SME literature on actual implementations and risk management methods, and as a result this aspect is covered in more depth by current research projects (cf. Consultation & Research Centre of the Institute of Chartered Accountants, 2005, p. 5; O'Hara et al., 2005, p. 32).

The research work carried out to date on risk management in SMEs can be grouped into the following main themes: One area is the management of financial risks and the insurance coverage of SMEs, which has already been more heavily researched (cf. Voss, 1992; Deakins and Bentley, 1995). The other area is the attitude of SMEs towards risk (see Janney and Dess, 2006; Mak et al., 2005; Watson and Robinson, 2003; Helliard et al., 2001; Sparrow and Bentley, 2000; Smallman, 1996).

The present thesis attempts to investigate the current state of risk management more comprehensively and in more depth. This includes in particular the management's knowledge of business management methods and the management's behaviour with respect to risk and decision-making. The investigation will consider with special emphasis the scope of the business planning and the usage of modern performance measurement instruments such as the Balanced Scorecard. A major concern of the present work is to investigate more closely the integration of risk management into the existing company management system.

A problem is that no standard has developed what is to be understood in detail by a holistic risk management (Alquier and Tignol, 2006, p. 277; Hoitsch et al., 2006, p. 2006; Reichmann and Diederichs, 2003, p. 229). Among the management subsystems that have been discussed most frequently with respect to a connection with risk management, business planning comes first (Eck et al., 2000, p. 85; Romeike and Gleißner, 2005, p. 114). The use of instruments of performance measurement comes second (Wolf, 2003). The literature sources agree that risk management is only useful if it is linked with the already existing management subsystems (see, for example, Wolf, 2003, p. 107).

The linking of the subsystems for a holistic risk management takes on special importance and has so far not been widely investigated by the literature (see for example Münzel and Jenny, 2005, p. 74; Gleißner et al., 2004, p. 78). Schematically, Figure 2.1 displays the approach to a holistic risk management, as seen by the author of this thesis. On the topic of a holistic risk management very little of relevance to SMEs is available (see Clink, 2001, p. 44; Kessler, 2000, p. 64).

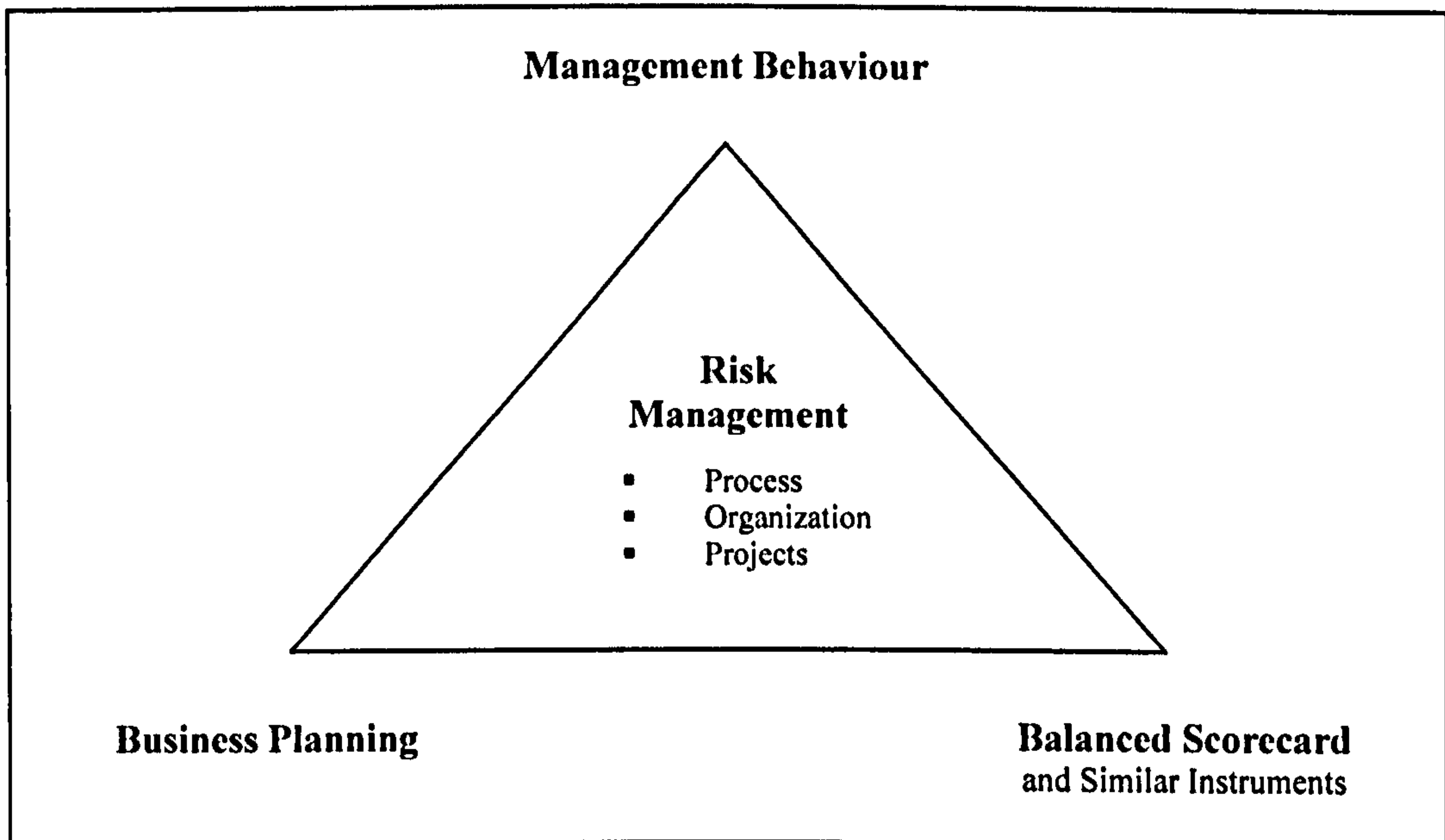


Figure 2.1 Holistic Risk Management

As Mugler (1980), Hollman and Mohammad-Zadeh (1984) and Kirchner (2002) have pointed out, risk management is a much broader approach than merely insurance management. SMEs need very strong support with the systematic implementation of the risk management process since, in general, they lack the necessary resources and the management knowledge to establish an effective risk management (Kirchner, 2002, p. 199). The authors describe what the shape of the risk management process should be and which methods could be chosen for it. They do not go into any further detail on how the risk management process can be integrated into existing management systems.

Recently, as Ossadnik et al. (2004, p. 621) reveal, SMEs in Germany have increasingly become the object of research activities and in particular of empirical investigations. These studies concentrate more closely on business planning and management systems and their assessment in the course of rating in the light of

Basel II (see Berens et al., 2005; Dahms and Siemes, 2005). Flacke and Siemes (2005) also gave some consideration to questions of risk management. They come to the conclusion that SMEs simply overestimate their risk management abilities (p. 256). According to investigations carried out by Breetz (2003), Almus (2004, p. 192) and Wildemann (2005, p. 235), the most frequent reason for insolvencies in SMEs is that – owing to a lack of management skills – they did not identify critical company developments early enough. This substantiates the importance that management behaviour, business planning, performance measurement instruments have for risk management; the following subsections of the literature review cover each of these points.

2.2 Management Behaviour

Table 2.2 lists the main sources of the academic literature on management behaviour in SMEs. The successful managing of a company presupposes that a business strategy has been established. The first part of this section therefore considers how formally the establishment of a strategy is actually carried out in SMEs and which techniques are applied to implement it. In this context the subsection then considers the current problems of SMEs as they are relevant to the present research. The section concludes with the investigation of the attitude to risk. In particular it analyses whether there are differences between SMEs and very large firms and how the attitude to risk influences the management.

Table 2.2 Management Behaviour: Literature Summary

Author / Research focus	Key findings
Management Techniques and Decision Tendencies	
<p>1. Frese et al. (2000)</p> <p>2. van Gelderen et al. (2000) Action strategies and success in SMEs: 49 interviews and 80 questionnaires addressing small business founders with less than 50 employees (Netherlands, local).</p> <p>3. Fletscher/Harris (2000) The value of planning in strategy formation: 25 in-depth interviews with graduate entrepreneurs (entrepreneurs having passed a training programme) of small firms (Scotland).</p> <p>4. Ossadnik et al. (2004) Managerial accounting in SMEs; here instruments used and responsibilities: 155 questionnaires addressing SMEs with up to 500 employees (Germany, local).</p>	<p>Firms having no formal business strategy are most frequently in danger to become bankrupt.</p> <p>Strategy formation needs more than the formal planning procedures that many entrepreneurship programmes merely deal with. For example, formal strategy meetings and setting objectives are clearly of value for better performance.</p> <p>Managerial accounting concentrates on operational planning and monitoring (budgets, cost accounting). Strategic aspects and the application of corresponding instruments such as Cost-Benefit Analysis, GAP-Analysis and the Balanced Scorecard are mentioned rather seldom. The managing director is responsible for the strategic planning and the use of the strategic instruments alone.</p>
<p>5. Smith (1998) Strategies for startups: 150 questionnaires addressing micro firms, followed by interviews with a selection of 17 respondents (Scotland).</p> <p>6. van Gelderen et al. (2005) Success and risk factors in the pre-startup phase: 271 telephone interviews during the startup process (Netherlands).</p>	<p>Very young firms which proactively use formal strategic planning, will tend to perform better than those who follow a more visionary or reactive approach to running the business. Carrying their own business planning and keeping it up to date will lead to success. Enterprises dealing with risk management techniques during the startup phase are more likely to survive.</p>
<p>7. Woods/Joyce (2003) Owner-manager and the practice of strategic management: 436 telephone interviews with micro and small firms (UK, local).</p> <p>8. Richbell et al. (2006) Owner-manager and the practice of business planning: 70 semi-structured face-to-face interviews with small metalworking firms (UK, local).</p>	<p>Owner-manager have heard of fewer strategic tools and risk management techniques than other managers.</p> <p>Owner-manager characteristics can be important in explaining the presence/absence of business planning within the small firm. Especially the level of education and previous work experience in a large firm before setting up their own firm have a significant influence.</p>
Current Developments in Managing SMEs	
<p>9. Hall et al. (2004) Capital structures of European SMEs: Analysis of financial data of 4,000 SMEs having fewer than 200 employees, with a sample of 500 SMEs from each of the selected countries (8 European countries).</p>	<p>German SMEs have the highest gearing ratio in Europe, which has strong impact on the lending practice of German banks.</p>
Risk Behaviour	
<p>10. Sparrow (1999) Risk behaviour of owner-managers of SMEs: 24 interviews addressing high-technology firms with fewer than 200 employees (UK, local).</p> <p>11. Sparrow/Bentley (2000) Decision tendencies of entrepreneurs and SME risk tendencies: 24 interviews addressing firms with fewer than 200 employees (UK, local).</p>	<p>Owner-managers of high-technology small firms take a holistic view with respect to the handling of risks fundamentally different from the way large firms do.</p> <p>Building coherent alternative risk management approaches that are based upon different decision-making tendencies may be a more valuable contribution than singular ideal practices. Entrepreneurs may therefore feel that there could be some benefit from training that provides frameworks to identify and appraise risks.</p>
<p>12. McConaughy et al. (2001) Performance, risk and value in founding family controlled firms: Analysis of the financial statement data of 219 enterprises, comparing the risk behaviour of family controlled and non-family controlled SMEs (USA).</p>	<p>Family ownership controlled firms are more risk averse than non-family controlled ones.</p>
<p>13. Watson/Robinson (2003) Comparing the risk behaviour of male and female controlled SMEs: analysis of the financial data (official database) of 2,367 SMEs having less than 200 employees (Australia).</p>	<p>Regarding the attitude toward risk, there is no significant difference between the performance of male and female controlled firms.</p>

Management Techniques and Decision Tendencies

In their longitudinal studies, Frese et al. (2000) and van Gelderen et al. (2000) revealed that the application of strategic planning techniques in the individual phases of a company is not continuous. Companies which have not established a strategy are the least successful, which often results in the company closing down. The companies only react to external influences (“reactive strategy”), and there is no proactive management.

The most successful companies are those that base their planning during the start-up phase in accordance with the “critical point strategy.” This strategy concentrates on one goal at a time, aiming to solve the most difficult problem first, thereby making strategy an iterative process. It is also noticeable that, having survived the founding phase (the time period has not been quantified more closely), the most successful companies are those which then switch from a “critical point strategy” to a “complete planning strategy” (a top-down approach with a long-term planning horizon). Complete planning means producing a comprehensive set of plans which actively structure given situations.

A further aspect which was investigated was just how far the different planning strategies help to deal with uncertainty in the world outside the company (industrial level uncertainty: change, complexity). Complexity is positively associated with the complete planning strategy and negatively with the critical point strategy. Complete planning strategy is negatively influenced by the changeability of the environment.

The above considerations are to be studied in more depth in the present investigation. Especially the extent is to be investigated to which uncertainty considerations are included in German SMEs’ strategic planning and which instruments are employed.

Fletscher and Harris (2002) confirm the findings of Frese et al. (2000) and van Gelderen et al. (2000). The written description of the company strategy is of the greatest importance for the survivability of the company, particularly in the start-up phase. Other important points are that the board of directors should discuss the strategy with the employees and that progress towards its implementation should be monitored. As Fletscher and Harris (2002) have also observed (with micro-firms and small-firms), directors express the desire for an increased level of

specific practical advice on implementing strategic planning to be taught in further training courses for entrepreneurs.

In his empirical study Ossadnik et al. (2004) discovered that in German SMEs with up to 50 employees the owner alone is responsible for all questions related to strategy. Considerations of strategy are not dealt with in a very formal and systematic manner. As Dutta and Evrard (1999) note, the appropriate employee capacities are often not available, and the employees available do not have the necessary specialized knowledge.

Woods and Joyce (2003) have also established that owner-managers have less strategic planning skills than other managers. It is not that owner-managers view these techniques more sceptically but rather that they simply have less knowledge of the methods. A situation similar to that of strategic management techniques can be observed in the operation of risk analysis techniques, which can be especially seen in companies with up to 50 employees. One explanation is certainly that the other managers were often previously employed in larger companies and so had already come into contact with appropriate techniques. Woods and Joyce (2003) confirm that, as company size increases, the owner-managers begin to take on other managers to provide support for the top management. They also confirm that a greater utilization of strategic methods could be seen than in the companies surveyed.

Richbell et al. (2006) draw on the results of Woods and Joyce (2003) and confirm that the owner-managers characteristics can have a significant influence on the business planning activities in small firms. In particular, the level of education and previous work experience in a large firm immediately before setting up their firm and running firms in sectors outside their previous experience, have a significant influence on the attitudes on planning activities and practices. According to Richbell et al. (2006) there is very limited research into the factors influencing the planning practice of owner-managers, which need further investigation.

The current state of business management knowledge should be investigated for German SMEs since – as Günterberg and Kayser (2004) confirm – the proportion of owner-managed SMEs is very high. As Schachner et al. (2006) note, the literature contains a number of individual (and to some extent contradictory) findings. One reason is that until now (2006) there exist only few studies on the phenomenon of owner-managers (Richbell et al., 2006, p. 509). So it has not

definitely been confirmed whether in owner-managed firms their size has an essential influence on the quality of management systems or if the educational background of the owner-manager constitutes a key factor (Schachner et al., 2006, p. 589).

Having discussed management techniques and decision tendencies in SMEs, current developments and problems SMEs are facing will be looked at.

Current Developments in Managing SMEs

According to a recent survey by Müller et al. (2005), the four most frequently cited problem areas in German SMEs are:

- staff costs
- taxes and charges
- questions of financing in consequence of Basel II
- succession

It is interesting to note that the same study was carried out a year ago (2004) and that Basel II was then in first place (Müller et al., 2004, p. 17). A critical threshold based on company size was not set.

As Feltham et al. (2005) note, owner-managed companies are very much dependent on one person, both in terms of representation and of succession. According to this study, most companies have no rules concerning representation in the event of an emergency. The Canadian SMEs studied are badly prepared in terms of planning succession. This is more than questionable for the continuing existence of the company.

In the future some 71,000 family-owned firms in Germany each year will be confronted with the problem of succession or transfer of the company (see Freund, 2004). According to a study by the IfM, often no successor has been nominated; and for 8.3% of the companies the lack of a successor must lead to the company closing down (see Kayser, 2006, p. 15).

The lack of rules on representation and succession present SMEs with an existential problem. Such rules must be dealt with as part of a comprehensive risk management system.

The questions of providing rules for representation and succession however also come into play in the third problem area which affects SMEs, that is the much

feared and tighter controls on the granting of loans which result from Basel II. Following Basel II – and depending on the size of the SME – an external rating or an internal bank rating is required. Here “hard facts” such as business planning and risk management systems are assessed and “soft facts” such as the knowledge of the top management and rules on representation are given greater consideration. Thus risk management for SMEs will become an existential component of the granting of loans¹.

According to the empirical study by Hall et al. (2004), German SMEs have the highest proportion of external financing in Europe. For German SMEs bank credit is often the only source of external financing. This is the reason why the SMEs fear that Basel II will have a negative effect on the relationship with the bank (Winkeljohann and Hölscher, 2001).

Risk Behaviour

Management and decision-making are significantly influenced by the way the company deals with uncertainty and risks. In the following the literature is critically analysed in order to assess in how the attitude of SMEs to risks differs from that in very large companies.

As Sparrow (1999) and Sparrow and Bentley (2000) note, the literature has mainly investigated financial risks. According to the authors, SMEs have a completely different view of risks to that taken by very large companies. While larger companies make much more utilization of formal methods for the optimization and management of individual risks, SMEs attempt rather to make a more comprehensive risk assessment. This is due to the following reason: In contrast to large companies SMEs generally have only one risk strategy, namely that of bearing the risk themselves (risk taking). They only take out standard insurance cover for damage resulting from fire, water, loss in output and interruption to operations. Otherwise the risks are more comprehensively assessed in terms of the business sector in which the company is active, i.e. in terms of supplier, customer, technology and the internal business processes.

¹ According to the new Basel agreements on equity capital, in future the individual risks of the borrower must be given particular consideration; these find expression in the rating score. Easements are proposed for loans to small and medium size enterprises with a total loan volume of less than 1 million Euros. Concerning credits to companies with an annual turnover of up to 50 million Euros and a total credit volume of more than 1 million Euros, in the internal rating approach the weighting of the probability of default is made dependent on the company size. These provisions are to come into effect as of 1 January 2007 (Anonymous, 2006, p. 63; Basel Committee on Banking Supervision, 2003)

The authors also determined that the subjective view of the respective manager/owner is often a barrier to systematic risk assessment in SMEs. These individuals prefer to view and allow for the specific risks associated with their business sector in a somewhat simplistic manner. Further, a managing director often makes such an overall risk assessment by himself and keeps it to himself, not discussing risk aspects to any great extent with the employees. At the same time the directors interviewed admitted that they lacked knowledge of the methods exercised to identify and assess risks. In the opinion of Sparrow and Bentley (2000), this problem could be overcome by the operation of appropriate training programmes for SMEs. Such programmes should not simply involve adopting the risk management training used for very large companies, but the authors are not specific about how SME programmes should look in practice.

As has already been mentioned in the subsection on management behaviour, owner-managers often have a different attitude towards management techniques, and the same is true for their attitude towards risk. Thus McConaughy et al. (2001) investigated the attitude and the behaviour adopted by large US family-owned companies. Although the study does not cover the classic SME sizes, the results can to some extent be transferred to them. The following results were arrived at:

“Founding Family Controlled Firms (FFCF) perform better on a wide variety of measures. FFCF have greater working capital, higher sales growth, carry less debt. FFCF are financed more conservatively, consistent with the notion that the CEOs of the FFCF are more risk-averse; perhaps they have more to lose [*interpretation of the author: the well-being of the company is very closely associated with their personal well-being*]. The suggestion is also that it is family control of the firm rather than management ownership that is the key to these differences.”

One critical aspect which should be remarked here is that the statements by McConaughy et al. (2001) are based only on the evaluation of the companies' annual financial statement. The analysis of the financial data, made with the help of statistical methods, does not yet allow any conclusions to be drawn on the causes. The differences between family control and owner control also need further analysis.

While the personal link with the company exercises a significant influence, the treatment of risks is independent of gender (Watson and Robinson, 2003). Female controlled firms appear to be no more risky than male controlled ones.

Decisive choices are made in terms of how risks are dealt with as early as the beginning of the life cycle of a company – the start-up phase. This new empirical

evidence supports the main hypothesis that even very young firms, which proactively apply formal strategic planning methods, will tend to perform better than those following a more visionary or reactive approach to running the business (Smith, 1998). The greatest weaknesses, where any were admitted to, lay with access to sources of finance, market share and foresight or forward planning in the business. Smith (1998) therefore infers that most firms in the early stage of their life-cycle are prone to over-exaggerating their own strengths and under-estimating the threats from rival firms and from other factors external to the firm. Further, the small minority of firms which formulate realistic expectations tend to experience enhanced performance. A special finding of the study is that the high performers typically had accurate, up-to-date and detailed financial information. Again, highly performing firms disclosed that they had higher skills than the lower performers in that they were most likely to produce their own accounts without any outside help.

According to a study carried out by van Gelderen et al. (2005) the points for a successful company are set as early as the pre-founding phase. Indeed the critical evaluation with the possible risks during the founding phase is decisive for the subsequent survivability of the company. The involvement of professional consultants or advisors also has a positive influence on subsequent survivability. The results of the study must be treated with some caution, since it is the first of its kind. As Janney and Dess (2006, p. 396) note, the involvement in a “network” with other potential founders of companies has also a positive effect on the founder’s ability to assess risks.

However, it must be critically mentioned that none of the literature sources which cover the topic of risk behaviour have dealt with German companies. According to Hofstede (2005), attention should be given to the cultural context, since different perceptions of risk exist in different countries. It is therefore doubtful whether the results can be directly applied to Germany.

With all the deficits identified in terms of management behaviour, external pressure through Basel II and the German KonTraG law is certainly helpful, as it leads to companies acting in their own interest (even if the formal requirements are to some extent too demanding). Left to themselves, SMEs would otherwise expose little improvement in terms of company management, as empirical studies confirm (see cf. Ossadnik et al., 2004; Berens et al., 2005).

Summarizing, one can state that the personal attitudes of the managing director and his knowledge of business management methods have an essential influence on the management system of SMEs. In particular, regarding the use of management techniques and the need for further training, recent literature sources distinguish between owner-managers and other managers. For German SMEs until now (2006) there exist no studies on this general subject. One special aim of the present thesis is to analyse – with respect to possible differences between the outcomes for owner-managers and for other managers – the handling of business planning systems and of instruments of performance measurement. International literature sources focussing on these issues or other sources dealing only marginally with it are discussed in Sections 2.3 and 2.4.

Information is needed whether there are characteristic differences between owner-managers and other managers in handling the above systems and instruments. Such differences must also be taken into consideration when regarding the implications for developing risk management systems (Sections 7.1 and 7.2.). It should be noted that none of the cited studies explicitly deals with project-oriented firms.

2.3 Business Planning

Strategic management requires planning (operationalization of the strategy). Planning is based on assumptions which in turn are associated with uncertainty. Much of the literature on uncertainty and risk therefore concerns business planning, which is particularly true for the international literature on SMEs.

Business planning is hallmarked by the interaction between various subsystems, the degree of integration of their links and by the time horizon. The classic master budget, i.e. the integration of the planning subsystems, is seen as the present state of the art (see for example Garrison et al., 2003). Table 2.3 below presents the main literature sources on business planning which will now be discussed.

Table 2.3 Business Planning: Literature Summary

Author / Research focus	Key findings
Business Planning Systems	
<p>1. Perry (2001) Written business plans and failure in small firms: 304 telephone interviews with two samples of failed and non-failed small firms with less than 500 employees, each sample consisting of 152 SMEs (US).</p> <p>2. Berens et al. (2005)</p> <p>3. Flacke/Siemes (2005)</p> <p>4. Dahms/Siemes (2005) Joint research project in managerial accounting practices of German SMEs (see also Table 3.5 - T 3.6); here:</p> <ul style="list-style-type: none"> - Strategic and operational controlling systems - Business planning, Basel II - Strategic controlling and risk <p>213 questionnaires addressing SMEs with an average of 90 employees (Germany, local).</p>	<p>Very little formal planning goes on in U.S. small businesses.</p> <p>Non-failed firms do more sophisticated planning than similar failed firms did prior to failure.</p> <p>Considerable deficits with respect to the business planning were detected, having great impact on the requirements concerning Basel II.(see 3.)</p>
Organization of Business Planning	
<p>5. Gibson/Cassar (2002) Planning behaviour in small firms: Analysis of the financial data (official database) of 3,554 SMEs having less than 200 employees (Australia).</p>	<p>Planning behaviour may change over time (positively and negatively). Company age is negatively associated where as size, training, education are positively associated with planning sophistication.</p>
Uncertainty and Risk in Planning	
<p>6. Matthews/Scott (1995) Uncertainty and planning in small firms: 130 questionnaires addressing owner-managers and entrepreneurs of firms with less than 500 employees (US, local).</p>	<p>Although entrepreneurial firms have more sophisticated planning they show similar risk behaviour as small firms. As perception of environmental uncertainty increases, strategic and operational planning decrease.</p>
<p>7. Rauch et al. (2000) Cultural difference in planning/success relationships: Questionnaires from 201 German and 77 Irish firms with up to 50 employees (Germany and Ireland, local).</p>	<p>The relationship between planning and success is dependent on the cultural context. Due to the higher level of uncertainty avoidance, this relationship is positive in Germany.</p>
<p>8. Buchner/Weigand (2002) Early warning for enterprise control: Framework implemented in a medium-sized engineering business with 350 employees and 40 million Euro annual turnover (Germany).</p>	<p>Strategic and operational early warning by sophisticated business planning and by early warning indicators constitutes a suitable risk management for SMEs.</p>

For SMEs in Germany it is noticeable that for some years more literature has again begun to appear in which the formalities of business planning are analysed (see for example Ossadnik et al., 2004). One reason must certainly be the increased legal requirements resulting from the KonTraG law and the new requirements resulting from Basel II (see also Flacke and Siemes, 2005). Lachnit (1989) was a pioneering source and indicated that business planning systems are also sensible and useful for the successful management of SMEs. Using a spreadsheet calculation program, Lachnit developed a business planning system for companies involved in mass production. In 1994 the author then extended his original system by adding a project-oriented approach (for details see Section 2.5.3). The fact that Lachnit's systems have not found wide application may be due to the reason that the implementation and adaptation onto a personal computer represents a substantial programming challenge for SMEs.

Business Planning Systems

Perry (2001) discovered that the critical size above which a systematic planning in the form of a master budget begins to make sense is from 5 to 15 employees. Below this level detailed written planning makes little sense, and it cannot positively influence the potential to insolvency. However, if the company employs more than 15 employees, detailed planning has a clear positive effect on the likelihood of insolvency. Perry (2001) further determined that SMEs are either good planners or they are non-planners – there is no intermediate group between these extremes.

What has to be said in criticism of Perry's study is that one cannot generalize that above a particular size business planning makes sense. The type of company and industrial sector in which it is active certainly exercise a considerable influence. However, there is no information on whether differences between industries have any bearing. Thus, for example, a self-employed craftsman who deals with a low complexity of business processes does not need such a detailed planning system as a small high technology firm requires. It is questionable whether interrelationships between planning activities and company size apply directly to German SMEs, which are very heavily externally-financed. Indeed the high level of external financing of SMEs means that a certain degree of planning is called for on the part of the banks.

As part of a joint research project Berens et al. (2005), Flacke and Siemes (2005) and Dahms and Siemes (2005) investigated business planning and management accounting in SMEs in Westphalia and the Rhineland. They revealed that there are only few integrated systems. A budgeted balance sheet is rarely prepared, and a liquidity plan is often not correctly prepared or only prepared at irregular intervals. The predominant planning horizon is one year. The authors also note that their questions on business planning received the least number of responses from the companies, which led them to the conclusion that the planning is very much under-developed.²

Micro firms were excluded and small firms were under-represented in the above regional study. As Berens et al. (2005, p. 186) state, the selection of companies was made by the participating co-operative banks; which forwarded a fully-

² As Peel and Bridge (1998, p. 849) discovered, SMEs often only begin to think and plan strategically when a critical situation has already arisen, which means that it is often too late. Micro-firms were not included in this investigation either.

electronic questionnaire to the individual corporate clients. The results are clearly biased, since the heavily externally-financed SMEs must have borne in mind that the data they returned might also be evaluated by the banks and that this might have a negative effect on their standing with the bank. It can therefore be assumed that the actual business planning systems are even worse.

Organization of Business Planning

The organization of business planning is to be understood in two ways: firstly, embedding of the formal planning systems into the company's hierarchy and secondly, the impact on planning of characteristics such as knowledge, attitude, belief of the managing director.

Weber (2000) and Gibson and Cassar (2002) state that the age and size of the company have a substantial influence on the quality of planning. As size increases, the responsibility for business planning shifts from the company management alone to the lower levels (accounting and controlling functions³). The level of training and knowledge also has a positive effect on successful planning.

In detail Weber (2000) revealed the following for German SMEs: The owners and managing directors have recognized that undertaking all planning tasks themselves leads to overloading, and that sooner or later this can involve a risk to the continuing existence of the company. In the course of the company's development there also occurs a shift in the communications structure in terms of the planning processes, from top-down procedures towards counter-flow procedures. As the company continues to develop, an increase can also be seen in the employment of formalized methods such as scenario techniques. In Weber's opinion, the sample size of 26 personally-administered questionnaires is too small and the results therefore cannot be generalized. They should merely be treated to highlight the problem areas appropriate for the further investigation of the topic.

Uncertainty and Risk in Planning

In the empirical work on business planning in SMEs the focus of the investigations so far has been on what effect the quality of the business planning has on the financial performance of the company. In this context the investigation often considered how far uncertainty of the external environment influences the attitude

³ "Controlling function" is a German peculiarity. The English language area prefers the term "management accounting."

to planning. One interesting point here is that the various empirical studies carried out reach very different conclusions.

Thus for example Shrader et al. (1989), Schwenk and Shrader (1993), Rue and Ibrahim (1998) and Gibson and Cassar (2002) determined that an increase in uncertainty leads to increased business planning, which in turn proves to be helpful for the management of the company. However, the authors themselves note that the exact cause and effect relationships of the effects of uncertainty on the operational and strategic business planning are not easy to explain and that longitudinal studies will have to be carried out to investigate this phenomenon. A one-off postal survey or meta-analysis of studies carried out is not by itself sufficient to reveal the influence of variables such as industry sector, company age etc.

In contrast to that, Matthews and Scott (1995), van Gelderen et al. (2000) and Frese et al. (2000) determined that, as perception of environmental uncertainty increases, strategic and operational planning decrease, which holds for both owner-managed and other SMEs. For the most part, this pattern was consistent regardless of the source of the uncertainty (financial, competitive, governmental). It was not possible to determine whether there are significant differences between industrial sectors, since, as the authors themselves admit, the sample sizes were often relatively small.

It should be noted that the preceding studies do not refer to German samples, so that once again cultural differences should be considered.

As for example Rauch et al. (2000) have shown, the value placed on planning as a tool for managing uncertainty varies with culture and country. The authors investigated the influence of uncertainty on the attitude to planning in a regional study involving German SMEs with up to 50 employees. According to Hofstede (2005), there is a high level of uncertainty avoidance in Germany, which makes cultural planning appropriate and successful. Rauch et al. pointed out that planning in small-scale enterprises is related to success only in cultures that value uncertainty avoidance. Uncertainty avoidance is related to planning because planning is perceived to help control future events and thus to reduce the uncertainty of running a business. Since Germany as a whole values planning highly, only business owners and other managers who plan in detail have a good fit with their culture and achieve success. It was found that the quality of business

planning is positively related to success in both East and Western Germany. What is missing is an explanation as to how uncertainty and risks should be explicitly addressed in the business planning.

According to Buchner and Weigand (2002), good business planning is a very useful tool for SMEs in the early identification of risks. In particular, given the scarcity of resources and the problems of acceptance faced by newly developed methods of business management, business planning is a very suitable tool. The authors recommend the use of scenario techniques for obtaining early warning indicators. It is certainly doubtful whether SMEs are aware of and systematically deal with such an instrument.

For assessing qualitative risks, the firm that Buchner and Weigand investigated in their case study operated the Balanced Scorecard (Kaplan and Norton, 1996a). The question must also be critically assessed as to whether in general SMEs are already aware of this tool and, moreover, plan its use in their risk management.

One problem is generalization, since the approach has only been introduced in one specific SME which has a turnover of 40 million Euro and 350 employees. Its two directors have degrees in business management and one of the two (see Buchner, 2002) was awarded a doctorate based on his study of the effects of uncertainty on classic business planning. One weakness of this study is, that there is no description how the link between business planning and risk management should be developed in detail. Another shortcoming is that Buchner and Weigand (2002) assume a well developed business planning system to exist. As the literature review has already revealed that the assumption is questionable.

The literature analysis on business planning systems has shown that the picture for Germany is very incomplete. Partly, the studies deal with relatively small or with regional samples. Moreover, they focus too strongly on medium-sized firms. For micro and small firms, findings can hardly be deduced since often they are not taken into account. Regarding the components of strategic and operational planning systems there exist only rather indiscriminate data. Furthermore, up to now (2006), there are no specific studies on project-based organizations (see also Section 2.5.3). Characteristic differences between owner-managers and other managers also have not been investigated. The cited studies for Germany also do not give information about to what degree risk aspects are considered within the business planning.

2.4 Balanced Scorecard and Similar Instruments

Classic business planning is only oriented towards quantitative measures (financial measures). For long-term development however non-financial measures are also important. But financial measures stand at the end of the business process. A comprehensive performance measurement system should therefore contain not only financial (“lagging”) measures but also non-financial (“leading”) measures. Of the various instruments available to performance measurement which consider both types of measures the Balanced Scorecard (Kaplan and Norton, 1996a and 1996b) has taken on special significance in recent years. Further, the introduction and application of shareholder value and knowledge management for SMEs has also been the subject of intensive discussion in the last few years (see, for example, Hudson et al., 2001; Günther, 2002; Botta, 2002).

One important task of risk management is to identify critical developments early enough so that sufficient time is still available to take countermeasures. It is therefore relevant to study to what extent such instruments of performance measurement can at all improve the management of SMEs and still be of benefit to risk management. After all, as the studies on management behaviour in Section 2.2 have revealed, many SMEs complain about the inadequate strategic instruments for company management.

As Hudson et al. (2001) have discovered, SMEs have quite a positive view of the newer approaches offered by performance measurement. The surveyed companies have recognized that the indicators on company management which are strongly financially-oriented are not by themselves sufficient. SMEs also complain that it takes too long to collect the data and that by the time information is available it is often out of date. According to Hudson et al. (2001), it can also be noted that many indicators display no link to company strategy.

Hudson et al. (2001) also state that limited resources represent substantial barriers for the successful implementation of performance measurement systems within SMEs. For this reason they suggest an iterative process be exercised for the implementation of such a system. An iterative approach more closely corresponds to the ad-hoc style of decision-making in SMEs, since results from the introductory process become apparent over the short term and thus changes desired by the entrepreneur can be introduced more easily. Having evaluated 10 performance measurement systems available from the literature, Hudson et al.

(2001) determined that the Balanced Scorecard is a very good reflection of what SMEs expect from a tool which may support them in monitoring their performance. Table 2.4 assembles the literature sources on performance measurement systems.

Table 2.4 Performance Measurement Systems: Literature Summary

Author / Research focus	Key findings
Balanced Scorecard	
1. Kaplan/Norton (1996a) Balanced Scorecard. 10 case studies with enterprises of various size to develop a performance measurement system (US).	The Balanced Scorecard is introduced as a tool covering both financial and non-financial measures and being suitable for enterprises of any size.
2. Geiger/Hermann (2003) Balanced Scorecard in SMEs: Research project with 15 SMEs to develop and to implement a “sustainable” Balanced Scorecard (Germany, local). No information regarding the size classes of the firms attending at the research project.	Translation of strategy into action by the Balanced Scorecard is proposed to become a continuous and sustainable process.
3. Fernandes et al. (2006) Balanced Scorecard in a medium-sized firm: Case study with a medium-sized manufacturing firm with less than 250 employees to implement a Balanced Scorecard (UK).	It is shown that Kaplan and Norton’s four perspective approach (see 1.) is applicable in practice.
4. Berens et al. (2005)	Only few enterprises work with the Balanced Scorecard, but the use of it is increasing with increasing size.
5. Flacke/Siemes (2005)	
6. Dahms/Siemes (2005) Managerial accounting (see also Table 2.3, 2.-4.; here : Strategic instruments such as the Balanced Scorecard 213 questionnaires addressing SMEs with an average of 90 employees (Germany, local).	
7. Gumbus/Lussier (2006) Managerial accounting in SMEs; three case studies regarding the implementation of the Balanced Scorecard addressing SMEs with fewer than 250 employees (USA, local).	Implications are that, like large businesses, SMEs can also benefit from using a BSC to improve their performance. The BSC helps SMEs to set strategy and align operations to achieve breakthrough results.
8. Schachner et al. (2006) Performance Measurement in SMEs; here : Use of strategic instruments such as the Balanced Scorecard by owner-managed/family-owned businesses: 210 questionnaires addressing SMEs with employees ranging from 50 up to 500 (Germany, Austria, local).	Exclusively owner-managed companies are organized more centrally and use formal performance measurement systems like the Balanced Scorecard significantly less often.
9. Speckbacher et al. (2003) Investigation of the implementation of the Balanced Scorecard by very large firms in German-speaking countries: 201 questionnaires addressing publicly traded firms (Austria, Germany, Switzerland; local).	The Balanced Scorecards have been implemented to very different degrees of details. The spectrum ranges from simple ratio summaries to Balanced Scorecards with the classic cause-and-effect chains, with the latter being found rather hardly.
Shareholder Value	
10. Pampel (2000) Value-based management: Theoretical considerations to adopt the shareholder value approach to SMEs.	The unity of ownership and management promotes the use of the shareholder value. This approach supports long-term orientation.
Risk Aspects	
11. Smallman (1999) Knowledge management and risk management: Theoretical analysis of knowledge management to support risk management.	Knowledge management is an important “technology” for improving risk management, in particular with respect to non-financial risks.
12. Alquier/Tignol (2006) Risk Management in SMEs; here : European project for developing a risk management approach for SMEs; one case study with a small firm from the aerospace industry sector (France, local).	Suggest better use and linking of the existing subsystems for the purpose of risk management. In particular, application of knowledge management as an important instrument for risk management is recommended.

Balanced Scorecard

The basic idea behind Kaplan and Norton's development of the Balanced Scorecard (1996a) was to provide a balanced mix of financial and non-financial measures in a compact form suitable for use in company management. Ideally the measures should be derived from and linked to the company strategy in order to allow better agreement with it. The Balanced Scorecard can also contribute to managing and monitoring the implementation of the strategy. There is not enough space for a detailed explanation of the BSC, but the main components are shown in Figure 2.5.⁴

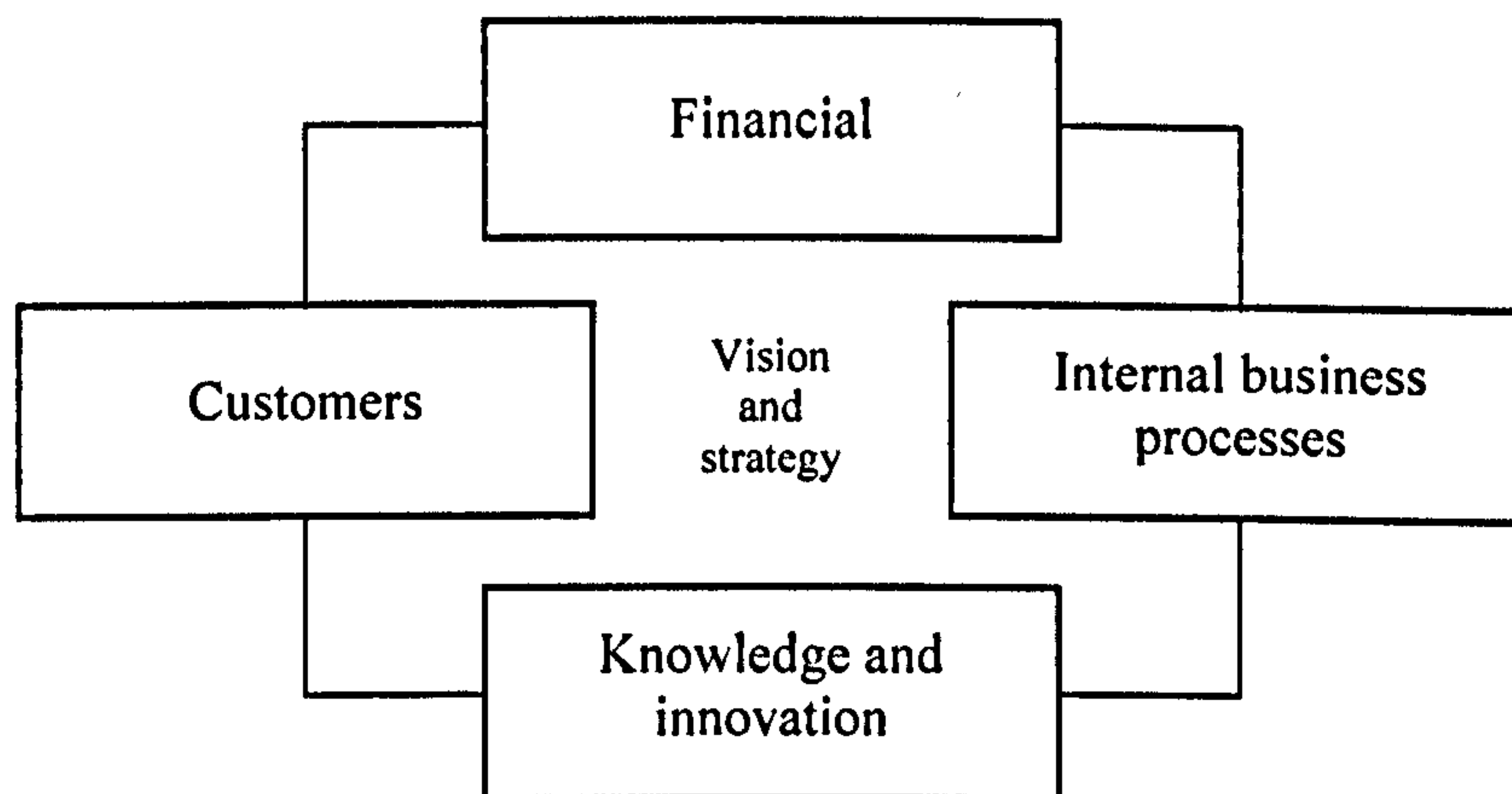


Figure 2.5 Components of the Original Balanced Scorecard

Since its introduction the Balanced Scorecard has been the subject of critical analysis by many researchers. The most cited weaknesses are the difficulties associated with the derivation of cause-and-effect chains and the determination of appropriate indicators for the company. There is a certain time gap between cause and effect, and the Balanced Scorecard is particularly criticized since it cannot correctly display this gap (some of the many examples: Butler et al., 1997; Nørreklit, 2000; van Veen-Dirks and Wijn, 2002; Botta, 2002; Maltz et al., 2003). According to Nørreklit (2003) a further critical point is the lack of operationalization of the concept presented by Kaplan and Norton (1996a), so that users find little help on implementation from the inventors of the Balanced Scorecard. This mainly applies to the cause-and-effect chains since Kaplan and

⁴ For a detailed presentation of the Balanced Scorecard see Kaplan and Norton (1996a, 2001). Scheibeler (2002) describes at length the implementation of a Balanced Scorecard in SMEs with the aid of quality management.

Norton's book presents only very logical interrelationships which everyone can grasp but which are not very practical to implement (Nørreklit, 2003).

The difficulties concerning the basics of the Balanced Scorecard naturally have a noticeable effect on its operational implementation. Speckbacher et al. (2003) investigated the implementation of the Balanced Scorecard in German-speaking countries by the most important publicly traded firms in Germany, Austria and Switzerland. Of the very large companies investigated, at the time of the survey a Balanced Scorecard had been partially implemented in 17% of the companies and fully implemented in a further 9%. The most interesting finding of the study is however that implementation of the concept in practice varies widely. When companies mention that they have already implemented a Balanced Scorecard, it does not by a long way mean that the main elements of Kaplan and Norton's classic Balanced Scorecard are covered. The authors have identified the following 3 types:

- Type I BSC: Strategic measures/objectives, grouped into perspectives
- Type II BSC: Type I BSC and development of cause-and-effect chains
- Type III BSC: Type II BSC also contains action plans/targets, and is linked to remuneration for senior management

More than half of the BSC users surveyed have so far implemented Type I. The two other types are relatively equally distributed over the remaining BSC users. The investigation revealed no significant size effects in the implementation of Type III BSC. The study did not investigate whether the Balanced Scorecard is also applied for aspects of risk management.

Over the last three years there has been an increased discussion in the literature on the employment of Balanced Scorecard by SMEs. Up till now (2006) there has been little in the literature on the utilization and the advantages of the Balanced Scorecard. This applies both to the German-speaking countries (see Geiger and Hermann, 2003; Rossmannith and Kabela, 2004) and to the wider international context (Fernandes et al., 2006; Gumbus and Lussier, 2006). All these authors view the Balanced Scorecard as an appropriate management system for SMEs and summarize the following advantages for:

- improvement of the communication within the company
- structured evaluation and improved reporting
- stimulate thinking on appropriate measures
- ongoing, team-based process
- continuous improvement

Geiger and Hermann (2003) and Fernandes et al. (2006) recommend that in the development of the BSC in SMEs the number of indicators should be kept well below 20. The reason is that in SMEs the processes are not so complicated and therefore 10 to 15 indicators would be quite sufficient. According to Fernandes et al. (2006, p. 11), other aspects important to a successful implementation are:

- support from university academics, since there is a generally sceptical attitude towards consultants and people are scared of their high costs
- strong support from the top management
- good co-operation within departments
- strongly benefits from and is supported by the existence of ISO 9000 systems, since these techniques already contain a large amount of data important to the BSC

Gumbus and Lussier (2006, p. 410) point out that even SMEs with 5 employees can also usefully introduce a BSC, benefiting from its application and improving their performance.

In terms of the level of distribution of the Balanced Scorecard in German SMEs, in a regional study Berens et al. (2005, p. 230) discovered that so far the BSC is used in only 1 in 10 of the companies surveyed. A size effect can be recognized, namely that utilization of the BSC increases with increasing company size. However, the study concentrated on SMEs with 50 and more employees. It did not investigate how the BSC is structured in detail.

Schachner et al. (2006) studied SMEs in Austria and southern Germany with more than 50 employees, where they identified a similarly low level of application. Schachner et al. (2006) then determined that c. 35% operate a simplified Type I BSC but without using the cause-and-effect chains. A Type II BSC is applied by 23.5% of the companies surveyed. Owner-managed companies – independent of the company size – employ the Balanced Scorecard to a much less extent than the other managers. Schachner et al. (2006) though point out that micro and small firms are strongly underrepresented, so that the results must be considered with caution (p. 598).

None of the empirical studies cited investigated whether the Balanced Scorecard is also applied in risk management.

Shareholder Value

The classic instruments of performance measurement, such as the return on investment (ROI) indicator system, often represent a single period model and do not have any reference to the future. This static view of traditional performance measurement does not support comprehensive risk considerations (Wolf, 2003, p. 22). Moreover, conventional performance measurement systems are strongly oriented towards measures of earnings and not to cash flow measures. The shareholder value can overcome these limitations. There are three variants of calculation, namely Economic Value Added (EVA), Cash Flow Return on Investment (CFROI) and the Discounted Cash Flow (DCF) method.⁵

SMEs need to become more intensively involved with the shareholder value approach. On the one hand, the ownership structures of SMEs facilitate the pursuit of longer-term earnings goals. On the other hand, SMEs are increasingly confronted with business partners who think in terms of categories of the shareholder value – whether as large customers, competitors or the lending bank (Pampel, 2000; Günther, 2002).

For a practical implementation of the shareholder value idea the basic concepts such as the EVA, CFROI and the DCF methods should be reduced to their conceptual core. Further refinements must be taken up specific to the company and with due regard for the data available from the accounting system, for the exact determination of cash flows or of interest costs (see also Günther, 2002).

The EVA method is the oldest concept. It has a number of methodical weaknesses (Otley, 1999, p. 373), but – with its robust reformatting of information from annual reports – it is entirely suitable to demonstrating the contribution of one business year to the development of the company's value. For SMEs only a few modifications to the measures of earnings and the capital base need to be made. The good communicability based on the external preparation of accounts makes the EVA a transparent measure of performance in SMEs (see Zirkler, 2002).

⁵ For a critical assessment of the three methods and their suitability for risk management see the detailed analysis of Wolf (2003).

To reduce the methodological disadvantages of EVA, Otley (1999) suggests linking the EVA formula with the financial perspective of the BSC. The approaches are not contradictory but complement each other quite well. In addition, the BSC allows the business strategies to be evaluated more comprehensively.

The CFROI method is based on the internal rate of return. This appears to be more suitable as an instrument for a co-ordinated management of segmented very large companies. Limitations result from the determination of a gross investment basis. The DCF method also appears to be too demanding in terms of the data which must be made available (Pampel, 2000; Wolf, 2003).

Up to the present (2006) there are no empirical studies on the utilization of the shareholder value in German SMEs. So investigations are needed into how widespread the shareholder value approach and the respective way of thinking is in these SMEs.

Knowledge Management

As Baisch et al. (1998) note, one major deficit in classic strategic planning systems is that they offer no opportunity for making the experience-based knowledge (which is often not clearly structured) suitable for planning purposes. Therefore a knowledge management system forms an important component for the development of an early warning system for the timely recognition of critical developments (p. 239).

The authors expressly point out that an early warning system for risks which is suitable for practical use in SMEs cannot do without an appropriate knowledge management (p. 240). Here, when speaking of a knowledge management adequate for application by SMEs, Baisch et al. do not mean an expert system but rather the well-structured collection of important company information from the company's external and internal environments.

The authors recommend the employment of "feedback diagrams" for collecting information in the strategic area. This type of information is often not clearly structured. Mind mapping can be utilized as a support tool for the visualization of the feed-back diagrams. Baisch et al. report very positive experience gained when through workshops the management and the employees together were able to extract the critical factors for the company's success, thus making them

transparent for all employees. Suitable early warning indicators and measures are then determined in order to be able to monitor the critical success factors.

Feedback diagrams are very similar to the cause-and-effect chains which are an important element in the Balanced Scorecard. The authors therefore point out in their paper the need to check the interface with the Balanced Scorecard, since clear agreements can be determined (p. 243). However, these considerations are not detailed further in the paper. One reason is certainly that at the time the research project was carried out, the concept of the Balanced Scorecard was not very common in German-speaking literature and practice (see Speckbacher, et al., 2003, p. 369).

Little is generally known about the degree of distribution of knowledge management in German SMEs. According to studies made by Ernst & Young (2001, 2006), the introduction of a knowledge management system was seen as a top priority by the entrepreneurs surveyed. These studies, however, only covered rapidly growing SMEs, which received an award in the programme “Entrepreneur of the Year” so that the results cannot be generalized for all SMEs. As Ernst & Young point out, knowledge management in SMEs is frequently established in the form of a knowledge database, with no application of complex knowledge management instruments.

Risk Aspects

The Balanced Scorecard is intended to facilitate the management and thus the critical monitoring of the company’s main success factors. Critical success factors can be both opportunities and risks at the same time, which means that by nature the Balanced Scorecard is an instrument closely related to risks. It is interesting to note that primarily the German-speaking literature emphasizes the possible use of the Balanced Scorecard for handling risks; other sources do not underscore explicitly this application.

Concerning the operation of the BSC for risk management purposes, there are two ways of integrating risks:

1. Each of the 4 perspectives are extended by a risk aspect. Corresponding risks and their influencing variables are assigned to the selected goals in the four perspectives (Weber et al., 1999; Wurl and Mayer, 2000; Oepping and Siemes, 2003).
2. The inclusion of an additional fifth perspective which contains all risk considerations and risk extensions and which thus provides a central report on the total potential risk faced by the company (Gleißner and Romeike, 2005).

In the first variant the main risks identified are associated with the corresponding perspective, together with a description of the measurement of the risks and the measures needed to control them. As Wurl and Mayer (2000) suggest, a report on the risks can then be made as part of the normal reporting. When the critical target values are reached an ad-hoc report is prepared. The process of preparation and maintaining of a risk-adjusted Balanced Scorecard is primarily handled by the controlling function.

In the opinion of Wolf (2003, p. 100), this variant is a convincing concept since it is simple and easily accessible and can be implemented with very little additional effort. The employees are sensitized to the risk. According to Wolf, one critical comment to be made is that the goals, opportunities and risks lie in the same area of responsibility, which is however not always the case.

For SMEs the first variant is to be preferred since it is the most practicable approach and can be established without any great effort if a Balanced Scorecard has already been implemented.

The second variant facilitates a concise communication of the risk potential in the organization. The concept, however, does lead to isolation of the risk aspect and to increasing the value of risk management (Wolf, 2003, p. 100). The inclusion of an additional risk dimension means that its figures must be linked with the other perspectives. The complexity of the cause-and-effect relationships increases, and the degree of comprehensibility reduces analogously (Wurl and Mayer, 2000, p. 281).

The second variant must be rejected for SMEs as being clearly too complicated. For even more difficult approaches such as separated Chances and Risks Balanced Scorecards (Reichmann and Form, 2000; Form and Hüllmann, 2002) holds the same.

The two performance measurement instruments of Balanced Scorecard and shareholder value are not contradictory concepts but can be easily linked together.

As Otley (1999, p. 371) and Günther (2002, p. 96-97) state, the Balanced Scorecard and the shareholder value can be developed into an integrated management system. This would avoid the strong focus on financial measures. The explicit dovetailing of the Balanced Scorecard and the shareholder value is made by means of the financial perspective. Such an approach allows a much more comprehensive evaluation of the business strategies adopted (see Otley, 1999). As Günther (2002) and Gleißner et al. (2004) point out, the risk assessments made in the individual perspectives of the Balanced Scorecard could find consideration in the form of a risk adjusted interest rate in the shareholder value.

As Smallman (1999) notes, strategic, operational and legal risks are difficult to manage, since often mathematical-statistical procedures cannot be applied. These risk categories strongly call for knowledge and foresight on the part of the employees. It would therefore appear to be sensible for an SME to organize itself so as to obtain details of this inestimable wealth of knowledge. Such an approach would at the same time support the communication on and management of risks. In Smallman's opinion (1999) such an approach would promote a comprehensive, company-wide risk management.

Smallman (1999, p. 16) suggests that the operationalization and the use of knowledge management for risk management be implemented with the aid of the Balanced Scorecard:

“Undertaking to balance out all the inter-relationships in such a complex open system, relying as much on feed forward as feedback control, is not simple to operationalize. However, aside from adopting structures and policies that can encourage the development of a knowledge management culture, a starting point may lie in taking a different approach to corporate performance measurement. By accounting for the contribution of knowledge (in the form of customer capital, human capital) in corporate performance and relating that to issues of the performance of corporate governors and risk management, we should be able to develop a much-improved picture of organizational risk.”

The BSC observes the company from different perspectives by monitoring the critical success factors for each of them. So Smallman's idea (1999) to use the BSC for knowledge management is convincing. The BSC supports a structured assessing of these success factors and in this way a stepwise implementation of a knowledge database.

The implementation of this interesting approach is then little operationalized (see Smallman, 1999, p. 16) so that SMEs would certainly have difficulty in implementing it.

As Alquier and Tignol (2006, p. 275) determined, knowledge management can merely be a path-finding route for SMEs to developing a practical risk management system. The construction and application of a knowledge management system can provide the company with a “corporate risk memory tool.” Fed with the experience gained from earlier projects, it can be practised as a good starting point for estimating the risks of new proposals as well as a source of information for new staff having just joined the company.

Finally, one can conclude that – regarding the application of modern instruments of performance measurement – for German SMEs there exist only little empirical data or even no data at all. In this context, the object of most of the empirical investigations is the Balanced Scorecard (cf. Geiger and Hermann, 2003; Schachner et al., 2006). There are no empirical data on the distribution in SMEs of the shareholder value and on knowledge management, especially in Germany. None of the cited studies discusses whether instruments of performance measurement are also employed by SMEs for risk management and how the application may be carried out in detail. As in the discussion of management behaviour (Section 2.2) it seems to be meaningful to investigate possible differences between owner-managers and other managers in taking advantage of these instruments.

2.5 Risk Management

There are very few sources in the literature on risk management as applied by SMEs. As Kirchner (2002, p. 200) states, investigations on this subject often largely overlook the problems of SMEs. The literature on risk management being available mainly concerns the implementation in very large joint stock companies. Again according to Kirchner (p. 198), even in 2002 – which means 4 years after the introduction of the KonTraG law and its risk management requirements – there is for SMEs still a substantial need for action and for catching up on the backlog.

Sections 2.5.1 and 2.5.2 deal with the process-related and the organizational topics of risk management in general, while Section 2.5.3 covers both topics for the special case of handling projects.

Table 2.6 shows the main sources for the full section on risk management:

Table 2.6 Risk Management: Literature Summary

Author / Research focus	Key findings
1. Risk Management Process	
Risk Identification and Risk Evaluation	
<p>1. Turpin (2002, 2004) Risk management practices in European enterprises; here risk techniques: 600 telephone interviews addressing enterprises in 6 European countries having annual turnover between 50 and 500 million Euros and with 50 to 500 employees, where 100 enterprises were selected from each country (6 European countries).</p>	<p>Current methods to control, measure and monitor the effectiveness of risk management procedures are inadequate, particularly for high-impact risks.</p>
<p>2. O'Hara et al. (2005) Risk assessment in SMEs: 11 interviews with small enterprises and 13 interviews with medium-sized enterprises to identify examples of good practice in the use of risk assessment (UK).</p>	<p>Two main barriers to risk assessment were identified: time pressure and access to suitable guidance.</p>
<p>3. Consultation and Research Centre of the ICAEW (2005) Current state of Risk Management practice in SMEs; 364 online questionnaire addressing SMEs with employees ranging from 10 up to 500 (UK).</p>	<p>Surprisingly, 27% of respondents discussed the general risk profile of the business only annually or less often and 19% discuss specific risks annually or less often.</p>
Links between Risk Management and Business Planning	
<p>4. Eck et al. (2000) Risk management and business planning simulation: Framework for a practicable risk management system, implemented in a construction incorporation (Germany).</p>	<p>A direct link of risk management with the business planning system seems to be best suitable for SMEs.</p>
Links between Risk Management and the Balanced Scorecard	
<p>5. Wolf (2006) Theoretical contribution to establish a risk reporting with the aid of the Balanced Scorecard.</p>	<p>The Balanced Scorecard is a good mean for presenting the risks identified, together with the corresponding indicators.</p>
2. Risk Management Organization	
Risk Management Responsibilities	
<p>6. Kessler (2000) Handling of operational risks: Questionnaire survey addressing 22 medium-sized and 22 large enterprises (Germany, Switzerland).</p>	<p>The main handling strategy is risk insurance, followed by risk avoidance and risk taking. Statistics of damage/losses are most frequently exercised for the evaluation of risks.</p>
<p>7. Clink (2001) Risk management in SMEs: 74 questionnaires addressing small and medium-sized firms (Scotland, local).</p>	<p>SMEs are particularly susceptible to the sudden unavailability of the owner or the equipment.</p>
<p>8. Turpin (2002) Risk management practices in European enterprises; here: Understanding of risks (see also 1.): 600 telephone interviews addressing enterprises in 6 European countries having annual turnover between 50 and 500 million Euros and with 50 to 500 employees, where 100 enterprises were selected from each country (6 European countries).</p>	<p>A third of senior managers even do not know whether their company has suffered significant losses or not.</p>
3. Project Risk Management	
Project Management Techniques	
<p>9. White/Fortune (2002) Project management practices: 236 questionnaires addressing all employee size classes, with very large firms dominating (UK).</p>	<p>Classic project management tools are used rather seldom, and risk considerations mostly do not occur.</p>
<p>10. Maylor (2001) Project management beyond the Gantt chart: Theoretical considerations for enterprises of any size of linking organizational strategy with project strategy.</p>	<p>Classic project management techniques too strongly focus on single projects, thus neglecting the combined impact of all projects on the development of the entire enterprise.</p>
<p>11. Anderson/Merna (2003) Project management strategy: Introduction of a rough framework and 30 interviews with practitioners to evaluate applicability, followed by further refinement (UK).</p>	<p>Propose a broader view of project management that departs from merely managing single projects (in accordance with Maylor, see 10.), emphasizing a link with the business planning system of the entire enterprise.</p>

Table 2.6 Risk Management: Literature Summary (*continued*)

Author / Research focus	Key findings
Integration of Projects Into Risk Management	
12. Lachnit (1994) Management accounting for project-oriented enterprises: Foundations of the approach and development of a practicable model.	Effective project planning, monitoring and controlling must be directly linked with the business planning of the entire enterprise.
13. Guserl (1996) 14. Guserl (1999) Management accounting and risk management for project-oriented enterprises: Developing a project risk management framework based on Lachnit's work on managerial accounting (see 12.).	Risk management in general needs both ways of information flow: top-down and bottom-up. Considering project risk management, it is indispensable that the handling of single projects is linked with the business planning of the entire enterprise.
15. Leopoulos et al. (2006) Application of proprietary risk management software tools in SMEs: one case study in a project oriented small to medium-sized enterprise.	Especially for SMEs, the benefits of a risk management software tool – such as @RISK – are even more important since due to their size they cannot really afford project cost overruns.

2.5.1 Risk Management Process

The presentation of the literature on the risk management process is divided into two parts: risk identification and risk evaluation, and risk monitoring and risk reporting. The links with the subsystems discussed in Sections 2.3 (business planning) and 2.4 (Balanced Scorecard and similar instruments) will then be addressed.

Risk Identification and Risk Evaluation

Auckenthaler and Gabathuler (1997), Baisch et al. (1998) and Hahn et al. (2000) recommend that SMEs avoid elaborate methods (e.g. estimating probabilities of occurrence) when undertaking risk identification and evaluation. Instead they should draw on checklists, questionnaires, workshops, mind maps, feed back diagrams and risk brainstorming.

Greater exploitation should be made of business planning when identifying operational risks. Employees being responsible for the preparation of the operational planning are of course aware of the premises which were allowed for in the relevant planning figures. Thus it is easy to derive the critical values or risks from these figures and the premises which underlie them. The evaluation of the risk measures is then made by introducing numerical values for the risks in the business planning. It is thus possible to estimate the critical value e.g. by operating with different estimates (good/average/poor), or – in a rather more systematic way – with the application of what-if analysis. It can also be helpful to call on the application of indicators taken from accounting.

Strategic risks are much more difficult to structure. For their identification workshops should be implemented, involving both the company management and employees. Here in a first approach by brainstorming or mind maps the larger risk areas should be derived, followed by detailed identification procedures. Mind maps make it possible to bring out the risk landscape of a company and to graphically document the mutual dependencies between the respective risk areas. The detailed risk considerations try to break down the risk areas, aiming at suitable indicators for monitoring each individual risk. For the evaluation of these risks, to some extent use can be made of the long-term business planning (Auckenthaler and Gabathuler, 1997; Baisch et al., 1998). Furthermore, Baisch et al. (1998, p. 243) suggest that the interface with the Balanced Scorecard should be checked. At the time their article was prepared, the Balanced Scorecard was not widely implemented in Germany; so the authors could not investigate or develop this point further. The linking of the business planning and the Balanced Scorecard to the risk management system were each developed and tested by observing just one company, thus lacking a broader empirical basis has not yet been developed for them.

The following notes discuss the empirical results available on handling risk assessment in SMEs.

As Kessler (2000) and Helliard et al. (2001) have empirically revealed, SMEs employ less formal procedures for risk identification and evaluation. The managers responsible depend much more on their own experience and attempt to obtain more knowledge on their risk situation through discussions with colleagues or experts. The risk assessment is often made through the evaluation of statistics on losses and from prior accidents. Statistical methods of risk evaluation are little employed. Kessler's study (2000) could not clarify how far size effects come into play for German SMEs, since the sample size was too small. Enterprises from the banking and insurance sectors were also involved, where quite other rules on risk management are the norm. Further, Kessler's small sample size contains substantially more medium-sized companies.

According to the studies by Turpin (2002, 2004), all European SMEs are at about the same level with respect to the frequency of risk reviews. Rather more than half of all SMEs check their risks at least twice a year, and a quarter do so on an ad-hoc basis. The risk management process is making only slow progress, particularly in

the formalization of risk assessment. SMEs are lacking in appropriate techniques. When Turpin's first study of 2002 was repeated two years later, even then more than half of the companies interviewed see themselves as badly prepared for dealing with their greatest risks. According to them, substantial improvements were only made with elementary risks (which can be treated by insurance cover) and with the financial risks.

It must be viewed critically that Turpin's SME size criteria correspond neither with the EU criteria nor with those operated by the German Institute for SME Research (IfM). Companies covered by his investigation had an annual turnover of between 50 million and 500 million Euro. Further, micro and small firms were not considered at all. In terms of employee numbers only companies with more than 50 employees were surveyed. If the above deficits can be determined in the company of the sizes investigated by Turpin then it can only be assumed that still greater deficits will be present in terms of the classic SME size classes. Another weakness in Turpin's studies is that it did not investigate in detail which methods SMEs exercise for risk assessment.

O'Hara et al. (2005) employed the European Union size definitions for SMEs in their investigation of workplace risks and determined (p. 40):

“SMEs identified two main barriers to risk assessment: time pressure, and access to suitable guidance. The time commitment associated with the various aspects of risk assessment was mentioned by the majority of interviewees as being problematic. This was particularly an issue for small firms that generally did not have a full-time person with designated responsibility for health and safety. Keeping up to date with legislative changes and regulations was perceived as an additional pressure. In the context of pressure for increased productivity and competitiveness, manager, supervisors and operational workers were also conscious of the time demands of risk assessments.”

It should be noted that the study involved a small sample and that it focussed on workplace and safety risks, although the authors propose that the results can be transferred to other risk areas.

The largest empirical investigation to date (2006) into risk management in SMEs – which fully respects the EU size criteria – was conducted by the Institute of Chartered Accountants in England and Wales (referred to as ICAEW; 2005). In the opinion of the ICAEW, on the status of risk management practices in SMEs there are few results presently available. Since SMEs are not simply small versions of larger companies the methods recognized for risk management in larger companies cannot simply be handed down to them (p. 5). An online-questionnaire was used to

survey members of the ICAEW – chartered accountants in other words – who are presently employed by SMEs.

Substantial risks were discussed in terms of quarterly reviews. The entire company's risk management is supervised by the top management at annual intervals (or even longer ones). Clear differences can be seen with Turpin's studies (2002, 2004). The differences can be traced back to Turpin deviating from the classic EU size definition. Consideration of strategic risks in the business planning occurs only very rarely. All in all, the entire process of risk assessment in the SMEs surveyed is not implemented very systematically. Which techniques and methods are utilized and how far the time horizon in the risk forecast reaches, is not reported. Small firms identify much fewer risk categories. It was generally determined that the risk management process is not implemented in a very formal manner and that there is not such a strong difference to be found between the small and the medium-sized companies.

The results of the ICAEW study have to be treated with caution and are biased with regard to the chartered accountants surveyed. As a rule, in German SMEs (and especially in small firms) chartered accountants are not employed (see Kayser, 2006). One further critical point to be made is that, as McCarthy (2003) has demonstrated, employees with the educational background of a chartered accountant have quite a different attitude to risk and have more rarely been encountered a critical company development. They choose a risk-taking approach much less often than is typical for SMEs.

Risk Monitoring and Risk Reporting

It is only possible to take appropriate measures in good time when the management receives regular information on opportunities and risks. It is therefore to be recommended that risk management be linked to the robust process of standard reporting (see for example Klatt et al., 2005; Diederichs and Form, 2003).

Klatt et al. (2005) recommend that in SMEs the controlling unit and the quality management staff should be responsible for setting up risk monitoring and risk reporting. These personnel also should look after the co-ordination and summarization of the results from the risk assessment and manage the reporting process. Risk reporting should take place once a month in the frame of the

standard reporting. Reviewing the countermeasures specified for the identified risks should be made every three months.

The suggestion has recently appeared in the literature that companies which have already introduced a Balanced Scorecard could also take advantage of it for internal risk reporting. The Balanced Scorecard – thanks to its systematic and structured approach – collects all important measures, and thus it would be easy to add notes to the corresponding risk measures (see, for example, Wolf, 2006).

Concerning the current situation of risk reporting in German SMEs, no empirical findings are available. Particularly it is not known how the board of directors is informed about risky developments.

Links between Risk Management and Business Planning

Most literature sources are in favour of a direct connection between risk management and business planning. A direct link is to be understood in two ways. On the one hand, the business planning should support the systematic assessment of risks. Risk considerations were of course made in order to decide on the planning measures when the various subplans were prepared. This means that it is now possible to make use of risk considerations and to check each planning position in terms of its potential risks. The advantage is that it is a systematic procedure for risk and one which provides employees with an understandable procedure in risk assessment. The risk figures can be noted together with the planning data.

On the other hand, with the help of business planning it is possible to determine what the effects of the identified risks would be on the company goals of profit and liquidity. In the simplest case it can be done by varying the risk parameters when entering them in the business planning so as to approach the critical thresholds for the risk-adjusted values. The approach can be formalized still further with the aid of methods such as what-if analysis and scenario technique.

One interesting aspect is that a link between risk management and business planning is especially recommended by sources in the literature on risk management in SMEs (Vogler and Gundert, 1998, p. 2382; Hahn et al., 2000, p. 2624; Buchner and Weigand, 2002, p. 180; Gleißner et al., 2004; Togo, 2004; Klatt et al., 2005, p. 72; Leopoulos et al., 2006). It is not clear from the sources

how the specific implementation of a link between risk management and business planning should be made.

The most specific and detailed suggestion to be found in the literature to date (2006) is that made by Eck et al. (2000), which appears to be very practicable for SMEs but which however has only been tried in practice in merely one company. Since the suggestion has been recognized as being very appropriate, it will be critically explained in somewhat more detail in the following, in order to extract the points relevant for a further review of this approach in the present empirical investigation.

Eck et al. present a simulation model for financial planning, that has been extended to include risk management aspects. They carried out a case study with a construction enterprise which had implemented their system. The authors emphasize that as a result of its high flexibility, the application of their software is limited neither by industry nor by enterprise size.

The financial planning model referred to is based on a pre-system, which is an integrated system in the form of a master budget. Omitting the technical details, Eck et al. indicate how risk considerations can be handled by the simulation model. There is no precise description how the risk data entered are processed within the planning model.

The approach followed by Eck et al. assumes that an enterprise has already established a comprehensive business planning system. Regarding SMEs, there is a need to investigate whether the assumption is justified. The simulation system may be easy to apply, but establishing and customizing it seems to be a complicated process. Empirical testing of the system has taken place within only one firm. Finally, the model does not consider qualitative risks. In spite of the time and knowledge needed for programming, such a simulation model is a suitable technique for SMEs to practice in determining the effect of risk figures on the target figures of the enterprise.

In order to test whether this approach really is practicable for SMEs the present study – as already referred to under Section 2.3 on business planning – should consider which business planning systems already exist in German SMEs. On the other hand the question also needs to be investigated as to how the link with risk management should be shaped.

Links between Risk Management and the Balanced Scorecard

Theoretical papers on the application of BSC in risk management view the function of the Balanced Scorecard in risk management in two ways.

On the one hand, the Balanced Scorecard provides a compact representation for risk monitoring and so for risk reporting. Thus for example Diederichs and Form (2003) and Wolf (2006) suggest that the BSC report forms should include the relevant risk measures together with their current values and the thresholds. This would offer the advantage that a stronger connection would be established with the strategic company goals. The authors point out that the process of strategic planning and of risk management are identical and a combination of these activities would therefore be sensible. The success and risk factors important for the company would be available to the management in a compact form at a glance. It is however to be noted that software support is required if the approach is to be shaped in a way which can be clearly understood and administered. Form and Hüllmann (2002) have developed a prototype as a report form using standard software (Microsoft Excel). It allows to introduce modifications to such a system both rapidly and simply while it is being developed.

On the other hand, the Balanced Scorecard is an appropriate instrument for assessing non-financial risks. As Oepping and Siemes (2003, p. 229) argue, the aim of the Balanced Scorecard is to make financial and non-financial measures available. Thus the leading and lagging indicators already developed for the various perspectives of the Balanced Scorecard can be directly applied to risk management. Thus a link between Balanced Scorecard and risk management is quite obvious. However, there are no papers available which discuss how it could be implemented in practice for SMEs.

2.5.2 Risk Management Organization

Risk management responsibilities, the first issue on the organization of risk management, discusses who is responsible for setting up and developing the risk management and which personnel are responsible for the ongoing risk identification. Risk management documentation then considers the requirements for SMEs arising from the new legal regulations in Germany.

Risk Management Responsibilities

According to Dickinson (2001), the Faculty of Finance and Management of The Institute of Chartered Accountants in England and Wales (2002) and the Federation of European Risk Management Associations (2003), the top management should be responsible for the management of risks. The responsibility means, for example, fixing the company's risk strategy and determining the responsibilities of each employee in the risk assessment. The controlling unit should be the contact point for the ongoing co-ordination of information resulting from the risk management process (Gleißner et al., 2004).

The post of a "Chief Risk Officer" as suggested by Dickinson (2001, p. 364) would appear to be either missing or not possible for SMEs, due to their limited financial and personnel resources. The top management is also responsible for the further development of the risk management and for ensuring that the risk management is monitored by an independent person. In terms of independent monitoring the literature specifies, depending on company size, either the internal audit function, the controlling unit or an external inspection by an chartered accountant (Münzel and Jenny, 2005; Gleißner and Romeike, 2005).

According to the empirical studies carried out by Kessler (2000) and Turpin (2002; 2004), in German SMEs the top management is responsible for setting up and monitoring the risk management. A special risk manager is almost never employed (Turpin, 2002). The results agree with the findings of Clink (2001) and the ICAEW (2005). Clink also points out that with small firms a significant risk exists due to the presence of only one director. Should he be absent for a longer period of time the company would become unable to react. Further, the greater number of the companies surveyed had not established any rules on representation. Many of the small firms also expressed a wish for training on questions of organizing and setting up their risk management.

Turpin (2002) determined that 4 out of 10 of the SMEs surveyed do not have any official risk strategy. Further, as many as 1/3 of the managers questioned cannot say whether the company suffered a substantial loss in recent years. In summary, according to Turpin (2002) in SMEs the predominant attitude to risk is a rather fatalistic one. In this context reference is made to cultural differences, whereby UK companies are the best prepared and companies from southern countries such as Italy and Spain are the worst prepared. In terms of risk perception German

SMEs are assessed as being good. There is also a great discrepancy between the board of director's perception of risk and the operational processes of risk management; that is the implementation of the risk management in the company. SMEs frequently concentrate on significant risks, whereby they can often be subjected to significant total losses arising from smaller losses which were not taken into consideration (Turpin, 2002, p. 8). The five most important risks are: competition, loss of key employees, changed customer demand, wrong strategy, times of staff shortage and delays in payment by the customers (Turpin, 2002, p. 10).

Risk Management Documentation

As discussed in Section 1.1, the documentation of the risk management becomes two-fold significant.

On the one hand, documentation of the risk management is necessary so that the employees have an guideline on how the risk management is to be implemented and new employees can be informed about it. The documentation should include the definition of the risk strategy and the measures for managing risk. It must also cover rules on emergency situations and on representation, and details of the risk reporting cycle. Regulations concerning the system of ad-hoc reporting should also be included.

On the other hand, the legal regulations on risk management have been greatly strengthened through additional changes to the German laws. Without appropriate documentation, the company management of an SME cannot provide any disculpatory evidence that – to be able to identify critical developments early enough – they have set up a risk management. Linked to this is the personal liability for members of the board should they not have fulfilled their duties of care – which in turn include the setting up of a risk management (for a detailed discussion see D'Alquen, 1999; Gleißner et al., 2004; Münzel and Jenny, 2005).

The documentation of the risk management takes on more significance through yet another issue. As Wildemann (2005) indicates, in assessing the creditworthiness of an SME, as part of the rating process the bank will also evaluate the implementation and documentation of its risk management. A poorly documented risk management can therefore lead to a worsening of the credit conditions.

No empirical findings are available on the formal documentation of risk management systems in German SMEs. It would also be interesting to know how far existing standards such as quality management are used for the purposes of risk management documentation.

2.5.3 Project Risk Management

Before discussing risks associated with projects, the characteristics of general project management techniques must first be considered. One aspect to be clarified is what know-how in SMEs of handling projects is available at all. The integration of projects into the risk management then deals with both process-related and organizational matters. The project risk management literature has been reviewed with special emphasis on the handling of project risks being consolidated, not the isolated risk management of individual projects.

As the literature review has revealed so far, there are few (national or international) risk management sources that explicitly deal with SMEs. Accordingly, the special topic of project risk management for SMEs is hardly found in the literature.

Project Management Techniques

In an empirical study based on a questionnaire, White and Fortune (2002) examine the current state of project management with respect to techniques, the application of software and general experience gained. The main findings are that project management is strongly characterized by the considerations of practitioners. Project managers' own experience plays an important role. Project management tools as proposed in the literature are not widely practised. The enterprises surveyed mention an interesting method of judging the success of a project: the fit between the project and the organization and the consequences of the project on business performance. This criterion is not found in other empirical studies.

In terms of critical success factors for projects the respondents most frequently mentioned: clear goals and objectives, support from senior management, and adequate funds and resources (p. 6). Over 95% of the respondents applied at least one project management tool. About two thirds employ Gantt charts. The most frequently mentioned project management tool was "off the shelf" software (p. 7). Project management software was considered to be the tool with the most

limitations and was identified as being unsuitable for dealing with complex projects (p. 10).

According to the study by White and Fortune (2002, p. 7), 50% of the companies investigated consider project risk management to be an important factor in success. In the authors' opinion the low percentage is based on an overall attitude to project management and the methods and techniques currently available. Of the companies which exercise risk evaluations for their individual projects, 65% make no use of special risk management software; they do not expect to obtain any great benefit from it (White and Fortune, 2002, p. 9).

The study of White and Fortune covered enterprises of all size classes (thus also SMEs). Results specific to SMEs cannot be derived. Nevertheless it is useful as a survey; thus contributing to the investigation of this thesis.

The results of White and Fortune are confirmed by the more recent study of Besner and Hobbs (2004) who interviewed practitioners of business management being members of related project management associations. The study was not based on company size classes or different industry sectors but rather on the different project types. The project tool utilized most extensively is the progress report while the Monte-Carlo analysis is worked with least often (p. 342). The tools most frequently and least frequently used are nearly the same for both the mature and less mature project-oriented organizations (p. 343). The degree of utilization of project management software decreases for more complex projects (p. 343). Risk management is an area where IT projects show greater usage of these tools and techniques (p. 348).

The low level of distribution of more sophisticated project management techniques has in recent years led to a change in the literature. There is a clear shift away from elaborated project management tools, changing towards management tools originally established for companies with mass production; examples are the Balanced Scorecard and knowledge management approaches (see Maylor, 2001; Anderson and Merna, 2003; Zimmermann and Jöhnk, 2003; Alquier and Tignol, 2006).

Maylor's framework (2001) with its criticism of the classic project management theory could provide a good approach for project management in SMEs. In his theoretical paper, Maylor generally remarks that project management should adapt many of the approaches of industrial mass production (e.g. that of quality

management). The author is turning away from mathematical models of operations research and complex models of project management. He proposes a different role for project management, with a stronger link to strategic planning. Well-trying strategic instruments of business management for industrial mass production should be utilized. They could be extended to include project-specific ratios. Such an approach ensures that the business strategy of the entire enterprise is taken into account. The Balanced Scorecard is mentioned as a strategic instrument for the control of project targets.

Classic project management is based more on empirical evidence than certain knowledge. It has no strong theoretical base (Maylor, 2001, p. 97). It focuses primarily on detailed network scheduling approaches for project planning that require increasingly complex tools and techniques. The number of high-profile failures indicates that the effectiveness of the techniques must be questioned. In many areas of commercial activity, project over-runs are considered the norm (p. 95). The literature on the traditional approach to project management presents systems that aim at assuring conformance to budget, scope and time constraints. Other considerations such as the need for excellence, continuous improvement and achieving customer delight are not found. Project managers are judged by measures of conformance, whereas modern project management requires “real performance” (p. 94).

The author proposes that new research approaches for project management should better integrate project performance and business drivers, in particular the role of policy deployment in business. Project performance management must move from conformance-based measures and use the popularity of approaches such as the Balanced Scorecard.

Maylor’s approach is interesting but it does not specify how it should be established in practice. For instance, the connection between the Balanced Scorecard and the business planning system with the additional project information is not explained.

No direct data is available for German SMEs with project-based activities. If so few project management tools are practised in large companies then the level of knowledge and application of project management techniques in SMEs is likely to be even lower. Therefore the present survey must first consider how the general management of single projects is carried out.

Integration of Projects Into Risk Management

More than 12 years ago, Lachnit (1994) studied the integration of individual project planning into the overall company business planning. Although his framework did not explicitly address project risk management aspects, the author pointed out (p. 113) that his system could also be applied to play through different scenarios, thus getting a feeling for the effects of the project risks identified.

Guserl (1996, 1999) took up Lachnit's system and developed it into a risk management framework for companies with project-based businesses. Due to its strong link to classic company business planning the approach appears to be quite suitable for SMEs, and it will therefore be discussed in more detail in the following.

The author (1999) establishes a theoretical framework for project risk management in engineering. He postulates that the risk management process in project-oriented enterprises should make use of both top-down and bottom-up approaches, in defining a risk policy and in risk analysis. Risk management should be part of a comprehensive management system, dealing with the entire enterprise as well as with the each single project. The top management has the overall view and can define the risk strategies and thresholds of risk figures (top-down). Conversely, information of the single projects must be fed back to the top from those closest to the sources of risk (bottom-up).

Therefore an integrated risk management demands a risk policy for single projects to be structured "top-down" and "bottom-up." Single projects must be considered with respect to the risk situation of the entire enterprise, not as isolated developments. Consequently, there is a need to guarantee that control measures for the entire enterprise are completely compatible with those related to single projects, and that they are integrated into the entire control system (p. 426-429).

Crucial for the author's framework is the integration of single projects into the master budget, thus establishing an integrated profit and cash control for the entire enterprise (p. 426). For monitoring projects, Guserl only considers the application of accounting figures, such as profit and liquidity.

Guserl's framework does not address qualitative (i.e. non-financial) risks. Moreover, no concrete suggestions for the implementation of the model are offered.

Tarr and Carr (2000) introduced a model on project risk management that is very similar to Guserl's approach (1996; 1999). The authors programmed a prototype and announced to test it in a longitudinal study with two project-based companies. A positive aspect which should be emphasized is that this approach completely manages without any mathematical-statistical risk estimates. It also brings into play linguistic expressions to estimate exposure to risk and the probability of occurrence, which can then be sorted into risk classes with the aid of percentage values, thus allowing a quantification to be made. One critical point which should be mentioned is that it is not clear how the combination of the observations of individual project risks can lead to an overall risk position of the company. Up until now (2006) no analysis on practical experience arising from this task could be found in the literature.

Leopoulos et al. (2006) argue that SMEs simply cannot afford to finish a project at a loss. Each project should therefore be subject to a risk consideration to be able to identify the critical factors in the project. Since most SMEs apply spreadsheet software and Microsoft Project, the authors suggest that the risk analysis of the project plans should be carried out by extending standard software through risk management add-ons such as @RISK or Crystal Ball. Built-in scenario functions can be used to assess the risk profile for each project on the basis of the available project planning. Such a software support must be viewed somewhat critically since, as was shown in Section 2.2, SMEs lack the necessary technical skills. Investigating, among other issues, into the exploitation of risk management software, the author of this thesis will try to confirm for German SMEs the general impression derived from the literature sources.

2.6 Business Strategy Typologies and Risk Behaviour

Typologies to classify firms are not unknown to the literature. They mainly deal with organizational behaviour and strategy formulation. The present thesis investigates risk management practices. So it is only natural to develop a variant of a typology approach to classify types of risk management practices. The literature review analyses sources on typology approaches which at least to some extent address risk management issues.

In a meta-analysis Zahra and Pearce II (1990) examine the validity of 17 empirical typology studies. They evaluate typology approaches regarding the following dimensions (p. 752):

- existence of distinct strategic types
- environment-strategic link
- adaptive cycle of an enterprise:
entrepreneurial problem, engineering problem, administrative problem
- internal organization, managerial philosophies
- competitive devices
- performance

Although Zahra and Pearce exclusively deal with investigations on the Miles and Snow typology (1978, 2003) other authors examine similar dimensions.

If typologies treat risk issues at all, they rather aim at psychological components, such as the managers' risk taking behaviour. A typology covering to at least some extent the aspects of a holistic risk management as this thesis supports does not exist (see Section 2.1).

The literature review on business strategy typologies considers literature sources that have already been empirically validated or that specifically go into SMEs, with the intention to possibly adapt their approaches within the frame of the present study. Table 2.7 assembles the main sources.

Table 2.7 Business Strategy Typologies: Literature Summary

Author / Research focus	Key findings
1. Miller and Friesen (1978, 1996) Archetypes of strategy formulation: Scoring of cases using published data of very large firms (USA).	Ten archetypes derived from 31 variables, covering environment, organization and strategy making.
2. Mintzberg (1979, 1989) The structuring of organizations (Organizational configurations): (Can).	Develops a typology for organizational structure general approach: six types; for small firms: two types, namely entrepreneurial and innovative ones.
3. Miles and Snow (1978, 1984, 2003) Fit among an organization's strategy, structure and management processes: Mail questionnaires and interviews (USA).	Suggest four types of organizational strategy: reactor, defender, prospector and analyser.
4. Smallman (1996) Relationship between risk strategy and organizational structure: Addresses micro, small, medium and large firms. Proposes field research programme by questionnaires and case studies (UK).	Uses Miles and Snow's typology and combines it with the polarized classification of risk management paradigms, i.e. the fatalistic and holistic approach. Up to now (2006) the proposed research has not been carried out.

Performing a type classification ranges from self-typing, the use of an expert panel, an assessment by the investigator or empirical derivation by mathematical-statistical methods (Zahra and Pearce II, 1990, p. 755).

The typology approaches of Table 2.7 to the companies' strategy and organization will now be critically reviewed, whether they might be applied to classify risk management practices.

Miller and Friesen (1978, 1996) present a first approach that departs from studying the strategy behaviour of firms by examining the dependency on various variables merely separately, i.e. by bivariate considerations. On the contrary, the authors concentrate simultaneously on a variety of variables, being important for the description of organizational behaviour. Essentially, these are the dimensions of strategic behaviour as described above.

For their study Miller and Friesen use 81 undisguised firm cases that had been published in the journals “Fortune Magazine” and “Harvard Case Clearing House”. The aim was to extract “success and failure patterns” associated with the respective firms. For further validation 10% of the rated cases had been sent to the chief executives of the respective firm, asking them to check whether their statement had been correctly interpreted by the researchers. Essentially, they confirmed the researchers’ scoring.

The scoring approach by Miller and Friesen (carried out by several researchers) is a transparent assessment. The authors derive from a set of 31 variables a variety of 10 types, which simply does not seem to be practicable for SMEs. Moreover, risk taking behaviour does not appear within all firm types identified. Based on secondary statistical data, information on some variables is partly lacking.

In all, Miller and Friesen’s approach is to be rejected. On the one hand, the large number of 10 different types does not seem to be practicable. Even those 6 types that have been identified to be successful are difficult to separate. On the other hand, taking into account 31 variables is not suitable in the SME context.

Mintzberg (1979, 1989) also works out a typology approach to assess the organizational behaviour of firms. In his original approach (1979) Mintzberg developed a typology with 6 types, which he announced to be applicable independent of the company size. In a later study (1989), Mintzberg identified organizational structures especially for small firms, namely the “entrepreneurial organization” and the “innovative organization.”

The “structure of the entrepreneurial organization is simple, characterized above all by what it is not: elaborated” (Mintzberg, 1989, p. 117). The entrepreneurial organization is totally geared to the owner-manager, being the centre of the organization and holding the reins. This organizational type is suitable for simply structured management problems.

In contrast, innovative organizations are prepared for other challenges: “... Innovation of the sophisticated variety requires another kind of flexible structure, one that can draw together different forms of expertise.” (Mintzberg, 1989, p. 199). The innovative organizational type has an adequate structure for complex management problems.

The proposed 2-type classification for SMEs does not allow to discriminate SME structures in a differentiated way. On the other hand, Doty et al. (1993, p. 1196) criticize the 6-type scale for the general case to be not usable.

Doty et al. (1993, p. 1196) remark critically that the typology demonstrates a very comprehensible description but with little empirical foundation of the theory. So they carried out a longitudinal study to check Mintzberg’s theory as well as Miles and Snow’s typology (1978). The aim was to examine whether the approaches might be suitable to assess the firms’ strategy behaviour. The study included some smaller firms with up to 200 employees but the focus was on large firms.

The statistical evaluations of Doty et al. (1993, p. 1229) have revealed that company types according to Mintzberg offer little information to discriminate: Firms following one of the Mintzberg type developments and orienting towards Mintzberg’s criteria of “strategic fit” did not perform more successfully than those violating the criteria.

According to Doty et al. (p. 1239) the typology of Miles and Snow (1978) is a better base to classify firms than what Mintzberg’s theory offers. Miles and Snow’s approach is the typology that has most frequently been validated empirically (see also Zahra and Pearce II, 1990, p. 751; Buchner, 2002, p. 116; Schachner et al., 2006, p. 604; Laugen et al., 2006). It reduces the number of types to four, being easier to identify. The four types are named as:

- reactor
- defender
- prospector
- analyser

These four types constitute a manageable number of groups that can be well differentiated by the criteria Miles and Snow present (see Section 6.1). Miles and Snow (1978) do not offer a detailed operationalization how to extract the different types. Additionally, explicit assessment of risk management does not occur;

merely the managers' risk taking behaviour is treated in a rather wholesale manner.

As Gimenez (2000) states, the Miles and Snow typology is especially suitable for classifying SMEs strategic behaviour. In the small business context one can find all four strategic types proposed in the Miles and Snow's model (p. 243). The empirical study of Gimenez has also revealed, that all strategic types in Miles and Snow's model are options for this business size. Gimenez also mentions that because of its simple and transparent description the Miles and Snow typology can easily be transferred to other research areas (p. 237).

Smallman (1996) draws on the typology of Miles and Snow and associates their company types to the risk paradigms "reactive risk management" and "proactive risk management" (see Chapter 1.2). Reactors and defenders are classified with respect to risk management as being "reactive" and prospectors and analysers as "proactive".

Smallman announces a very detailed description of a comprehensive research programme (questionnaires, interviews), addressing micro, small, medium and large firms. It must be criticized that Smallman's research model does not contain any operationalization how to assess risk management types. It is not described how the state of risk management (process and organization) must look like to fit with one of the types being considered. Issues of project risk management have not been taken into account at all. The literature review has revealed that until now (end of 2006) Smallman's research programme has not been carried out.⁶

2.7 Conclusion

As the literature review has revealed, little is known about the present level of sophistication of risk management in German SMEs. In particular, it is not clear which factors can positively influence the establishment of a risk management system in SMEs (examples of such factors are size effects, industry effects, staff responsibilities etc.). Therefore up till now (2006) generally only single aspects of risk management have been investigated, such as the management of operational risks.

⁶ Since 1996 the only study published by Smallman is from 2002; it examines the effect of risk management on project success with a case study in one firm from the utilities sector and has nothing to do with typologies (Elkington and Smallman, 2002).

One of the key findings of the literature analysis is that the attitude of the managing director towards risk plays an essential role in how systematically risks are handled. Often he lacks sophisticated business management knowledge, as would be needed for a comprehensive risk management approach.

Among the instruments that can serve for risk management, the business planning is dealt with by the literature to the greatest extent. In general, the results indicate that there is still great need for improving planning systems, whether or not they are used for risk management. It is worth while noting that the extent how firms value planning is dependent on the cultural context.

There are few studies on how well known to SMEs are instruments of performance measurement and to what degree they are established. Most frequently, the literature has probed the Balanced Scorecard. Investigations on the SMEs' application of instruments of performance measurement for handling risks are lacking.

The literature recognizes that in project-based companies the risk management process should not be an isolated subdiscipline of project management, but rather it requires an integrated approach. To constitute a comprehensive project risk management, in a bottom-up procedure the development of the single projects should be consolidated, resulting in a complete risk profile for the entire company.

Regarding business strategy typologies and risk behaviour, the literature review has revealed that there is yet no approach for a comprehensive assessment of risk management activities in SMEs.

Summarizing, there are no empirical studies on risk management practices in German SMEs, following a broader perspective rather than dealing with isolated topics. The main aim of the present thesis is to fill this gap. Chapter 3 discusses its research design, a combination of questionnaire survey and research interviews. The investigation will follow the lines of the holistic approach to risk management outlined in Section 2.1. The results of the questionnaire and the research interviews will be presented in Chapters 4 and 5, respectively. Based on the quantitative data of both questionnaire and interview inquiries, Chapter 6 will derive a typology for risk management practices, i.e. a scheme allowing to assess a firm's sophistication with respect to the different aspects of a holistic risk management. Chapters 7 will assemble practical implications how SMEs could

overcome the risk management deficiencies identified by this empirical investigation. Moreover, a framework for a comprehensive risk management system will be offered, being a guideline for a systematic handling of risks.

3 Research Methodology and Research Design

First, Section 3.1 discusses and evaluates the research approach which has been chosen for the present empirical investigation. Section 3.2 presents the research questions and relates them to the research objectives of Section 1.4. Then Sections 3.3 and 3.4 outline the research methods of a questionnaire survey and in-depth research interviews. Section 3.5 describes the methodical basics of the scoring approach of this study and the typology of risk management practices derived from the scoring. Finally, Section 3.6 briefly reports on the statistical evaluations by which the questionnaire and the interview results have been analysed.

3.1 Research Approach

At the beginning of the investigation in 2002, only little (and unreliable) data was available on the state of risk management in German SMEs (see e.g. Kessler, 2000, p. 64; Kirchner, 2002, p. 200). This gave rise to the decision to determine current risk management practices in German SMEs by an explorative approach.

The literature review has impressively revealed that risk management is a relatively new research area. No general standard has been established for risk management being suitable for SMEs (see, for example, ICAEW, 2005; Alquier and Tignol, 2006). Most literature sources on risk management deal with large firms. Concerning the small amount of information being available, at the outset of the study plausible hypotheses on the validity of certain theoretical assertions cannot be formulated. This thesis rather applies an inductive approach.

Regarding the research object of SMEs, an analysis of existing data does not seem to be promising. On the one hand, the literature review (Chapter 2) has shown, that most published data concern rather large firms than SMEs. On the other hand, existing data per se do not necessarily fit with the aims of the own research, so their meaningfulness might be limited.

There are various ways to get own data from company sources. In advance, the leadership structure and the organizational culture of SMEs exclude certain methods of data collection. In SMEs the decision behaviour and the knowledge of controlling the firm is strongly concentrated on the managing director. This

important person is often not willing to invest much time to participate in a research project (De, 2005, pp. 250-251).

A comprehensive approach in the form of a case study would be ideal but being present in a firm for such a purpose is in general too time-consuming for most SMEs. SMEs are afraid of informing comprehensively about company details (Weber, 2000, p. 15), which also opposes to a longer presence of an investigator. Moreover, getting an overview of current risk management practices means holding a larger number of case studies; the generalization of the results of only a few case studies would not be justified (Krämer, 2003, p. 138). In any case, a case study approach would take too much time, for the firms as well as for the researcher.

This thesis aims at both a broad picture and the further deepening of selected issues. So a questionnaire approach, followed by research interviews, appeared to be adequate. Derived from the literature review, the research questions that determined the structure of the questionnaire were formulated rather broadly so that the questionnaire survey itself could be used to identify the significant problem fields in more details. For further validating and refining, research interviews were designed, taking into account the feedback of the questionnaire results.

A questionnaire offers a sensible and cost-effective opportunity of obtaining an overview of the current situation of risk management in SMEs. Since SMEs have a very heterogeneous structure this can only be satisfactorily investigated with difficulty if one relies on just one research method (see Curran and Blackburn, 2001, p. 8). Therefore a questionnaire will only be a first step (carried out in 2002 and 2004) to investigate the current state of risk management in German SMEs and of the supporting areas identified in the literature review as relevant – e.g. business planning, Balanced Scorecard and similar instruments. Research interviews (carried out in 2005 and the beginning of 2006) are the only method suitable for an in-depth analysis to be made of the links between the components of a holistic risk management and for an investigation of the differences in the patterns of decision-making on the part of the managing director.

As Curran and Blackburn (2001, p. 46) correctly observe: “Often research on small firms benefits strongly from a mix of quantitative and qualitative approaches [...] Confidence in the conclusions will be higher if different approaches have

produced similar results.” In summary, the selected mix of quantitative and qualitative research techniques is considered to be suitable for fulfilling the research objectives defined in Section 1.4.

3.2 Research Questions

In a similar way to the structure of the literature review (Chapter 2), the research questions are divided into the following main topics: management behaviour, business planning, Balanced Scorecard and similar instruments, risk management and project risk management.

This thesis will specifically investigate the following research questions:

Risk Management

1. What are the likely key factors (quantitative: demographic variables such as enterprise size or industry sector; qualitative: the managing director’s knowledge or personal attitudes) that have influenced risk management practices in the main industries of German SMEs?
2. What are the methods and techniques used in the various steps of the risk management process?
3. How is risk management incorporated into the company’s organizational structure?

Business Planning

4. How comprehensive has a business planning been implemented? How has the risk management process been linked to the business planning?

Balanced Scorecard and Similar Instruments

5. To what extent have SMEs used performance measurement instruments such as the Balanced Scorecard and similar instruments for the early warning of risks (risk assessment)?

Project Risk Management

6. At which phases of a single project are risk management techniques utilized?
7. How is a possible interface between single project risk considerations and the risk profile for the entire enterprise developed?

Scoring of Risk Management Practices

8. How can capability types be derived from the scoring of risk management practices?

Table 3.1 below displays the link between the research questions and the methods selected for data collection and analysis. As Abernethy et al. (1999, p. 8) note, every research project must obey and observe three maxims of scientific method: construct validity, internal validity, external validity.

Construct validity is broadly defined as the extent to which the constructs of theoretical interest are successfully operationalized in the research. This definition incorporates both the extent to which the constructs are reliably measured and also whether the measures dealt with capture the construct of interest (Abernethy et al., 1999, p. 8). Construct validity aims to ensure that the research apply appropriate tools and techniques to investigate the research questions effectively.

Internal validity (credibility) refers to the extent to which the research design permits to reach causal conclusions about the effect of the independent variable on the dependent variable (Abernethy et al., 1999, p. 8). Internal validity is the extent to which causal relationships can be established.

External validity (generalizability) requires the researcher to establish whether the results can be generalized from the research sample and setting to the wider population, settings or times.

The assessment of the selected research methods is made under the points of view of Table 3.1.

Table 3.1 Matching the Research Objectives with Research Questions and Research Methods

Research questions	Research objectives (see Section 1.4)	Selected research methods	Evaluation criteria of construct validity, internal and external validity
1a. What are the quantitative factors that have influenced risk management practices in the main industries of German SMEs?	To identify similarities and differences across enterprise size, industry sector and other identified factors	Questionnaire survey	Restriction is mostly in terms of the depth of the data collected. This limitation is justifiable when the research questions require answers related to scope, rather than depth, and the sample data are taken to draw inferences about the population (Roberts, 1999, p. 74; Saunders et al., 2003, p. 284).
2. What are the methods and techniques used in the steps of the risk management process?	To inquire the formal techniques of risk management		
3. How is risk management incorporated into the company's organizational structure?	To inquire the organization of risk management		
4a. How comprehensive has a business planning been implemented?	To investigate into the components and the time horizon of the business planning		
1b. What are the qualitative factors that have influenced risk management practices of German SMEs?	To reveal how the personal attitude to risk of SME owner-manager affects approaches to risk management	Semi-structured research interviews	The semi-structured interview method exercised here is rich in heuristic potential, but is subject always to the intrusive effects of interviewer bias, both during the interview and in the analysis of transcripts (Lillis, 1999, p. 84; Easterby-Smith et al., 2002, p. 93).
4b. In which way has the risk management process been linked to the business planning?	To focus on links of risk management with business planning		
5. To what extent have SMEs used performance measurement instruments such as the Balanced Scorecard and similar instruments? Do SMEs use them also for the early warning of risks?	Use of instruments of performance measurement for risk management purposes	Questionnaire survey and semi-structured research interviews	First, by drawing on a mail questionnaire it is possible to obtain a sample being large enough to reduce sampling error to acceptable levels. Second, for the same sample size, the costs (in both time and money) are normally considerably less for a mail questionnaire than for face-to-face interviews. Finally, mail surveys do not introduce interviewer bias that is a potential problem for face-to-face interviews (Roberts, 1999, p. 57).
6. At which phases of the project life cycle are risk management techniques utilized?	To examine the handling of single projects with respect to their contribution to the risk situation of the entire enterprise		
7. How is the interface between single project risk considerations and the risk profile for the entire enterprise developed?			
8. How can capability types be derived from the scoring of risk management practices?	To develop a risk management typology for the assessment of the risk management sophistication of SMEs	Multidimensional scoring approach, derived from the questionnaire and interview results	Random sample of questionnaire responses and all interviews evaluated by the researcher to ensure conformity with the typology.

3.3 Design of Questionnaire

3.3.1 Development of Questions

The type of questionnaire discussed in Chapter 4 is a self-administered postal one. It was accompanied by a covering letter and a short glossary explaining the

purpose of the survey and the most important terms. The questionnaire was mailed with freepost envelopes. As an incentive to participate in the inquiry a coupon was added where the companies were invited to fill in their address if they were interested in the results of the questionnaire.

The intention was to give the questionnaire a clear layout and to use as little technical jargon as possible. Reference to any elaborate mathematical methods of risk evaluation and risk analysis has been avoided. This would be simply too much for SMEs.

The questionnaire is divided into four parts and has a total of 35 questions. Each part has an introduction briefly explaining its contents. Closed-ended questions dominate. The breakdown Table 3.2 relates the parts of the questionnaire and the main issues, ensuring the relevancy of the questions asked in the survey. A full example of the questionnaire is included in the Appendix D.

Table 3.2 Breakdown Relating Questionnaire Parts, Main Issues and Research Questions

Questionnaire Section	Main issues	Research questions
Part 1 (Questions 1.1 to 1.9): “Basic facts about your business”	Subject descriptors: turnover, number of employees, industry, legal form, independence criterion, auditing of financial statements, early-warning mechanisms Business planning systems	1a. What are the quantitative key factors that have influenced the risk management practices? 4. How comprehensive has a business planning been implemented? How has the risk management process been linked to the business planning?
Part 2 (Questions 2.1 to 2.9): “Organization of risk management in your business”	Risk management process Risk management organization	2. What are the methods and techniques used in the steps of the risk management process? 3. How is risk management incorporated into the company’s organizational structure?
Part 3 (Questions 3.1 to 3.4): “Use of instruments of performance measurement in your business”	Balanced Scorecard Shareholder value Knowledge management (general use and use for risk management purposes)	5. To what extent have SMEs used performance measurement instruments such as the Balanced Scorecard and similar instruments? Do SMEs use them also for the early warning of risks?
Part 4 (Questions 4.1 to 4.8): “Only for businesses with project-based structures”	Project risk management	6. At which phases of a project are risk management techniques utilized? 7. How is a possible interface between single project risk considerations and the risk profile for the entire enterprise developed?

It was hoped that personalized addressing of the covering letters would avoid any gatekeepers and get the message through the owner-operator’s attention filter. An expected completion time of 20 minutes was clearly stated in the covering letter.

The covering letter was also printed on paper with a letterhead containing the inscription of the Hochschule Merseburg University of Applied Sciences, Germany. As Bartholomew and Smith (2006, p. 93) note, this has a positive effect on the response rate:

“Obtaining endorsement from a relevant trade or professional association thus appears an effective as well as inexpensive means for researchers to bolster the social legitimacy of their survey and to improve the response rate.”

The procedures adopted for the administration of the survey are based on guidelines for mail surveys specified in Gillham (2000a) and Kent (2001). The guidelines include issues relating to the mailout package (the questionnaire, the format of the covering letter, the mailout and return envelopes, and the techniques for assembling these materials).

3.3.2 Testing and Piloting the Questionnaire

Before using the questionnaire to collect data, discussions in Germany and the United Kingdom were held with researchers who deal with risk management issues. Managers and partners of accountancy and management consultancy businesses were also contacted, which led to improvements of the questionnaire.

Table 3.3 Organizations Contacted While Designing the Questionnaire

Organization	Industry/department	Country	Persons contacted	Position within organization
Napier University Business School, Edinburgh	accounting and finance department	UK	3	professor, lecturer
Hochschule Merseburg University of Applied Sciences, Merseburg	business management faculty	Germany	1	professor
Ernst & Young LLP, Edinburgh	business risk consulting	UK	2	partner, manager
Ernst & Young Deutsche Allgemeine Treuhand AG, Düsseldorf and Leipzig	risk management services	Germany	2	partner, senior manager
Deutsche Gesellschaft für Mittelstandsberatung, Düsseldorf	management consultancy	Germany	1	senior consultant
Haarmann Hemmelrath Management Consultants GmbH, Munich	management consultancy	Germany	1	manager

In order to gain further feedback from a larger section of the research community, in 2002 the risk management framework and the questionnaire topics were presented at the research conference for junior research fellows at the Hochschule Harz University of Applied Sciences, Germany. Thereafter semi-structured test interviews were conducted with 5 SMEs. As a consequence, parts of the questions were changed, technical terms were reduced to a minimum, and a glossary added.

In the spring of 2002, an online questionnaire was published as a pilot test. Links on the homepages of two international accountancy and consultancy firms and on those of the Hochschule Merseburg University of Applied Sciences, Germany, and the Napier University, United Kingdom invited SME owners and employees to take part in the online survey. Additionally, a short article in the monthly information journal of the German Chamber of Industry and Commerce referred to the online questionnaire. The results of 28 online questionnaires from SMEs of different size classes led to minor modifications of the postal questionnaire¹.

As a result of the pilot redundant or ambiguous questions have been removed, and the technical jargon used kept to a minimum. The glossary has also been revised. Some more detailed explanations have been incorporated, for example on the entries describing instruments of performance management: Balanced Scorecard, shareholder value and knowledge management. Concerning knowledge management, the hint has been included that knowledge management does not require elaborated methods; in its simplest form it means implementing a knowledge database (see Appendix E). The results of the pilot test were not included in the main survey.

3.3.3 The Sample

The following Table 3.4 is intended to give an overview of the total number of companies in Germany and their distribution across the various industry sectors. The official Value Added Tax (VAT) statistics include all companies with an annual turnover above 16,617 Euros.

As the German Institute for SME Research IfM notes, there are no official statistics from which the number of SMEs can be derived directly without the need for additional calculations (see Hauser, 2000; Günterberg and Wolter, 2002; Günterberg and Kayser, 2004). Therefore empirical SME studies make use of the Value Added Tax statistics in estimating the parent population. As already discussed in Section 1.3, the EU and the IfM definitions differ with regard to the number of employees². However, the official VAT statistics only include the

¹ The size of the sample for the pilot test is the subject of widely different approaches in the literature. Clink (2001, p. 87) for example in his investigation of risk management and small business evaluated a pilot test involving 20 completed questionnaires.

² The IfM definition is based on the number of full-time employees as follows: up to 9 employees = small enterprise. From 10 to 499 employees = medium-sized enterprise. In terms of annual turnover the IfM and the EU definitions are in agreement and define an SME as a company with a turnover of up to 50 million Euros.

annual turnover as a parameter so there is no problem in estimating the total number of SMEs in Germany.

Following the Nomenclature Activity Classification Europe (NACE) code structure, the original industry sectors of the questionnaire (Appendix D) have been grouped into the following main industries:

- construction
- engineering
- information technology
- auditing/consulting/training
- trade/service/logistics

As mentioned in Chapter 1, in these industry sectors project-oriented activities dominate.

The overall breakdown of German businesses according to the VAT statistics and the share represented by SMEs can be taken from Table 3.4. Its last column summarizes the respective number of firms belonging to one of the above main industrial sectors.

Table 3.4 Number of Businesses in Germany

Size classes according to VAT statistics		Annual turnover from ... to less than ... Euros	Total number of enterprises in Germany	Thereof the five main industries addressed by the questionnaire		
		16,620 - 50,000	804,626	533,270		
		50,000 - 100,000	578,390	382,085		
		100,000 - 250,000	664,344	468,579		
		250,000 - 500,000	349,435	270,775		
		500,000 - 1 million	229,728	189,732		
Micro	(less than 2 million Euros)	1 - 2 million	139,597	2,766,120	119,197	1,963,638
		2 - 5 million	90,936	78,604		
Small	(from 2 to less than 10 million Euros)	5 - 10 million	32,958	123,894	28,809	107,413
		10 - 25 million	20,990	18,525		
Medium	(from 10 to less than 50 million Euros)	25 - 50 million	7,638	28,628	6,689	25,214
		50 - 100 million	3,972	3,460		
		100 - 250 million	2,360	2,067		
Large	(50 million Euros and more)	250 million and more	1,596	7,928	1,328	6,855
Total			2,926,570	2,103,120		

Source: Value Added Tax Statistic (2002), Statistisches Bundesamt (2004) and own computations

Once the total population has been determined there remains the problem of selecting a suitable database for determining the sample. Because of simplifications for SMEs with respect to the disclosure requirements of the annual financial statements only few quantitative data are available publicly (see Sections 326 and 327 of the German Commercial Code HGB). This fact makes difficult the definition of a sample and its selection.

Referring to the data of regional chambers of trade and industry had to be rejected. On the one hand, it would have been be very time-consuming to extract the addresses of SMEs from the database of the chambers. On the other hand, some chambers even were not willing to hand out their data.

After having analysed commercial address databases, the decision was made to work with the Hoppenstedt (2002) CD-ROM database for German SMEs. This is a well-known and annually updated database containing information about c. 65,000 German SMEs, the largest SME database with an over-regional focus. It is oriented towards the European Union definition of SMEs, and the firm profiles contain all essential quantitative information. Similar as the VAT statistics above, it is organized according to the Nomenclature Activity Classification Europe (NACE) code, which supports selecting the industries being relevant for the present investigation.

By the technique of cluster sampling, all enterprises with a number of employees up to 250 and an annual turnover up to 50m € within the construction, engineering, information technology, auditing/consulting/training and trade/service/logistics industries were selected from the Hoppenstedt database. This resulted in a total sample of 1,801 firms. The following Table 3.5 presents the sample from the Hoppenstedt data.

**Table 3.5 Numerical Breakdown of Sample:
Questionnaires Sent Out and Evaluated Responses**

	Sent out*		Evaluated	
Size by annual turnover (Q 1.5)				
Micro (up to 2 million Euros)	17	0.9%	22	7.0%
Small (more than 2 to 10 million Euros)	1,398	77.6%	179	57.0%
Medium (more than 10 to 50 million Euros)	386	21.4%	85	27.1%
Large (more than 50 million Euros)	0	0.0%	7	2.2%
No statement			21	6.7%
Total	1,801	100.0%	314	100.0%
$\chi^2 = 301,329.227$ df = 3 p = 0.000 Sign. < 0.01				
Size by number of employees (Q 1.6)				
Micro (up to 9 employees)	0	0.0%	16	5.1%
Small (10 to 49 employees)	0	0.0%	47	15.0%
Medium (50 to 249 employees)	1,800	99.9%	237	75.5%
Large (250 to 499 employees)	1	0.1%	14	4.5%
Total	1,801	100.0%	314	100.0%
$\chi^2 = 14,139,428.442$ df = 3 p = 0.000 Sign. < 0.01				
Industrial sector (Q 1.1)				
Construction	413	22.9%	92	29.3%
Engineering	728	40.4%	107	34.1%
Information technology	169	9.4%	42	13.4%
Auditing/consulting/training	311	17.3%	32	10.2%
Trade/service/logistics	180	10.0%	41	13.1%
Total	1,801	100.0%	314	100.0%
$\chi^2 = 26,068$ df = 4 p = 0.000 Sign. < 0.01				

* Source: Hoppenstedt database (2002) and own computations

As Table 3.5 shows, in some cases the number of responses is larger than in the sample drawn from the Hoppenstedt database. The database is updated only once a year, while the firms permanently follow a process of re-structuring, which results in belonging to a different size class when comparing the sample data and the response data.

Concerning size by the number of employees, Table 3.5 contains one “sent out” outlier. The sample had been drawn from the Hoppenstedt data source by filtering with respect to size by annual turnover (as well as with respect to industries). In this way one firm had been collected which is large in term of number of employees.

As can be seen from the table, micro firms are under-represented. The reason is that the Hoppenstedt database does not contain enough information about these companies. Obtaining data on micro firms proves to be very difficult, and such firms are also less willing to answer questionnaires (see Bartholomew and Smith, 2006, p. 90). This is the explanation why, as has been mentioned in the literature review (Chapter 2), many studies exclude micro firms. The present work will avoid following such a route. Micro-firms should rather be handled as a control group, in order to see whether there really are clear differences in terms of risk management between such firms and other companies (see Section 3.6).

Annual turnover is employed as an important size criterion in the presentation of the research findings. In addition the Appendix F reports on the results in terms of employee size classes, since with SMEs one criterion alone is rarely sufficient to detect size effects (see Curran and Blackburn, 2001, p. 39). To make the results of the own investigation comparable with other empirical studies, the EU size definitions will be assessed and extended through the addition of one extra class for the IfM definition.

3.3.4 Response and Bias

The appropriate level of the response rate is the subject of much controversial discussion in the literature.

Bartholomew and Smith (2006, p. 85) assessed trends in survey research on entrepreneurs and small firms and conducted a review of articles published over the last seven years in the international journals of *Entrepreneurship Theory and Practice* and the *Journal of Small Business Management*. Mail surveys are the

dominant form of data collection in entrepreneurship and in small business research compared with other methodologies. Their review revealed that mail survey response rates in small business research are lower than for research on large firms. A review of the empirical studies in the above journals over the period 1998 to 2004 revealed an average response rate of 27%.

According to Bartholomew and Smith (2006) the lower response rate in surveys sent specifically to small and/or new firms may be due to several factors.

First, small firms have fewer slack resources than larger firms. Organizational slack offers firms a cushion of resources that allows organizations to take on additional tasks, such as survey completion.

Second, as knowledge of the firm's strategy and activities is usually highly concentrated in the leader of the small firm, mail surveys to small businesses are almost always sent to the managing director. The managing director is a difficult respondent from which to gain data via mail surveys. Furthermore, in small firms, a survey sent to the managing director may not be delegated as easily compared with larger firms in which various members of the organization may have full knowledge of the firm's strategy and key activities. Further reports from other survey researchers such as Dennis (2003) suggest that it is becoming increasingly difficult to obtain responses. The respondents often complain of the high number of surveys in which they are asked to participate. There is a high degree of questionnaire fatigue.

Bartholomew and Smith (2006) then carried out another test on the factors which can positively influence the response rate and concluded the following (p. 86):

“... endorsement from the relevant trade association had a significant positive influence, with recipients of the endorsement letter being 1.4 times more likely to respond to the survey than those who did not receive an endorsement letter accompanying the survey.”

This was also allowed for in the author's present study.

Newby et al. (2003, p. 169) investigated the following for SMEs:

“This study evaluates four response-inducing strategies in terms of their effect on data quality, response rates, and cost effectiveness for a population of SMEs. If researchers are concerned with the cost-effectiveness of adequate questionnaires, a single mailing without pre-notification or monetary incentive appears best.”

Due to the financial and time limitations the present investigation did not include any follow-up procedure.

According to the investigation carried out by Newby et al. (2003, p. 168), a mailing without any additional action can reach a response rate of 8%. If a follow-up mailing is made the response rate can be increased to 12.4%. If this is compared with the response rate of the author's own study in Table 3.6 then the response rate actually achieved (17.4%) can certainly be described as good. The comparatively high response rate certainly depends on the external pressure on SMEs to deal with risk management issues, as discussed in Section 2.2 of the literature review.

Table 3.6 Detailed Computation of Response Rate

Number of questionnaires	First wave 2002		Second wave 2004		Total	
Sent out	1,292	100.0%	509	100.0%	1,801	100.0%
Returned, but not filled in	296	22.9%	87	17.1%	383	21.3%
	27	2.1%	17	3.3%	44	2.4%
Filled in, but unusable	269	20.8%	70	13.8%	339	18.8%
	11	0.9%	3	0.6%	14	0.8%
Usable, but with number of employees > 499	258	20.0%	67	13.2%	325	18.0%
	9	0.7%	2	0.4%	11	0.6%
Evaluated	249	19.3%	65	12.8%	314	17.4%

A test on differences between the results of the surveys in 2002 and in 2004 has been carried out. With regard to risk management issues, essential differences between both questionnaire waves could not be detected. The outcomes of the chi-square test are summarized in the Appendix H.

The response rate is related to the problem of non-responding firms. As was determined earlier under Section 3.1, the object of the investigation is very inhomogeneous and therefore difficult to study.

The relevant literature generally suggests the following on the response rate topic, but without any specific reference to SMEs. As, for example, Roberts (1999, p. 62) recommends:

“To assess whether responses from non-respondents would have been significantly different from the data collected. These approaches compared the association between known characteristics of both respondents and non-respondents. The characteristics used for this test of non-response bias are size (in terms of number of employees and annual sales turnover), location and industry sectors.”

In contrast, Dennis (2003, p. 292) comments that a non-response bias test makes less sense for SMEs, for the following reasons:

“The experiment also showed that some small business owners are more inclined to participate in surveys than others. Small business owners appear not to respond as either business people or as individuals. Extrapolating from literature examining other populations, therefore, is tenuous. As a corollary, these experimental results

imply the potential presence of a response bias in most small business owner surveys that probably cannot be detected through comparison of sample and respondent demographic characteristics. The implication is that a simple demographic comparison is an inadequate check for bias. The experiment also showed that some small business owners are more inclined to participate in surveys than others. A substantial portion of non-responses in mail surveys can be attributed to accessibility rather than to non-cooperation.”

The data of Table 3.5 reveal a clear bias with respect to the Hoppenstedt database. The chi-square test results included in the table are a formal confirmation of this fact.

The Hoppenstedt database contains firms of smaller size, but with an amount that is much smaller than that of the corresponding size intervals of the VAT statistics. Nevertheless, since using the Hoppenstedt database is the only practicable way to get nationwide data, it was taken to draw the sample from, thus making possible a nationwide investigation.

Because of the problems of data access, micro forms are excluded from many studies (Kessler, 2000; Clink, 2001; Turpin, 2002; Ossadnik et al., 2004; Berens et al., 2005; ICAEW, 2005); some of them also even do not deal with small firms. The obvious bias concerning the size distribution has been accepted by the present thesis, which deliberately includes micro firms, in order to obtain results about at least tendencies for this class. The proportions of micro and small firms within the interview sample are larger than the corresponding ones within the questionnaire respondents.

3.4 Design of Research Interviews

3.4.1 Development of Interview Issues

The development of the issues for the research interviews was made following further study of the literature and a detailed analysis of the results of the questionnaire from Chapter 4. In order to promote further feedback and scientific debate, the first questionnaire wave (2002) was presented to the 26th Annual European Accounting Association Congress in April 2003 in Seville, Spain. The research findings were also presented to the 50th Annual World Conference of the International Council for Small Business, Washington, USA, in June 2005, where the procedure operated in the interviews was also shown. It produced some useful comments since not only scientists were present at the conference but also SME

owners. The set of issues for the interviews displayed in Table 3.7 was then prepared on this basis.

Table 3.7 Breakdown Relating Research Interview Parts, Main Issues and Research Questions

Parts of the research interview schedule	Main issues	Research questions
<u>Base data sheet*</u>	Subject descriptors: turnover, number of employees, industry, legal form, independence, business age, ISO-certification, owner- other manager, project duration, number of projects	1a. What are the quantitative key factors that have influenced the risk management practices?
<u>Background</u> (Questions 1 to 2): “Uncertainty in the internal/external business environment”	An opening question intended to stimulate discussion of uncertainty in the external/internal environment relating to the interviewee’s business. Uncertainty descriptors: external environment, internal environment, turnover growth, external support	Not obviously a research-related question but valuable when set against the overall interview findings.
<u>Part 1</u> (Questions 3 to 6): “Organization of risk management”	Intended to gather information on an organization’s approach to dealing with risk issues. To find out if a risk awareness culture exists. To understand which risk management strategies are employed.	3. How is risk management incorporated into the company’s organizational structure? 1b. What are the qualitative key factors that have influenced the risk management practices?
<u>Part 2</u> (Questions 7 to 12): “Risk management process”	This is an enquiry into how the risk management process is carried out in detail. Special emphasis lies on the development of a risk portfolio for the entire business.	2. What are the methods and techniques used in the steps of the risk management process?
<u>Part 3</u> (Questions 13): “Business planning”	To investigate the link between risk management and business planning.	4b. In which way has the risk management process been linked to the business planning?
<u>Part 4</u> (Questions 14 to 15): “Balanced Scorecard and similar instruments”	How and to what extent are these performance measurement instruments used for risk management issues.	5. To what extent have SMEs used performance measurement instruments such as the Balanced Scorecard and similar instruments? Do SMEs use them also for the early warning of risks?
<u>Part 5</u> (Questions 16 to 17): “Project risk management”	This enquires into project risk management practices and the use of formal risk management techniques. To gather information about the link between project risk management and the risk management of the entire business.	6. At which phases of a single project are risk management techniques utilized? 7. How is the possible interface between single project risk considerations and the risk profile for the entire enterprise developed?
<u>Information on interviewee</u>	Interviewees’ educational background and work experience.	Not obviously research-related but valuable when set against the overall interview findings.

* Mailed in advance; checked and clarified by the end of the interview.

The detailed interview guidelines can be found in the Appendix I where the referencing for the issue numbers is also used for the presentation in Chapter 5.

A one-page interview guideline was also prepared for the interview participants (see Appendix J). They could take advantage of it to obtain an preliminary overview of the themes to be discussed. The participants in the interviews are

more willing to carry out such an interview when they are aware of the topics in advance (see Gillham, 2000b). Care was taken that the interview guideline should include as little technical jargon as possible, and that only the main topic areas are discussed, namely: business planning, Balanced Scorecard and similar instruments, risk management. The interviewee's guideline was posted together with the base data sheet (containing demographic data on the company) a week before the date of the interview. Further, the companies were again phoned to check that the documents had been received and to ask whether they had any questions on them.

In order to open up the discussion with the interview partners, the interviews began with questions on the company's external and internal business environment as a way of entering into the theme. Questions concerning the interviewee's personal data were asked at the end of the discussion, since the telephone contact made before the interview already revealed which position the contact person held in the company. Each interview began with a question as to whether the data could be tape-recorded. To be safe, handwritten notes were also made during the course of the interview. Each participant was offered the opportunity of receiving a copy of the recorded conversation so as to allow him to make corrections or additions. Only a few of the companies questioned took advantage of this offer.

3.4.2 Testing and Piloting the Interviews

The provisional set of questions was discussed with the persons indicated in Table 3.3. In addition, working with the support of the regional chambers of trade and industry and the Centre for Founders of New Businesses of the Hochschule Merseburg University of Applied Sciences, Germany, five test interviews with SME were carried out. On average the test interviews lasted between 45 and 60 minutes. One aspect which appears sensible was to have a general discussion of the company's external and internal business environment before entering into the questions of risk management. Many of the test interview candidates often said the following during the first telephone contact:

"We don't run a risk management system. Nevertheless we can certainly get together for a chat; we have nothing to lose and we might even learn something from it." (interview company no. 2, small enterprise, trade sector)

Following the piloting interviews the interview guideline was given some textual modifications but otherwise generally left unchanged.

3.4.3 Selection of Interviewees

A real challenge in the research interview method is to decide how large the number of research interviews must be to ensure adequate certainty or “basis” for the results. Miles and Huberman (1994) simply determine that one can stop carrying out research interviews when the sample shows a certain “pattern identification/matching and explanation building.” This is not very helpful. Coviello and Jones (2004) in their analysis of 50 empirical studies (content analysis in terms of sample characteristics, data collection procedures, equivalence issues) in international SME journals on the subject of entrepreneurship and small business, discovered that as a rule fewer than 30 research interviews were carried out (p. 494).

So a figure of around 30 interviews was considered to be reasonable for the present explorative investigation. Further, at least 5 companies should be included in each of the size classes micro, small and medium-sized.

Two methods were exercised for the selection of the interview participants, which will be presented in somewhat more detail.

The participants in the postal survey were offered the opportunity of being sent the results after the questionnaires would have been evaluated. Of the 314 usable questionnaires 220 companies expressed their interest in the results and returned, details of their address. These companies were later sent the results of the postal survey, together with a covering letter. The covering letter asked if the companies would be interested in a personal discussion on the topic of risk management. A week after posting off the results, the companies were contacted by phone to ask about their interest. Some SMEs initiated contact themselves, expressing their interest.

This procedure led to 11 participants in the research interviews that had already taken part in the questionnaire survey. The approach was considered to be sensible since thus the available results of the questionnaire can be partly validated and the interview can then concentrate on the main topics as referred to in Section 3.4.1.

On the other hand, to collect data from interviewees who had not been influenced by the postal questionnaire, a number of additional SMEs were contacted by phone. This proceeding was supported by the chambers of trade and industry and the Centre for Founders of New Businesses of the Hochschule Merseburg University of Applied Sciences. In addition, contact with some SMEs was also

made through the accountancy company Ernst and Young, Germany. In all, the second approach led to 27 interviewees.

In selecting the participants, special care was taken to ensure that micro firms were more strongly represented than in the postal survey, in order to obtain more detailed information on them. Attempts were also made to agree a date for the interview with the managing director himself, since in SMEs he has a complete overview and is responsible for making all important decisions. Thus interviews were carried out with 38 companies between April 2005 and January 2006. The detailed demographic data on the companies can be found in the Appendix K.

3.4.4 Methods of Analysis of Interview Results

Based on the tape-recordings (which 23 out of 38 interviewees had agreed to) and the interviewer's notes the individual interviews were carefully worked through ("within-case" analysis). In a first step, for each interview issue of the interviewer's guideline the corresponding responses have been assembled as verbatim as possible in an analyse grid (Gillham, 2000b, pp. 62-65). All transcripts were edited thoroughly to ensure accuracy.

From the original wording of the responses, categories were extracted describing the individual content by standard terms, where, in general, a response covered several categories. These categories allow an encoding for the purpose of quantitative evaluations. In this way, the quantifiable parts of the 38 interviews can be made accessible to analyses similar to those of the questionnaire data (Section 3.5; see Miles and Huberman, 1994, p. 55). To remove errors, the encoding of the interview cases was independently cross-checked by a second researcher, leading to some minor changes.

The application of special software for evaluating interview data (programs for qualitative data analysis) were considered to be too time-consuming and too expensive.

Common features and differences were studied in terms of factors such as personality of the entrepreneur, education, sector or company size ("cross-case" analysis), in order to obtain conclusions.

Non-quantifiable interview data will be presented in the form of "direct quotations." The statements will be used for an analysis of management behaviour, but also for the examination of problems that arise in connection with establishing

a risk management system. In addition to that, the quotations allow to reproduce the general atmosphere in which the interviews took place. To support the impression, the translation of the quotations does not use English standard language, but it tries to reflect the spontaneous statements as they originally occurred.

3.5 Scoring Approaches and Risk Management Typology

A main element of this research project is the development of scoring variables, with similar constructions for both the questionnaire results and the interview results. Scoring is introduced to allow an assessment of risk management and to derive a typology of risk management practices.

The following comments briefly explain the principles of constructing the scoring variables from the underlying scoring summands and the definition of the associated scoring classes.

Scoring summands: Most questionnaire and (quantitative) interview results have a nominal or at most an ordinal scale. Responses of the type “Yes/No” or “Yes/Partly/No” have an inherent rank and were encoded reflecting this rank (for the encoding see the score columns in Appendices F and L). Concerning issues with multiple response the simplest form of deriving a scoring summand is the counting measure: If n options had been ticked in the questionnaire or mentioned to the interviewer, respectively, the scoring summand is given the value n . Simply counting the number of selected options means that all options are considered to have the same “value”. If in contrast to that an option is estimated to have particular meaning it will be given an increased value of 2 or more instead of the “normal” value 1. In this way the scoring summands can be treated as metric variables³.

Scoring variables: In its simplest form, a scoring variable is defined as the sum of the corresponding scoring summands. There are two reasons to deviate from simple sums by applying weighting factors: If a scoring summand has a relatively small range compared to the other summands, a weighting factor is applied to compensate. Furthermore, if the contribution of a scoring summand is judged to be of particular importance for the score of the respective risk management aspect, it

³ Perry (2001, p. 204) points out that such an approach is permissible in exploratory research and that the main task of exploratory research is to study “... with the intent of pointing the way to more definitive and rigorous research in the future.”

will be given a weighting factor of 2 or more. Being a weighted sum of metric variables, each scoring variable is also metric.

Scoring classes: Due to their origin, the scoring variables have different and therefore non-comparable ranges. To overcome this difficulty, the ranges of all scoring variables are simply subdivided into three intervals of equal length, named the “low”, “moderate” and “high” scoring class. It should be noted that “range of a scoring variable” means the set of values between the variable’s theoretical minimum and its theoretical maximum, not its empirical range when regarding the scores of a sample. In this manner, the scoring ranges become normalized and thus made comparable.⁴

In Chapter 4 the analysis of the questionnaire results will be taken as the basis for constructing scoring variables. A similar scoring is carried out for the results of the research interviews, based on their quantitative data (Chapter 5). Both scoring variants evaluate separate scores for the main topics considered as important in the literature review:

- business planning
- Balanced Scorecard and similar instruments
- risk management process
- risk management organization
- project risk management

The scoring approach of this thesis allows the sophistication of a risk management system to be classified by a set of four or five scoring attributes (in the cases of general risk management or project risk management, respectively). The set of scoring attributes assessing a firm’s risk management practices forms a specific pattern, with each of the components varying in the range low–moderate–high.

For details of the construction of the scoring variables see Sections 4.4.1 and 5.3.1, with special attention to Tables 4.32 and 5.21.

The bivariate examinations and the scoring outcomes will be taken as a base to derive a typology for risk management practices. As a result of an overall analysis of the questionnaire and the interview findings, general descriptions of the determinants of risk management types will be presented. Dependent on its low–

⁴ The analyses of Chapters 4 and 5 will reveal that a finer gradation does not seem to be appropriate; for example, risk management organization and performance measurement do not show an adequate scoring range for further differentiation (see Tables 4.32 and 5.21).

moderate–high scoring pattern, each firm can then be assigned to one of the following types (see also Section 2.6):

- reactor
- defender/pro prospector
- analyser

A risk management type assembles firms with similar scoring patterns. This similarity is not defined in a mathematical way; it is due to a classification by the investigator, according to the general type descriptions (see Tables 6.1 to 6.3).

It is pointed out that the type extraction distinguishes between the cases of general and of project risk management.

3.6 Statistical Evaluations

The first approach to evaluate the responses of the questionnaire survey and the quantifiable data obtained from the research interviews will apply descriptive statistics (essentially frequency evaluations). Most basic analyses consider bivariate associations. To detect interesting dependencies, the questionnaire and interview results are crosstabulated versus certain basic variables which reflect a firm's demographic data (subject descriptors). Being specific for the interview data, bivariate investigations are also carried out with a set of variables describing external and internal uncertainty in the firm's business environment.

Because of the small (in the statistical sense!) interview sample (38 interviews compared to 314 evaluated questionnaires) statistical tests have been restricted to the questionnaire analyses. Most frequently applied in connection with bivariate considerations is the chi-square test, to detect whether two variables reveal a dependency of statistical significance. In connection with statistical tests, significance in the stricter sense will be associated with a level of 1%. A variant of the chi-square test checks whether observed values fit a given frequency distribution. Bias considerations draw on this kind of goodness of fit test.

The chi-square test is applicable with variables of any scale type. Another statistical test is carried out in the context of metric variables: the ANOVA test (analysis of variances) checks whether a metric variable has significant different means within subsets of cases defined by a second variable. This study applies ANOVA to the means of the questionnaire scoring variables (Section 3.5).

In addition to the bivariate examinations of the questionnaire and interview results, in the questionnaire case the findings are also submitted to multivariate analyses. More precisely: The scoring summands (Sections 3.5) associated with the risk management aspects in the stricter sense will be taken as input for a combined factor and cluster analysis.

The input of a factor analysis is a collection of metric variables indicating which characteristics of the sample are to be treated simultaneously. The output is a smaller collection of variables (the “factors”) that can be treated to a certain extent as a substitute for the input variables. Moreover, the factors induce a grouping of the input variables (via a matrix of “loadings”), showing which single factor can be treated as a substitute for which subset of the input variables. In this study, factor analysis is carried out by the extraction method of principal components analysis.

The input of a cluster analysis, as applied here, is a collection of metric variables, and its output is a set of clusters of sample elements (“cases”). It should be noted that there is also a dual version of cluster analysis, with cases as input, building clusters of variables (see, for example, Clink, 2001, p. 119).

Cluster analysis (like factor analysis) serves to discover a grouping structure. While factor analysis induces categories of related variables, cluster analysis builds sets of cases, where cases within the same cluster have a relatively small distance, and cases from different clusters have a relatively large distance. Here the definition of distance between two cases needs to be specified. This study applies the widely used squared Euclidean distance.

The cluster analysis (Section 4.5.2) will be based on the factors identified in a preceding factor analysis (Section 4.5.1). Factors form a set of mutually independent normalized (“orthonormal”) variables, thus meeting the requirements for cluster analysis (for this approach, see, for example, Yusuf and Saffu, 2005, p. 487; Clink, 2001, p. 116; Backhaus et al., 2003, p. 538).

Multivariate analyses have been carried out to get support for the scoring approach and to validate the grouping of scoring summands to construct scoring variables assessing the various risk management topics. Moreover, they shall deliver new ideas for grouping related topics and to detect relationships.

4 Questionnaire Results

4.1 Introduction

As pointed out in the literature review (see Chapter 2), there is little knowledge about the state and the implementation of risk management in German small to medium-sized enterprises. In a first approach, the current state of risk management has been investigated by means of a postal questionnaire. Details of the methodological approach have been presented in Chapter 3. The collecting of data was carried out in two questionnaire series in autumn 2002 and in spring 2004. In general, the data of both series will be presented as a whole.

At first, in the following sections the questionnaire data will be examined by univariate (Section 4.2) and bivariate analysis (Section 4.3). To facilitate the comparison of the results with what was reviewed in Chapter 2, the results are structured in the same way as the literature review. After that, the results of the essentially descriptive examinations are used to develop a “scoring” approach, which shall help to estimate the sophistication of risk management systems (Section 4.4). To validate the self-developed scoring of “risk management practices”, the questionnaire results will be analysed by multivariate methods (Section 4.5). The questionnaire findings will be validated and deepened by research interviews (see Chapter 5).

4.2 Univariate Analysis

Firstly, the “basic variables” of the questionnaire sample is studied (Section 4.2.1). Then business planning, the pivotal element of a comprehensive risk management approach, is discussed (Section 4.2.2). As a first step toward the main topic of risk management, the univariate analysis reports on early warning systems (Section 4.2.3).

4.2.1 Basic Enterprise Data

This section deals with fundamental data or “basic variables” describing the demographic profile of firms, such as size or industrial sector. In general, various questionnaire results will be combined with the basic variables, to examine whether they might depend on certain demographics or not.

The basic data of both questionnaire series of the years 2002 and 2004 are contained in Table 4.1. A chi-square test has justified the combination of the two questionnaire waves (see Section 3.3.4 and Appendix H). The source for obtaining the sample was the Hoppenstedt (2002) database for German SMEs introduced in Chapter 3. If enterprise are classified according to the annual turnover, small firms in the sample clearly dominate. If, on the other hand, the number of employees is taken to define enterprise size, there is a clear shift towards the class of medium-sized firms. As recommended by the literature on SMEs (see, for example, Curran and Blackburn, 2001, p. 22), the questionnaire results take account of both size criteria.

Table 4.1 Demographic Data of the Questionnaire Respondents

	Data				Total ¹	
	2002		2004			
Size by annual turnover (Q 1.5)						
Micro (up to 2 million Euros)	16	6.4%	6	9.2%	22	7.0%
Small (more than 2 to 10 million Euros)	146	58.6%	33	50.8%	179	57.0%
Medium (more than 10 to 50 million Euros)	71	28.5%	14	21.5%	85	27.1%
Large (more than 50 million Euros)	5	2.0%	2	3.1%	7	2.2%
No statement	11	4.4%	10	15.4%	21	6.7%
Total²	249	100.0%	65	100.0%	314	100.0%
Size by number of employees (Q 1.6)						
Micro (up to 9 employees)	8	3.2%	8	12.3%	16	5.1%
Small (10 to 49 employees)	33	13.3%	14	21.5%	47	15.0%
Medium (50 to 249 employees)	197	79.1%	40	61.5%	237	75.5%
Large (250 to 499 employees)	11	4.4%	3	4.6%	14	4.5%
Total	249	100.0%	65	100.0%	314	100.0%
Industrial sector (Q 1.1*)						
Construction	78	31.3%	14	21.5%	92	29.3%
Engineering	86	34.5%	21	32.3%	107	34.1%
Information technology	28	11.2%	14	21.5%	42	13.4%
Auditing/consulting/training	28	11.2%	4	6.2%	32	10.2%
Trade/service/logistics	29	11.6%	12	18.5%	41	13.1%
Total	249	100.0%	65	100.0%	314	100.0%
Legal form (Q 1.2)						
Unincorporated firm	41	16.5%	20	30.8%	61	19.4%
Incorporated firm	208	83.5%	45	69.2%	253	80.6%
Total	249	100.0%	65	100.0%	314	100.0%
Part of a group (Q 1.3)						
Yes	94	38.1%	23	35.9%	117	37.6%
No	153	61.9%	41	64.1%	194	62.4%
Total	247	100.0%	64	100.0%	311	100.0%
Audited (Q 1.4)						
Yes	189	77.1%	46	73.0%	235	76.3%
No	56	22.9%	17	27.0%	73	23.7%
Total	245	100.0%	63	100.0%	308	100.0%
Early warning system established (Q 1.9a)						
Established	161	66.3%	35	53.8%	196	63.6%
Planned	56	23.0%	18	27.7%	74	24.0%
Not planned	26	10.7%	12	18.5%	38	12.3%
Total	243	100.0%	65	100.0%	308	100.0%

* Q 1.1 This grouping of industrial sectors has been introduced in Section 3.3.3.

According to the official value added tax statistics (Statistisches Bundesamt, 2002), the industries of construction, engineering, information technology, auditing/consulting/training (briefly “auditing”) and trade/service/logistics (briefly “trade”) constitute the major part of SMEs in Germany. Moreover, enterprises of these 5 industries are mainly project-oriented. Regarding the legal form, in German SMEs sole trader/unincorporated firms and private limited companies dominate (Statistisches Bundesamt, 2004, pp. 18-19).

¹ In general, varying sample totals are due to the fact that the respondents skipped certain questions or that some responses had to be rejected by the investigator as not being plausible. The aim was to evaluate for each question a maximum of usable responses.

² Due to rounding effects, the percentages may not add up to exactly 100.0%.

About 38% of the surveyed enterprises have a parent company which itself does not fulfil the criteria of an SME. This percentage is in accordance with other empirical studies on German SMEs (Tschandl and Baumann, 2002, p. 101; Ossadnik et al., 2004, p. 623).

The effective response rate of 17.4% resulting from a single mail shot (see Section 3.3.4) can be considered as satisfactory. The average response rate of empirical studies on SME risk management practices goes from 8% to 17% (see Consultation and Research Center of the ICAEW, 2005, pp. 6-7; Clink, 2001, p. 90).

4.2.2 Business Planning as a Base for Risk Management

As emphasized in the literature review (see Section 2.3), a well-developed business planning is seen as an essential instrument for a holistic risk management. Since there are only few empirical results on business planning in German SMEs, two introductory questionnaire issues investigate long-term planning (Questions 1.7a, 1.7b) and short-term planning (Question 1.8). The findings are summed up in Table 4.2.

Table 4.2 Long-term Business Planning: Components (Q 1.7a*) and Time Horizon (Q 1.7b)

	Total		Rank
Components			
Budgeted profit statement	147	47.0%	1
Cash budget	100	31.9%	2
Budgeted balance sheet	42	13.4%	4
Master budget	88	28.1%	3
Other planning	17	5.4%	6
No statement	35	11.2%	5
Total	313	100.0%	
Time horizon			
1 year	64	23.2%	2
2 to 3 years	146	52.9%	1
4 years or more	62	22.5%	3
No statement	4	1.4%	4
Total	276	100.0%	

* Multiple selection allowed

Concerning long-term business planning in SMEs, non-integrated subsystems clearly dominate, especially a budgeted profit statement and a cash budget. A budgeted balance sheet is used rather seldom. The classic master budget was found only in 28% of the surveyed SMEs.

The time horizon of long-term business planning is rather short (1 to 2 years), being typical for SMEs. These enterprises often work in market niches and must permanently observe the behaviour of larger competitors. To an increased extent,

large enterprises try to get into the niches. For SMEs it means to change frequently their strategy and to switch over to other segments or to other customer requests.

The investigation of business planning has revealed, that its sophistication has not much improved, compared to the studies of Lachnit (1989 and 1994). It has confirmed the deficits of long-term planning as stated in regional studies on German SMEs (Ossadnik et al., 2004; Behrens et al., 2005). Probably meanwhile (2006), by the new Basel II regulations, enterprises feel more pressure to improve their business planning (see also Flacke and Siemes, 2005, p. 256).

With respect to short-term considerations, profit planning dominates. Short-term financial planning is not well-developed (see the Appendix F, Question 1.8).

4.2.3 Early Warning Systems for Risk Identification

To approach the subject of risk management, firstly it was investigated whether the SMEs have already established any monitoring system to detect risky developments early enough (also called early warning system; Question 1.9a). The background for this question was to find out, how the enterprises themselves estimate their effort to implement a monitoring system. Additionally, it was asked, whether they think it is legally required to implement a monitoring system (Appendix F, Question 1.9b).

Table 4.3 presents the findings on early warning systems.

Table 4.3 Early Warning System: Implementation (Q 1.9a)

	Total		Rank
Established	196	63.6%	1
Planned	74	24.0%	2
Not planned	38	12.3%	3
Total	308	100.0%	

The number of enterprises having established an early warning system (or at least planning to establish it) is remarkably large, indicating that SMEs intensively deal with this problem. It remains to investigate how systematic their approach is and whether they even may overestimate the capability of their risk management efforts.

4.3 Bivariate Analysis

In the following sections, selected questionnaire results are presented in the same manner: Comments on the respective totals are followed by an analysis of

crosstabulation with respect to firm size measured by annual turnover (Question 1.5) and by number of employees (Question 1.6; see Appendix F) and by crosstabulation with respect to industrial sector (Question 1.1). Furthermore, significant differences with respect to the basic variables “Legal form” (Question 1.2), “Part of a group” (Question 1.3), “Audited” (Question 1.4) and “Early warning system established” (Question 1.9a) are reported, together with interesting details. It is remarked that “significant” is used here as a short word for “result of a chi-square test having a significance level $p < 0.01$.” A summary of all respective chi-square test results is presented in the Appendix G.

Some detailed bivariate results are not covered by the tables of the present chapter or by Appendix F. They have been derived by analysing crosstabulations that belong to the context of the respective chi-square tests of Appendix G. A detailed presentation of all these tables would go beyond the scope of this thesis.

4.3.1 Business Planning

The bivariate analyses begin with a discussion of business planning. Table 4.4 displays the planning components (Question 1.7a) and the time horizon (Question 1.7b) of long-term planning within the SME size classes as defined by annual turnover.

Firstly, the totals of Questions 1.7a and 1.7b will be discussed.

Table 4.4 Long-term Business Planning: Components (Q 1.7a*) and Time Horizon (Q 1.7b). Versus Company Size by Annual Turnover (Q 1.5)

	Size by turnover										Total	Rank	
	Micro		Small		Medium		Large		No stmt.				
Components													
Budgeted profit statement	7	31.8%	78	43.8%	51	60.0%	3	42.9%	8	38.1%	147	47.0%	1
Cash budget	8	36.4%	57	32.0%	26	30.6%	2	28.6%	7	33.3%	100	31.9%	2
Budgeted balance sheet	0	0.0%	28	15.7%	10	11.8%	1	14.3%	3	14.3%	42	13.4%	4
Master budget	5	22.7%	55	30.9%	21	24.7%	1	14.3%	6	28.6%	88	28.1%	3
Other planning	1	4.5%	9	5.1%	5	5.9%	1	14.3%	1	4.8%	17	5.4%	6
No statement	6	27.3%	16	9.0%	8	9.4%	2	28.6%	3	14.3%	35	11.2%	5
Total	22	100.0%	178	100.0%	85	100.0%	7	100.0%	21	100.0%	313	100.0%	
Time horizon													
1 year	8	47.1%	37	23.4%	14	17.9%	0	0.0%	5	27.8%	64	23.2%	2
2 to 3 years	6	35.3%	89	56.3%	43	55.1%	2	40.0%	6	33.3%	146	52.9%	1
4 years or more	1	5.9%	31	19.6%	20	25.6%	3	60.0%	7	38.9%	62	22.5%	3
No statement	2	11.8%	1	0.6%	1	1.3%	0	0.0%	0	0.0%	4	1.4%	4
Total	17	100.0%	158	100.0%	78	100.0%	5	100.0%	18	100.0%	276	100.0%	

* Multiple selection allowed

Components (Question 1.7a)

Making out about one half, a budgeted profit statement is the dominating component of the long-term business planning, followed by a cash budget with about 1/3. Among the non-integrated subsystems, the budgeted balance sheet has a remarkable low percentage of 13%, which is nearly the same as for “no statement.” The classic master budget (see Section 2.3) is employed by less than 1/3 of the firms. These findings are in line with the regional study of Flacke and Siemes (2005, p. 256).

Within all turnover size classes, the master budget as a long-term planning component (Question 1.7a) has been mentioned very rarely. The budgeted profit statement clearly dominates, but its application is decreasing with increasing enterprise size. The cash budget component follows, with no significant differences between size classes. It is pointed out that “no statement” is given by almost 1/4 of the micro and the large firms, respectively, a relatively large amount.

If size is defined by the number of employees, the results are similar (see Appendix F).

Time Horizon (Question 1.7b)

Concerning the time horizon, slightly more than half of the firms prefer the medium interval of 2-3 years. The remaining use to about the same amount 1 year or 4 years and more.

The time horizon of long-term planning is significantly dependent on size. A planning horizon of 4 and more years is reported mainly by medium-sized and large enterprises.

If size is defined by the number of employees, the results are similar.

Industrial sector (Question 1.1): Long-term business planning components reveal no significant difference with respect to the five main industries. In contrast to that, the time horizon significantly depends on industry (see Table 4.5).

Table 4.5 Long-term Business Planning: Components (Q 1.7a*) and Time Horizon (Q 1.7b). Versus Industrial Sector (Q 1.1)

	Industrial sector										Total	Rank	
	Construction	Engineering	IT	Auditing	Trade								
Components													
Budgeted profit statement	41	44.6%	54	50.9%	19	45.2%	15	46.9%	18	43.9%	147	47.0%	1
Cash budget	28	30.4%	32	30.2%	15	35.7%	9	28.1%	16	39.0%	100	31.9%	2
Budgeted balance sheet	15	16.3%	17	16.0%	3	7.1%	2	6.3%	5	12.2%	42	13.4%	4
Master budget	24	26.1%	32	30.2%	14	33.3%	6	18.8%	12	29.3%	88	28.1%	3
Other planning	4	4.3%	4	3.8%	2	4.8%	4	12.5%	3	7.3%	17	5.4%	6
No statement	10	10.9%	12	11.3%	3	7.1%	4	12.5%	6	14.6%	35	11.2%	5
Total	92	100.0%	106	100.0%	42	100.0%	32	100.0%	41	100.0%	313	100.0%	
Time horizon													
1 year	21	26.3%	19	20.4%	8	20.5%	9	32.1%	7	19.4%	64	23.2%	2
2 to 3 years	52	65.0%	49	52.7%	19	48.7%	12	42.9%	14	38.9%	146	52.9%	1
4 years or more	5	6.3%	25	26.9%	12	30.8%	6	21.4%	14	38.9%	62	22.5%	3
No statement	2	2.5%	0	0.0%	0	0.0%	1	3.6%	1	2.8%	4	1.4%	4
Total	80	100.0%	93	100.0%	39	100.0%	28	100.0%	36	100.0%	276	100.0%	

* Multiple selection allowed

It is interesting to note that the construction sector has a rather short planning horizon, the interval 2-3 years making up about 2/3, which is the largest amount of all sectors. Within the other industrial sectors, the percentage of a planning horizon of 4 and more years is nearly the same.

Audited (Question 1.4): If the financial statements are audited, enterprises have a more comprehensive long-term planning system. To utilize a master budget is frequently suggested by certified chartered accountants.

Early warning system (Question 1.9a): There are no differences between the time horizon intervals of firms that have established an early warning system and firms that plan to establish one. But when compared to firms that do not even plan to establish one, the former firms clearly tend have longer intervals.

Finally, it is emphasized that the sophistication of long-term business planning unveils great deficits within all size classes, which the univariate analyses have already indicated for the respective totals (Section 4.2.2). This fact must be taken into account when developing risk management systems for SMEs.

4.3.2 Balanced Scorecard and Similar Instruments

In this section, firstly it will be analysed whether instruments of performance measurement such as Balanced Scorecard, shareholder value and knowledge management have already become established in SMEs. Then it will be investigated, to what degree these instruments are employed for risk management purposes (Questions 3.1-3.3). The use of instruments of performance measurement

for risk management displays relatively low numbers of cases, making it difficult to detect significant dependencies (see Table 4.6).

Table 4.6 Use of Balanced Scorecard and Similar Instruments (Q 3.1 - Q 3.3).
Versus Company Size by Annual Turnover (Q 1.5)

	Size by turnover										Total	Rank	
	Micro	Small	Medium	Large	No stmt.								
Balanced Scorecard (Q 3.1)													
Used	3	15.0%	18	11.0%	16	20.0%	0	0.0%	4	21.1%	41	14.2%	3
Used for risk management	2	10.0%	11	6.7%	8	10.0%	0	0.0%	2	10.5%	23	8.0%	
Not used for risk management	1	5.0%	7	4.3%	8	10.0%	0	0.0%	2	10.5%	18	6.3%	
Planned to use	2	10.0%	24	14.7%	17	21.3%	2	33.3%	4	21.1%	49	17.0%	2
Not planned to use	15	75.0%	121	74.2%	47	58.8%	4	66.7%	11	57.9%	198	68.8%	1
Total	20	100.0%	163	100.0%	80	100.0%	6	100.0%	19	100.0%	288	100.0%	
Shareholder value (Q 3.2)													
Used	1	5.0%	28	17.1%	17	21.0%	1	16.7%	3	15.8%	50	17.2%	2
Used for risk management	0	0.0%	12	7.3%	6	7.4%	0	0.0%	1	5.3%	19	6.6%	
Not used for risk management	1	5.0%	16	9.8%	11	13.6%	1	16.7%	2	10.5%	31	10.7%	
Planned to use	3	15.0%	11	6.7%	15	18.5%	1	16.7%	2	10.5%	32	11.0%	3
Not planned to use	16	80.0%	125	76.2%	49	60.5%	4	66.7%	14	73.7%	208	71.7%	1
Total	20	100.0%	164	100.0%	81	100.0%	6	100.0%	19	100.0%	290	100.0%	
Knowledge management (Q 3.3)													
Used	4	21.1%	29	17.9%	17	21.8%	0	0.0%	5	27.8%	55	19.5%	2
Used for risk management	3	15.8%	18	11.1%	7	9.0%	0	0.0%	3	16.7%	31	11.0%	
Not used for risk management	1	5.3%	11	6.8%	10	12.8%	0	0.0%	2	11.1%	24	8.5%	
Planned to use	2	10.5%	28	17.3%	13	16.7%	2	40.0%	1	5.6%	46	16.3%	3
Not planned to use	13	68.4%	105	64.8%	48	61.5%	3	60.0%	12	66.7%	181	64.2%	1
Total	19	100.0%	162	100.0%	78	100.0%	5	100.0%	18	100.0%	282	100.0%	

Balanced Scorecard (Question 3.1)

About 2/3 of the 288 firms do not apply the BSC, the remaining 41 to nearly the same amount, applying it or at least planning to take advantage of it. If size is defined by turnover, then medium-sized firms have the largest percentage of using it (c. 20%), while according to size by number of employees, large firms are leading (c. 30%).

The auditing sector is clearly dominating, with about 1/3 applying the BSC. Engineering is also relatively strong with respect to the BSC, while the construction and trade sectors both are weak, to about the same amount.

Slightly more than half of the 41 firms working with the BSC also use it for risk management. Here the turnover size class "large" does not occur, in contrast to the employee size class "large". Details of the handling can only be investigated by research interviews (see Section 5.2.3).

Shareholder value (Question 3.2)

When compared to the use of the Balanced Scorecard (Question 3.1), the corresponding results for the shareholder value have partly moved from planning

to using. With respect to turnover, medium-sized firms are leading in exercising it (c. 20%). In contrast, with respect to employees, large firms dominate (c. 50%). Although there are only a few large firms in the sample, it is worth while to point out this amount.

The IT and engineering sectors are clearly leading in calculating the shareholder value, while trade comes last. The application of this concept significantly depends on size only with respect to the number of employees (which, in the context of instruments of performance measurement, is the only size effect in the stricter sense).

Considering the 50 respondents who exploit the shareholder value, slightly more than 1/3 use it also for risk management purposes.

Knowledge management (Question 3.3)

The outcomes of utilizing knowledge management have changed to give more positive results, when compared to those of the Balanced Scorecard (Question 3.1) and the shareholder value (Question 3.2). Knowledge management is applied to nearly the same amount by micro, small and medium-sized firms, if size is defined by turnover. The size criterion of number of employees reveals a strictly decreasing use, starting with micro firms that make up about 1/4.

Regarding the 55 respondents who employ knowledge management, slightly more than 1/2 use it also for risk management.

Industrial sector (Question 1.1): As indicated in Table 4.7, the IT and auditing sectors are leading; both work with knowledge management to about 1/3. The general use of instruments of performance management is lowest in the construction and the trade sectors. In the construction sector it could be due to the fact that here there are fewer managers and owners with broad knowledge of business management. Craftsmen and technicians dominate. Concerning the trade sector, it can only be surmised that long-term strategies do not play a larger role and that rather short-term reacting to the business environment takes place.

Table 4.7 Use of Balanced Scorecard and Similar Instruments (Q 3.1 - Q 3.3).
Versus Industrial Sector (Q 1.1)

	Industrial sector										Total	Rank	
	Construction		Engineering		IT		Auditing		Trade				
Balanced Scorecard (Q 3.1)													
Used	5	6.3%	19	19.0%	6	15.0%	9	31.0%	2	5.1%	41	14.2%	3
Used for risk management	5	6.3%	8	8.0%	4	10.0%	4	13.8%	2	5.1%	23	8.0%	
Not used for risk management	0	0.0%	11	11.0%	2	5.0%	5	17.2%	0	0.0%	18	6.3%	
Planned to use	10	12.5%	21	21.0%	10	25.0%	2	6.9%	6	15.4%	49	17.0%	2
Not planned to use	65	81.3%	60	60.0%	24	60.0%	18	62.1%	31	79.5%	198	68.8%	1
Total	80	100.0%	100	100.0%	40	100.0%	29	100.0%	39	100.0%	288	100.0%	
Shareholder value (Q 3.2)													
Used	9	11.1%	23	23.0%	11	26.8%	4	13.8%	3	7.7%	50	17.2%	2
Used for risk management	5	6.2%	9	9.0%	2	4.9%	1	3.4%	2	5.1%	19	6.6%	
Not used for risk management	4	4.9%	14	14.0%	9	22.0%	3	10.3%	1	2.6%	31	10.7%	
Planned to use	6	7.4%	14	14.0%	5	12.2%	4	13.8%	3	7.7%	32	11.0%	3
Not planned to use	66	81.5%	63	63.0%	25	61.0%	21	72.4%	33	84.6%	208	71.7%	1
Total	81	100.0%	100	100.0%	41	100.0%	29	100.0%	39	100.0%	290	100.0%	
Knowledge management (Q 3.3)													
Used	15	18.8%	15	15.3%	14	35.0%	8	29.6%	3	8.1%	55	19.5%	2
Used for risk management	10	12.5%	10	10.2%	7	17.5%	2	7.4%	2	5.4%	31	11.0%	
Not used for risk management	5	6.3%	5	5.1%	7	17.5%	6	22.2%	1	2.7%	24	8.5%	
Planned to use	12	15.0%	19	19.4%	7	17.5%	3	11.1%	5	13.5%	46	16.3%	3
Not planned to use	53	66.3%	64	65.3%	19	47.5%	16	59.3%	29	78.4%	181	64.2%	1
Total	80	100.0%	98	100.0%	40	100.0%	27	100.0%	37	100.0%	282	100.0%	

Part of a group (Question 1.3): The shareholder value instrument occurs with increasing frequency in enterprises which are part of a group. This is not unexpected, since the group's concept of shareholder value is very likely to have an effect on the associated company.

Early warning system (Question 1.9a): Firms which have already established an early warning system, significantly tend to implement the shareholder value or knowledge management, respectively. The tendency though appears on a relatively low level. In addition, these firms practise knowledge management to an increased extent for their risk management.

In general, as the present study has revealed, instruments of performance measurement are not widely found in German SMEs. It is striking that firms which apply the instruments also, to a relatively large degree, apply them for managing risks. Details – in the general sense or with respect to risk management – of how techniques of value-based management are exploited, will be investigated in Chapter 5.

4.3.3 Risk Management

As in the literature review (Chapter 2) the presentation of risk management results begins with the risk management process (Section 4.3.3.1), then followed by the

discussion of the organization of risk management (Section 4.3.3.2). Finally, the features of project risk management are discussed (Section 4.3.3.3).

4.3.3.1 Risk Management Process

Firstly, this section on the formalities of the risk management process discusses risk categories (Question 2.3). Then it deals with the risk reviewing frequency (Question 2.5a) and time horizon (Question 2.5b) and the way in which the board of directors is informed about risks (Question 2.6a). The section ends with one of the fundamentals of the holistic approach of this study, namely the integration of risks into the company's business planning (Question 2.7).

Concerning risk categories, the five most frequently occurring ones are (see Table 4.8):

- market risks
- strategic risks
- business process risks
- financial risks
- legal risks

The two most frequently mentioned risk categories reflect the strategic (long-term) perspective, while the remaining ones belong to an operational (short-term) perspective.

Table 4.8 Risk Categories (Q 2.3*).
Versus Company Size by Annual Turnover (Q 1.5)

	Size by turnover										Total	Rank	
	Micro		Small		Medium		Large		No stmt.				
Strategic risks	14	66.7%	101	58.4%	52	64.2%	2	33.3%	11	55.0%	180	59.8%	2
Market risks	13	61.9%	118	68.2%	61	75.3%	1	16.7%	12	60.0%	205	68.1%	1
Legal risks	8	38.1%	46	26.6%	36	44.4%	1	16.7%	10	50.0%	101	33.6%	5
Financial risks	7	33.3%	65	37.6%	32	39.5%	3	50.0%	13	65.0%	120	39.9%	4
Group company risks	1	4.8%	12	6.9%	12	14.8%	1	16.7%	2	10.0%	28	9.3%	7
Risks from group companies abroad	1	4.8%	4	2.3%	5	6.2%	1	16.7%	1	5.0%	12	4.0%	
Corporate governance risks	6	28.6%	56	32.4%	25	30.9%	2	33.3%	5	25.0%	94	31.2%	6
Business process risks	6	28.6%	98	56.6%	54	66.7%	1	16.7%	9	45.0%	168	55.8%	3
Other risks	1	4.8%	4	2.3%	1	1.2%	0	0.0%	0	0.0%	6	2.0%	8
No statement	0	0.0%	4	2.3%	0	0.0%	1	16.7%	0	0.0%	5	1.7%	9
Total	21	100.0%	173	100.0%	81	100.0%	6	100.0%	20	100.0%	301	100.0%	

* Multiple selection allowed

In comparison to this thesis, European studies with respect to the identified risk categories in SMEs reveal a similar picture. It is interesting that strategic risks (market risks, wrong strategy) and operational risks (finances, personnel, business processes) are among the five most frequently reported risk categories (Kessler,

2000, p. 77; Turpin, 2002, pp. 10-11; ICAEW, 2005, p. 8). These studies allow only limited results with respect to enterprise size.

Concerning enterprise size, there are three obvious facts. Market risks are observed less frequently in large enterprises (if size is measured by turnover). Probably such firms deal with markets of less dynamic changes, or because of their size market risks are less relevant. A similar result was found by a study of the ICAEW (2005, p. 18).

The identification of legal risks concentrates on the classes of micro, small and medium-sized firms, being very low for large firms.

Business process risks are identified by more than half of the small firms and by about 2/3 of the medium-sized ones. The percentage for large firms comes last.

Operational risks play an important role for small and medium-sized enterprises, which agrees with the findings of other empirical studies (see Kessler, 2000, p. 77).

Concerning the mean number of risk categories dealt with, there is an increase with increasing turnover size (micro: 2.67; small: 2.89; medium: 3.37), except for large firms (1.83; only 6 cases). The corresponding means with respect to size by number of employees behave strictly monotone, increasing from micro (2.80) across small (2.95) and medium-sized (2.99) to large firms (3.54; 13 cases). The overall mean is 3.00.

Industrial sector (Question 1.1): Effects of risk categories with respect to industry are presented in Table 4.9.

Table 4.9 Risk Categories (Q 2.3*)
Versus Industrial Sector (Q 1.1)

	Industrial sector										Total	Rank	
	Construction		Engineering		IT		Auditing		Trade				
Strategic risks	50	56.8%	58	55.8%	27	67.5%	23	74.2%	22	57.9%	180	59.8%	2
Market risks	51	58.0%	83	79.8%	29	72.5%	23	74.2%	19	50.0%	205	68.1%	1
Legal risks	25	28.4%	37	35.6%	17	42.5%	11	35.5%	11	28.9%	101	33.6%	5
Financial risks	35	39.8%	41	39.4%	18	45.0%	9	29.0%	17	44.7%	120	39.9%	4
Group company risks	10	11.4%	11	10.6%	3	7.5%	2	6.5%	2	5.3%	28	9.3%	7
Risks from group companies abroad	3	3.4%	6	5.8%	2	5.0%	0	0.0%	1	2.6%	12	4.0%	
Corporate governance risks	33	37.5%	19	18.3%	15	37.5%	12	38.7%	15	39.5%	94	31.2%	6
Business process risks	55	62.5%	59	56.7%	32	80.0%	12	38.7%	10	26.3%	168	55.8%	3
Other risks	1	1.1%	2	1.9%	1	2.5%	0	0.0%	2	5.3%	6	2.0%	8
No statement	1	1.1%	2	1.9%	0	0.0%	0	0.0%	2	5.3%	5	1.7%	9
Total	88	100.0%	104	100.0%	40	100.0%	31	100.0%	38	100.0%	301	100.0%	

* Multiple selection allowed

There are significant differences between industrial sectors only for market risks and business process risks. Within the engineering, information technology and auditing sectors, market risk are identified to nearly the same amount of 3/4, while only about 1/2 of the construction and trade sectors deal with this risk category. Regarding business process risks, it is noticeable that for the information technology sector it is a very important risk category; 80% identify it. The trade sector judges the category to be least important (about 26%).

Strategic risks are observed least frequently within the construction, the engineering and the trade sectors. Corporate governance risks are identified least frequently within the engineering sector.

Early warning system (Question 1.9a): About 3/4 of the firms that have established an early warning system deal with market risks. Among the firms that only plan to establish such a system and among the firms that do not plan to establish it, only slightly more than 1/2 identify market risks.

Following the identification of risks, the risk management process leads to the discussion of the frequency and the time horizon of risk identification and risk evaluation (Table 4.10).

Table 4.10 Risk assessment: Frequency (Q 2.5a) and Time Horizon (Q 2.5b). Versus Company Size by Annual Turnover (Q 1.5)

	Size by turnover										Total	Rank	
	Micro		Small		Medium		Large		No stmt.				
Frequency													
Every year	6	28.6%	27	16.0%	14	17.5%	2	40.0%	4	20.0%	53	18.0%	2
Every 6 months	4	19.0%	32	18.9%	11	13.8%	0	0.0%	3	15.0%	50	16.9%	3
Every 3 months	4	19.0%	75	44.4%	33	41.3%	1	20.0%	9	45.0%	122	41.4%	1
Every month	3	14.3%	16	9.5%	8	10.0%	1	20.0%	1	5.0%	29	9.8%	5
Other period	4	19.0%	19	11.2%	14	17.5%	1	20.0%	3	15.0%	41	13.9%	4
Total	21	100.0%	169	100.0%	80	100.0%	5	100.0%	20	100.0%	295	100.0%	
Time horizon													
1 year	12	57.1%	81	47.6%	32	40.5%	4	100.0%	5	25.0%	134	45.6%	1
2 years	3	14.3%	49	28.8%	19	24.1%	0	0.0%	4	20.0%	75	25.5%	2
3 years	2	9.5%	13	7.6%	9	11.4%	0	0.0%	4	20.0%	28	9.5%	4
5 years	2	9.5%	6	3.5%	3	3.8%	0	0.0%	1	5.0%	12	4.1%	5
Open	2	9.5%	21	12.4%	16	20.3%	0	0.0%	6	30.0%	45	15.3%	3
Total	21	100.0%	170	100.0%	79	100.0%	4	100.0%	20	100.0%	294	100.0%	

Frequency (Question 2.5a)

The frequency of identifying and evaluating risks (Table 4.10) is independent of enterprise size. A frequency of 3 months clearly dominates within all size classes (with respect to turnover as well as to the number of employees).

Time Horizon (Question 2.5b)

With respect to the time horizon of risk identification there are no significant differences with respect to turnover size classes. The majority (46%) reports 1 year. Remarkably many firms chose an “open” time horizon (15%), which indicates that risk review is not carried out very systematically. This corresponds to the frequency of risk reviewing (Question 2.5a), where 14% chose “other period”.

With respect to size defined by the number of employees, the results are similar (see the Appendix F).

Industrial sector (Question 1.1): The risk assessment frequency displays no peculiarity with respect to industrial sectors (Table 4.11). Within all sectors, 1 year of risk assessment time horizon dominates by far (with construction having the largest percentage). All sectors show decreasing percentage with increasing time horizon, except for auditing; here the horizon of 5 years is a positive outlier (and it has the largest percentage of all sectors).

Table 4.11 Risk assessment: Frequency (Q 2.5a) and Time Horizon (Q 2.5b). Versus Industrial Sector (Q 1.1)

	Industrial sector										Total	Rank	
	Construction		Engineering		IT		Auditing		Trade				
Frequency													
Every year	11	12.9%	22	21.6%	5	12.8%	7	22.6%	8	21.1%	53	18.0%	2
Every 6 months	19	22.4%	12	11.8%	6	15.4%	5	16.1%	8	21.1%	50	16.9%	3
Every 3 months	33	38.8%	44	43.1%	18	46.2%	12	38.7%	15	39.5%	122	41.4%	1
Every month	11	12.9%	10	9.8%	4	10.3%	2	6.5%	2	5.3%	29	9.8%	5
Other period	11	12.9%	14	13.7%	6	15.4%	5	16.1%	5	13.2%	41	13.9%	4
Total	85	100.0%	102	100.0%	39	100.0%	31	100.0%	38	100.0%	295	100.0%	
Time horizon													
1 year	49	57.6%	42	41.2%	13	33.3%	13	41.9%	17	45.9%	134	45.6%	1
2 years	22	25.9%	29	28.4%	11	28.2%	7	22.6%	6	16.2%	75	25.5%	2
3 years	4	4.7%	10	9.8%	8	20.5%	1	3.2%	5	13.5%	28	9.5%	4
5 years	1	1.2%	6	5.9%	1	2.6%	3	9.7%	1	2.7%	12	4.1%	5
Open	9	10.6%	15	14.7%	6	15.4%	7	22.6%	8	21.6%	45	15.3%	3
Total	85	100.0%	102	100.0%	39	100.0%	31	100.0%	37	100.0%	294	100.0%	

Early warning system (Question 1.9a): Having established an early warning system, the risk assessment centres on “every month” or “every 3 months”, which means a high frequency (together about 2/3). The remaining respondents with such a system cover equally the low frequency cases “every half year” and “every year”.

The next step of the risk management process addresses risk reporting, i.e. the way in which the board of directors is informed about the development of risk figures (Table 4.12).

Table 4.12 Risk Reporting: Informing Board of Directors (Q 2.6a).
Versus Company Size by Annual Turnover (Q 1.5)

	Size by turnover										Total	Rank	
	Micro		Small		Medium		Large		No stmt.				
Separate risk reporting	1	4.8%	12	7.0%	13	16.0%	1	16.7%	5	25.0%	32	10.7%	2
Risk reporting part of general reporting	16	76.2%	128	74.9%	56	69.1%	5	83.3%	11	55.0%	216	72.2%	1
Other reporting	2	9.5%	11	6.4%	3	3.7%	0	0.0%	3	15.0%	19	6.4%	4
No statement	2	9.5%	20	11.7%	9	11.1%	0	0.0%	1	5.0%	32	10.7%	2
Total	21	100.0%	171	100.0%	81	100.0%	6	100.0%	20	100.0%	299	100.0%	

The documentation of risks mainly takes places within the standard reporting (more than 70%). At present, a separate risk reporting has only little meaning for SMEs.

Industrial sector (Question 1.1): Risk reporting within the main industries is presented in Table 4.13. The sectors of construction and engineering mainly make use of the standard reporting for their risk reporting. In contrast to that, information technology prefers a separate risk reporting.

Table 4.13 Risk Reporting: Informing Board of Directors (Q 2.6a).
Versus Industrial Sector (Q 1.1)

	Industrial sector										Total	Rank	
	Construction		Engineering		IT		Auditing		Trade				
Separate risk reporting	4	4.5%	9	8.8%	9	22.5%	4	12.9%	6	15.8%	32	10.7%	2
Risk reporting part of general reporting	66	75.0%	80	78.4%	26	65.0%	19	61.3%	25	65.8%	216	72.2%	1
Other reporting	4	4.5%	6	5.9%	1	2.5%	4	12.9%	4	10.5%	19	6.4%	4
No statement	14	15.9%	7	6.9%	4	10.0%	4	12.9%	3	7.9%	32	10.7%	2
Total	88	100.0%	102	100.0%	40	100.0%	31	100.0%	38	100.0%	299	100.0%	

At the end of the risk management process section, the possible linking of risk management and business planning is investigated (Table 4.14).

Table 4.14 Link of Risk Management To Business Planning (Q 2.7).
Versus Company Size by Annual Turnover (Q 1.5)

	Size by turnover										Total	Rank	
	Micro		Small		Medium		Large		No stmt.				
Direct integration of risk figures	10	50.0%	60	36.8%	21	26.3%	0	0.0%	7	35.0%	98	34.3%	2
No direct integration of risk figures	6	30.0%	59	36.2%	38	47.5%	1	33.3%	9	45.0%	113	39.5%	1
No link to the business planning system	4	20.0%	44	27.0%	21	26.3%	2	66.7%	4	20.0%	75	26.2%	3
Total	20	100.0%	163	100.0%	80	100.0%	3	100.0%	20	100.0%	286	100.0%	

The link of risk management to the business planning is independent of enterprise size (as measured by turnover as well as by number of employees). Only about 1/3 of the enterprises have established a direct link. It is also remarkable that about 26% have no link at all. This relatively large frequency could be explained by a weak development, of the underlying risk management as well as of the business planning (see Section 4.3.1).

Industrial sector (Question 1.1): An analysis of industry effects exhibits no significant dependency (Table 4.15).

Table 4.15 Link of Risk Management To Business Planning (Q 2.7).
Versus Industrial Sector (Q 1.1)

	Industrial sector										Total	Rank	
	Construction	Engineering	IT	Auditing	Trade								
Direct integration of risk figures	25	30.1%	33	32.7%	13	34.2%	11	36.7%	16	47.1%	98	34.3%	2
No direct integration of risk figures	33	39.8%	44	43.6%	13	34.2%	10	33.3%	13	38.2%	113	39.5%	1
No link to the business planning system	25	30.1%	24	23.8%	12	31.6%	9	30.0%	5	14.7%	75	26.2%	3
Total	83	100.0%	101	100.0%	38	100.0%	30	100.0%	34	100.0%	286	100.0%	

Early warning system (Question 1.9a): Firms that have already established an early warning system increasingly have established a direct link of risks to the business planning. The quality of the link is nearly the same within firms that have not established an early warning system and firms that plan to establish one. In contrast to that, firms with an early warning system report to a much greater degree a direct link.

In general, the risk management process displays no clear size effect and no significant differences between the industrial sectors. This is in contrast to the results on risk management organization (see Section 4.3.3.2). A direct integration of risk figures into the company's business planning is developed rather seldom.

4.3.3.2 Organization of Risk Management

Firstly, this section on organization discusses responsibilities for establishing and improving of risk management (Questions 2.1a, 2.1b). Thereafter responsibilities and methods for risk assessment are reported (Question 2.4). Then software support (Questions 2.8) and expenditures for risk management (Questions 2.9) will be analysed.

Table 4.16 summarizes responsibilities for implementing and maintaining risk management.

Table 4.16 Responsible For Risk Management: Implementation (Q 2.1a*) and Reviewing (Q 2.1b*).
Versus Company Size by Annual Turnover (Q 1.5)

	Size by turnover										Total	Rank	
	Micro	Small	Medium	Large	No stmt.								
Responsible for implementation													
Board of directors	21	100.0%	162	95.9%	73	89.0%	6	85.7%	15	75.0%	277	92.6%	1
Internal audit	0	0.0%	5	3.0%	2	2.4%	0	0.0%	1	5.0%	8	2.7%	8
Designated risk manager	0	0.0%	1	0.6%	7	8.5%	0	0.0%	3	15.0%	11	3.7%	7
Chief financial officer	3	14.3%	51	30.2%	31	37.8%	2	28.6%	2	10.0%	89	29.8%	3
Head of accounting function	0	0.0%	28	16.6%	13	15.9%	2	28.6%	2	10.0%	45	15.1%	4
Controlling function	2	9.5%	46	27.2%	36	43.9%	4	57.1%	12	60.0%	100	33.4%	2
Staff of business units	1	4.8%	18	10.7%	13	15.9%	2	28.6%	4	20.0%	38	12.7%	5
Other	1	4.8%	5	3.0%	4	4.9%	0	0.0%	3	15.0%	13	4.3%	6
No statement	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	9
Total	21	100.0%	169	100.0%	82	100.0%	7	100.0%	20	100.0%	299	100.0%	
Responsible for reviewing													
Board of directors	21	100.0%	151	89.3%	71	86.6%	2	33.3%	15	75.0%	260	87.2%	1
Internal audit	1	4.8%	6	3.6%	1	1.2%	0	0.0%	2	10.0%	10	3.4%	5
Controlling function	5	23.8%	62	36.7%	36	43.9%	4	66.7%	12	60.0%	119	39.9%	2
Self-control of business units	0	0.0%	19	11.2%	9	11.0%	2	33.3%	2	10.0%	32	10.7%	3
Other	0	0.0%	12	7.1%	10	12.2%	1	16.7%	1	5.0%	24	8.1%	4
No statement	0	0.0%	3	1.8%	0	0.0%	0	0.0%	0	0.0%	3	1.0%	6
Total	21	100.0%	169	100.0%	82	100.0%	6	100.0%	20	100.0%	298	100.0%	

* Multiple selection allowed

Implementation (Question 2.1a)

With increasing size by turnover, the responsibility of the board of directors significantly decreases. This also holds, with respect to both size definitions, for a designated risk manager and the controlling function. The responsibility of controlling significantly increases with increasing size (both definitions).

Delegating the tasks to a designated employee – a so-called risk manager – is not important for SMEs. In general, risk management for SMEs is not too complex; with only these tasks a risk manager would not be fully occupied and thus meaningful for SMEs.

Internal audit is not an issue for SMEs. Because of their size, for most SMEs such a function is not legally required. Moreover, regarding the clear enterprise structure, management often does not consider it to be necessary.

For the controlling function a significant association with size was found: with increasing size this function is put in charge of the tasks of establishing and improving risk management.

Reviewing (Question 2.1b)

The responsibility of the board of directors for risk management reviewing also significantly decreases with increasing turnover size. The decreasing also holds for

size by employees, but in this case it is very slow so that there is no significant dependency.

It is worth while noting that, concerning the responsibility for supervising and reviewing risk management (Question 2.1b), with increasing size, the role of the board of directors strongly decreases and that of the controlling function strongly increases. For medium-sized and large firms, self-control of business units is reported remarkably frequently.

As stated by Reichmann and Diederichs (2003, p.231), very large German enterprises partly give a similar picture. For establishing and reviewing risk management, the controlling function comes first. Then a designated risk manager, a single member of the managing board, a risk management committee and staff of business units follow.

Industrial sector (Question 1.1): An analysis of risk management responsibilities within the five main industries is presented in Table 4.17.

Table 4.17 Responsible For Risk Management: Implementation: (Q 2.1a*) and Reviewing (Q 2.1b*). Versus Industrial Sector (Q 1.1)

	Industrial sector										Total	Rank	
	Construction	Engineering	IT	Auditing	Trade								
Responsible for implementation													
Board of directors	81	95.3%	93	88.6%	38	92.7%	29	96.7%	36	94.7%	277	92.6%	1
Internal audit	1	1.2%	2	1.9%	0	0.0%	3	10.0%	2	5.3%	8	2.7%	8
Designated risk manager	1	1.2%	3	2.9%	4	9.8%	0	0.0%	3	7.9%	11	3.7%	7
Chief financial officer	33	38.8%	30	28.6%	11	26.8%	9	30.0%	6	15.8%	89	29.8%	3
Head of accounting function	17	20.0%	14	13.3%	9	22.0%	0	0.0%	5	13.2%	45	15.1%	4
Controlling function	15	17.6%	50	47.6%	12	29.3%	8	26.7%	15	39.5%	100	33.4%	2
Staff of business units	8	9.4%	14	13.3%	10	24.4%	2	6.7%	4	10.5%	38	12.7%	5
Other	3	3.5%	5	4.8%	1	2.4%	0	0.0%	4	10.5%	13	4.3%	6
No statement	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	9
Total	85	100.0%	105	100.0%	41	100.0%	30	100.0%	38	100.0%	299	100.0%	
Responsible for reviewing													
Board of directors	74	87.1%	92	88.5%	34	82.9%	29	96.7%	31	81.6%	260	87.2%	1
Internal audit	3	3.5%	1	1.0%	0	0.0%	4	13.3%	2	5.3%	10	3.4%	5
Controlling function	25	29.4%	52	50.0%	18	43.9%	9	30.0%	15	39.5%	119	39.9%	2
Self-control of business units	12	14.1%	9	8.7%	8	19.5%	1	3.3%	2	5.3%	32	10.7%	3
Other	8	9.4%	6	5.8%	4	9.8%	3	10.0%	3	7.9%	24	8.1%	4
No statement	1	1.2%	1	1.0%	0	0.0%	0	0.0%	1	2.6%	3	1.0%	6
Total	85	100.0%	104	100.0%	41	100.0%	30	100.0%	38	100.0%	298	100.0%	

* Multiple selection allowed

Regarding risk management responsibility for implementation (Question 2.1a), the only significant difference between sectors appears in the case of controlling. Here the percentage ranges from about 48% for engineering to about 18% for construction. In the auditing and the trade sectors, the internal audit is mainly responsible for implementing risk management. For auditing it is certainly a

consequence of broad expertise of management. In the information technology and trade sectors a designated risk manager is often reported.

All these results similarly hold for the responsibility for reviewing risk management (Question 2.1b).

Legal form (Question 1.2): Concerning risk management responsibilities (Question 2.1a), in incorporated firms a risk manager, the internal audit and the controlling function dominate. Internal audit being mentioned frequently is not surprising, since in public limited companies from a certain size on this is required by the German Stock Companies Act.

Part of a group (Question 1.3): Enterprises that are part of a group often work with a risk manager for establishing their risk management. Frequently this fact will arise from the group structure and the legal regulation being in force for the group. Being part of a group leads to an increased utilization of a risk management manual (Question 2.2).

Audited (Question 1.4): Enterprises that are audited reveal a strong decreasing of the board of directors, when concerning responsibility for supervising and reviewing risk management. For firms that are audited, the percentage of controlling as being responsible for risk management implementation is nearly twice the percentage of non-audited firms. This is very much the same picture regarding the responsibility for risk management reviewing. Enterprises, the financial statements of which are audited, more frequently have a risk manager for establishing risk management.

Early warning system (Question 1.9a): If enterprises have already established an early warning system, they report more personnel or functional areas to be responsible for the implementation of risk management, among which the controlling function and staff of business units dominate. In this case, risk management supervising and reviewing is more frequently carried out by the controlling function than in non-audited firms.

The percentage for risk management responsibility of controlling strictly increases as one passes from firms with no early warning system to firms which plan to establish such a system and then to firms, that already use it. Regarding the responsibility for risk management reviewing, controlling presents the same results.

Concerning the documentation (Question 2.2), it must be pointed out that in SMEs risk management is generally not taken down in written form in a very comprehensive way. This holds within all sizes classes.

Enterprise already carrying out some documentation do it mainly in their general procedural manual. A separate risk management manual has no meaning for SMEs. The option “other” frequently named documentation in the quality manual or in the minutes of top management meetings. For details, see the Appendix G.

An analysis of risk management documentation within the main industries reveals no significant dependency.

Now it will be analysed how risks are identified and evaluated (Table 4.18).

Table 4.18 Risk Assessment: Responsibility and Methods (Q 2.4*).
Versus Company Size by Annual Turnover (Q 1.5)

	Size by turnover										Total	Rank	
	Micro		Small		Medium		Large		No stmt.				
By management alone	14	66.7%	78	45.1%	21	25.9%	1	16.7%	4	20.0%	118	39.2%	2
By managemt. together with functions	7	33.3%	82	47.4%	52	64.2%	1	16.7%	7	35.0%	149	49.5%	1
By internal audit	1	4.8%	5	2.9%	2	2.5%	0	0.0%	1	5.0%	9	3.0%	7
By controlling function	1	4.8%	65	37.6%	37	45.7%	5	83.3%	10	50.0%	118	39.2%	2
By workshops with business units	0	0.0%	17	9.8%	9	11.1%	0	0.0%	2	10.0%	28	9.3%	6
By designated employees of busin. units	2	9.5%	40	23.1%	22	27.2%	2	33.3%	10	50.0%	76	25.2%	4
Inquiries by questionnaires or check lists	1	4.8%	16	9.2%	12	14.8%	0	0.0%	4	20.0%	33	11.0%	5
Other way	1	4.8%	2	1.2%	2	2.5%	0	0.0%	1	5.0%	6	2.0%	8
No statement	0	0.0%	1	0.6%	0	0.0%	0	0.0%	0	0.0%	1	0.3%	9
Total	21	100.0%	173	100.0%	81	100.0%	6	100.0%	20	100.0%	301	100.0%	

* Multiple selection allowed

With increasing size the percentage of sole responsibility of management for risk assessment strongly decreases, while the responsibility of management together with departments increases (with the exception of large firms). Within all size classes the controlling function is strongly involved, and it is even increasing with increasing size. Holding risk workshops seldom takes place in SMEs, with no significant changes concerning size. In all size classes, relatively few designated employees of business units are assigned to identifying and evaluating risks. About 11% of all surveyed firms draw on questionnaires or check lists to identify and evaluate their risks.

Defining size by the number of employees, the percentage of controlling function display a similar increase with increasing size. It is worth noting that in this context in large firms about 54% report designated employees of business units to be involved in risk identification and evaluation.

Industrial sector (Question 1.1): Differences with respect to industries are shown in Table 4.19.

Table 4.19 Risk Assessment: Responsibility and Methods (Q 2.4*)
Versus Industrial Sector (Q 1.1)

	Industrial sector										Total	Rank	
	Construction	Engineering	IT	Auditing	Trade								
By management alone	41	46.6%	33	31.7%	14	35.0%	16	51.6%	14	36.8%	118	39.2%	2
By managemt. together with functions	43	48.9%	58	55.8%	22	55.0%	12	38.7%	14	36.8%	149	49.5%	1
By internal audit	2	2.3%	1	1.0%	0	0.0%	4	12.9%	2	5.3%	9	3.0%	7
By controlling function	25	28.4%	51	49.0%	15	37.5%	9	29.0%	18	47.4%	118	39.2%	2
By workshops with business units	5	5.7%	14	13.5%	4	10.0%	1	3.2%	4	10.5%	28	9.3%	6
By designated employees of busin. units	21	23.9%	22	21.2%	15	37.5%	6	19.4%	12	31.6%	76	25.2%	4
Inquiries by questionnaires or check lists	6	6.8%	14	13.5%	9	22.5%	0	0.0%	4	10.5%	33	11.0%	5
Other way	1	1.1%	4	3.8%	0	0.0%	0	0.0%	1	2.6%	6	2.0%	8
No statement	1	1.1%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	1	0.3%	9
Total	88	100.0%	104	100.0%	40	100.0%	31	100.0%	38	100.0%	301	100.0%	

* Multiple selection allowed

The distribution of internal audit is significantly dependent on the industrial sector, with the auditing sector being most strongly involved into the risk management process. It is pointed out that internal audit has a relatively small total of 11.

The occurrence of the controlling function also depends on industry: construction and auditing reveal the least occurrence. In addition to that, the sectors of information technology, engineering and trade make significantly more use of check lists and questionnaires than the other sectors.

Part of a group (Question 1.3): If firms are part of group then the percentage of management alone as being responsible for risk assessment is significantly smaller, a fact that could be expected. In this case, questionnaires and checklists are appear three times as much (on a low level), when compared to firms that are not part of a group.

Audited (Question 1.4): For firms that are audited the responsibility for risk assessment of management alone is half of the corresponding share for non-audited firms, making up about 1/3. Concerning management together with departments, the situation is somehow complementary: for audited firms the responsibility doubles, making up about 2/3. The responsibility of controlling increases for audited firms. In about 10% of all cases, workshops with business units are held to assess risks. All but one of these firms are audited.

Early warning system (Question 1.9a): For firms with an early warning system, the percentage of designated employees of business units as being responsible for risk

assessment is about twice, compared to firms that have no such system or that only plan to establish such a system.

The following Table 4.20 reports how risk management is supported by software.

Table 4.20 Risk Management Software (Q 2.8*).
Versus Company Size by Annual Turnover (Q 1.5)

	Size by turnover										Total	Rank	
	Micro		Small		Medium		Large		No stmt.				
Standard office software	15	71.4%	108	62.8%	57	70.4%	2	33.3%	13	65.0%	195	65.0%	1
Standard business administration softw.	4	19.0%	68	39.5%	30	37.0%	1	16.7%	4	20.0%	107	35.7%	2
Risk management software	0	0.0%	4	2.3%	2	2.5%	0	0.0%	2	10.0%	8	2.7%	5
In-house software	4	19.0%	50	29.1%	15	18.5%	3	50.0%	4	20.0%	76	25.3%	3
Other software	0	0.0%	0	0.0%	2	2.5%	0	0.0%	2	10.0%	4	1.3%	6
No statement	2	9.5%	11	6.4%	6	7.4%	1	16.7%	1	5.0%	21	7.0%	4
Total	21	100.0%	172	100.0%	81	100.0%	6	100.0%	20	100.0%	300	100.0%	

* Multiple selection allowed

The analysis reveals that there is still relatively little application of formal risk management software. Standard office software (Microsoft Office) is clearly preferred.

Industrial sector (Question 1.1): Significant dependencies on industrial sectors of software use could not be found (see Table 4.21).

Table 4.21 Risk Management Software (Q 2.8*).
Versus Industrial Sector (Q 1.1)

	Industrial sector										Total	Rank	
	Construction		Engineering		IT		Auditing		Trade				
Standard office software	61	69.3%	63	61.2%	31	77.5%	21	67.7%	19	50.0%	195	65.0%	1
Standard business administration softw.	34	38.6%	42	40.8%	9	22.5%	10	32.3%	12	31.6%	107	35.7%	2
Risk management software	2	2.3%	4	3.9%	1	2.5%	0	0.0%	1	2.6%	8	2.7%	5
In-house software	19	21.6%	28	27.2%	9	22.5%	10	32.3%	10	26.3%	76	25.3%	3
Other software	1	1.1%	0	0.0%	1	2.5%	0	0.0%	2	5.3%	4	1.3%	6
No statement	4	4.5%	8	7.8%	2	5.0%	2	6.5%	5	13.2%	21	7.0%	4
Total	88	100.0%	103	100.0%	40	100.0%	31	100.0%	38	100.0%	300	100.0%	

* Multiple selection allowed

Early warning system (Question 1.9a): Firms with an early warning system increasingly take advantage of in-house software for risk management purposes.

Now it will be presented which amount SMEs plan for risk management expenditure (Table 4.22).

Table 4.22 Risk Management Expenditure (Q 2.9).
Versus Company Size by Annual Turnover (Q 1.5)

	Size by turnover										Total	Rank	
	Micro		Small		Medium		Large		No stmt.				
No investments planned	16	76.2%	90	55.6%	41	54.7%	2	40.0%	10	52.6%	159	56.4%	1
Less than 25 thousand Euros	5	23.8%	55	34.0%	20	26.7%	2	40.0%	6	31.6%	88	31.2%	2
From 25 up to 50 thousand Euros	0	0.0%	11	6.8%	7	9.3%	0	0.0%	2	10.5%	20	7.1%	3
More than 50 thousand Euros	0	0.0%	6	3.7%	7	9.3%	1	20.0%	1	5.3%	15	5.3%	4
Total	21	100.0%	162	100.0%	75	100.0%	5	100.0%	19	100.0%	282	100.0%	

56% of all surveyed enterprises do not plan any risk management investment at all. Some size effect can be recognized with respect to the number of employees: here medium-sized and large firms plan more risk management expenditure than the other firms.

Industrial sector (Question 1.1): Risk management expenditure within the industrial sectors is illustrated in Table 4.23.

Table 4.23 Risk Management Expenditure (Q 2.9).
Versus Industrial Sector (Q 1.1)

	Industrial sector										Total	Rank	
	Construction		Engineering		IT		Auditing		Trade				
No investments planned	51	63.8%	53	54.1%	22	55.0%	19	65.5%	14	40.0%	159	56.4%	1
Less than 25 thousand Euros	23	28.8%	29	29.6%	13	32.5%	8	27.6%	15	42.9%	88	31.2%	2
From 25 up to 50 thousand Euros	3	3.8%	8	8.2%	4	10.0%	2	6.9%	3	8.6%	20	7.1%	3
More than 50 thousand Euros	3	3.8%	8	8.2%	1	2.5%	0	0.0%	3	8.6%	15	5.3%	4
Total	80	100.0%	98	100.0%	40	100.0%	29	100.0%	35	100.0%	282	100.0%	

The engineering and trade sectors report the highest expenditure for risk management.

Different from the results of Sections 4.3.3.1 the organization of risk management reveals clear size effects. Concerning responsibilities for establishing and reviewing risk management as well as assessing risks, with increasing enterprise size the sole responsibility of the board of directors decreases, while other personnel/functions are increasingly involved. This is especially the case for the controlling function.

4.3.3.3 Project Risk Management

This section covers general project management as well as project risk management. The general project management part discusses separate project business plans (Question 4.2) and the degree of consolidation of single project plannings (Question 4.3). The risk management part examines project risks (Question 4.5) and the project risk integration into the company's business planning (Question 4.7), one of the fundamental links of the holistic risk management approach treated in Section 2.1.

Since not all surveyed enterprises are to at least some extent project-oriented, its base is a smaller subset of the whole sample of usable responses (namely, 264 out of 314).

Firstly, it will be examined whether there are business plans for single projects, such as a budgeted profit statement or a cash budget (Table 4.24).

Table 4.24 Separate Project Business Plans (Q 4.2).
Versus Company Size by Annual Turnover (Q 1.5)

	Size by turnover										Total	Rank	
	Micro		Small		Medium		Large		No stmt.				
For every project	8	50.0%	84	54.5%	33	44.6%	2	50.0%	8	53.3%	135	51.3%	1
Only for some projects	7	43.8%	64	41.6%	33	44.6%	2	50.0%	6	40.0%	112	42.6%	2
For no project	1	6.3%	6	3.9%	8	10.8%	0	0.0%	1	6.7%	16	6.1%	3
Total	16	100.0%	154	100.0%	74	100.0%	4	100.0%	15	100.0%	263	100.0%	

The majority of SMEs (51%) exploit business plans for each project. Another 43% apply business plans at least for some projects, presumably only for more complex or more risky ones. Astonishingly, only 6% report to conduct no project business plans at all.

The results are not significantly dependent on enterprise size, with respect to annual turnover as well as with respect to number of employees.

Industrial sector (Question 1.1): Concerning the industrial sectors, the analysis did not support any significant difference in the usage of project business plans (Table 4.25).

Table 4.25 Separate Project Business Plans (Q 4.2).
Versus Industrial Sector (Q 1.1)

	Industrial sector										Total	Rank	
	Construction		Engineering		IT		Auditing		Trade				
For every project	43	54.4%	51	56.0%	21	51.2%	12	44.4%	8	32.0%	135	51.3%	1
Only for some projects	31	39.2%	38	41.8%	16	39.0%	12	44.4%	15	60.0%	112	42.6%	2
For no project	5	6.3%	2	2.2%	4	9.8%	3	11.1%	2	8.0%	16	6.1%	3
Total	79	100.0%	91	100.0%	41	100.0%	27	100.0%	25	100.0%	263	100.0%	

Early warning system (Question 1.9a): Firms with an early warning system have to a significantly increased degree business plans for all of their projects. The percentage is strongly increasing if one passes from the options “for no project” to “for all projects”.

Now it will be examined to what extent SMEs carry out the consolidation of single project plans within the business planning of the entire enterprise (Table 4.26).

Table 4.26 Consolidation of Project Plannings (Q 4.3).
Versus Company Size by Annual Turnover (Q 1.5)

	Size by turnover										Total	Rank	
	Micro		Small		Medium		Large		No stmt.				
For every project	10	66.7%	79	52.0%	33	45.2%	2	50.0%	7	46.7%	131	50.6%	1
Only for some projects	3	20.0%	67	44.1%	34	46.6%	2	50.0%	7	46.7%	113	43.6%	2
For no project	2	13.3%	6	3.9%	6	8.2%	0	0.0%	1	6.7%	15	5.8%	3
Total	15	100.0%	152	100.0%	73	100.0%	4	100.0%	15	100.0%	259	100.0%	

It is interesting, that only about 6% of the SMEs do not integrate their project plans into the company's business planning. About half of the respondents practise an integration for all of their projects.

The results are not significantly dependent on company size, with respect to annual turnover as well as with respect to number of employees.

Industrial sector (Question 1.1): The grouping with respect to industrial sector is presented in Table 4.27.

Table 4.27 Consolidation of Project Plannings (Q 4.3).
Versus Industrial Sector (Q 1.1)

	Industrial sector										Total	Rank	
	Construction		Engineering		IT		Auditing		Trade				
For every project	39	50.0%	46	51.1%	18	45.0%	21	77.8%	7	29.2%	131	50.6%	1
Only for some projects	32	41.0%	41	45.6%	20	50.0%	5	18.5%	15	62.5%	113	43.6%	2
For no project	7	9.0%	3	3.3%	2	5.0%	1	3.7%	2	8.3%	15	5.8%	3
Total	78	100.0%	90	100.0%	40	100.0%	27	100.0%	24	100.0%	259	100.0%	

The auditing sector dominates, concerning the integration of all project plans into the company's business planning, while trade have the lowest rate of consolidation. About 63% of trade use integration only for selected projects. Construction and trade most frequently make no integration at all.

Early warning system (Question 1.9a): As in the case of project business plans (Question 4.2), firms with an early warning system carry out to a significantly increased degree a consolidation of project planning for all of their projects. The percentage is strongly increasing if one passes from the options "for no project" to "for all projects". Comparing with firms that have no early warning system or firms that only plan to establish such a system, the percentages change to a consolidation of fewer projects.

Starting with risk management for projects, Question 4.4 asks whether risks for single projects are considered. The relatively large amount of positive answers to consider risks for at least some projects is slightly surprising. Since the

corresponding methods have not been inquired, SMEs maybe overestimate their ability for project risk management. Details will be investigated by research interviews (see Section 5.2.5.3).

Within the micro, small and medium classes, considering risks nearly remains constant, with the percentage of “for each project” decreasing and, to about the same amount, the percentage of “for some projects” increasing. Large firms (only 4 cases) do not match this development.

With respect to size by the number of employees, there is a similar picture, but, with increasing size, not such a clear tendency to dealing with only selected projects. Here, large firms (7 cases) fit better.

Concerning project risk categories, the five most frequently occurring ones are (see Table 4.28):

- operational risks
- financial risks
- design and construction risks
- quality risks
- legal risks

Generally, it is notable that project risk categories appear in a different ranking when compared to risk categories of the entire company (Question 2.3; see Table 4.8). Operational project risk categories stronger dominate.

Table 4.28 Project Risk Categories (Q 4.5*).
Versus Company Size by Annual Turnover (Q 1.5)

	Size by turnover										Total	Rank	
	Micro	Small	Medium	Large	No stmt.								
Legal risks	7	46.7%	60	42.3%	38	55.9%	1	50.0%	6	50.0%	112	46.9%	5
Design and construction risks	11	73.3%	83	58.5%	51	75.0%	1	50.0%	6	50.0%	152	63.6%	3
Operational risks	11	73.3%	109	76.8%	55	80.9%	0	0.0%	8	66.7%	183	76.6%	1
Financial risks	12	80.0%	104	73.2%	44	64.7%	2	100.0%	8	66.7%	170	71.1%	2
Personnel risks	3	20.0%	51	35.9%	16	23.5%	0	0.0%	4	33.3%	74	31.0%	6
Quality risks	7	46.7%	80	56.3%	39	57.4%	0	0.0%	6	50.0%	132	55.2%	4
Environmental risks	2	13.3%	17	12.0%	14	20.6%	0	0.0%	2	16.7%	35	14.6%	7
Other risks	0	0.0%	1	0.7%	0	0.0%	0	0.0%	0	0.0%	1	0.4%	8
No statement	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	9
Total	15	100.0%	142	100.0%	68	100.0%	2	100.0%	12	100.0%	239	100.0%	

* Multiple selection allowed

With respect to the mean number of project risk categories dealt with, there is an increase with increasing turnover size (micro: 3.53; small: 3.56; medium: 3.78), except for large firms (2.00; only 2 cases!). The corresponding means with respect to size by number of employees behave differently: After increasing from micro

(3.27) to small firms (3.92), there is a decrease for medium-sized firms (3.57). Again, large firms have a comparably small mean number (2.83; 6 cases). The overall mean is 3.59.

Industrial sector (Question 1.1): The analysis of differences within industrial sectors follows (Table 4.29).

Table 4.29 Project Risk Categories (Q 4.5*).
Versus Industrial Sector (Q 1.1)

	Industrial sector										Total	Rank	
	Construction		Engineering		IT		Auditing		Trade				
Legal risks	37	50.0%	34	41.5%	17	45.9%	13	54.2%	11	50.0%	112	46.9%	5
Design and construction risks	43	58.1%	70	85.4%	18	48.6%	9	37.5%	12	54.5%	152	63.6%	3
Operational risks	62	83.8%	63	76.8%	27	73.0%	19	79.2%	12	54.5%	183	76.6%	1
Financial risks	55	74.3%	57	69.5%	22	59.5%	16	66.7%	20	90.9%	170	71.1%	2
Personnel risks	25	33.8%	18	22.0%	18	48.6%	10	41.7%	3	13.6%	74	31.0%	6
Quality risks	41	55.4%	47	57.3%	24	64.9%	15	62.5%	5	22.7%	132	55.2%	4
Environmental risks	19	25.7%	10	12.2%	2	5.4%	1	4.2%	3	13.6%	35	14.6%	7
Other risks	0	0.0%	0	0.0%	0	0.0%	0	0.0%	1	4.5%	1	0.4%	8
No statement	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	9
Total	74	100.0%	82	100.0%	37	100.0%	24	100.0%	22	100.0%	239	100.0%	

* Multiple selection allowed

Risk consideration of single projects will be concluded with an investigation, to what extent project risks are integrated into the business planning of the entire company (Table 4.30).

Table 4.30 Project Risk Integration Into Business Planning (Q 4.7).
Versus Company Size by Annual Turnover (Q 1.5)

	Size by turnover										Total	Rank	
	Micro		Small		Medium		Large		No stmt.				
For every project	8	53.3%	45	31.7%	18	26.5%	1	50.0%	3	25.0%	75	31.4%	2
Only for some projects	5	33.3%	85	59.9%	45	66.2%	0	0.0%	8	66.7%	143	59.8%	1
For no project	2	13.3%	12	8.5%	5	7.4%	1	50.0%	1	8.3%	21	8.8%	3
Total	15	100.0%	142	100.0%	68	100.0%	2	100.0%	12	100.0%	239	100.0%	

There is no significant dependency of the integration behaviour with respect to company size by turnover. Two third use an integration for some, but not for all projects. It is striking that in micro and in large firms more frequently such an integration takes place. These results are in accordance with the results on integration of single project plannings (Tables 4.26 and 4.27).

Examining integration behaviour with respect to size by number of employees, there are no significant differences. The frequency of risk integration for all projects, though, decreases in the medium-sized and large employee classes.

Industrial sector (Question 1.1): Significant differences between industrial sectors have not been observed (Table 4.31).

Table 4.31 Project Risk Integration Into Business Planning (Q 4.7).
Versus Industrial Sector (Q 1.1)

	Industrial sector										Total	Rank	
	Construction		Engineering		IT		Auditing		Trade				
For every project	20	27.0%	30	36.6%	8	21.6%	9	37.5%	8	36.4%	75	31.4%	2
Only for some projects	45	60.8%	47	57.3%	26	70.3%	13	54.2%	12	54.5%	143	59.8%	1
For no project	9	12.2%	5	6.1%	3	8.1%	2	8.3%	2	9.1%	21	8.8%	3
Total	74	100.0%	82	100.0%	37	100.0%	24	100.0%	22	100.0%	239	100.0%	

Early warning system (Question 1.9a): Enterprises already having established an early warning system (Question 1.9a) increasingly carry out single project plannings (Question 4.2). They also more often integrate project plans into the company's business planning (Question 4.3), and they also more regularly consider risks for at least some of their projects (Question 4.4).

To sum up, project risk management reveals no significant differences with respect to enterprise size and to industrial sector. In general, SMEs have only a weakly developed project risk management. Especially, the consolidation of single project plannings within the company's business planning is not very well developed across all size classes.

4.4 Scoring of Questionnaire Results

The following sections deal with the construction process (Section 4.4.1) and the analysis of scoring variables (Section 4.4.2) introduced for different aspects of risk management. Scoring will be the base for deriving types of risk management practices in Chapter 6.

4.4.1 Construction of Scoring Variables

Several scoring variables have been introduced to estimate the sophistication of different aspects of comprehensive risk management systems. The scoring approach does not aim exclusively at risk management in the stricter sense. The literature review has shown that the quality of business planning and the use of instruments of performance measurement can considerably improve risk management (see Sections 2.3 and 2.4). Moreover, risk management itself appears with different aspects: the process and the organization, and for project-oriented companies there are both aspects with respect to their single projects. This indicates that it is not suitable to estimate holistic risk management by a single scoring figure. Instead, five groups of questionnaires results have been formed, each leading to a corresponding scoring variable. The single contributions that

form a scoring variable will be called scoring summands. Together the five scoring variables shall give SMEs a transparent and practicable framework to estimate the sophistication of their risk management system.

The principles of constructing scoring variables from the scoring summands and the derivation of scoring classes have been introduced in Section 3.5.

Table 4.32 summarizes, for the five aspects of a holistic risk management, the construction of the respective scoring variables. It also displays the theoretical and empirical values for maximum and minimum scores and the low, moderate and high scoring classes.

Table 4.32 Scoring Variables: Construction and Descriptive Statistics

	N	Theoretical		Min	Max	Mean	StdDev	Weight	Low	Mod.	High
		Min	Max								
Q 1.7a Long-term pl.: Components	276	0	6	0	6	2.66	1.714	1			
Q 1.7b Long-term pl.: Time horizon	276	0	3	0	3	1.96	0.718	1			
Q 1.8 Short-term pl.: Components	276	0	3	0	3	1.63	0.615	1			
scq_plan	276	0	12	0	11	6.26	2.138		0-3	4-7	8-12
Q 3.1 Balanced Scorecard	280	0	4	0	4	0.61	1.146	1			
Q 3.2 Shareholder value	280	0	4	0	4	0.57	1.092	1			
Q 3.3 Knowledge management	280	0	4	0	4	0.76	1.282	1			
scq_perf_rm	280	0	12	0	12	1.95	2.411		0-3	4-7	8-12
Q 2.3 Risk categories	281	0	8	0	7	3.08	1.368	1			
Q 2.5a Risk assessment: Frequency	281	0	4	0	4	2.14	1.221	1			
Q 2.5b Risk assessment: Time horizon	281	0	4	0	4	1.43	1.005	1			
Q 2.6a Risk reporting to board of dirs.	281	0	3	0	3	1.12	0.712	1			
Q 2.7 Link of r.m. to bus. planning	281	0	2	0	2	1.09	0.772	3			
scq_rm_proc	281	0	25	2	21	11.04	3.788		0-8	9-16	17-25
Q 2.1a Respons.: R.m. implementation	282	0	10	1	7	2.03	1.152	1			
Q 2.1b Respons.: R.m. reviewing	282	0	6	0	5	1.54	0.736	1			
Q 2.2 Risk management documentation	282	0	7	0	6	1.23	1.324	1			
Q 2.4 Risk assessment: Respons./meth.	282	0	8	1	6	1.79	0.856	1			
Q 2.8 Risk management software	282	0	6	0	4	1.35	0.735	1			
Q 2.9 Risk management expenditure	282	0	3	0	3	0.61	0.837	2			
scq_rm_org	282	0	43	3	26	9.17	3.728		0-14	15-28	29-43
Q 4.2 Project business plans	230	0	2	0	2	1.50	0.567	2			
Q 4.3 Consolidation of proj. plannings	230	0	2	0	2	1.48	0.574	2			
Q 4.5 Risk categories for projects	230	0	8	1	7	3.62	1.569	1			
Q 4.6 Project risk documentation	230	0	8	0	7	3.04	1.587	1			
Q 4.7 Project risk integr. into planning	230	0	2	0	2	1.25	0.587	3			
Q 4.8 Project risk scenarios	230	0	2	0	2	0.82	0.530	2			
scq_prm	230	0	34	3	31	18.00	4.957		0-11	12-22	23-34

scq_plan: Planning

Question 1.7a: The separate long-term planning subsystems (budgeted profit statement, cash budget, budgeted balance sheet, other planning system) are simply counted with equal value 1. The classic master budget is given the score 5, which shall reflect that such an integrated system is superior to the combined use of all three non-integrated components (these would be counted as 3).

Question 1.7b: The options for the time horizon have an inherent natural order, with short horizon attribute given a small scoring value.

Question 1.8: The components of short-term business planning are simply counted with equal weight 1.

Since neither the range of the scoring summands nor the importance of a particular summand give rise to the fixing of weighting factors, the combination is carried out as a simple sum.

$$\begin{array}{r}
 \text{score(Q 1.7a Long-term planning: Components)} \\
 + \text{ score(Q 1.7a Long-term planning: Time horizon)} \\
 + \text{ score(Q 1.8 Short-term planning: Components)} \\
 \hline
 = \text{ scq_plan}
 \end{array}$$

scq_perf_rm: Performance Measurement and Risk Management

Questions 3.1 - 3.3: The scoring summands corresponding to Balanced Scorecard (3.1), shareholder value (3.2) and knowledge management (3.3) are all constructed in the same way. Merely planning the use of the respective instrument of performance measurement is given a score of 1, its general use counts as 2, and to distinguish its application for risk management purposes, this is given an increased value of 4.

The instruments are judged as similar, so they are combined by a simple sum.

$$\begin{array}{r}
 \text{score(Q 3.1 Balanced Scorecard)} \\
 + \text{ score(Q 3.2 Shareholder value)} \\
 + \text{ score(Q 3.3 Knowledge management)} \\
 \hline
 = \text{ scq_perf_rm}
 \end{array}$$

scq_rm_proc: Risk Management Process

Question 2.3: All risk categories are counted equally with value 1 since there is no plausible argument to prefer one risk category to another.

Question 2.5a: The risk assessment frequency is encoded from 0 (other frequency) to 4 (every month) consistent to the inherent order of the options.

Question 2.5b: The risk assessment time horizon is encoded from 0 (other time horizon) to 4 (5 years), again corresponding to the inherent order of the options.

Question 2.6a: A separate risk reporting is a characteristic of a more elaborate risk management. Therefore this option is counted with increased value 3. The other option both get the score 1.

Question 2.7: Being an essential element of the holistic risk management approach, a direct link of risk management and business planning gets the score 2. A link in any other way gets 1.

Combining the above scoring summands, the score of link of risk management with business planning is weighted by the factor 3 for two reasons. Its range is relatively small when compared with that of the other scoring summands. Moreover, it deals with a crucial element of the approach of this study.

$$\begin{array}{r}
 \text{score(Q 2.3 Risk categories)} \\
 + \text{ score(Q 2.5a Risk assessment: Frequency)} \\
 + \text{ score(Q 2.5b Risk assessment: Time horizon)} \\
 + \text{ score(Q 2.6a Risk reporting to board of directors)} \\
 + 3 * \text{ score(Q 2.7 Link of risk management to business planning)} \\
 \hline
 = \text{ scq_rm_proc}
 \end{array}$$

scq_rm_org: Risk Management Organization

Questions 2.1a, 2.1b: Concerning the scoring of responsibilities for risk management implementation and risk management reviewing, respectively, a special risk manager (2.1a) and internal audit (2.1a, 2.1b) are counted with increased weight 2; all other options are assigned a normal weight 1. An increased value is given since delegating risk management tasks to designated personnel is a characteristic of a more comprehensive risk management when compared to the board of directors dealing alone with it.

Question 2.2: Documentation in the form of a special risk management manual is added up with increased weight 4, so that this option outweighs the common ticking of the 3 other options.

Question 2.4: Counts the outcomes of the responsibility and methods of risk assessment. No different weighting has been performed.

Question 2.8: The application of software support for risk management prefers special risk management software by considering this option with the increased weight 2.

Question 2.9: Risk management expenditure is encoded from 0 to 3 corresponding to the inherent order of the options.

Because of its comparably small range, the contribution of the scoring summand for expenditure is spread by the weighting factor 2.

$$\begin{aligned}
& \text{score(Q 2.1a Responsibility: Risk management implementation)} \\
+ & \text{score(Q 2.1b Responsibility: Risk management reviewing)} \\
+ & \text{score(Q 2.2 Risk management documentation)} \\
+ & \text{score(Q 2.4 Risk assessment: Responsibility/methods)} \\
+ & \text{score(Q 2.8 Risk management software)} \\
+ & 2 * \text{score(Q 2.9 Risk management expenditure)} \\
\hline
= & \text{scq_rm_org}
\end{aligned}$$

scq_prm: Project Risk Management

Questions 4.2, 4.3, 4.7, 4.8: The identical options “For every project / Only for some projects / For no project” are encoded with scores 2 / 1 / 0. This applies to project business plans (Question 4.2), the consolidation of project plannings (Question 4.3), the integration of project risks into the company’s business planning (Question 4.7) and the utilization of project risk scenarios (Question 4.8).

Question 4.5: The score for project risk categories merely counts the number of selected categories. There is no plausible argument to prefer one risk category to another.

Question 4.6: The options for risk documentation in a project specific way (in project cost calculations, by project controlling, in a project database) are each given an increased score of 2.

The construction of the scoring variable for project risk management operates with several weighting factors. Generally, the scores for Questions 4.2, 4.3, 4.7 and 4.8 need weighting factors because of their small range, when compared with the scores for Questions 4.5 and 4.6. Moreover, Question 4.7 deals with a decisive link of project risk management and the company’s business planning (holistic approach). So the contribution of the associated scoring summand will get the increased weight 3, while the other score contributions mentioned are only doubled.

$$\begin{aligned}
& 2 * \text{score(Q 4.2 Project business plans)} \\
+ & 2 * \text{score(Q 4.3 Consolidation of project plannings)} \\
+ & \text{score(Q 4.5 Risk categories for projects)} \\
+ & \text{score(Q 4.6 Project risk documentation)} \\
+ & 3 * \text{score(Q 4.7 Project risk integration into planning)} \\
+ & 2 * \text{score(Q 4.8 Project risk scenarios)} \\
\hline
= & \text{scq_prm}
\end{aligned}$$

Referring to the scoring variable means and the corresponding scoring classes, it is worth noting that the mean score of risk management organization and of performance measurement fall in the “low” class, while the remaining means

belong to the “moderate” class. This is in accordance with the findings of the bivariate analyses (Section 4.3).

4.4.2 Analysis of Scoring Variables

Having presented the construction of the scoring variables, this section discusses whether there are significant differences between the means of the scoring variables on the classes induced by the basic variables (see Table 4.33).

Table 4.33 ANOVA for Scoring Variables with Respect to Demographics

		scq_plan		scq_perf_rm		scq_rm_proc		scq_rm_org		scq_prm	
		Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
Size by annual turnover (Q1.5)											
Micro	(up to 2 million Euros)	5.00	17	1.74	19	11.05	20	6.76	21	18.33	15
Small	(more than 2 to 10 million Euros)	6.37	158	1.76	161	11.05	161	8.85	162	18.21	136
Medium	(more than 10 to 50 million Euros)	6.31	78	2.32	77	10.96	78	10.05	75	17.53	66
Large	(more than 50 million Euros)	6.20	5	1.40	5	8.50	2	9.40	5	19.00	1
No statement		6.28	18	2.39	18	11.50	20	11.05	19	17.83	12
Total		6.26	276	1.95	280	11.04	281	9.17	282	18.00	230
		F Ratio		1.600		0.971		0.304		5.028	
		Significance p		0.174		0.424		0.875		0.001	
Size by number of employees (Q 1.6)											
Micro	(up to 9 employees)	4.31	13	1.60	15	9.40	15	6.47	15	17.73	11
Small	(10 to 49 employees)	6.06	35	1.79	39	11.65	40	8.90	42	18.59	37
Medium	(50 to 249 employees)	6.36	215	1.94	214	11.07	214	9.19	214	17.96	177
Large	(250 to 499 employees)	7.08	13	3.00	12	10.50	12	13.64	11	15.80	5
Total		6.26	276	1.95	280	11.04	281	9.17	282	18.00	230
		F Ratio		4.684		0.918		1.374		8.614	
		Significance p		0.003		0.433		0.251		0.000	
Industrial sector (Q 1.1)											
Construction		5.84	80	1.49	79	10.63	80	8.54	80	17.49	73
Engineering		6.59	93	2.16	98	11.06	100	9.46	98	19.04	77
Information technology		6.54	39	2.77	39	12.11	37	9.53	40	17.50	36
Auditing/consulting/training		5.57	28	2.41	27	10.60	30	8.28	29	18.30	23
Trade/service/logistics		6.56	36	1.14	37	11.18	34	10.17	35	16.52	21
Total		6.26	276	1.95	280	11.04	281	9.17	282	18.00	230
		F Ratio		2.454		3.440		1.090		1.886	
		Significance p		0.046		0.009		0.362		0.113	
Legal form (Q 1.2)											
Unincorporated firm		5.92	51	2.14	57	10.64	55	8.67	55	17.09	47
Incorporated firm		6.33	225	1.90	223	11.14	226	9.30	227	18.24	183
Total		6.26	276	1.95	280	11.04	281	9.17	282	18.00	230
		F Ratio		1.549		0.462		0.772		1.235	
		Significance p		0.215		0.497		0.380		0.267	
Part of a group (Q 1.3)											
Yes		6.71	104	2.16	105	10.85	105	9.72	106	17.82	90
No		6.00	171	1.79	173	11.19	174	8.87	174	18.18	139
Total		6.27	275	1.93	278	11.06	279	9.19	280	18.04	229
		F Ratio		7.367		1.570		0.532		3.434	
		Significance p		0.007		0.211		0.466		0.065	
Audited (Q 1.4)											
Yes		6.51	212	2.01	212	11.23	212	9.73	212	18.08	171
No		5.40	60	1.71	63	10.47	66	7.46	67	17.84	56
Total		6.27	272	1.94	275	11.05	278	9.19	279	18.02	227
		F Ratio		13.290		0.722		2.028		20.156	
		Significance p		0.000		0.396		0.156		0.000	
Early warning system established (Q 1.9a)											
Established		6.55	182	2.12	175	11.91	188	9.98	189	19.09	145
Planned		6.09	66	2.10	70	9.09	57	8.52	60	15.84	55
Not planned		4.62	26	0.76	34	9.30	30	5.75	32	16.50	24
Total		6.26	274	1.95	279	11.04	275	9.19	281	18.01	224
		F Ratio		10.279		4.791		17.396		21.709	
		Significance p		0.000		0.009		0.000		0.000	

Company size (Questions 1.5/1.6): Size with respect to turnover (Question 1.5) reveals significant differences only for scq_rm_org. On the average, micro and small firms have smaller scores with respect to risk management organization. It is interesting, that firms that gave no turnover response have the best scores.

Regarding size with respect to the number of employees (Question 1.6), the mean scores for business planning and risk management organization appear with significant differences. For both scoring variables, micro and small firms perform more badly than medium-sized and large firms.

Industrial sector (Questions 1.1): Significant differences appear only with respect to the scoring variables for planning sophistication and instruments of performance measurement. Generally, *scq_rm_org* has bad values within all industrial sectors, with the trade sector still having the highest values. Concerning *scq_plan*, engineering, IT are leading, and audit comes last. IT ranks first in the use of instruments of performance measurement, followed by engineering. Here trade comes last.

Legal form (Question 1.2): Incorporated firms have higher mean scores than unincorporated ones, with the exception of the performance measurement variable. This may be due to the fact that, to fulfil the legal requirements, incorporated firms need more detailed risk information for their annual accounts.

Part of a group (Question 1.3): Firms that are part of a group have better mean scores for planning and risk management organization. Especially for risk management organization this result certainly reflects the influence of the group parent. In accordance with the German KonTraG law (see Section 1.1) a group parent bears the responsibility that subsidiaries take adequate risk management precautions.

Audited (Question 1.4): Firms the annuals accounts of which are audited demonstrate significant higher mean scores with respect to planning and the organization of risk management. These results are in line with the bivariate analyses in Sections 4.3.1 and 4.3.3. Firms that are audited clearly benefit from the knowledge of chartered accountants and their requiring of a risk management system being established in order to get an unqualified audit opinion.

Early warning system established (Question 1.9a): All five scoring values have significant different means, with the firms having established an early warning system resulting in the highest respective mean. The tendency could be observed in all bivariate analyses of Section 4.3.

The scoring approach has shown that it is meaningful to work with both size criteria for SMEs. The scoring means differ significantly with respect to industrial

sectors. Moreover, a certain positive influence due to being part of a company group can be recognized.

4.5 Multivariate Analysis

This study deals with two multivariate methods: factor analysis and cluster analysis (see Section 3.6). In a first step, Section 4.5.1 applies factor analysis to certain subsets of variables concerning risk management in the stricter sense. The result of the factor analysis (the “factors”) is then used as input for the cluster analysis of Section 4.5.2. The two steps result in a segregation of the sample into “clusters” of somehow related cases.

4.5.1 Factor Analysis

In this section, the focus is on the grouping result of a factor analysis. The aim of the factor analysis, as applied to the questionnaire sample, is to examine how selected questionnaire results on risk management in the stricter sense can be grouped into categories of (formally) related topics. It is carried out with just the same variables that were used in Section 4.4.1 to construct scoring variables, i.e. the scoring summands. So the factoring can serve to justify whether the grouping of questionnaire results in connection with the scoring approach had been adequate.

Factor analysis is carried out in two variants: firstly, covering only general risk management aspects (11 risk items) and secondly, including also project risk management aspects (17 risk items). Since not all surveyed enterprises deal with projects, the general risk management approach without considering projects is necessary to include as much responses as possible. Moreover, comparing the results of both factor analyses in the sense of comparing the respective induced categories may give additional insight into “related topics”, in particular, it may indicate whether project risk management leads to substantially different categories.

4.5.1.1 Factor Analysis 1: General Risk Management (11 risk items)

The first variant of factor analysis is based on all 11 scoring summands that had been applied for the construction of the scoring variables `scq_rm_proc` (risk management process) and `scq_rm_org` (risk management organization; see Section 4.4.1). It is suggested that there should be at least ten times as many cases

as variables to be analysed (see Hair et al., 1998, p. 99). This ten-to-one ratio is clearly fulfilled.

There are several guidelines how to determine the appropriate number of factors to extract: the “eigenvalue > 1” (or Kaiser) criterion and the “elbow” criterion. Both criteria can be applied to the screeplot, which visualizes the decreasing sequence of N eigenvalues the factor analysis computes from a set of N original variables.

Figure 4.34 presents the screeplot for factor analysis 1. It has a “sharp” elbow for 2 factors (and a “weak” one for 4 factors) while there are 4 eigenvalues greater than 1. The percentage of 57.9% of the total variance that an extraction of 4 factors would explain can be seen as quite a good approximation (see Bellgardt, 2004, p. 221) and supports a 4 factor solution (here 2 factors would only explain 36.1%).

Eigenvalue

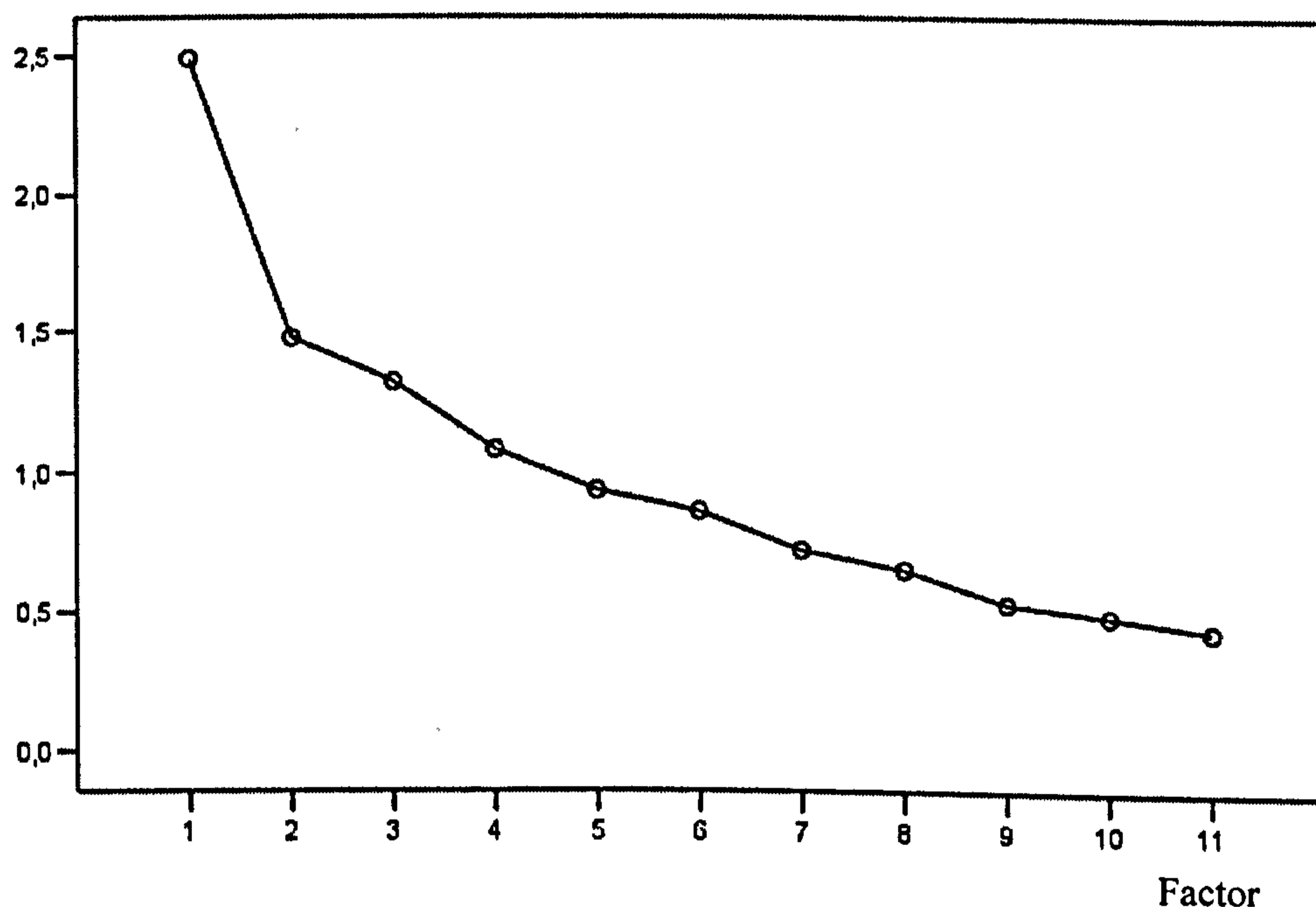


Figure 4.34 Factor Analysis 1: General Risk Management. Screeplot

Once the number 4 of factors to be extracted has been fixed, the allocation of the original 11 variables to these factors is determined, as can be seen from the matrix of rotated loadings (Table 4.35). For the sake of clarity only factor loadings with value greater than 0.4 are presented (with one exception added).

Table 4.35 Factor Analysis 1: General Risk Management.
Matrix of Rotated Loadings of the 4 Factor Solution

Item	Factor			
	#1	#2	#3	#4
Q 2.1a Responsible for r.m. implementation	0.809			
Q 2.1b Responsible for r.m. reviewing	0.789			
Q 2.4 Risk assessment: Respons., methods	0.704			
Q 2.5a Risk assessment: Frequency		0.751		
Q 2.7 Link of r.m. to business planning		0.643		
Q 2.8 Risk management software		0.581		
Q 2.6a Risk reporting to board of directors			0.842	
Q 2.2 Risk management documentation			0.841	
Q 2.3 Risk categories				0.729
Q 2.5b Risk assessment: Time horizon				0.653
Q 2.9 Risk management expenditure				[0.323

Varimax rotation. Only loadings > 0.4 shown (one exception).

As suggested in the literature, to validate the identified factors a split test has been carried out (see Hair et al., 1998). For this purpose, the sample was divided into two parts, and separate factor analyses were applied to the subset of “even” and “odd” cases. Then the resulting 4 factor solutions were compared to the 4 factor solution of the whole sample, in the sense of similar groupings induced by the factors (but not necessarily induced by factors with the same number). The split test confirmed the total factor solution, the “even” solution nearly perfectly, and the “odd” one with slight deviation.

The identified abstract factors will be given the following descriptive labels, covering as much as possible of the issues of the induced groupings.

Factor #1: “Risk management responsibilities”

Factor #1 tackles responsibilities for risk management implementation (Questions 2.1a) and risk management reviewing (Questions 2.1b). It also includes personnel/methods involved in risk assessment (Question 2.4). Since this factor covers the responsibility aspects of risk management organization it will be called “risk management responsibilities”.

Factor #2: “Risk management process, part 1”

Factor #2 summarizes some aspects of the risk management process. Here appear risk assessment frequency (Question 2.5a) as well as the link of risk management to business planning (Question 2.7). In addition, the software use for risk management is also covered by this factor (Question 2.8).

Factor #3: “Risk communication”

Factor #3 is concerned with current risk information and risk reporting directed at the board of directors (Question 2.6a) as well as with the documentation of the general risk management regulations (Question 2.2).

Factor #4: “Risk management process, part 2”

Factor #4 treats additional aspects of the risk management process. Firstly, here appear the risk categories being evaluated (Question 2.3) and the time horizon of risk assessment (Question 2.5b). Risk management expenditure is also assigned to factor #4 (Question 2.9).

It should be pointed out that in an earlier version of the scoring approach of Section 4.4.1, risk categories (Question 2.3) were associated with the scoring variable for risk management organization. On the other hand, the responsibility/methods for risk assessment (Question 2.4) were related to the scoring variable for the risk management process. The above factor analysis suggested that an exchange of these issues would be meaningful, thus leading to the revision of the scoring construction, as presented in Sections 4.4.1 and 5.3.1, respectively.

4.5.1.2 Factor Analysis 2: Project Risk Management (17 risk items)

The second variant of factor analysis is based on all 17 scoring summands that had been taken for the construction of the scoring variables `scq_rm_proc` (risk management process), `scq_rm_org` (risk management organization) and `scq_prm` (project risk management; see Section 4.4.1). Even in this situation (fewer cases, more variables to be analysed), the ten-to-one ratio of cases and variables is fulfilled (see Hair et al., 1998, p. 99).

Concerning project risk management, there are 6 factors with eigenvalues greater than 1, with those of the factors 4, 5 and 6 being only slightly greater than 1 (see the screeplot in Figure 4.36). So here it is the elbow criterion that suggests to take again a 4 factor solution. An 8 factor extraction which might be supported by a second elbow would not lead to a meaningful reduction of the number of variables. The 4 factor solution explains 47.4% of the total variance, which is slightly worse when compared to the case of general risk management.

Eigenvalue

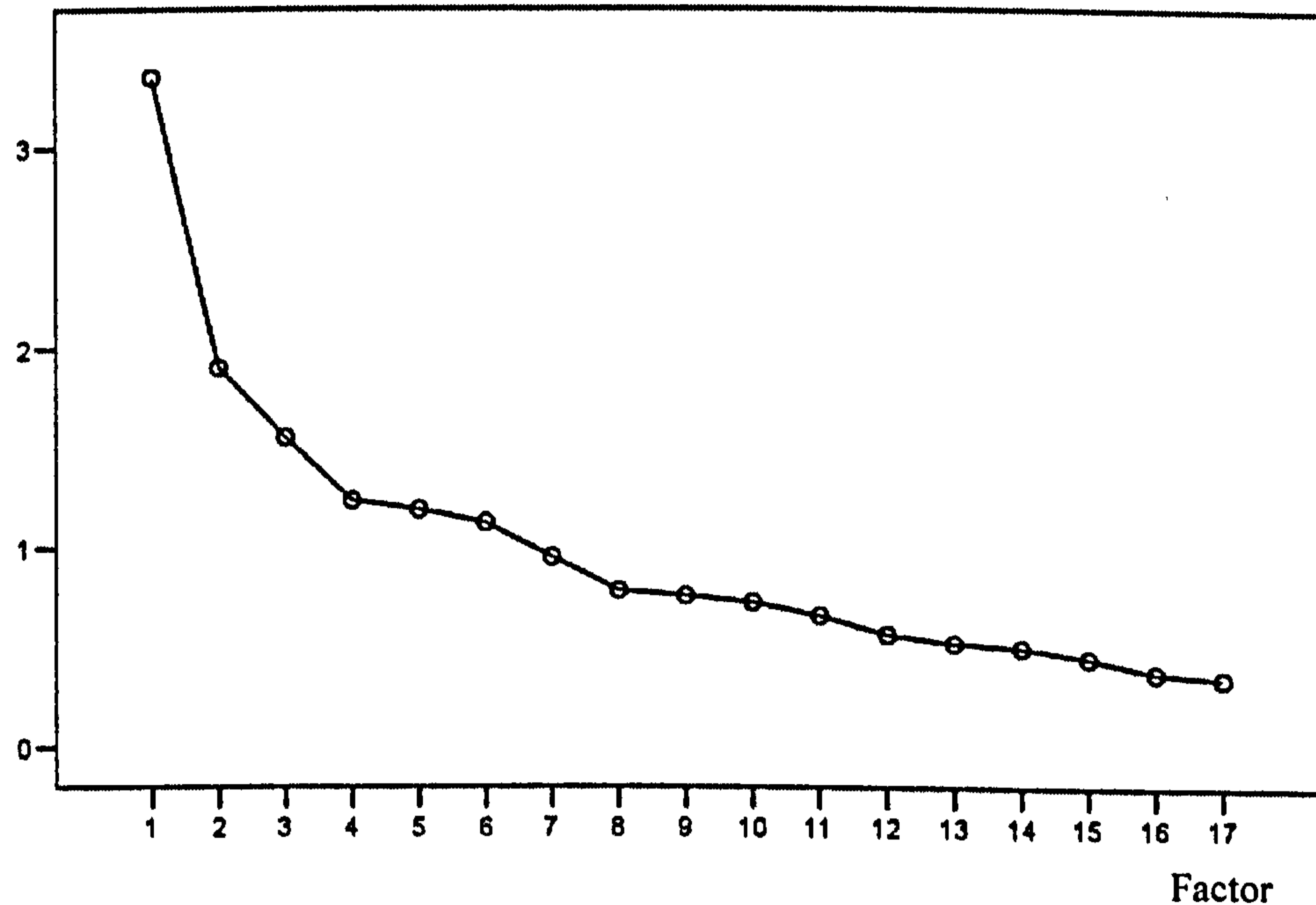


Figure 4.36 Factor Analysis 2: Project Risk Management. Screeplot

The factor analysis for project risk management leads to the following results (Table 4.37).

Table 4.37 Factor Analysis 2: Project Risk Management. Matrix of Rotated Loadings of the 4 Factor Solution

Item	Factor			
	#1	#2	#3	#4
Q 4.3 Consolidation of project plannings	0.757			
Q 4.7 Project risk integration into planning	0.710			
Q 4.2 Project business plans	0.701			
Q 2.7 Link of r.m. to business planning	0.527			
Q 4.6 Project risk documentation	0.411			
Q 2.1b Responsible for r.m. reviewing		0.828		
Q 2.1a Responsible for r.m. implementation		0.817		
Q 2.4 Risk assessment: Respons., methods		0.694		
Q 2.8 Risk management software		0.400		
Q 2.6a Risk reporting to board of directors			0.743	
Q 2.2 Risk management documentation			0.735	
Q 2.5 Risk assessment: Frequency			0.433	
Q 2.9 Risk management expenditure			0.429	
Q 4.8 Project risk scenarios			[0.329	
Q 2.3 Risk categories				0.771
Q 4.5 Risk categories for projects				0.702
Q 2.5b Risk assessment: Time horizon				[0.252

Varimax rotation. Only loadings > 0.4 shown (two exceptions).

Again, a split test has been carried out. Comparing the 17 items of factor analysis 2 with the 11 ones of factor analysis 1, there are more possibilities for the “even” and “odd” solutions based on the respective subsamples to deviate from the total

factor solution. Taking this into account, the factor analysis for project risk management could also be confirmed, with the “even” solution fitting slightly better than the “odd” one.

As in the general risk management case, descriptive labels for the formal factors are proposed.

Factor #1: “Project planning”

Factor #1 deals with variables of the project risk management part of the questionnaire that concern planning in the context of projects (Questions 4.2, 4.3, 4.7). Moreover, project risk documentation has a high loading on factor #1 (Question 4.6); the issue is not reflected by the proposed labelling. In addition to the integration of project risks into the company’s business planning (Question 4.7), the “general” integration of risks into planning (Question 2.7) is also associated with this factor.

Factor #2: “Risk management responsibilities”

Factor #2 summarizes all scoring summands that handle the responsibilities for risk management: responsibility for implementation (Question 2.1a) and reviewing (Question 2.1b) as well as risk assessment (Question 2.4). All three questions offer similar options. The use of risk management software (Question 2.8) is a component that is not addressed by the suggested factor name.

Factor #3: “Risk communication”

Factor #3 assembles risk reporting (Question 2.6) and risk management documentation (Question 2.2). A further component of the “risk communication” factor is the risk assessment frequency (Question 2.5a). Risk management expenditure also loads high on this factor (Question 2.9). Somehow unusual in this context seems to be use of project risk scenarios (Question 4.8), having a factor loading of 0.329, which is only slightly higher than its loading 0.291 with respect to factor #4.

Factor #4: “Risk management process”

Factor #4 combines the scoring summands for risk categories, concerning general risk management (Question 2.3) as well as project risk management (Question 4.5). It also covers the time horizon for risk assessment (Question 2.5b).

It is remarkable that in the second factor analysis the project-specific variables essentially load high on the same factor, with the remaining variables being distributed over the other factors similarly as in the case of general risk management. The induced groupings named “risk management responsibilities” and “risk communication” are nearly identical.

4.5.2 Cluster Analysis

A cluster analysis has been carried out which is based on the factors identified in Section 4.5.1. Since there are two variants of the factor analysis, the cluster analysis also comes with two versions: general risk management (with a total of $N = 266$ cases) and project risk management ($N = 201$).

Sections 4.5.2.1 and 4.5.2.2 follow the same pattern. The respective cluster solutions are compared with the demographic variables, such as company size or industrial sector.

4.5.2.1 Cluster Analysis 1: General Risk Management ($N = 266$)

The first variant of cluster analysis is based on the 4 factors identified by factor analysis 1 dealing with general risk management, i.e. with the aspects of risk management process and risk management organization (see Section 4.5.1.1).

Table 4.38 displays the fusion process, beginning with the 5 cluster solution and ending with the 2 cluster one. There is no unique way to determine the appropriate number of clusters to stop clustering. In general, a 2 cluster solution allows too little differentiation. The development of the Ward agglomeration coefficients suggests the 4 cluster solution to be appropriate. On the other hand, investigating with crosstabulations of the various cluster solutions with respect to the basic variables and examining scoring means on the clusters revealed the 3 cluster solution to have enough differentiation power.

**Table 4.38 Cluster Analysis 1: General Risk Management.
Fusion Process Leading to the 3 Cluster Solution**

Solution	5 Clusters		4 Clusters		3 Clusters		2 Clusters	
Cluster #1	113	42.5%	113	42.5%	113	42.5%	231	86.8%
Cluster #2	35	13.2%	35	13.2%	35	13.2%	35	13.2%
Cluster #3	47	17.7%	91	34.2%	118	44.4%		
Cluster #4	27	10.2%	27	10.2%				
Cluster #5	44	16.5%						
Total	266	100.0%	266	100.0%	266	100.0%	266	100.0%

The 3 cluster solution has an interesting structure. Clusters #1 and #3 contain about the same number of cases, while cluster #2 covers only 13.2%.

After having introduced the solution, the demographic profile of the enterprises separated into the 3 clusters will be presented (Table 4.39). The basic variables are the same as those in the bivariate examinations in Section 4.3.

Table 4.39 Cluster Analysis 1: General Risk Management.
Demographics Summary of the 3 Cluster Solution

	Cluster							
	#1		#2		#3		Total	
Size by annual turnover (Q1.5)								
Micro (up to 2 million Euros)	11	9.7%	3	8.6%	6	5.1%	20	7.5%
Small (more than 2 to 10 million Euros)	71	62.8%	15	42.9%	66	55.9%	152	57.1%
Medium (more than 10 to 50 million Euros)	27	23.9%	11	31.4%	35	29.7%	73	27.4%
Large (more than 50 million Euros)	0	0.0%	0	0.0%	2	1.7%	2	0.8%
No statement	4	3.5%	6	17.1%	9	7.6%	19	7.1%
Total	113	100.0%	35	100.0%	118	100.0%	266	100.0%
$\chi^2 = 14.073$ df = 8 p = 0.080 Sign. < 0.1								
Size by number of employees (Q 1.6)								
Micro (up to 9 employees)	5	4.4%	3	8.6%	7	5.9%	15	5.6%
Small (10 to 49 employees)	19	16.8%	3	8.6%	16	13.6%	38	14.3%
Medium (50 to 249 employees)	89	78.8%	25	71.4%	89	75.4%	203	76.3%
Large (250 to 499 employees)	0	0.0%	4	11.4%	6	5.1%	10	3.8%
Total	113	100.0%	35	100.0%	118	100.0%	266	100.0%
$\chi^2 = 12.682$ df = 6 p = 0.048 Sign. < 0.05								
Industrial sector (Q 1.1)								
Construction	34	30.1%	7	20.0%	32	27.1%	73	27.4%
Engineering	42	37.2%	11	31.4%	42	35.6%	95	35.7%
Information technology	11	9.7%	8	22.9%	18	15.3%	37	13.9%
Auditing/consulting/training	12	10.6%	1	2.9%	16	13.6%	29	10.9%
Trade/service/logistics	14	12.4%	8	22.9%	10	8.5%	32	12.0%
Total	113	100.0%	35	100.0%	118	100.0%	266	100.0%
$\chi^2 = 12.343$ df = 8 p = 0.137 Sign. \geq 0.1								
Legal form (Q 1.2)								
Unincorporated firm	20	17.7%	7	20.0%	25	21.2%	52	19.5%
Incorporated firm	93	82.3%	28	80.0%	93	78.8%	214	80.5%
Total	113	100.0%	35	100.0%	118	100.0%	266	100.0%
$\chi^2 = 0.452$ df = 2 p = 0.798 Sign. \geq 0.1								
Part of a group (Q 1.3)								
Yes	37	33.0%	20	57.1%	43	36.8%	100	37.9%
No	75	67.0%	15	42.9%	74	63.2%	164	62.1%
Total	112	100.0%	35	100.0%	117	100.0%	264	100.0%
$\chi^2 = 6.699$ df = 2 p = 0.035 Sign. < 0.05								
Audited (Q 1.4)								
Yes	84	75.0%	30	85.7%	87	74.4%	201	76.1%
No	28	25.0%	5	14.3%	30	25.6%	63	23.9%
Total	112	100.0%	35	100.0%	117	100.0%	264	100.0%
$\chi^2 = 2.050$ df = 2 p = 0.359 Sign. \geq 0.1								
Early warning system established (Q 1.9a)								
Established	88	78.6%	24	68.6%	71	60.2%	183	69.1%
Planned	16	14.3%	9	25.7%	28	23.7%	53	20.0%
Not planned	8	7.1%	2	5.7%	19	16.1%	29	10.9%
Total	112	100.0%	35	100.0%	118	100.0%	265	100.0%
$\chi^2 = 11.261$ df = 4 p = 0.024 Sign. < 0.05								

With regard to size by turnover, most micro and small firms are found in cluster #1. In cluster #2 (having the fewest number of cases), most firms are medium-sized or have not stated their turnover. With respect to the number of employees, large firms concentrate on cluster #2.

There are no significant differences with respect to industrial sector as well as to legal form.

Cluster #2 includes significantly more firms being part of a group than the other clusters.

The clusters reveal no significant differences between firms that are audited and those that are not audited.

Cluster #1 comprises the largest percentage of firms that have already established an early warning system.

4.5.2.2 Cluster Analysis 2: Project Risk Management (N = 201)

The second variant of cluster analysis is grounded on the 4 factors identified by factor analysis 2 dealing with project risk management, i.e. with the aspects of risk management process, risk management organization and project risk management (see Section 4.5.1.2).

Table 4.40 demonstrates the fusion process from the 5 cluster solution to the 2 cluster one. Similar to the case of general risk management, the decision led to the 3 cluster solution.

Table 4.40 Cluster Analysis 2: Project Risk Management.
Fusion Process Leading to the 3 Cluster Solution

Solution	5 Clusters		4 Clusters		3 Clusters		2 Clusters	
Cluster #1	57	28.4%	88	43.8%	88	43.8%	88	43.8%
Cluster #2	58	28.9%	58	28.9%	94	46.8%	113	56.2%
Cluster #3	31	15.4%	36	17.9%	19	9.5%		
Cluster #4	36	17.9%	19	9.5%				
Cluster #5	19	9.5%						
Total	201	100.0%	201	100.0%	201	100.0%	201	100.0%

Again, two clusters – here #1 and #2 – contain about the same number of cases, and cluster #3 covers only few cases.

Now the demographics of the 3 cluster solution of project risk management are discussed (Table 4.41).

Table 4.41 Cluster Analysis 2: Project Risk Management.
Demographics Summary of the 3 Cluster Solution

	Cluster							
	#1		#2		#3		Total	
Size by annual turnover (Q1.5)								
Micro (up to 2 million Euros)	9	10.2%	4	4.3%	1	5.3%	14	7.0%
Small (more than 2 to 10 million Euros)	56	63.6%	52	55.3%	8	42.1%	116	57.7%
Medium (more than 10 to 50 million Euros)	21	23.9%	31	33.0%	7	36.8%	59	29.4%
Large (more than 50 million Euros)	1	1.1%	0	0.0%	0	0.0%	1	0.5%
No statement	1	1.1%	7	7.4%	3	15.8%	11	5.5%
Total	88	100.0%	94	100.0%	19	100.0%	201	100.0%
$\chi^2 = 14.205$ df = 8 p = 0.077 Sign. < 0.1								
Size by number of employees (Q 1.6)								
Micro (up to 9 employees)	4	4.5%	5	5.3%	2	10.5%	11	5.5%
Small (10 to 49 employees)	14	15.9%	16	17.0%	0	0.0%	30	14.9%
Medium (50 to 249 employees)	69	78.4%	72	76.6%	14	73.7%	155	77.1%
Large (250 to 499 employees)	1	1.1%	1	1.1%	3	15.8%	5	2.5%
Total	88	100.0%	94	100.0%	19	100.0%	201	100.0%
$\chi^2 = 19.176$ df = 6 p = 0.004 Sign. < 0.01								
Industrial sector (Q 1.1)								
Construction	32	36.4%	25	26.6%	2	10.5%	59	29.4%
Engineering	30	34.1%	37	39.4%	5	26.3%	72	35.8%
Information technology	7	8.0%	18	19.1%	7	36.8%	32	15.9%
Auditing/consulting/training	12	13.6%	9	9.6%	1	5.3%	22	10.9%
Trade/service/logistics	7	8.0%	5	5.3%	4	21.1%	16	8.0%
Total	88	100.0%	94	100.0%	19	100.0%	201	100.0%
$\chi^2 = 20.459$ df = 8 p = 0.009 Sign. < 0.01								
Legal form (Q 1.2)								
Unincorporated firm	19	21.6%	18	19.1%	3	15.8%	40	19.9%
Incorporated firm	69	78.4%	76	80.9%	16	84.2%	161	80.1%
Total	88	100.0%	94	100.0%	19	100.0%	201	100.0%
$\chi^2 = 0.393$ df = 2 p = 0.822 Sign. \geq 0.1								
Part of a group (Q 1.3)								
Yes	36	41.4%	34	36.2%	11	57.9%	81	40.5%
No	51	58.6%	60	63.8%	8	42.1%	119	59.5%
Total	87	100.0%	94	100.0%	19	100.0%	200	100.0%
$\chi^2 = 3.145$ df = 2 p = 0.073 Sign. \geq 0.1								
Audited (Q 1.4)								
Yes	62	71.3%	73	78.5%	16	84.2%	151	75.9%
No	25	28.7%	20	21.5%	3	15.8%	48	24.1%
Total	87	100.0%	93	100.0%	19	100.0%	199	100.0%
$\chi^2 = 2.080$ df = 2 p = 0.353 Sign. \geq 0.1								
Early warning system established (Q 1.9a)								
Established	49	56.3%	77	81.9%	10	52.6%	136	68.0%
Planned	25	28.7%	13	13.8%	7	36.8%	45	22.5%
Not planned	13	14.9%	4	4.3%	2	10.5%	19	9.5%
Total	87	100.0%	94	100.0%	19	100.0%	200	100.0%
$\chi^2 = 16.918$ df = 4 p = 0.002 Sign. < 0.01								

With respect to company size, the cluster have very much the same structure as in the general risk management approach. Micro and small firms (size by turnover) concentrate on cluster #1. Medium-sized firms are distributed over clusters #2 and #3. Firms with no statement on turnover are increasingly found in cluster #3. Size by number of employees appears similarly, with clearly more large firms in cluster #3.

In contrast to Section 4.5.2.1, here the clusters have significant differences with respect to industrial sector. Construction and audit concentrate on cluster #1. Engineering is found more frequently in cluster #2. IT and trade concentrate on the small cluster #3.

Concerning legal form, being part of a group and being audited, there are no significant differences between the clusters.

There are significant differences between the clusters with respect to firms having established an early warning system (with stronger significance than in the general risk management case). Cluster #2 covers the majority of firms that have already established an early warning system, while cluster #1 contains most of the firms that report to have not established such a system.

Summarizing; both cluster solutions behave similarly with respect to the demographic variables.

4.5.2.3 Cluster Solutions and Risk Management Scoring

Before cluster solutions 1 and 2 are brought together with the scoring approach of Section 4.4, they will be directly compared with each other (Table 4.42).

Table 4.42 Cluster Analyses 1 and 2: Comparison of Risk Management Cluster Solutions

Cluster	Project Risk Management			Total	
	#1	#2	#3		
General	#1	38	50	1	89
Risk	#2	3	5	16	24
Management	#3	47	39	2	88
Total		88	94	19	201

Both small clusters of solutions 1 and 2 nearly coincide (within the reduced subset of 201 cases for which both solutions are defined). In contrast to that, the remaining clusters of both solutions strongly overlap.

Regarding risk management in the stricter sense, the starting point for the scoring approach of Section 4.4 and the cluster solutions of Section 4.5.2 is the same, namely the respective scoring summands. In the case of general risk management, there are 11 metric variables associated with two scoring variables, and in the case of project risk management there are 17 metric variables associated with three scoring variables. Considering this relationship, it will be examined whether the means within the clusters of the associated scoring variables display significant differences (Tables 4.43 and 4.44). It should be noted that cluster analysis – via the

preparatory factor analysis – treats all input variables equally, in contrast to the weighting factors being applied to construct the scoring variables.

**Table 4.43 Cluster Analysis 1: General Risk Management.
ANOVA for the 2 Associated Scoring Variables**

	scq_rm_proc		scq_rm_org	
	Mean	N	Mean	N
Cluster #1	13.05	113	8.61	113
Cluster #2	11.17	35	11.43	35
Cluster #3	9.16	118	9.14	118
Total	11.08	266	9.21	266
F Ratio	38.723		8.056	
Significance p	0.000		0.000	

Only the scoring variables scq_rm_proc (risk management process) and scq_rm_org (risk management organization) have significantly different means within the clusters. With respect to the risk management process, cluster #1 comes first. Cluster #2 containing the smallest number of cases has the highest mean score of risk management organization.

Now the scoring means for the corresponding cluster solution for project risk management is presented (Table 4.44).

**Table 4.44 Cluster Analysis 2: Project Risk Management.
ANOVA for the 3 Associated Scoring Variables**

	scq_rm_proc		scq_rm_org		scq_prm	
	Mean	N	Mean	N	Mean	N
Cluster #1	9.16	88	7.17	88	15.75	88
Cluster #2	13.44	94	10.77	94	20.85	94
Cluster #3	12.16	19	11.58	19	14.37	19
Total	11.44	201	9.27	201	18.00	201
F Ratio	39.008		32.214		43.089	
Significance p	0.000		0.000		0.000	

As Table 4.44 clearly demonstrates, all three risk management scoring variables have significantly different cluster means. It is most remarkable that cluster #3 with the smallest number of cases has the highest mean score of risk management organization. Cluster #2 has the highest mean scores for risk management process and project risk management. With the exception of project risk management, cluster #1 has the lowest mean scores. A similar structure could be observed for cluster solution 1 on general risk management. This suggests that project-oriented firms do not perform essentially different, considering their general risk management.

In summing up, scoring of general and of project risk management is a very useful assessment framework to estimate the sophistication of risk management systems. The same scoring approach will be carried out with the results of the research interviews in Chapter 5. Moreover, a broader scoring approach will be used to derive a typology for classifying firms with respect to their risk management capability in Section 6.1.

5 Interview Results

5.1 Introduction

The questionnaire findings have led to interesting relationships which need further deepening. As indicated in Chapter 3, the research interviews particularly investigated the influence of management behaviour on the risk management in SMEs.

Section 5.2 explores quantitative interview issues. This part covers the same risk management aspects as the corresponding questionnaire in Section 4.3. In view of the sample size, the quantitative interview data are merely analysed by methods of descriptive statistics. Similar to the questionnaire approach, scoring variables to judge risk management abilities are constructed (Section 5.3). Then, being specific for the interview approach, the moderating effect of management behaviour on the establishing and maintaining of risk management is discussed (Section 5.4).

The research interviews were carried out from April 2005 until January 2006. A total of 38 firms were interviewed. All interviews were held in the presence of the managing director or at least one of his deputies. The interview schedule, which is also the base for the presentation of the results of this chapter, is displayed in the Appendix I.

5.2 Analysis of Quantitative Results

The analysis of quantitative interview results starts with the basic enterprise data (Section 5.2.1), with some additional issues when compared to the basic data in the corresponding questionnaire results (Section 4.2.1). A new issue – uncertainty in the business environment – is presented in Section 5.2.2. Then the main topics business planning (Section 5.2.3), Balanced Scorecard and similar instruments (Section 5.2.4) and risk management (Section 5.2.5) follow. The results are discussed with respect to enterprise size effects as well as with respect to the characteristic of organizational structure distinguishing owner managers and other managers; the latter was newly taken into consideration.

5.2.1 Basic Enterprise Data

Table 5.1 summarizes the essential data of the interview participants. Additional details are presented in the summary sheet of the Appendix K. Since micro firms are underrepresented in the questionnaire investigation, the interview sample was chosen to cover a larger percentage of micro than in the questionnaire case (see Table 4.1).

Table 5.1 Demographic Data of the Interview Sample

	Total
Size by annual turnover (I 1.9)	
Micro (up to 2 million Euros)	13 34.2%
Small (more than 2 to 10 million Euros)	6 15.8%
Medium (more than 10 to 50 million Euros)	16 42.1%
Large (more than 50 million Euros)	3 7.9%
Total ¹	38 100.0%
Size by number of employees (I 1.10)	
Micro (up to 9 employees)	9 23.7%
Small (10 to 49 employees)	8 21.1%
Medium (50 to 249 employees)	10 26.3%
Large (250 to 499 employees)	9 23.7%
Very large (500 and more employees)	2 5.3%
Total	38 100.0%
Industrial sector (I 1.4)	
Construction	4 10.5%
Engineering	6 15.8%
Information technology	4 10.5%
Auditing/consulting/training	3 7.9%
Trade/service/logistics	4 10.5%
Other sector	17 44.7%
Total	38 100.0%
Legal form (I 1.7)	
Unincorporated firm	11 28.9%
Incorporated firm	27 71.1%
Total	38 100.0%
Part of a group (I 1.8*)	
Yes	7 18.4%
No	31 81.6%
Total	38 100.0%
Company age (I 1.6)	
0 to 4 years	5 13.2%
5 to 9 years	3 7.9%
10 to 19 years	18 47.4%
20 and more years	12 31.6%
Total	38 100.0%
ISO-audit (I 1.11)	
Yes	23 60.5%
No	15 39.5%
Total	38 100.0%
Owner manager/other manager (I 1.5)	
Owner manager	24 63.2%
Other manager	14 36.8%
Total	38 100.0%
Average number of projects (I 1.12)	
0 to 9 projects	5 19.2%
10 to 19 projects	6 23.1%
20 to 100 projects	9 34.6%
100 and more projects	5 19.2%
No statement	1 3.8%
Total	26 100.0%
Average project duration (I 1.13)	
0 to 5 months	7 26.9%
6 to 11 months	8 30.8%
12 to 23 months	8 30.8%
24 and more months	3 11.5%
Total	26 100.0%

* I 1.8: More than 25% owned by a single holding company

¹ Due to rounding effects, the percentages may not add up to exactly 100.0%.

In 29 out of the 38 interviews a member of the board of directors was present. For micro and small firms it often was the only managing director. The remaining 9 firms mostly belong to the medium, large or even very large size classes. In these cases, the head of the controlling function² took part. The average duration of the interviews was 1.5 hours, with a minimum of 45 minutes and a maximum of 3 hours. 23 of the participants gave their permission to tape-record the interview. In the remaining cases detailed notes were the base for the analyses.

Among the 38 interviewed firms there were 11 that had already been surveyed by the postal questionnaire in 2002 or 2004. This fact allows for issues that are common to the questionnaire and interview approaches (and thus comparable) to examine whether the risk management practices of the respective firm have been changing over time.

The interview firms were selected according to the size criteria for annual turnover and for number of employees as defined in Section 1.3. Since not all of the firms were covered by the five main industries of the questionnaire results, an additional “other” sector had to be introduced. There are fewer firms that are “Part of a group” (see Section 4.2.1), which may be due to the fact that in the interviews it was additionally asked whether the share makes up more than 25%, thus excluding immaterial amounts of shareholding.

Concerning company age, classes have been constructed that respect the firm’s life cycle phases, being in accordance with the literature (De, 2005, p. 149). Class #1 (0-4 years) contains start-up firms. Classes #2 (5-9 years) and #3 (10-19 years) cover growing firms, while class #4 (20 years and more) consists of firms having become established in the market. In addition to that, the organizational distinction between owner managers and other managers has been included.

26 of the 38 interviews were held with project-type firms. In these cases, the average number of projects being handled simultaneously and the average project duration were recorded.

5.2.2 Uncertainty in the Business Environment

This section deals with the dynamics of the external and the internal business environment, with the turnover growth and with the support by external

² “Controlling function” is a German peculiarity. The English language area prefers the term “management accounting.”

consultants. The external environment covers customers, competitors, government and relationship to the lending bank due to Basel II, while the internal environment contains technology, product innovation and shortage of personnel. Table 5.2 presents the respective totals of the uncertainty data.

Table 5.2 Uncertainty Perceived in the Interview Sample's Business Environment

	Total	
External environment (I 2.1)		
Relationship to customers (I 2.1.1)		
Getting better	2	5.3%
Static	16	42.1%
Getting worse	20	52.6%
Total	38	100.0%
Relationship to competitors (I 2.1.2)		
Getting better	0	0.0%
Static	19	50.0%
Getting worse	19	50.0%
Total	38	100.0%
Governmental regulations (I 2.1.3)		
Getting better	0	0.0%
Static	28	73.7%
Getting worse	10	26.3%
Total	38	100.0%
Relationship to bank/Basel II (I 2.1.4)		
Became better	1	2.6%
Static	24	63.2%
Became worse	13	34.2%
Total	38	100.0%
Internal environment (I 2.2)		
State of technology (I 2.2.1)		
Is mature	29	76.3%
Can be improved	7	18.4%
Just introduced	2	5.3%
Total	38	100.0%
State of product (I 2.2.2)		
Is mature	25	65.8%
Can be improved	8	21.1%
Just introduced	5	13.2%
Total	38	100.0%
Shortage of personnel (I 2.2.3)		
No shortage	23	60.5%
Shortage	15	39.5%
Total	38	100.0%
Turnover growth (I 2.3*)		
Strongly increasing	4	10.5%
Slightly increasing	3	7.9%
Static	18	47.4%
Slightly decreasing	7	18.4%
Strongly decreasing	6	15.8%
Total	38	100.0%
External support (I 2.4)		
Certified chartered accountant	21	55.3%
Tax advisor	13	34.2%
Management consultant	1	2.6%
No external support	3	7.9%
Total	38	100.0%

* I 2.3: During the last three years

Firstly, the external business environment deals with the customer perspective. The interviewees were asked to evaluate the relationship with their customers, whether, for example, they had become more demanding or more sensitive to prices. Then analogous questions with respect to their competitors and about changes due to legal regulations follow. As a special example of external influence the relationship to the lending bank as a consequence of Basel II is examined.

Concerning the external environment, it is remarkable that 52.6% of the firms state a worsening with respect to customers. About half of them also confirm that the situation with respect to competitors is getting worse. One third of the firms mention an exacerbating of legal regulations. Even more than one third describe the relationship to the lending bank to deteriorate, a fact that especially is stated by micro and small firms (see Appendix L).

The internal business environment firstly investigates how the firms evaluate the technology of their products and services. Then it is asked in which phase of the product life cycle their main products are located. Finally, it was inquired whether the firms currently suffer from a shortage of personnel.

In view of the technology of products and services, a clear majority (76.7%) declare it to be mature, with few innovations being possible. This tendency is also found with respect to the product life cycle. About one third of the firms mention a shortage of personnel. Details of the conversation revealed that frequently sales personnel is lacking.

The 38 interviewed companies were asked to describe the turnover growth during the last three years, with five characteristics from strongly decreasing to strongly increasing. To help estimating the growth it was asked whether a possible decrease or increase made up more than 10% or less than 10%. For further checking the annual financial statements were looked at.

Nearly half of the firms report constant turnover during the last three years, which certainly is a consequence of the current bad economic situation in Germany (2005). Decreasing turnover was especially found in the classes of micro and small firms (see Appendix L).

It was also examined in which way the firms make use of external support. Here certified chartered accountants and tax advisors clearly dominate, with the tax advisor more frequently being employed in micro and small firms and the certified

chartered accountants being preferred in medium-sized and large firms. A management consultant is brought in very seldom.

Summarizing, one can state that the interviewed SMEs work in a dynamic business environment, with considerable insecurities particularly in the external relationships.

5.2.3 Business Planning

The interviews results (see Table 5.3) confirm the corresponding questionnaire results that SMEs reveal considerable deficits with respect to their long-term business planning systems (see Sections 4.2.2 and 4.3.1).

Micro and small firms have relatively poor business planning systems. Integrated subsystems (a master budget) are seldom found. A budgeted balance sheet is hardly established. As a time horizon the short interval of 1 year is dominating. The interviews revealed that in micro and small firms the business planning is frequently carried out externally by a tax advisor.

There are two reasons for inappropriate planning systems. Firstly, accountancy is carried out externally, so that there are no detailed data as a base for business planning. One depends entirely on the consultant. Secondly, SME managers often have a technical education, with little knowledge in business management. This tendency is essentially found in small firms.

Table 5.3 Business Planning Components (I 3.1*) and Time Horizon (I 3.2). Versus Owner-Manager/Other Manager (I 1.5)

Components	Manager		Total	Rank
	Owner	Other		
Budgeted profit statement	18 75.0%	11 78.6%	29 76.3%	1
Cash budget	11 45.8%	11 78.6%	22 57.9%	2
Budgeted balance sheet	2 8.3%	6 42.9%	8 21.1%	3
Master budget	5 20.8%	3 21.4%	8 21.1%	3
Total	24 100.0%	14 100.0%	38 100.0%	
Time horizon				
1 year	13 54.2%	3 21.4%	16 42.1%	1
2 to 3 years	7 29.2%	5 35.7%	12 31.6%	2
4 years or more	3 12.5%	6 42.9%	9 23.7%	3
No statement	1 4.2%	0 0.0%	1 2.6%	4
Total	24 100.0%	14 100.0%	38 100.0%	

* Multiple selection allowed

Owner-managers clearly apply less than other managers a cash budget and a budgeted balance sheet. Concerning a master budget, there is no such difference; both groups employ it relatively seldom. Owner-managers use to plan with a

considerably shorter time horizon, which corresponds to the planning systems being of little quality. Summarizing, owner-managers unveil a worse quality of business planning in relation to other managers.

The interview findings will be illustrated by some short quotations, each one with a typical or with a dramatic statement. It is pointed out that size classes associated with these quotations always refer to the definition by annual turnover.

An owner-manager on business planning:

No. 1 (small firm, other sector, self-employed engineer with non-business background): “Because of the low prices I can obtain in the market, after 11 years I must close my firm. Another reason is that I – being an engineer – only dealt with the handling of orders and did not carry out any business planning at all. I only relied on the tax advisor who did the entire accountancy work for me. At the end of the year, we discussed the annual statement. In view of the lacking project controlling we cannot decide whether the projects achieve a positive pay-off.”

Another owner-manager who faced scarce liquidity claimed:

No. 2 (micro trade firm, master craftsman): “In the short term we could solve problems [author’s remark: problems with respect to liquidity and financing], but in the long term we will face the same problems since the business planning and business management had not been improved.”

Small owner-managed firms show other needs for action:

No. 3 (small firm, other sector, degree in engineering with additional qualification in business management): “Establishing a budgeted balance sheet would be a useful completion. Besides that, because of Basel II, now the bank demands a budgeted balance sheet from us.”

As the literature has already revealed, there is little progress concerning planning activities of SMEs. Here the effects of Basel II can also be noticed. The banks stress to improve the business planning. It seems that such an external pressure is needed in order to lead SMEs to carry out an improvement of their business planning systems, a long overdue task.

In this context, an owner-manager stated:

No. 19 (small consulting firm, architect): “Our business planning was considerably criticized by the bank. No details existing, too short time horizon. We were asked to establish a more detailed business planning for the next 2 to 3 years.”

One owner-manager remarked:

No. 28 (micro trade firm): “We have little knowledge on business planning. Here, for firms of our kind, there clearly is need for action.”

An owner-manager with technical background explained:

No. 36 (small high tech engineering firm): “The controlling job has just been newly established in our firm. In future, business planning shall be carried out by the controller and no longer by external consultants.”

Since in the holistic risk management approach business planning plays an important role, its sophistication with respect to the methods of forecast, what-if-analysis and scenario analysis is evaluated by the interviews (Table 5.4). Just for “playful” estimating of risk effects what-if analysis and scenario analysis are suitable instruments. Even forecasting methods allow to a modest degree to recognize critical deviations from planned figures, to take countermeasures early enough.

Table 5.4 Sophistication of Planning Systems (I 3.4*).
Versus Company Size by Turnover (I 1.9)

	Size by turnover				Total	Rank
	Micro	Small	Medium	Large		
Forecasting methods	1 7.7%	4 66.7%	9 56.3%	3 100.0%	17 44.7%	2
What-if analysis	0 0.0%	2 33.3%	3 18.8%	2 66.7%	7 18.4%	3
Scenario analysis	3 23.1%	2 33.3%	11 68.8%	3 100.0%	19 50.0%	1
Total	13 100.0%	6 100.0%	16 100.0%	3 100.0%	38 100.0%	

* Multiple selection allowed

All three instruments indicate a clear size effect. Micro and small firms clearly employ the techniques less frequently. The large rate of scenario analysis in micro and small firms is astonishing though. The interviews have indicated that the firms often simply manually vary values of planning positions (one position at a time while keeping constant the others) and study the effect on the target figures. This is done in a less systematic way than in medium-sized and large firms.

The technical realization of business planning mainly consists – within all size classes – of self-developed Microsoft Excel spreadsheet tables. They often lead to problems of co-ordination as a result of non-dynamic links between subsystems as well as to implementations problems if the planning system must be changed.

The head of the controlling function of a medium-sized firm pointed out:

No. 15 (medium-sized firm, other sector; 290 employees): “The business planning was presented to the bank in the light of an expansion strategy with loan financing. The bank staff found mistakes in the planning system; some planning figures did not fit. This was extremely embarrassing for us, but within complicated spreadsheet systems one can easily lose track.”

5.2.4 Balanced Scorecard and Similar Instruments

As in the case of the questionnaire results, the interview results on the application of the BSC exhibit a size effect (Section 4.3.2). For micro firms the BSC up to now (2006) is no important instrument. About half of the interviewed firms did not know it at all. It is interesting that a relatively large number of small firms already use a BSC. But detailed questioning and giving the instrument a closer inspection led to the insight that the BSC had not been completely established, as suggested by Kaplan and Norton (1996a); it rather consists of a collection of financial and non-financial ratios. A link of strategic objectives with corresponding ratios and plans for action has been established only rudimentarily.

The interview findings confirm the results of the study of Schachner et al. (2006, p. 605) according to which small firms utilize rather simple BSC-type constructs without the intensively discussed cause-and-effect chains. Only 4 of the 38 interviewed firms have established what could be called the entire concept of the BSC.

Participants who state to know the BSC were asked whether they could explain its concept briefly in their own words. Here a clear difference between owner-managers and other managers is found: while 54.2% of the owner-managers mention to know the instrument even 82.9% of the other managers know it.

With respect to the application of the BSC (or its planning) there are no essential differences between the groups of owner-managers and other managers.

It is interesting that some firms work with systems that they do not name BSC but which have similar functions. Financial and non-financial ratios have priority. The interviews revealed that ratios from different perspectives often are not linked. The ratios being utilized by the interviewed firms have proved to be good indicators.

It is also noticeable that a written company strategy from which ratios can be derived does not always exist. The number of ratios being used is much less than the number proposed by Kaplan and Norton. They content themselves with 10 to 15 ratios. Introducing such systems is generally carried out without external support by management consultants.

Several quotations on the general application of the BSC shall demonstrate the variety of implementations.

General use: Owner-Manager

One owner-manager of a small firm reports:

No. 7 (small construction firm, degree in engineering): “Yes, the Scorecard is already used. One looks at the company from different perspectives. Critical success factors and targets are fixed. Corresponding ratios for the perspectives are still lacking. The employees can access the Scorecard via the intranet.”

An owner-manager, being a chartered account; noted:

No. 37 (small auditing firm): “Vision and strategy have been fixed. Eight weeks ago objectives have been fixed and derived from the company’s strategy. To implement the BSC we calculate with a duration of 1 to 2 years. The advantage of the BSC is that the targets become obligatory for the respective employees. For the moment only a BSC for the entire company is aimed at. Later on a BSC for the various business lines shall be developed.”

In a small firm a concept is employed that – to some extent – is very similar to the BSC:

No. 3 (small firm, other sector): “We use a similar system. There are the perspectives man (personnel), machine (technology) and customers, for which respective ratios have been developed. These ratios are weekly discussed at the board meeting, and of one the participants has to record the data. Special emphasis lies on non-financial ratios, such as the customer contact and the satisfaction of employees.”

A large owner-managed firm works with a complete BSC, including cause-and-effect chains. The following words from the head of the controlling function illustrate the process of implementation of the BSC:

No. 25 (very large firm, other sector): “Yes, it is used. Introducing the BSC took us about one year. We used the support of an external management consultant. Internally a so-called “top team” was formed, which consisted of the key personnel of the firm and the board of directors. This team formulated and checked the company’s strategy and derived the ratios. The strategy team annually meets to check strategy and ratios during a workshop that lasts two days. The BSC consists of 15 ratios for which target values and actions have been put down. As the most important figure of the financial perspective the economic value added had been chosen. Introducing the BSC made necessary great efforts, but it has been worth while. The project was initiated by the managing director who had taken part in a seminar on the issue. There is a BSC for the entire company as well as a separate BSC for the three business lines. Ratios in the BSC are revised and updated quarterly. For better visualization, we work with traffic light colouring.”

Some critical quotations follow that do not judge the introduction of a BSC as being sensible. The criticisms are found equally distributed across all size classes.

An owner-manager with a degree in economics remarked:

No. 11 (medium-sized engineering firm): “We have no use for it since it is problematic to find suitable ratios for the perspectives.”

A founder with a doctorate in engineering commented:

No. 14 (medium-sized engineering firm): “No, this is not necessary for a firm of our size. And we were concerning different perspectives before the BSC appeared.”

A similar statement is made by an owner-manager who is engineer by profession, who claims:

No. 24 (small engineering firm): “No, too much effort for a firm of our size. The managing director must become familiar with the issue, and then there is no personnel to implement such a project.”

General use: Other Manager

Some other managers on the BSC:

A medium-sized firm with an entirely technical board of directors emphasized:

No. 6 (medium-sized firm, other sector): “It is discussed since two years and is currently introduced by a management consultancy. The reason for implementing the BSC is that too many ratios had been chosen that even are not related with each other. Also the presentation of these ratios has not been solved satisfactorily. Introducing the BSC, we make strong use of quality management.”

Sometimes a BSC-like concept is employed without naming it Balanced Scorecard, as the following quotation from a managing director with a technical background revealed:

No. 29 (medium-sized firm, other sector): “But parts of it are already used, without calling it BSC.”

Considering the following quotation, it must be noted that the firm is part of a group, the application of formal methods thus being influenced by the parent company:

No. 30 (medium-sized firm, other sector): “Yes, but without calling it BSC. We call it spider chart, which is put up for all employees at a central place. For the various perspectives the ratios are revised monthly. The system is updated by the personnel department, but it is fully supported by the board of directors. It is a good management support, and it clearly communicates the strategy to the employees. The radar chart is a good visualization of actual status and target status. As ratios for the financial perspective we chose the cash flow and the ROI. Further ratios of the other perspectives are, for example, product quality, the reject rate and productivity.”

The section on the general use of the BSC as judged by other managers, concludes with some critical remarks. The chairman of a public limited company commented:

No. 13 (small information technology firm): “No, the board of directors is not convinced of the usefulness of the BSC. We would like – in a stronger manner – to orient towards the shareholder value, calculate it formally and derive from it the remuneration.”

The managing director of a private limited company pointed out:

No. 20 (medium-sized engineering firm): “No, too much effort for an SME. The board of directors collects the data in meetings. A good reporting and controlling are rather for large firms where often an overview is lacking. Problematic is the updating of such a system; we have no time for this.”

The head of the controlling function of a very large firm expresses big reservations towards the BSC:

No. 10 (very large firm, other sector): “No, its use is not planned, since the concept does not convince me and we want to orient towards the EVA as a control measure. In future, the variable remuneration will be derived from it.”

Firms that already employ the BSC (or a comparable system) find it also suitable for supporting risk management. A medium-sized and a very large firm have already established it formally. Other firms at least estimate that such a link should be taken into consideration.

Risk management use: Owner-Manager

Within the perspectives chosen by the firm, risks are considered simultaneously with the identified success factors. This is also documented in the minutes of the board of directors. One Owner remarked:

No. 3 (small firm, other sector): “Yes, concerning the ratios, it is fixed in advance which figures are critical and how to react if necessary. Then in weekly discussions it will be decided whether measures must be taken and which.”

In the most formal way the BSC is established in a very large owner-managed firm. Here the risk in the perspectives are judged with the aid of checklists and recording sheets by the heads of department and then transferred to the controlling. Then – moderated by the controlling function – discussions with the heads of the functions and the board of directors take place where the risks are evaluated and countermeasures are fixed. Responsible personnel are informed monthly by the controlling function about important figures, in the frame of the usual reporting. It is interesting to note that the essential risks are summarized within a separate risk perspective. A manager of this firm commented:

No. 25 (very large firm, other sector): “In the BSC there was included a separate risk perspective. Risk are identified within the single usual perspectives, but risk that affect essentially the economic value added transferred to the risk perspective. Then for the respective risks measuring figures and target values are estimated. For this the data from the business planning, the FMEA and from questionnaires and checklists are used. This way of action had been recommended by the management consultant.”

The above BSC project had been introduced together with a management consultant over a period of 1.5 years. It was initiated by the managing director who indeed is a qualified engineer, but very open-minded with respect to business management issues. He had heard from the BSC during a workshop and found it very useful for his company. It is noticeable that the managing director came from a very large company group where he had worked in the controlling function.

Risk management use: Other Manager

As the following comment reveals medium-sized firms are more open-minded to apply the BSC also for risk management purposes:

No 6 (medium-sized firm, other sector): “We could imagine [author’s remark: to use it for risk management] since chances and risks are strongly related to each other.”

The managing director of a medium-sized firm agreed with this view and pointed out:

No. 30 (medium-sized firm, other sector): “Not yet established, but [the BSC is] an interesting issue for risk assessment. However, I think it is a problem to make it understandable to the employees and to make them sensitive to it.”

Other instruments of performance measurement

Concerning other instruments of performance measurement, the questionnaire often contained as answers examples of simple methods of business management, having nothing to do with value-based management. So the interviews should inquire which other methods – besides the BSC – the firms use. The methods named were grouped into value-based methods and into other business management techniques.

The application of other instruments reveals a clear size effect: medium-sized and large firms increasingly make use of them.

As Table 5.5 indicates there is a significant³ difference: owner-managers clearly work with less value-based methods.

Table 5.5 Instruments of Performance Measurement (I 4.2*).
Versus Owner-Manager/Other Manager (I 1.5)

	Manager		Total	Rank
	Owner	Other		
Value-based methods				
Economic Value Added	0	1	1	12
Knowledge management	1	0	1	12
European Foundation for Quality Management model	0	1	1	12
Quality function deployment	0	1	1	12
Failure Mode and Effect Analysis	0	1	1	12
Normal methods				
Internal and external benchmarking	7	8	15	1
SWOT analysis	4	11	15	1
Portfolio analysis	4	10	14	3
Customer analysis	4	6	10	4
Employees capabilities index	3	5	8	5
ABC Analysis	5	1	6	6
Quality circle	2	4	6	6
Scenario planning	0	2	2	8
Overhead value analysis	0	2	2	8
Gross profit analysis	2	0	2	8
Ratio analysis	1	1	2	8
Mind-mapping	1	0	1	12
GAP analysis	0	1	1	12
Product life-cycle analysis	0	1	1	12
Succession planning for the board of directors	0	1	1	12
No tools used	6	0	6	

* Multiple selection allowed

Presentations such as in Table 5.5 serve to structure the variety of possibilities to respond to open questions of the form “Which instruments do you use for ...”. Each case is treated individually: If several instruments are mentioned by an interviewee, each of them is, according to its sophistication, counted within the respective subsection.

On the other hand, to get an overall impression of the use of instruments for a certain purpose, unique attributes have been attached to the cases, to reflect the quality of the entire set of instruments being employed. The attribute was derived by the interviewer from all available data (see also the remarks in connection with Table 5.8).

The discussion revealed that the respective instruments were not applied in a pure manner and not very systematically, but they were fitted according to the company’s interests. The instruments are also utilized rather sporadically, not continuously.

³ Applied in a non-statistical sense. For the quantifiable interview data only descriptive statistics have been evaluated.

Finally, one can state that among the methods of performance measurement, the BSC is known best and is used most frequently. In general, owner-managers have little knowledge of instruments of value-based management.

Furthermore, the interview manifested that owner-managers sometimes could not be convinced that it would be worth while to deal with these instruments of value-based management. Most frequently lack of time and the clear structure of the firm were mentioned as reasons against them. It is interesting that partly the statement of Woods and Joyce (2003) can be confirmed, according to which owner-managers who had already dealt with the instruments found them useful and then implemented them.

5.2.5 Risk Management

As in the questionnaire case, the risk management section contains the issues risk management process (Section 5.2.5.1), risk management organization (Section 5.2.5.2) and project risk management (Section 5.2.5.3).

5.2.5.1 Risk Management Process

Regarding the risk management process, the interviews shall examine which risk categories were judged to be essential for the company's success. Then details of the methods of risk assessment are investigated, especially how formal this process has been integrated into day-to-day business practice.

Another focus lies on the fact whether the interviewed firms are able to establish a risk mapping for the entire company or if they at least think that such a portfolio could be useful. Then the link of business planning and risk management will be examined in detail. Finally, difficulties that arise from the risk management process and the need for action are discussed.

Essential Risk Categories

Table 5.6 presents the risk categories that the firms estimate to be essential for controlling the company and ensuring its survival.

Table 5.6 Risk Categories (I 5.1*).
Versus Owner-Manager/Other Manager (I 1.5)

	Manager				Total	Rank	
	Owner		Other				
Strategic risks	9	37.5%	12	85.7%	21	55.3%	4
Market risks	13	54.2%	12	85.7%	25	65.8%	2
Legal risks	7	29.2%	4	28.6%	11	28.9%	5
Financial risks	17	70.8%	8	57.1%	25	65.8%	2
Group company risks	0	0.0%	0	0.0%	0	0.0%	7
Corporate governance risks	3	12.5%	0	0.0%	3	7.9%	6
Business process risks	18	75.0%	10	71.4%	28	73.7%	1
Total	24	100.0%	14	100.0%	38	100.0%	

* Multiple selection allowed

Risk categories are presented in Table 5.6 just in the same way as in the corresponding questionnaire Table 4.8: The answer “Yes” means that within the respective category, one or more examples are dealt with. In contrast to that, the research interviews have investigated, how many examples of risks are dealt within a category. The more differentiating results considering the number of examples of risks within the categories are shown in Appendix L. It should be noted that the number of these risks (not merely of the underlying categories) will be used as score in the interview scoring approach of Section 5.3.2.

Qualitative Risks and Early Warning Indicators

As an essential extension of the questionnaire approach, the interviews should investigate to which degree the firms monitor qualitative risks (Table 5.7). Qualitative risks are considered much less than quantitative ones. A more comprehensive approach to qualitative risks can be recognized only for medium and large firms (see Appendix L).

Table 5.7 Qualitative Risks (I 5.3*).
Versus Owner-Manager/Other Manager (I 1.5)

	Manager		Total	Rank	
	Owner	Other			
Internal					
Research and development activity		0	1	1	6
New products		1	0	1	6
Employees' satisfaction		1	0	1	6
External					
Customer satisfaction		3	2	5	1
Development of markets, market competition		2	2	4	2
Probability of won contracts		1	1	2	3
Customers retained from last period		1	1	2	3
Closer look on competitors		2	0	2	3
No qualitative risks considered		17	9	26	

* Multiple selection allowed

Qualitative risks such as customer satisfaction and the development of markets clearly dominate. The firms admitted that these risks often are not assessed very

systematically. They rather try to get a picture of the development of customers and markets by talking with customers and employees and by reading specialist journals.

It is worth noting that, being part of a group, firms consider more qualitative risks.

At the end of discussing risk categories the firms were asked whether they have developed so-called early warning indicators for their important risks and if they are monitoring them.

The 15 firms dealing with early warning indicators prefer quantitative or financial indicators. Most frequently are mentioned:

- rate of incoming orders
- cash flow
- customer satisfaction

Owner-managers show a different behaviour with respect to early warning indicators than other managers; they use it to an essentially low degree (see Appendix L). This finding also verifies that owner-managers exploit less elaborated risk management techniques.

It is interesting that 23 out of 38 (60.5%) of the interviewed firms do not employ any early warning indicators, a phenomenon covering all size classes. In general, in all size classes early warning indicators are used rather seldom (Appendix L).

Again firms that are part of a group more often take advantage of early warning indicators. The same holds for ISO-certified firms.

Methods of Risk Assessment

Regarding methods of risk assessment, there is a clear size effect. More formalized methods are worked with in medium-sized and large firms. They cover questionnaires and checklists, separate risk recording sheets and methods such as error tree analysis and Failure Mode and Effect Analysis (FMEA). Working with the probability of occurrence to estimate the amount of damage takes place only in large firms.

Micro and small firms that conduct a more systematic risk assessment most frequently apply for that purpose the existing business planning. A small firm as an example:

No. 7 (small construction firm, owner-managed business): “The risks are verbally noted at the positions of the corresponding planning figures and then monitored by the responsible employees.”

The methods of risk assessment being mentioned in the interviews were formed into three groups: statistical techniques, non-statistical formal techniques and no formal techniques (see Table 5.8).

Table 5.8 Methods of Risk Assessment: Overview (I 5.2).
Versus Company Size by Turnover (I 1.9)

	Size by turnover								Total	Rank	
	Micro		Small		Medium		Large				
Statistical techniques	0	0.0%	0	0.0%	2	12.5%	1	33.3%	3	7.9%	3
Non-statistical formal techniques	1	7.7%	3	50.0%	8	50.0%	2	66.7%	14	36.8%	2
No formal techniques	12	92.3%	3	50.0%	6	37.5%	0	0.0%	21	55.3%	1
Total	13	100.0%	6	100.0%	16	100.0%	3	100.0%	38	100.0%	

Personal inspection by the interviewer led to the overall association with exactly one the above attributes, even if methods of different degrees of formalization are employed. If, for example, some firm applies both statistical and non-statistical formal techniques, the overall picture gave rise to the qualifying of either “statistical” (if elaborate methods of this kind clearly dominate) or to “non-statistical formal” (if a simple statistical approach meets many non-statistical formal ones).

Statistical techniques are utilized only by medium-sized and large firms (see Appendix L). With increasing size, the application of non-statistical formal techniques increases, starting with a very low percentage for micro firms. On the contrary, the use of non-formal techniques strictly decreases from a very high value for micro firms to 0 for large one.

The results have unveiled that for risk assessment in all SMEs experience and discussions with employees dominate, supported by checklists and questionnaires. Mathematical and statistical calculation methods have currently no meaning for SMEs.

Incorporated firms handle more elaborate methods of risk assessment than unincorporated firms. The same holds for firms that are part of a group.

Owner-managers clearly work with less formal methods for assessing risks (see Table 5.9). Thus risk management in owner-managed firms has strong deficits and hence need for action.

Table 5.9 Methods of Risk Assessment: Details (I 5.2*).
Versus Owner-Manager/Other Manager (I 1.5)

	Manager		Total	Rank
	Owner	Other		
Strong formalization				
Probabilistic assessments of outcomes	0	6	6	3
Failure Mode And Effect Analysis	1	2	3	5
Business Planning	0	1	1	7
European Foundation for Quality Management model	0	1	1	7
Medium formalization				
Checklists and questionnaires	9	9	18	2
Mind-maps, brainstorming techniques	2	2	4	4
Workshops with employees	2	1	3	5
Expert interviews	0	1	1	7
Feasibility Study	0	1	1	7
Little formalization				
Experience, discussions with project members and board of directors, no formal methods	21	7	28	1
Analysis of bidding documents	1	0	1	7
No methods used	0	0	0	

* Multiple selection allowed

Firms that have been ISO-audited apply more formal methods of risk assessment. The certification demands from the firms a systematic documentation of their business processes, including all risks involved. Thus certified firms have a good base for risk assessment, when using the preliminary work done by their quality management.

A very interesting connection can be detected regarding firms that suffered from a major loss during the last three years. About 80% of them did not apply formal methods for risk assessment. This clearly reveals that firms without a systematic risk assessment are easily subject to major losses.

Link of Risk Management to Business Planning

This section investigates the details of a link of risk management and business planning, especially the way in which risks are taken into account within the business planning. The details could not be detected by the central Question 2.7 of the questionnaire with its rather rough options.

It is not surprising that in micro and small firms there is no direct link of risk management to the business planning. The business planning section above has already revealed that micro and small firms have plannings of only weak quality, so that a direct link with risk management is very unlikely to exist.

Firms that carry out a direct integration of risks into the business planning, associate the identified risks with their values to the corresponding positions in the business planning. To quantify the risks, often various scenarios are gone through.

Simulation techniques are not used. With the aid of a sensitivity analysis the effect of risk values on the target figures for profit and liquidity is determined. Then critical values for the risks are individually fixed and noted at the corresponding positions of the business planning. The documentation of these risk figures is integrated into the papers of business planning and can be looked at by the employees being responsible for risk management.

Firms that are part of a group tend to establish a direct link of risk management to the business planning. Here the knowledge of the company group may become noticeable: Partly a systematic identification and documentation of risks is mandatory for the group-wide risk management.

Two quotations of SMEs being part of a group follow. The managing director with a degree in business management reported:

No. 18 (large firm, other sector): “A direct assignment of the evaluated risks to positions of the business planning takes place. Each risk can be quantified.”

Another managing director echoed:

No. 30 (medium-sized firm, other sector): “A direct integration of quantitative risks into the business planning takes place. This is useful to recognize the effects on the planned figures and the target figures.”

It is also worthy to notice that ISO-audited firms tend to establish more frequently a direct integration of risk into the business planning.

Risk Mapping

With the topic of risk mapping the interviews should examine whether the firms produce a risk mapping for their entire company, covering all risks that have been identified to be essential. This is one of the main focuses of the interview issues.

Generally it can be stated that only very few firms develop a risk portfolio. The interviewed firms felt that it was a great deficit. They often admitted that single risks are assessed, but that they were not able to determine the risk situation of the entire company. Managing directors mentioned that they have no way of systematically estimating the company's risk position.

Regarding the risk mapping, size effects appear in a manifest way (Table 5.10). Up to now (2006), micro, small and medium-sized firms have no such risk mapping. Managers of micro firms rely much more on the own experience and on discussions with the employees. Small and medium-sized firms declared to plan

establishing it, with high priority. Even of the large firms only one third have introduced a risk mapping. This finding is very alarming.

Table 5.10 Risk Mapping (I 5.5).
Versus Company Size by Turnover (I 1.9)

	Size by turnover								Total	Rank	
	Micro		Small		Medium		Large				
Used	0	0.0%	0	0.0%	0	0.0%	1	33.3%	1	2.6%	3
Planned to use	0	0.0%	3	50.0%	6	37.5%	1	33.3%	10	26.3%	2
Not used	13	100.0%	3	50.0%	10	62.5%	1	33.3%	27	71.1%	1
Total	13	100.0%	6	100.0%	16	100.0%	3	100.0%	38	100.0%	

There are complaints by the interviewees that, although recording sheets for single risks may be very detailed, a consolidation of these sheets does not take place, because of the lacking know-how.

Owner-managers and other managers reveal no difference with respect to the existence of a risk portfolio. Firms that are part of a group have slightly more frequently a risk mapping. ISO-audited firms (Table 5.11) more frequently apply a risk portfolio or at least plan to implement it.

Table 5.11 Risk Mapping (I 5.5).
Versus ISO-audit (I 1.11)

	ISO-audit				Total	Rank	
	Yes		No				
Used	1	4.3%	0	0.0%	1	2.6%	3
Planned to use	10	43.5%	0	0.0%	10	26.3%	2
Not used	12	52.2%	15	100.0%	27	71.1%	1
Total	23	100.0%	15	100.0%	38	100.0%	

Need for Action in the Risk Management Process

Getting to the end of the risk management process topic, it was enquired whether the interviewed firms are so far satisfied with what they have established or where in the future they see need for action. The answers have been classified into three groups (see Table 5.12).

Table 5.12 Risk Management Process: Need for Action (I 5.7*).
Versus Owner-Manager/Other Manager (I 1.5) "risk management:need for action"

	Manager		Total	Rank
	Owner	Other		
Knowledge of methods and formalization				
Improvement of the risk identification techniques	9	1	10	2
Improvement in the application of risk evaluation methods	2	2	4	3
To make greater use of qualitative risks	1	1	2	5
Integration and consolidation				
Development of company-wide risk portfolio	5	6	11	1
To bring together the isolated parts of the enterprise planning systems and techniques	2	1	3	4
Personnel				
Delegation of power/responsibilities	2	0	2	5
Improvement of risk awareness by employees	1	1	2	5
No need for action	6	4	10	

* Multiple selection allowed

Leading in the need for action is further formalization of risk identification. Since, as could be shown, in all size classes experience and checklists dominate in connection with risk identification, it is only understandable that the greatest need for improvement is seen in this area.

Establishing a risk portfolio comes second. As an example:

No. 9 (medium-sized construction firm, owner-managed technical board of directors): "The board of directors have no means to get an overview of the company's entire risk situation."

Most of the difficulties the interviewees had was to talk about methodological issues, concerning risk management. It was noticeable that they often had little knowledge of the various methods of risk assessment. Many participants declared at the beginning of the interview that they did not carry out risk management. But in the course of the discussion, things became more differentiated. The firms carried out tasks that they did not call formal risk management, but which nevertheless already come close to some form of managing risks.

5.2.5.2 Organization of Risk Management

Firstly, this section reports the current state of risk management systems in the interviewed firms. The difficulties in running such a system are presented, and reasons for not having established such a system are also investigated.

Then it is examined which risk strategy the firms have fixed and how the details are documented. In this context, the reaction to major losses are reported. The discussion of contingency, replacement and succession regulations follow (see Section 2.2), topics that the questionnaire had not investigated.

State of Risk Management

Many interviewees mentioned not to carry out formal risk management (78.9%). Further discussion revealed that – especially in smaller firms – the managing director performs a good risk management, mainly in his head. Often he does not communicate it to the employees, but only collects data or ratios from them, which may lead to the situation that the employees do not know and understand the purpose of the data and why there are evaluated.

Large firms have a more elaborated risk management system than smaller ones. Even in this class, only 33.3% report having established a more comprehensive risk management system. The remaining two thirds of the large firms mention to have established it in certain parts, which was in accordance with the author's impression during the interviews (see Appendix L, I 6.1).

Three main reasons for not having established a risk management system could be detected:

- not sensible for a firm of the respective size
- the board of directors lacking experience and knowledge
- deficits with respect to applicable methods/techniques

These reasons shall be illuminated by some quotations.

Company Size

The following view was especially pronounced in the responses of micro and small firms interviewed:

No. 2 (micro trade firm, master craftsman): “Our firm is too small. We are lacking management knowledge. The owner is a technician.”

Another interviewee noted:

No. 3 (small firm, other sector, engineer with additional qualification in business management): “Too formal for a company of our size.”

An owner-manager with a technical background agreed with this view and pointed out:

No.7 (small construction firm, engineer): “The company is too small to set up a proper risk management, but essential risks are documented within the process description of quality management, so that the employees know which risks there are and how to observe them.”

It is remarkable that – as in Section 5.2.5.1 on the risk management process– the ISO-certified firms increasingly deal with risk management topics.

It is also interesting that firms that mentioned to be too small for establishing risk management had to deal with the topic recently, in the course of Basel II. The lending bank indicated that Basel II requires to consider it. The comments of an owner-manager underscore this point:

No. 24 (small engineering firm, engineer): “Our company is too small. Because of Basel II, for the first time something had been put down on paper: which strategic risks we are facing and who is responsible for monitoring them.”

Lacking Experience and Knowledge

The following responses indicate that the lacking knowledge is a stumbling block for SMEs of all size classes:

No. 4 (micro information technology firm, owner-managed with degree in engineering): “Lacking time and techniques, ... but coming to realize that this must be changed.”

It was evident from the conversations that even for medium-sized firms there are a shortage of personnel as the following quotation points out:

No. 14 (medium-sized engineering firm): “The company is too small, no personnel competence and resources are available. The essential principles for judging the risks of projects are fixed with the managing director and the controlling function. Monthly project discussions with the managing director and controlling are held.”

Another response provides some evidence that there is a flaw of experience and knowledge with the risk management:

No. 19 (micro consulting firm, architect): “No experience, lacking knowledge and time. We are having no personnel for it. One year ago we employed someone for controlling who to an increased extent is to deal with it, so that we can fulfil the requirements of the bank.”

Deficits of Methods

One Owner began to realize that there should be more efforts done:

No. 32 (micro auditing firm, tax advisor): “We are lacking knowledge. Risk management shall now be tackled with more emphasis, also in the light of the ISO-certification being planned.”

The head of the controlling function of a drug company concluded:

No 23 (large firm, other sector): “A responsible person having the respective specialist knowledge is lacking. Also the need for a position is seen that deals more intensively with the strategic company development and that supports the board of directors. Additionally, a solicitor would be helpful, because of the legal requirements having strongly increased.”

It is interesting that offers for further education or training on risk management are hardly used. 35 of the 38 interviewed firms mentioned not to have visited any training courses concerning risk management.

With respect to formally establishing a risk management system, owner-managers again perform badly: 96% of the owner-managed firms have no formal risk management.

Micro, small and medium-sized firms confirm that an extension and formalization of their risk management system would be useful. This could make easier monitoring and controlling the company, and one could assess the company's situation more comprehensively.

Now the strategies are presented how the firms handle risks (Table 5.13). The issue was answered by all firms, even if they had no formal risk management. The board of directors nevertheless has a strategy for handling risks. Among the classic strategies, risk taking and risk insurance dominate.

Table 5.13 Risk Management Strategy (I 6.7*)
Versus Company Size by Turnover (I 1.9)

	Size by turnover								Total	Rank	
	Micro		Small		Medium		Large				
Risk avoidance	0	0.0%	1	16.7%	0	0.0%	0	0.0%	1	2.6%	4
Risk insurance	3	23.1%	3	50.0%	6	37.5%	3	100.0%	15	39.5%	2
Risk transfer	0	0.0%	1	16.7%	5	31.3%	0	0.0%	6	15.8%	3
Risk taking	13	100.0%	5	83.3%	16	100.0%	3	100.0%	37	97.4%	1
Total	13	100.0%	6	100.0%	16	100.0%	3	100.0%	38	100.0%	

* Multiple selection allowed

A size effect can only be recognized for the strategies of risk insurance and risk transfer. With increasing company size the importance of risk insurance increases. With the exception of large firms (where there is no risk transfer at all), this also holds for the strategy of risk transfer. The interviews led to the result that it is often a credit insurance for customers' accounts. These findings confirm a study of Kessler (2000, p. 88), according to which for operational risks SMEs often follow the insurance strategy.

Finally, the interviewed firms were asked what caused major losses in the last three years and which countermeasures had been taken to avoid such losses in future (Table 5.14).

Table 5.14 Sources of Major Losses and Action Taken (I 6.9*).
Versus Owner-Manager/Other Manager (I 1.5)

	Manager		Total	Rank
	Owner	Other		
Sources of major losses				
Internal				
Bad debts	7	2	9	1
Reduction of workforce	1	1	2	3
Major losses for single projects	2	0	2	3
Underutilization of capacity	0	1	1	6
Technological problems	1	0	1	6
Employees training and qualification, contingency planning	1	0	1	6
External				
Reduction of market share	1	2	3	2
Exchange rate losses	0	2	2	3
Misjudgement of market opportunities	0	1	1	6
No major losses	14	8	22	
Action taken				
Internal				
Better credit control procedures, down payments	5	0	5	1
Improvement of cost accounting	1	2	3	3
Development of new business line	1	2	3	3
Improved Market analysis	0	2	2	5
Cost cutting procedures	1	1	2	5
Closer watch on cash receipts and demand for payments	0	1	1	8
Installation of Key Account Manager	0	1	1	8
Replacement of Board of Directors	0	1	1	8
Better organization of contract documents	1	0	1	8
External				
Credit and money insurance	4	0	4	2
Hedging	0	2	2	5
Business interruption/loss of profits insurance	1	0	1	8
No action taken	16	9	25	

* Multiple selection allowed

Two main kinds of losses were found. On the one hand, there are losses from bad debts, counting as an operational risk, and on the other hand, there are losses from reduced market share, a strategic risk. Strategic and operational risks are equally represented.

Since a lending insurance often does not cover all debts, the firms try to get more information about their customers. In addition, the amount of turnover with a single customer can be limited so that a possible loss is also limited.

The interviewed SMEs use classic insurance coverage against fire, water, storm, liability for products and services and lending insurance. In addition, the firms have the opinion that most of the risks must be taken and, since it would be too expensive, cannot be insured. Because of the difficult price situation at the market it is often not even possible to add a risk surcharge in the price calculation.

Contingency, Replacement and Succession

At the end of the subsection on risk management organization contingency, replacement and succession regulations shall be discussed.

Contingency

With respect to contingency regulations, there are substantial differences between size classes (Table 5.15). A comprehensive contingency planning is increasingly found in large and very large firms. Generally it must be recognized that a comprehensive contingency planning has been established in less than one third of the firms. Mainly security concepts for the electronic data processing were implemented.

Table 5.15 Contingency, Replacement and Succession (I 6.8).
Versus Company Size by Turnover (I 1.9)

	Size by turnover				Total	Rank
	Micro	Small	Medium	Large		
Contingency						
Comprehensive regulations	1 7.7%	1 16.7%	3 18.8%	2 66.7%	7 18.4%	3
Partial regulations	4 30.8%	4 66.7%	9 56.3%	1 33.3%	18 47.4%	1
No regulations	8 61.5%	1 16.7%	4 25.0%	0 0.0%	13 34.2%	2
Total	13 100.0%	6 100.0%	16 100.0%	3 100.0%	38 100.0%	
Replacement						
Comprehensive regulations	0 0.0%	2 33.3%	5 31.3%	3 100.0%	10 26.3%	2
Partial regulations	9 69.2%	4 66.7%	9 56.3%	0 0.0%	22 57.9%	1
No regulations	4 30.8%	0 0.0%	2 12.5%	0 0.0%	6 15.8%	3
Total	13 100.0%	6 100.0%	16 100.0%	3 100.0%	38 100.0%	
Succession						
Comprehensive regulations	0 0.0%	2 33.3%	0 0.0%	0 0.0%	2 5.3%	3
Partial regulations	1 7.7%	1 16.7%	3 18.8%	0 0.0%	5 13.2%	2
No regulations	12 92.3%	3 50.0%	13 81.3%	3 100.0%	31 81.6%	1
Total	13 100.0%	6 100.0%	16 100.0%	3 100.0%	38 100.0%	

As Table 5.16 demonstrates, owner managers have established contingency regulations on a noteworthy smaller scale than other managers.

Table 5.16 Contingency, Replacement and Succession (I 6.8).
Versus Owner-Manager/Other Manager (I 1.5)

	Manager		Total	Rank
	Owner	Other		
Contingency				
Comprehensive regulations	3 12.5%	4 28.6%	7 18.4%	3
Partial regulations	9 37.5%	9 64.3%	18 47.4%	1
No regulations	12 50.0%	1 7.1%	13 34.2%	2
Total	24 100.0%	14 100.0%	38 100.0%	
Replacement				
Comprehensive regulations	2 8.3%	8 57.1%	10 26.3%	2
Partial regulations	17 70.8%	5 35.7%	22 57.9%	1
No regulations	5 20.8%	1 7.1%	6 15.8%	3
Total	24 100.0%	14 100.0%	38 100.0%	
Succession				
Comprehensive regulations	2 8.3%	0 0.0%	2 5.3%	3
Partial regulations	3 12.5%	2 14.3%	5 13.2%	2
No regulations	19 79.2%	12 85.7%	31 81.6%	1
Total	24 100.0%	14 100.0%	38 100.0%	

Regarding the legal form, there is a difference: the incorporated firms have established better contingency measures than unincorporated ones. Contingency planning being an important element of the certification process, ISO-certified firms have a more comprehensive contingency planning than non-certified ones.

Replacement

The situation with respect to replacement regulations is still more dramatic. For micro and small firms it is very complicated. The interviewed firms of this size had only one managing director, and if he is unable to act the whole company would be in danger.

It is noticeable that owner-managed firms have considerably worse replacement regulations, compared to other managers. Many owner-managers admitted that their bank required improvements regarding replacement. Being asked why they still had not taken steps, many times the answer was:

No. 2 (micro trade firm, master craftsman): “Because of the day-to-day operations I did not get round to doing something about it. And besides, there is no one in the firm whom I can entrust the business to and who is familiar with everything.”

As an example of the strong pressure banks put on the firms:

No. 19 (micro consulting firm, architect): “Last year our bank had approached us for risk management, requiring to present detailed papers. Particularly the insufficient business planning had been criticized: not enough details and too short-term. Besides, for the first time, they asked about the existence of a replacement planning.”

ISO-audited firms have better replacement regulations, which is likely to be a result of the certification process.

Succession

It is very alarming that 12 of the 13 interviewed micro firms yet have not settled who is to be managing director's successor. His sudden absence or loss would mean the end of the business. The interviews revealed that the banks continuously address the subject and press for solutions. Even though to different degrees within the size classes, the succession problem is typical for all SMEs.

A typical comment of an owner-managed SME is:

No. 12 (micro construction firm, sole proprietorship): "This is a big problem since in our family there is no successor. The bank is speaking about this issue since many years."

Another owner-manager:

No. 9 (medium-sized construction firm): "The board of directors consists of several members, all being older than 60 years. This is a considerable problem. Until now there are no successors. It is forcefully approached for by the bank during the discussion on the annual statements."

The owner-manager of a firm of the same size claimed:

No. 38 (medium-sized firm, other sector): "The company originated in a management buy out, and these managing directors are relatively old. The bank already urged to establish a succession planning. Recently, we granted power of procuration to someone, which, of course, does not solve the problem."

Summarizing, the interview results confirm the finding of Freund (2004) who stated that the majority of owner-managed SMEs are unprepared for business succession. The results do not agree with the study of Feltham et al. (2005), who found that with increasing age of the owner and "proximity of the owner-manager to retirement" succession considerations are intensified. Many of the interviewed firms have owners near the age of retirement, yet there is no succession planning.

5.2.5.3 Project Risk Management

This section firstly examines which instruments for project planning are applied and how the consolidation of single project plannings within the company's business planning is established. Then it is discussed in which phases of the project life cycle risks are considered and which project risk categories are mainly dealt with. After that methods of project risk assessment are analysed. Another

important issue is the integration of project risks into the company's business planning. Finally, the need for action with respect to project risk management is presented, as mentioned by the interviewees.

General Project Management

The discussion of project risk management starts with project management tools being mainly applied (not only for the purpose of risk management). Table 5.17 distinguishes between sophisticated project management techniques and general formal business management techniques, not necessarily being project-specific.

Table 5.17 Project Management Techniques (I 7.1*).
Versus Owner-Manager/Other Manager (I 1.5)

	Manager		Total	Rank
	Owner	Other		
Formal project management				
Feasibility study	1	0	1	12
Project Breakdown Structure	4	5	9	5
Resources scheduling	4	1	5	7
Time scheduling	6	5	11	2
Activity list	2	0	2	10
Milestone planning	5	4	9	5
Network diagram/critical path method	0	2	2	10
Gantt chart	1	0	1	12
Ordinary business management techniques				
Ongoing monitoring of projects for budgeted costs	5	6	11	2
Lesson learned/post-mortem calculation	2	1	3	9
Cost-plus calculation	1	0	1	12
Target Costing	1	0	1	12
Project operating result	6	4	10	4
Cost budget	7	9	16	1
Project liquidity planning	2	3	5	7
Project-related Ratios	0	1	1	12
No tools used	2	0	2	

* Multiple selection allowed

Cost budget, ongoing monitoring of projects in terms of budgeted costs and time scheduling dominate. The interviewed firms do not work with elaborated project management techniques. Project-specific techniques such as project break down structure, milestone planning or feasibility studies are increasingly employed by medium-sized and large firms. As software support Microsoft Project and Microsoft Excel dominate across all sizes classes.

The average number of projects and the average project duration have no significant influence on the instruments being used, which disagrees with the findings of Besner and Hobbs (2004, p. 344). The company age also does not influence the instruments for project planning.

Consolidation of Single Project Plannings

Since most interviewed firms make for their projects cost budgets and profit planning, it is interesting to explore how far a consolidation of single project figures takes place.

Regarding the consolidation of single project plannings, there is no clear size effect (see Appendix L). With only 20% it is generally weakly developed. It is noticeable that ISO-audited firms increasingly tend to carry out such a consolidation.

Summarizing, none of the interviewed firms has an automated function to determine an overview of the cost and profit for all projects, together with the effect on the situation of the entire company. Often this must be performed manually. Most firms would welcome such a function for project monitoring.

Project Risk Management

After having discussed issues of general project management, now the handling of project risks will be treated. With respect to considering project risks, there is a clear size effect. While all micro, small and medium-sized firms regularly consider project risks, it is carried out in only one third of the large firms. A reason could be that for micro to medium-sized firms single projects have much more significance, i.e. the failure of one project may endanger the entire company. Large firms, on the other hand, often consider risks only for projects that are estimated to be particularly risky.

Project risks are assessed mainly for the proposal phase of the project life cycle. Then the planning phase follows.

The majority (24 out of 26 project-oriented firms) exert the project risk management strategy of risk taking, frequently by a risk premium within the cost estimating. 4 firms also draw on risk insurance and risk transfer.

Regarding risk assessment in the phases of the project life cycle (Table 5.18), the planning and the execution phase display clear size effects. In the planning phase, medium-sized and large firms increasingly use to monitor project risks. Even more remarkable is the difference in the execution phase where large firms dominate.

**Table 5.18 Risk Identification in the Project Life-Cycle (I 7.4*).
Versus Company Size by Turnover (I 1.9)**

	Size by turnover				Total	Rank
	Micro	Small	Medium	Large		
Proposal phase	9 100.0%	3 75.0%	6 60.0%	2 66.7%	20 76.9%	1
Planning phase	1 11.1%	1 25.0%	7 70.0%	3 100.0%	12 46.2%	2
Execution phase	1 11.1%	0 0.0%	1 10.0%	2 66.7%	4 15.4%	4
Termination phase	1 11.1%	1 25.0%	2 20.0%	2 66.7%	6 23.1%	3
Total	9 100.0%	4 100.0%	10 100.0%	3 100.0%	26 100.0%	

* Multiple selection allowed

Now the tools for project risk management are discussed (Table 5.19).

**Table 5.19 Techniques of Project Risk Assessment (I 7.6*).
Versus Owner-Manager/Other Manager (I 1.5)**

	Manager		Total	Rank	
	Owner	Other			
Strong formalization					
Failure Mode and Effect Analysis		2	5	7	3
Medium formalization					
Checklists and questionnaires		5	6	11	1
Internal risk estimations by several employees and use of external proposals from other bidders		1	0	1	4
Little formalization					
No formal methods, lessons learned and risk knowledge captured from old projects; learning from experience		10	1	11	1
No techniques used		0	1	1	

* Multiple selection allowed

Experience and checklists/questionnaire dominate. The application of more formal methods reveals a size effect; they appear mainly in the form of Failure Mode and Effect Analysis (see Appendix L).

With respect to the methods of risk assessment there is also a size effect. Less formal methods are employed by micro and small firms, where experience and discussions with employees dominate. Particular deficits of methods of project risk evaluation were admitted by the interviewees.

Again there are differences of project risk assessment, regarding the organization type. Owner-managed firms apply less formal method than other ones. Owner-managers make frequently use of experience from former projects and discussions with employees. Checklists and questionnaires then follow.

Companies that are part of a group tend to utilize more elaborated methods of project risk assessment, such as Failure Mode and Effect Analysis. ISO-audited firms behave similarly.

There are no significant differences in the use of more or less elaborate methods of project risk assessment with respect to the average number of projects and the average project duration.

Single Project Risk Consolidation

The interviewed firms were asked whether they carry out a consolidation of single risk evaluations to result in an estimation of the risk position of the entire company (Table 5.20).

Table 5.20 Single Project Risk Consolidations (I 7.9).
Versus Company Size by Turnover (I 1.9)

	Size by turnover								Total	Rank	
	Micro		Small		Medium		Large				
Yes	0	0.0%	0	0.0%	0	0.0%	1	33.3%	1	3.8%	2
No	9	100.0%	4	100.0%	10	100.0%	2	66.7%	25	96.2%	1
Total	9	100.0%	4	100.0%	10	100.0%	3	100.0%	26	100.0%	

It is very remarkable that only one firm carries out a systematic risk consolidation, with the remaining 25 project-oriented ones reporting considerable problems. The only firm having a systematic project risk consolidation is an incorporated one.

A typical quotation, considering problems of consolidation:

No. 11 (medium-sized engineering firm): “To get an overview of all project results is not possible. The effect of project risks on the level of the entire company cannot be realized. So, regarding risk estimations, one must rely on the respective project manager and hope that he estimates the risk situation correctly.”

A firm terminating many projects with a loss and having no project controlling reported on consolidation:

No.1 (micro firm, other sector): “Not possible; nor do I know exactly the cost per project. I can estimate it only roughly on the base of the handed over and used material.”

The following response again provides some evidence that the consolidation is a big problem, even for medium-sized firms:

No. 14 (medium-sized engineering firm): “It must be carried out manually. It would be helpful to have something like that for all projects. For analysis purposes this was occasionally carried out for some projects.”

The following firm is very large and owner-managed. Even in this case consolidating projects is possible only manually, with considerable amount of time.

No. 25 (very large firm, other sector): “Yes, but not automatically. It is carried out manually on the base of Microsoft Excel. Will be possible with the new Enterprise Resource Planning software that will be implemented; it will support functions of project management.”

There arises a problem for project risk management if a consolidation of single projects is not possible, i.e. if risk assessment concentrates only on the level of single projects. Management can only rely on the project managers having their projects under control and reporting the development of risky projects early enough.

Need for Action

Finally the interviewed firms were asked which problems they see considering their project risk management and where there is need for action.

Many of the interviewees expressed the wish to get an overview of the development of all projects, regarding cost and profit aspects. This could lead to more transparency for the entire company. Such a request manifests itself in the following quotation:

No. 9 (medium-sized construction firm, owner-managed business): “An overview of the project results is lacking, in particular their effect on the entire company. Moreover, to determine the work in progress for projects takes much effort.”

The consolidation of single projects emerged as a strong theme not only for owner-manager, as the following quotation shows:

No. 6 (medium-sized firm, other sector): “A consolidation of the results of the single projects would be desirable.”

Concerning the management of single projects, the interviewed firms formulated the need for stronger formalization and more competence relating to classic project management tools. Specifically, one owner-manager stated:

No. 1 (micro firm, other sector, engineer): “Little control is possible of the employees’ activities and of their working time. Also we have no exact knowledge of the project cost having accumulated so far. At the moment, a project cost control is not possible.”

The above firm does not carry out its accountancy in-house and has established no business planning at all.

An owner-manager having non-business background indicated:

No. 36 (small engineering firm, doctorate in physics): “It would be valuable to establish a systematic project management system and project management control.”

Considering risks of single projects is formalized to a low degree and not very well documented. The employees' lacking risk awareness was mentioned as well.

No. 7 (small construction firm): "A direct mapping of project risks into the business planning would be desirable."

The comment of the following head of the controlling function highlights the aspects of risk awareness:

No. 16 (medium-sized firm, other sector): "We want to generate the employees' risk awareness, to make them live it and apply it. The 'why' is important. They must be stimulated to do this of their own accord."

A chairman of the board of directors expressed this need for action:

No. 13 (small information technology public limited firm) "Implementation of a continuous evaluation and monitoring of project risks within the project state report would be helpful. Also the overview of the projects, regarding profit and performance. Establishing a data base for projects being terminated should be aimed at. Better co-ordination of all Excel spreadsheets needed."

As mentioned above, a consolidation of project risk data to determine the company's total risk situation does not take place. It is seen by many firms as urgent need for action.

5.3 Scoring of Interview Results

Having separately discussed in Section 5.2 various interview findings, this section, analogously to the questionnaire case (Section 4.4), presents a scoring approach to aspects of the interview results. The construction (Section 5.3.1) and the analysis (Section 5.3.2) of the scoring variables is followed by a comparison of questionnaire and interview scoring (Section 5.3.3). The interview scoring variant will also be taken into account for deriving types of risk management practices in Chapter 6.

5.3.1 Construction of Scoring Variables

This section introduces for the (quantitative) interview results scoring variables, describing the sophistication of a comprehensive risk management just in the same way as in the questionnaire case (Section 4.4). Since the research interviews aim both at validation and a deepening of the questionnaire results, the structure of their results does not match perfectly to those of the questionnaire approach. So the interview scoring will be a slight modification of the questionnaire scoring.

This also demonstrates how the scoring approach for risk management can easily be modified to fit a new risk management context.

The following Table 5.21 correspond to Table 4.32 of the questionnaire scoring approach. It should be remarked that, as only a subset of the 38 interviewed firms are project-oriented, the scoring variable for project management is defined for only 26 cases.

Table 5.21 Scoring Variables: Construction and Descriptive Statistics

		N	Theoretical		Min	Max	Mean	StdDev	Weight	Low	Mod.	High
			Min	Max								
I 3.1	Long-term pl.: Components	38	0	5	0	5	2.61	1.443	1			
I 3.2	Long-term pl.: Time horizon	38	0	3	0	3	1.76	0.852	1			
I 3.3	Short-term pl.: Components	38	0	2	0	2	1.55	0.724	1			
	sci_plan	38	0	10	0	10	5.92	2.614		0-3	4-6	7-10
I 4.1	Balanced Scorecard	38	0	4	0	4	0.37	0.852	1			
	sci_perf_rm	38	0	4	0	4	0.37	0.852		0-1	2	3-4
I 5.1	Risk categories	38	0	8	2	8	4.21	1.630	1			
I 5.5	Risk mapping	38	0	2	0	2	0.32	0.525	3			
I 5.6	Link of r.m. to bus. planning	38	0	2	0	2	0.42	0.642	3			
	sci_rm_proc	38	0	20	2	18	6.42	4.038		0-6	7-13	14-20
I 6.2	Risk management responsibility	38	0	5	1	3	1.50	0.647	1			
I 6.3	Risk assessment: Respons./meth.	38	0	7	1	4	1.87	0.991	1			
I 6.4	Risk management documentation	38	0	7	0	4	0.55	1.108	1			
I 6.5	Risk management software	38	0	1	0	1	0.24	0.431	3			
I 6.8	Contingency., replacemt, successn.	38	0	6	0	5	2.18	1.392	1			
	sci_rm_org	38	0	28	2	16	6.82	3.798		0-9	10-18	19-28
I 7.1	Project management techniques	26	0	2	0	2	1.27	0.724	2			
I 7.2	Consolidation of proj. plannings	26	0	1	0	1	0.19	0.402	2			
I 7.5	Risk categories for projects	26	0	7	0	4	2.54	0.984	1			
I 7.8	Project risk documentation	26	0	8	0	3	1.46	0.811	1			
I 7.9	Project risk integr. into planning	26	0	1	0	1	0.04	0.196	3			
	sci_prm	26	0	24	2	14	7.04	3.066		0-7	8-15	16-24

sci_plan: Planning

Compared to the questionnaire, the scoring variable for business planning is the same. It combines the scores for long-term and short-term business planning and the time horizon. The aim of inquiring business planning by the interviews was to give the systems a close personal inspection.

$$\begin{aligned}
 & \text{score(I 3.1 Long-term planning: Components)} \\
 + & \text{score(I 3.2 Long-term planning: Time horizon)} \\
 + & \text{score(I 3.3 Short-term planning: Components)} \\
 \hline
 = & \text{sci_plan}
 \end{aligned}$$

sci_perf_rm: Performance Measurement and Risk Management

Concerning the Balanced Scorecard and similar instruments, the interview scoring differs from the questionnaire approach in that it only deals with the BSC. The

BSC plays a central role in the holistic risk management approach proposed by this thesis. Both the questionnaire and the interviews have indicated that other instruments are applied rather seldom. Even the BSC itself is not used very widely, but within the collection of instruments of performance measurement it seems to be accepted most frequently.

$$= \frac{\text{score(I 4.1 Balanced Scorecard)}}{\text{sci_perf_rm}}$$

sci_rm_proc: Risk Management Process

The scoring variable for the risk management process covers the categories of risks being assessed as well as the link of risk management with business planning. A new contribution is the score for the risk mapping (or risk portfolio). Because of their comparably small ranges and also their importance, the contribution of the scoring summands for risk mapping and the link of risk management to business planning are each spread by a weighting factor 3.

$$= \frac{\begin{aligned} &\text{score(I 5.1 Risk categories)} \\ + &3 * \text{score(I 5.5 Risk mapping)} \\ + &3 * \text{score(I 5.6 Link of risk management to business planning)} \end{aligned}}{\text{sci_rm_proc}}$$

sci_rm_org: Risk Management Organization

The scoring variable for the risk management organization contains personnel responsible for establishing and maintaining the risk management system and the manner of its documentation. The score for personnel being responsible for risk assessment and that for software support are again part of this variable. The interviews have shown that there is a threat to the company's existence if there are no regulations for contingency, replacement and succession. So, in contrast to the questionnaire approach, an additional score respecting these issues has been included in the risk organization scoring. The small range of the scoring summand for risk management software is compensated by the weighting factor 3.

$$= \frac{\begin{aligned} &\text{score(I 6.2 Risk management responsibility)} \\ + &\text{score(I 6.3 Risk assessment: Responsibility/methods)} \\ + &\text{score(I 6.4 Risk management documentation)} \\ + &3 * \text{score(I 6.5 Risk management software)} \\ + &\text{score(I 6.8 Contingency, replacement and succession)} \end{aligned}}{\text{sci_rm_org}}$$

sci_prm: Project Risk Management

The scoring variable for project risk management covers methods of project management on a larger scale: it contains a score for the degree of formalization of the tools being used. This extension has been integrated; since the application of more elaborate tools for project management is likely to be a positive support for project risk management. The scoring summands for project management techniques, the consolidation of project plannings and the integration of project risks into the business planning have small range, compared to the remaining scoring summands. In addition, project risk integration into planning is given special emphasis in the risk management approach of this study. This led to the increased weight 3 for the latter summand, while the other score contributions mentioned are only doubled.

$$\begin{array}{rcl}
 & 2 * \text{score(I 7.1)} & \text{Project management techniques)} \\
 + & 2 * \text{score(I 7.2)} & \text{Consolidation of project plannings)} \\
 + & \text{score(I 7.5)} & \text{Risk categories for projects)} \\
 + & \text{score(I 7.8)} & \text{Project risk documentation)} \\
 + & 3 * \text{score(I 7.9)} & \text{Project risk integration into planning)} \\
 \hline
 = & \text{sci_prm} &
 \end{array}$$

5.3.2 Analysis of Scoring Variablessci_plan

The scoring variable for planning reveals a similar behaviour as that for the questionnaire approach. The standard deviation for the score of planning components demonstrates large differences between the firms. But nevertheless, the theoretical maximum of 10 is reached by some firms.

sci_perf_rm

It could be expected that the scoring of the use of Balanced Scorecard would be bad. The results are worse than the more differentiated questionnaire scoring. On the other hand, the interviews could detect the details of the BSC systems.

sci_rm_proc

The maximum scoring value for the risk management process does not reach the theoretical maximum, but coming close. The same holds for the questionnaire scoring. The score for risk mapping deviates strongest from its theoretical maximum. These low values have consequences for the whole risk management

process, since the firms are not able to perform a consolidation of the risks being assessed.

sci_rm_org

The theoretical maximum is not reached by any of the interviewed firms. The cause is that risk management in SMEs concentrates on only few personnel being responsible for the current managing of risks. The documentation of risk management also displays clear weaknesses. The score for contingency, replacement and succession has only a relatively small mean, another confirmation that this issue should be considered when judging risk management sophistication.

sci_prm

The scoring variable for project risk management also does not reach its theoretical maximum. The deficits of the consolidation of project plannings are apparent, having a clear effect on the consolidation of project risks. Again details of the consolidation processes were examined in more depth.

Table 5.22 presents the means for the scoring variables with respect to classes induced by size or other basic variables.

Table 5.22 Means of the Scoring Variables with Respect to Demographics

	sci_plan		sci_perf_rm		sci_rm_proc		sci_rm_org		sci_prm	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
Size by annual turnover (I 1.9)										
Micro (up to 2 million Euros)	4.15	13	0.08	13	3.54	13	3.69	13	5.78	9
Small (more than 2 to 10 million Euros)	5.33	6	0.67	6	8.00	6	7.33	6	6.75	4
Medium (more than 10 to 50 million Euros)	6.94	16	0.31	16	7.31	16	8.44	16	7.50	10
Large (more than 50 million Euros)	9.33	3	1.33	3	11.00	3	10.67	3	9.67	3
Total	5.92	38	0.37	38	6.42	38	6.82	38	7.04	26
Size by number of employees (I 1.10)										
Micro (up to 9 employees)	3.44	9	0.00	9	3.67	9	3.33	9	5.33	6
Small (10 to 49 employees)	5.50	8	0.63	8	6.00	8	5.63	8	6.17	6
Medium (50 to 249 employees)	6.10	10	0.20	10	6.00	10	6.60	10	8.50	6
Large (250 to 499 employees)	7.78	9	0.33	9	9.56	9	10.11	9	6.67	6
Very large (500 and more employees)	9.50	2	2.00	2	8.50	2	13.50	2	11.50	2
Total	5.92	38	0.37	38	6.42	38	6.82	38	7.04	26
Industrial sector (I 1.4)										
Construction	5.75	4	0.50	4	6.75	4	4.50	4	8.33	3
Engineering	6.50	6	0.00	6	6.50	6	6.83	6	6.00	5
Information technology	4.50	4	0.00	4	5.00	4	5.25	4	5.75	4
Auditing/consulting/training	5.33	3	1.00	3	4.00	3	6.33	3	8.00	1
Trade/service/logistics	4.25	4	0.00	4	3.50	4	4.00	4	6.00	1
Other sector	6.59	17	0.53	17	7.76	17	8.47	17	7.58	12
Total	5.92	38	0.37	38	6.42	38	6.82	38	7.04	26
Legal form (I 1.7)										
Unincorporated firm	4.18	11	0.27	11	4.73	11	4.64	11	5.80	5
Incorporated firm	6.63	27	0.41	27	7.11	27	7.70	27	7.33	21
Total	5.92	38	0.37	38	6.42	38	6.82	38	7.04	26
Part of a group (I 1.8*)										
Yes	7.71	7	0.57	7	8.57	7	10.43	7	9.17	6
No	5.52	31	0.32	31	5.94	31	6.00	31	6.40	20
Total	5.92	38	0.37	38	6.42	38	6.82	38	7.04	26
Company age (I 1.6)										
0 to 4 years	5.00	5	0.00	5	5.20	5	5.40	5	7.75	4
5 to 9 years	5.33	3	0.00	3	3.00	3	3.67	3	5.00	3
10 to 19 years	6.17	18	0.39	18	8.00	18	8.22	18	7.46	13
20 and more years	6.08	12	0.58	12	5.42	12	6.08	12	6.67	6
Total	5.92	38	0.37	38	6.42	38	6.82	38	7.04	26
ISO-audit (I 1.4)										
Yes	6.83	23	0.61	23	8.04	23	9.00	23	7.81	16
No	4.53	15	0.00	15	3.93	15	3.47	15	5.80	10
Total	5.92	38	0.37	38	6.42	38	6.82	38	7.04	26
Owner manager/other manager (I 1.5)										
Owner manager	5.17	24	0.42	24	5.50	24	5.33	24	6.60	15
Other manager	7.21	14	0.29	14	8.00	14	9.36	14	7.64	11
Total	5.92	38	0.37	38	6.42	38	6.82	38	7.04	26
Average number of projects (I 1.12)										
0 to 9 projects	5.40	5	0.00	5	9.60	5	7.60	5	6.80	5
10 to 19 projects	6.50	6	0.67	6	6.33	6	5.83	6	8.50	6
20 to 100 projects	6.67	9	0.44	9	7.44	9	9.00	9	6.56	9
100 and more projects	5.20	5	0.60	5	4.80	5	5.40	5	6.60	5
No statement	2.00	1	0.00	1	3.00	1	3.00	1	6.00	1
Total	5.92	26	0.42	26	6.92	26	7.08	26	7.04	26
Average project duration (I 1.13)										
0 to 5 months	4.71	7	0.00	7	7.71	7	5.57	7	6.43	7
6 to 11 months	5.13	8	0.38	8	6.25	8	5.38	8	6.63	8
12 to 23 months	7.88	8	0.88	8	8.13	8	10.75	8	8.38	8
24 and more months	5.67	3	0.33	3	3.67	3	5.33	3	6.00	3
Total	5.92	26	0.42	26	6.92	26	7.08	26	7.04	26

* I 1.8: More than 25% owned by a single holding company

Demographic Variables

Size by Annual Turnover (Issue 1.9)

The scoring variable means for business planning, risk management organization and project risk management show a clear size effect. With the exception of medium-sized firms, the same holds for performance measurement and risk management process.

Size by Number of Employees (Issue 1.10)

The scoring means within the employee classes reveal a similar result as the means within the turnover classes. Merely with respect to the project management scores, large firms have a smaller mean.

Industrial Sector (Issue 1.4)

The industry sectors engineering, IT and auditing have relatively high scoring means. The construction sector has a medium position. Firms within the “other” sector have the highest scoring means. In contrast to that, the trade sector has the lowest scoring means.

Legal Form (Issue 1.7)

In general, incorporated firms have higher scoring means than unincorporated ones.

Being Part of a Group (Issue 1.8)

Firms which are part of a group reveal the highest scoring means for all scoring variables.

Company Age (Issue 1.6)

The company age has a certain influence on the planning and control systems. With the age increasing within the classes from 0 to 19 years, all scoring means tend to increase. With the exception of performance measurement, the scores within the upper age class then decrease.

ISO-audit (Issue 1.4)

For all scoring variables, firms which are ISO-audited have remarkably higher scoring means.

Owner-Manager/Other Manager (Issue 1.5)

Except for performance measurement, firms with an other manager have higher scoring means than firms with an owner-manager. Owner-managers have a mean score for performance measurement lying slightly above the mean for other managers, but in view of the theoretical maximum of 4, both means are relatively small. Indeed, the interviews have revealed that some owner-managers have already dealt more closely with certain forms of instruments of performance measurement.

Number of Projects (Issue 1.12)

The number of projects being worked on and the mean scores do not show a uniform picture. With increasing average number of projects there is a tendency of increasing means for the scoring variables business planning, performance measurement and project risk management.

Project Duration (Issue 1.13)

The project duration has some influence on the scoring variables: With increasing duration the scoring means tend to increase (in a strict sense for business planning, performance measurement and project risk management). Firms with an average duration of 24 months and more deviate from the tendency to increase. This class contains only firms with research and development activities which do not apply the entire apparatus of project management.

Uncertainty Variables

Following, the behaviour of the scoring variables is investigated, when confronted with various forms of uncertainty in the business environment (Table 5.23).

Table 5.23 Means of the Scoring Variables with Respect to Uncertainty in the Business Environment

	sci_plan		sci_perf_rm		sci_rm_proc		sci_rm_org		sci_prm	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
External environment (I 2.1)										
Relationship to customers (I 2.1.1)										
Getting better	5.50	2	0.00	2	10.00	2	7.50	2	8.00	2
Static	5.94	16	0.19	16	5.13	16	6.31	16	6.55	11
Getting worse	5.95	20	0.55	20	7.10	20	7.15	20	7.31	13
Total	5.92	38	0.37	38	6.42	38	6.82	38	7.04	26
Relationship to competitors (I 2.1.2)										
Getting better	–	0	–	0	–	0	–	0	–	0
Static	5.63	19	0.21	19	6.63	19	6.05	19	6.42	12
Getting worse	6.21	19	0.53	19	6.21	19	7.58	19	7.57	14
Total	5.92	38	0.37	38	6.42	38	6.82	38	7.04	26
Governmental regulations (I 2.1.3)										
Getting better	–	0	–	0	–	0	–	0	–	0
Static	5.82	28	0.43	28	5.79	28	6.64	28	7.28	18
Getting worse	6.20	10	0.20	10	8.20	10	7.30	10	6.50	8
Total	5.92	38	0.37	38	6.42	38	6.82	38	7.04	26
Relationship to bank/Basel II (I 2.1.4)										
Became better	10.00	1	4.00	1	9.00	1	12.00	1	14.00	1
Static	6.08	24	0.33	24	7.54	24	7.21	24	7.00	15
Became worse	5.31	13	0.15	13	4.15	13	5.69	13	6.40	10
Total	5.92	38	0.37	38	6.42	38	6.82	38	7.04	26
Internal environment (I 2.2)										
State of technology (I 2.2.1)										
Is mature	5.76	29	6.83	29	6.62	29	0.31	29	7.18	17
Can be improved	5.86	7	5.00	7	7.00	7	0.71	7	7.00	7
Just introduced	8.50	2	5.50	2	9.00	2	0.00	2	6.00	2
Total	5.92	38	6.42	38	6.82	38	0.37	38	7.04	26
State of product (I 2.2.2)										
Is mature	5.48	25	5.92	25	6.24	25	0.16	25	7.13	15
Can be improved	6.75	8	7.00	8	6.88	8	0.38	8	4.83	6
Just introduced	6.80	5	8.00	5	9.60	5	1.40	5	9.40	5
Total	5.92	38	6.42	38	6.82	38	0.37	38	7.04	26
Shortage of personnel (I 2.2.3)										
No shortage	5.83	23	6.26	23	6.83	23	0.30	23	6.71	14
Shortage	6.07	15	6.67	15	6.80	15	0.47	15	7.42	12
Total	5.92	38	6.42	38	6.82	38	0.37	38	7.04	26
Turnover growth (I 2.3*)										
Strongly increasing	6.25	4	8.00	4	8.00	4	0.25	4	5.75	4
Slightly increasing	5.33	3	5.00	3	8.33	3	0.00	3	7.00	1
Static	6.50	18	6.50	18	7.28	18	0.44	18	7.92	12
Slightly decreasing	4.86	7	7.00	7	5.71	7	0.57	7	6.20	5
Strongly decreasing	5.50	6	5.17	6	5.17	6	0.17	6	6.75	4
Total	5.92	38	6.42	38	6.82	38	0.37	38	7.04	26
External support (I 2.4)										
Certified chartered accountant	7.38	21	8.05	21	8.95	21	0.52	21	8.20	15
Tax advisor	3.85	13	4.62	13	3.77	13	0.08	13	5.70	10
Management consultant	10.00	1	5.00	1	4.00	1	0.00	1	–	0
No external support	3.33	3	3.33	3	6.00	3	0.67	3	3.00	1
Total	5.92	38	6.42	38	6.82	38	0.37	38	7.04	26

* I 2.3: During the last three years

External Environment (I 2.1.1)

Firms which suffer from a worsening of their external business environment with respect to customers, competitors and governmental regulations mainly have higher scoring means. As the interviews revealed, these firms dealt intensively with improving the existing planning and control systems, which they judged to be important for the future success. It is interesting that firms with a worsening of their relationship to the bank have for each scoring variable the lowest mean score in the external environment context.

Internal Environment (I 2.1.2)

Firms with the largest uncertainty in the internal business environment have the highest scoring means. As the interviews showed, these firms frequently deal with new technologies and new products so that greater efforts must be made to conquer the market. This is accompanied by an increasing need for information with respect to the respective uncertainty variables.

Turnover Growth (I 2.1.3)

It is remarkable that firms with increasing turnover during the last three years tend to have relatively high scoring means.

External Support (I 2.1.4)

Firms that take advantage of external support by chartered accountants or tax advisors reach relatively high scoring means, while those without any support have the lowest means.

5.3.3 Comparison of Questionnaire and Interview Scoring

It is reminded that questionnaire scoring and interview scoring deal with the same five aspects of holistic risk management, but with slight differences between the details of construction, due to different focuses of investigation.

Differences between Questionnaire and Interview Scoring

With the exception of planning, all interview scoring means fall into the low class. Interview scoring means for risk management process, risk management organization and project risk management all have low values, while for

questionnaire scoring this was only the case with respect to risk management organization.

The interview scoring variable for risk management process additionally includes the score for risk mapping. Bad scores for risk mapping as well as bad ones for a link of risk management and business planning may contribute to a poor total score for the risk management process.

A similar tendency can be stated for project risk management. A consolidation of single project plannings has been established by the interviewed firms in a weak manner. The largest deficits were recognized with respect to the consolidation of project risk considerations which is rarely existing.

Similarities between Questionnaire and Interview Scoring

In both scoring approaches business planning unveils a very similar picture. The majority of the firms belong to the moderate class. Both approaches display scores of long-term planning components with a remarkable large standard deviation.

Because of the different structure, the scoring behaviour with respect to the Balanced Scorecard and similar instruments cannot directly be compared. But regarding only the BSC contributions, there is a similar picture.

Interview scoring with respect to the risk management organization confirms that only a few responsible employees are involved in establishing and maintaining risk management. The responsibility for assessing risk is not implemented company-wide; in particular, an integration of the employees within the various business processes rarely takes place.

5.4 Management Behaviour and Risk Management

This section describes issues of managerial behaviour that may have an influence on the form of risk management in SMEs. Firstly, differences of management behaviour with respect to firm size are discussed. Then the risk taking behaviour of the interviewees is examined. Finally, the issues of implementing risk management are presented, as well as possible changes in the relation to the lending bank, as a consequence of Basel II and its effect on risk management.

The interview participants were very open-minded and had great interest in the discussion. They often wished to know how other firms that had already been interviewed had established their risk management.

Some interviewees had only agreed to participate to obtain possible support to respond to increased requirements of their bank, demanding improvement of business planning and risk management. Sometimes this led to discussions of several hours. The managing directors readily presented documents on the business planning and the correspondence with their bank, and they were very eager to exchange views about the issues.

General Findings

Micro and small firms are to a larger extent working on local and regional markets. In all firms of this size, the interviewee was the owner-manager himself. It reflects the fact that the owner deals with the problems of business planning and risk management.

In this context owners often complained that they have no contact in their firm to discuss and to exchange views with each other:

No. 7 (small construction firm, engineer profession): “I need a sparring partner to exchange views on business management problems. Only discussions with the tax advisor or the certified chartered accountant are left for me.”

As a rule, as external support a tax advisor or a chartered accountant is consulted. Because of cost and time constraints, this takes place only once or twice a year. So micro and small firms frequently report that, while preparing the annual accounts, the business strategy is talked over.

Some of the small firms also mention that – with the aid of the tax advisor or the chartered accountant – they already have written down considerations for risk management. In general, it was initiated by the lending bank that had demanded efforts with respect to contingency regulations and related issues.

This explains why many of the participants asked the interviewer how he would judge the existing business planning or their risk management approach. It can be observed that the firms feel high pressure by the banks. Nearly all interviewed firms reported increasing requirements considering business planning and controlling. They have also been addressed directly whether a risk management system exists.

As external support, the firms most frequently draw on a tax advisor. Then a certified chartered accountant and a management consultant follow. Many micro and small firms report negative experience with management consultants. The

consultants did not do much for the company, they did not deal at all with the business structures, and the solutions they offered could hardly be implemented.

Micro and small firms often have only one managing director, the owner itself. He controls the entire business, has all essential figures in his mind and an overall view because of his experience regarding markets and his industrial sector. As many discussions revealed, in his mind he already carries out a good risk management. The owner collects essential data from the employees and treat them to form an overall picture.

It is remarkable that the owner does not intensively deal with assessing and monitoring single risks but he rather focuses on deriving the entire risk position of his acting in the business environment. Here the problem arises how to integrate the various risk categories with their mutual interdependencies to assess adequately the entire risk position. Also a systematic documentation, which may allow to study time development, is lacking. In the interviews the participants often mentioned that they do not know how to manage the flood of information.

Another existential risk becomes apparent if the owner-manager is unable to act for some weeks. Since everything is oriented towards the owner-manager, in this case the firm itself would also be unable to act. A complicating factor is that often there are no regulations with respect to authority to sign or power to represent.

Considering succession regulations, the situation is even more dramatic. In many of the interviewed firms, the owner-manager is relatively old, and up to now no regulations have been fixed to solve the succession problem. This is the same within all size classes. Often the interviewees reported that they had no time to deal with the problem or that the family had no possible successor or that the children showed no interest to take over the business. The bank regularly stresses the issue of succession during the meeting where the annual accounts are discussed.

In general, medium-sized firms work all over Germany. Some have started exporting and are willing to expand. Thus they try to escape pricing pressure since the domestic markets are facing heavy competition. The requirements by Basel II are also felt, but not so strongly as in the case of small firms. Again the owner-managers have less knowledge and less instruments of business management, but they are willing to make use of the support by management consultants.

Medium-sized firms told that they would like to take advantage of the support of regional universities. They expressed surprise that they offer so few seminars or training courses for employers. Concerning the costs, they would expect a more moderate pricing. Professional supplier of seminars are seldom selected, the costs often being 1,500 Euro or more per day, not including costs for travelling and accommodation. Medium-sized firms reported that they recently had employed graduates from regional universities, whose main topics were the improvement of business planning and controlling.

The interview results clearly indicated that owner-managers lack business management knowledge and thus utilize less elaborated management techniques.

On the other hand, it can be stated that owner-managers who have great interest in problems of business management, intensively deal with the issues and frequently request external support. Unfortunately, this kind of owner-manager is seldom found in micro and small firms. As one of them said:

No. 7 (small construction firm, engineer by profession): “I have studied mechanical engineering, and before founding my firm I was head of production planning in a large mechanical engineering firm. I am very much interested in issues of business management.”

An owner-manager also judged external support with the business planning being positive:

No. 8 (medium-sized trade firm, master craftsman): “It has proved to be helpful to use external support for establishing the business planning. Together with the management consultant, we quarterly do an analysis of profit and finances.”

Risk Taking

As various studies point out (see, for example, Turpin, 2002; ICAEW, 2005), SMEs differ from very large firms in that they present a stronger “pro-risk and entrepreneurial spirit approach,” which means that a risk taking culture dominates.

With respect to risk taking behaviour, the interviews could confirm this finding only for micro firms. These firms mainly had not fixed a risk strategy, let alone had they written down such a strategy. The discussion showed that they often had just started their business activities. Seminars for start-up firms had not been visited. Based on their experience from former activities as an employee, they had started with a promising business idea. All micro firms stated that the situation

with respect to competitors has become much worse and that it is necessary to work out a formal business strategy.

The interviews revealed that in the founding phase often no systematic risk management had been carried out. Being so convinced by their ideas, some risks had not been recognized at all. Two of the interviewed micro firms will have to close in the near future. The managing directors admit that they did not realize early enough the risky development of their firm. In both firms numerous projects have been terminated with a loss, which became apparent too late and which endangered the liquidity of the entire company. Because of a permanent shortage of liquidity insolvency will have to be declared.

For small and medium-sized firms a risk taking behaviour cannot be confirmed. These classes do not follow a dominating risk taking approach such as micro firms. Medium-sized firms more intensively weigh whether a certain business strategy should be followed or not, concerning the associated risks. The considerations are made by the board of directors. The risk awareness level of small and medium-sized firms can already be judged as good, but often suitable methods for risk evaluation are lacking. Their risk strategy is more formalized, but often not documented.

With respect to risk avoidance, differences between owner-managed and other firms could not be detected.

An explanation are certainly the cultural differences regarding the attitude toward risk and uncertainty. The studies mentioned in the literature review (see, for example, Section 2.5) deal with Great Britain and USA. Hellier et al. (2001, p. 89) also point out that still more studies of different countries are needed, since the cultural factor considerably influences the risk behaviour of managers.

Large firms have established and documented a more formal risk management. On the one hand, it is a consequence of being part of a group. On the other hand, the interviews showed that a formal risk management is demanded by major customers. A risk management system may also be required by legal regulations, as, for example, in the drug industry.

The two very large firms have been included in the interviews, since at the time of the postal questionnaire in 2002, both had less than 499 employees. Having set up branches in foreign countries and having bought other companies, they now belong to the class of very large firms. Comparing with their risk management as

examined by the questionnaire, both firms have very strongly improved. This holds especially for the risk management organization and documentation. With respect to risk assessment, they have become considerably more systematic. Both firms have no designated risk manager, and they do not plan to establish one. Risk management tasks are assigned to the controlling function.

The head of the controlling function of a very large firm commented:

No. 10 (very large firm, other sector): “One has fulfilled the legal regulations, but I have the feeling that risk management is not really ‘lived’ by the staff. Responsible staff fill in the risk recording sheets and hand them over to the controlling function. But nevertheless, observing and monitoring the risk being assessed is in parts not done correctly. Here considerable propaganda work still has to be done.”

Establishing Risk Management

The main reasons for having established risk management only rudimentarily, in all size classes the following issues could be detected:

The managing director is lacking time, and there are no qualified employees to whom the tasks could be delegated. For micro and small firms it could also be stated that the owner does not like to delegate, in order not to lose overview. This is typical for owner-managed firms.

Having often a technical educational background, the managing director has difficulties to understand the business management terminology. For example, an owner-manager with a degree in mechanical engineering noted:

No. 12 (micro construction firm, sole proprietorship): “Why must business management types make everything so complicated and then lard a German speech with English terminology so that one does not understand even simple things.”

The lending banks also do not supply much support. The interviewed firms complain that the banking staff does rarely visit the firm and partly does not understand the business.

All interviewed firms feel an increased pressure with respect to prices and competitors, in particular as a consequence of the extension of the EU. So there is not much time left for conceptual problems such as strategy and risk management.

It is worth noting that the firms are aware of their weaknesses, regarding business planning and risk management, but they do not know exactly how to improve. It is not only a problem of resources, but also a problem of know-how, especially for

micro and small firms. If a management consultant is involved regularly (which in micro and small firms is just not the case), a clear improving of planning and business management knowledge can be seen.

Relationship to the Bank/Basel II

The discussions with the managing directors clearly indicated that the German KonTraG law with its spill-over effect exercises little pressure on the interviewed firms. So it did not provoke essential improvements of business planning and risk management.

In advance, the Basel II regulations (coming into force on 1 January 2007) have led to much more pressure on SMEs, which has been confirmed by the interviews, affecting especially small firms. Since German SMEs are to a large degree financed by banks (see Hall et al., 2004), in many interviews the worrying was expressed of no longer satisfying the requirements of the lending bank. The firms fear that they might get no more credits or that even long standing relationship with the lending bank might be terminated. So a risk management system will become an essential prerequisite for the bank granting further credits.

Being in parts very dramatic, comments on the relationship to the bank shall be presented in more details. Regarding Basel II, one must note that micro firms do not come under these strict regulations (Anonymous, 2006, p. 63). But the interviews made clear that, as a consequence of their granting policy, the lending bank demands also from micro firms an improvement of controlling.

In this context, one owner-manager claimed:

No. 2 (micro trade firm, master craftsman): “According to the bank, the company does not satisfy the rating criteria nor the balance sheet ratios. In the past, an annual preparing of turnover planning and the annual accounts were sufficient. At present, we quarterly must present to the bank a managerial analysis. The bank has brought in a management consultant to analyse the situation of the company and to improve controlling.”

Another owner-managed firm was forced to look for a new lending bank:

No. 3 (small firm, other sector): “The relation to the bank dates back to 15 years. then the bank informed us that our industrial sector will no longer be promoted and that we would not be granted any more credits. The current overdraft facilities will be maintained until we will have found a new lending bank. In addition, since some time the bank had increased the requirement on business planning and on risk management.”

The comment of the following firm highlights the importance of risk management as a basis for a good relationship with the lending bank:

No. 19 (micro consulting firm, owner-managed): “Last year the bank spoke to us about risk management, with requiring detailed papers. In particular, the insufficient business planning was criticized: not detailed enough and too short-term. Also for the first time they asked whether a contingency planning exists.”

The following two quotations are examples of those few firms that report on a good relationship with their lending bank. Both firms stand out for a well-developed business planning and a regular general reporting. They also pursue a very proactive management of the bank relationship, i.e. on their own accord they make contact with the bank to inform about the company’s development.

No. 8 (medium-sized trade firm, owner-managed business, master craftsman): “At the moment we have no problems with our bank. At present we make profit, and the bank is very satisfied with the reporting presented. But in the case of loss, the relationship with the bank can quickly become the opposite. Small and medium-sized firms in Germany have a very low equity capital ratio, and if a loss is threatening the bank uses to be very cautious. This is expressed in the bank’s needs for information. They request papers in shorter intervals, and there are discussions with the banking staff also more frequently within the financial year, which, in other circumstances, is not often the case.”

No. 13 (small high technology firm, managing director, doctorate in information technology): “The relationship to the bank can also be judged positive, since essentially all new investment have been financed with equity capital and hardly bank loans were needed. Because of the stock market flotation planned in the near future we already prepare quarterly balance sheets voluntarily and present them to the bank. Our firm also has a comprehensive business planning and a good reporting, which the bank has judged very benevolent.”

Maintaining a good relationship and information policy with respect to the lending bank will become essential for the managing director. Regarding shareholders, he will face personal liability if he violated his care of duties and thus failed to act in the company’s best interest (see for example Hennrichs, 2006).

6 Types of Risk Management Practices Derived from Questionnaire and Interview Scoring

The aim of this chapter is, built on the scoring results of the questionnaire (Chapter 4) and the interviews (Chapter 5), to develop a typology for the evaluation of risk management practices for SMEs (Section 6.1). It draws on the type terminology of Miles and Snow (1978, 2003), by relating a type with certain sets of scoring figures. After the theoretical presentation of the risk management types their practical substantiation is developed by describing examples of companies which participated in the interviews and, partly, also in the questionnaire (Section 6.2).

6.1 Types of Risk Management Practices

The typology for risk management practices to be developed (Section 6.1.1) refers to an approach of Miles and Snow (1978, 1984, 2003), originally proposed for the classification of organizational behaviour. The Miles and Snow approach has inspired the author of the present thesis to make it applicable for the identification of types of risk management practices. Using the Miles and Snow approach as a “shell”, this thesis presents a framework for a comprehensive assessment of risk management capability, leading to the identification of three types of risk management practices. Such a typology approach dealing explicitly with different aspects of risk management is a new contribution to the field of risk management.

The classification of the risk management types will make use of the scoring variables constructed in Sections 4.4.1 and 5.3.1. By merging the central ones of the original four types, a classification as reactor type (Section 6.1.2), defender/prospector type (Section 6.1.3) and analyser type (Section 6.1.4) is introduced with a detailed description of its characteristics. These type descriptions have been derived from the questionnaire and interview findings, with regard to the various aspects of a holistic risk management. To extract a description of a type determinant, formal scoring evaluations have been brought together with an overall assessment of selected questionnaire and all interview cases. The assessment has been carried out by an in-depth personal inspection of a randomly drawn subsample of 65 of the original questionnaires and by an in-depth analysis of all interview transcripts and notes. The type definitions will each be illustrated

in a quantitative way by some examples of corresponding scoring patterns (see Tables 6.1 to 6.3).

A summary of the types identified by scoring patterns follows, both for the questionnaire and the interview results (Section 6.1.5). Finally, the risk management types are examined with respect to demographic and uncertainty variables (Section 6.1.6).

6.1.1 Typology Approaches for Organizational Performance

Miles and Snow (1978, 2003) introduce the following four types to classify organizational performance of companies:

- reactor
- defender
- prospector
- analyser

According to this classification, the reactor has no viable strategy; his further development or even his survival is critical. On the other end of the “continuum”, the analyser is prepared most effectively to respond to the dynamics in the business environment.

To assess the respective types of organizational performance, Miles and Snow use the following dimensions:

Context

The operating environment of the organization, measured in terms of environmental turbulence, environmental predictability, technological routinization, technological interdependence and company size.

Strategy and Structure¹

The form of the organization assessed through measures of formalization and environmental scanning. The strategy dimension contains the corporate business policy, measured in terms of product-market development, focus on efficiency, scope, strategic clarity and futurity.

¹ Originally two separate dimensions (Miles and Snow, 2003, pp. 21-28)

Effectiveness

Assessed along the issues resource acquisition, efficiency, human relations, quality and costs.

Smallman (1996, p, 20) applies Miles and Snow's dimensions and designs a research programme how to estimate organizational performance in connection with risk management.

In his assessment of the sophistication of the risk management, Smallman (1996) focuses on the classifications known to the literature. These are the "reactive or fatalistic" approach and the "proactive or holistic" approach to dealing with risks (see Section 1.2). The reactor and defender types are allocated to the reactive approach (p. 14) while the prospector and the analyser belong to the proactive approach (p. 21). Up to the present time (2006) no empirical basis and no detailed description and classification has been established for Smallman's (1996) approach (Section 2.6).

In the present thesis Miles and Snow's scheme (1978) is reduced to a classification of businesses into three types. As justified by the scoring approach (see Sections 4.4 and 5.3), for an assessment of each of the risk management components three categories are adequate. Extending this 3-category differentiation to the overall assessment of risk management capability by simultaneous consideration of the single risk management components led to the merging of the two central types of Miles and Snow into one, called the defender/pro prospector type. Thus the original four have been reduced to the following three types:

- reactor
- defender/pro prospector
- analyser

These risk management types are classified according to the following dimensions:

- strategy and structure
- business planning
- performance measurement
- risk management process
- risk management organization
- project risk management

The components of a holistic risk management are completed by the general dimension “strategy and structure”, which appears in the original typology approach to organizational performance. The original “context” and “effectiveness” dimensions are covered to some degree by the component of “risk management organization”.

The risk management types will be characterized by similar scoring patterns (Section 3.5). Similarity of scoring patterns is not defined in a mathematical way; it is due to a classification by the investigator, according to the general descriptions (see Tables 6.1 to 6.3).

6.1.2 Reactor

The assessment of the reactor type of risk management practices is presented in Table 6.1. To facilitate the handling, some examples of reactor type scoring patterns have been added to the description. The examples are very typical patterns or have occurred very frequently in the questionnaire and interview scoring analyses (see also Tables 6.6 to 6.9).

Table 6.1 Determinants of the Reactor Type

Strategy/Structure	Business Planning	Performance Measurement	Risk Management Process	Risk Management Organization	Project Risk Management
Description of Reactor Type Determinants					
Lacks a coherent business strategy (“event-driven”). Operates in mature markets. Less innovative industrial sector. No business growth and declining turnover. Strong reservations against management consultants.	No formal planning methods. Mostly, only an annual sales plan is developed. Does not look ahead. Accounts and financial statements are prepared externally.	No sophisticated performance measurement tools.	Identifies only very specific risks, which they are familiar with. Short-term risk time horizon. No formal risk reporting procedure. No link of business planning and risk management.	Risk strategy: risk retention and risk insurance dominating. Weak environmental scanning. Little formalization of the responsibilities for risk management, which is concentrated towards the managing director. Informality, no sophisticated risk assessment methods. Quantitative techniques dominating. Clear deficits in replacement regulations and succession planning.	No classic project planning tools. Exercises for projects only a cost calculation. No consolidation of single project results possible. No formal risk assessment techniques employed. Risk considerations only take place in the proposal phase. Weak risk documentation. The management is not aware of the total risk position the company faces from the projects undertaken.
Examples of Reactor Type Scoring Patterns					
Pattern 1	Low	Low	Low	Low	Low
Pattern 2	Moderate	Low	Low	Low	Low
Pattern 3	Low	Low	Moderate	Low	Low
Pattern 4	Low	Low	Low	Low	Moderate
Pattern 5	Moderate	Low	Moderate	Low	Low

The determinants of the reactor type, as summarized in Table 6.1, shall now be described in more detail.

Strategy and Structure

As the present investigation has revealed, micro- and small firms are heavily represented in the reactor type. The reactors are often owner-managed firms. The owner-managers mostly have a technical education and qualification. Few of the companies are certified to the ISO/QM standards.

These companies are largely to be found in sectors with low growth and low innovation potential. Their products and services also involve a mature technology. The management strategy has not been set down in writing. Some of the companies do not have any strategy at all since the business sector is declining and no improvement is in sight. The companies are looking for new business opportunities. It would be in one of the main sectors such as construction and trade/service/logistics, markets being dominated by intense competition. Often the only way to adapt is by modifying the price.

It is noticeable that banks put an increased pressure on reactors to improve their management systems.

Business Planning

There is no long-term planning system. Reactor type companies do not make any combined financial planning, balance sheet planning and profit planning. All that they actually execute is a rudimentary annual sales plan. In preparing it, the data from the preceding year's annual financial statement are processed. A permanent "target/performance" comparison for the development of the results almost never takes place.

Performance Measurement

Reactors do not employ instruments such as Balanced Scorecard, shareholder value or knowledge management. The preference is to work with simple business management techniques. Most frequently benchmarking, SWOT analyses and portfolio techniques are applied (see Section 5.2.4). These instruments are often not applied in their pure form and often not used continuously.

Risk Management Process

Reactors appraise only a few risks in the risk fields to be identified. The main ones here are the financial risks, and specifically the creditworthiness of the customers. Risks arising from the business processes follow. Risk identification and assessment is carried out once a year. The risk forecast period is also usually one year, or is described as “open-ended.” The top management is informed of the risks through the normal reporting procedure.

In the reactor type companies there is no link between risk management and the business planning since often there is no business planning at all. Even where a business planning does exist there is still no direct link between risk management and the business planning.

A reactor does not have available a summary overview of risks (risk mapping) and therefore cannot estimate the total risk position the company faces.

Risk Management Organization

The top management alone is responsible for the establishment and development of the risk management system. The risk management is scarcely formalized and only exists in the manager’s head. Up till now the risk management has almost never been documented.

The top management alone is responsible for the ongoing risk assessment. To assess the risk position, the managing director frequently asks the employees for important data, a procedure which mostly is carried out not very systematically and not continuously.

As a rule, there is no special software support for risk management. Software support at best is limited to standard office applications. Investment expenditure is not planned.

Strong weaknesses are found with respect to replacement and succession regulations. This may become crucial for a company to survive, a fact that also applies to the lacking planning and monitoring systems.

The regulations dealing with replacement and contingencies are defective. Where an contingency plan does exist, as a rule it only concerns the data processing systems.

Project Risk Management

Reactors do not utilize any project management techniques. The companies also rarely make any operational project planning. If such an operational project planning takes place, in general no project-specific techniques are applied. Most frequently an ongoing monitoring of projects for budgeted costs is carried out (see Section 5.2.5.3).

This may lead to the great danger that reactors are not able to estimate the actual profit and liquidity position of the projects being worked on. As the research interviews have revealed, many firms recognized not until the termination of a project that they suffered a loss, which could especially be stated for micro firms.

Considerations of project risk are made for the greater number of individual projects, although it is carried out in a very informal manner. In general, a written documentation of the risks being assessed does not exist. Essentially risks are assessed during the proposal phase. Risk assessment during other project phases is rather seldom.

A maximum of three risk categories are considered in the types of project risk. These include special risks arising from business processes, planning and design risks and credit risks.

The project risks are usually documented in the bid documents and the contract documents. Documentation in the project cost calculation follows.

No reactor of the surveyed firms was able to evaluate its total risk position.

6.1.3. Defender/Prospector

In contrast to Miles and Sow's typology approach (1978), the number of types has been reduced from four to three ones, by merging the central defender and prospector types (Table 6.2).

Table 6.2 Determinants of the Defender/Prospector Type

Strategy/Structure	Business Planning	Performance Measurement	Risk Management Process	Risk Management Organization	Project Risk Management
Description of Defender/Prospector Type Determinants					
Stable and less innovative industry. Controls secure market niches. Little or no product-market development. Stress efficiency of operations. Maintains its traditional approach in the face of environmental changes. Greater use of external support.	Less sophisticated formal planning methods. Long-term and short-term profit and liquidity planning exists. Medium-term planning horizon. Little use of forecasting methods. Accounts and Annual Financial Statements are prepared in-house.	No sophisticated performance measurement tools. Shows greater openness towards modern instruments of performance measurement (e.g. BSC, shareholder value). Regards the traditional performance measurement systems (such as ROI) they reveal no significant difference in the application of these instruments with respect to the reactor.	Slight improvements, when compared to reactors. Familiar with a narrow set of well-identified risks. Also some consideration of strategic risks. Without considering all risks, it can rush into costly failures. Risk assessment frequency and time horizon reveals minor improvements with respect to the reactor type. Risk reporting and link of risk management to business planning displays weaknesses.	Limited environmental scanning. Risk strategy: Risk retention and risk transfer. Initial contingency and replacement planning. Weak succession planning. Informality, no sophisticated risk assessment methods. Quantitative methods dominating.	Easy to use project management tools, such as Gantt charts, project budgets are employed. No formal application of project risk management tools. Great reliance is placed on experience as a means for risk assessment. Not to be able to determine the total risk position of the entire company.
Examples of Defender/Prospector Type Scoring Patterns					
Pattern 1	Moderate	Low	Moderate	Low	Low
Pattern 2	Moderate	Low	Moderate	Moderate	Low
Pattern 3	Moderate	Moderate	Moderate	Low	Low
Pattern 4	Moderate	Low	Moderate	Low	Moderate
Pattern 5	High	Low	Low	Low	Low

Strategy and Structure

In terms of company size the midway defender/prospector position mainly relates to small firms. It also includes some of the medium-sized firms. The medium-sized firms show a certain level of potential development, but it is not sufficient to be able to consider them as the analyser type.

A main focus in the industry sectors covered cannot be clearly identified here. The companies are active throughout Germany and only a rather low share of their activities is export-related. They are situated in a dynamic external business environment. The competitive situation has become noticeably worse. The companies must compete intensively with new micro- and small-firms entering the market. In most cases the technology dealt with is mature and no longer has any great potential for further development. The level of education of the managing directors is in most cases a university degree. The companies also make greater use of external support from consultants.

In some cases significant losses have also been experienced. They mainly involved the loss of important customers, losses due to bad debts and failed product developments. The relationship with the bank has noticeably worsened. The bank is now placing significantly more requirements on the business planning and controlling.

Business Planning

Business planning is much better arranged here than with the reactor type. All companies have a long-term profit planning. They also often have long-term financial plans. However, a balance sheet planning and integrated business planning systems hardly exist at all. The time horizon is generally between 2 and 3 years. Short-term (less than one year) business planning and liquidity planning is carried out, although only in a rudimentary form. Simplified systems are used, particularly for the liquidity planning; in the most extreme cases it simply involves monitoring the balance of the bank accounts. Defender/prospectors do not have a controlling function. The business planning is prepared by the top management together with staff from the accounting unit. Instruments such as scenario planning and what-if analysis are not found.

Performance Measurement

The simple business management methods clearly predominate in the performance measurement, although it is noticeable that the companies at least show a greater degree of openness towards value-oriented instruments than the reactor type. Concerning classic instruments of performance measurement, there is no different ranking when compared to the reactor type. The research interviews revealed that the instruments are used to a slightly greater extent.

Risk Management Process

There is a considerable improvement in the risk management organization compared with the reactor type but the risk management process in the defender/pro prospector type presents an equally poor picture.

A small improvement compared with the reactor type can be seen in the risk categories to be identified. Strategic risks are also assessed to an increased degree. Predominant are the market risks, financial risks and risks arising from the business processes. To some extent qualitative risks are also identified.

Risk identification and assessment is carried out once a quarter. Defender/prospectors see more necessity than reactors to carry out risk assessment more than once a year. However, the review of risks is largely an oral process involving meetings between the top management and the heads of functions. The formal implementation has clear weaknesses. The risk forecast period is as a rule either one year or is open-ended. The normal reporting procedures are chosen for the risk documentation.

The link between business planning and risk management is certainly somewhat better developed but there is no direct integration of the risk figures into the business planning. The companies make a note of the risks identified in the related planning documents. A risk overview (risk mapping) to estimate the total risk position of the company is not possible to prepare. This also has significant impact on the enterprise's risk monitoring.

Risk Management Organization

So far no formal risk management has been set up. Generally speaking, the top management alone is responsible for the establishment and development of the risk management system. While it is possible to identify a high level of risk awareness, the risk management is not very formalized and thus widely implemented.

The risk identification and evaluation process is somewhat more formal than for the reactor type although no special statistical procedures are used. The procedures for risk identification are predominantly checklists and questionnaires. Risk assessment still concentrates on the board of directors but the heads of the functional areas also participate to some extent. The final decision how to handle the risks is made by the managing director, relying strongly on experience, as the research interviews have shown (see Section 5.2.5.2).

There is little formal guidance on documenting of the risk management. No comprehensive contingency plan is available. Although as a rule a contingency plan for the IT unit is available. There are large deficits in terms of the regulations on replacement and successorship. Here too the question of rules on representation should the managing director be absent for a longer period of time presents a considerable problem. Further few companies have any plans for successorship.

Project Risk Management

The degree of formalization of the project management techniques used is higher than with the reactor type. Besides business project planning (which concentrates on project profit-planning), a capacity and activity plan is also prepared. For these tasks the company mainly draws on Gantt charts.

Consolidation of single projects is only very rarely present and even then it is only implemented in a rudimentary manner. As the research interviews have revealed the consolidation is mainly manually carried out if requested by the managing director. Most frequently it is based on the budgeted profit statement. A liquidity statement occurs less since it needs more efforts to be established (see Section 5.2.5.3).

Considerations of project risks are done for the great majority of individual projects. They largely take place during the proposal phase. In terms of project risk types, the major risks identified are design and construction risks and credit risks.

Great reliance is placed on experience and checklists as means for identifying and assessing the risks. Formal procedures such as Failure Mode and Effect Analysis are not exercised.

Documentation of the project risks is made in the bid documents and the contract documents, followed by the project cost calculation.

The single projects are not consolidated in terms of the risk aspects. Neither do the companies know what their overall risk position is. As the interviewed firms pointed out, here is the greatest need for action (Section 5.2.5.3).

6.1.4 Analyser

The determinants of the analyser type of risk management practices are displayed in Table 6.3.

Table 6.3 Determinants of the Analyser Type

Strategy/Structure	Business Planning	Performance Measurement	Risk Management Process	Risk Management Organization	Project Risk Management
Description of Analyser Type Determinants					
Predominantly proactive approach. Growth-oriented objectives and stress of innovation. Early adopter of successful innovations of its competitors. Prefers stability and limited adaptability. Risk averseness. Draws on external support (e.g. auditor, tax adviser and management consultant).	Sophisticated formal planning systems. The various subplans are linked together. Long-term planning horizon. For the short-term planning a detailed profit and liquidity planning is implemented.	Sophisticated performance measurement tools. Application of modern instruments of performance measurement, for example the Balanced Scorecard, the shareholder value and use of a knowledge management system. Also intends to use this instruments for risk management purposes.	Considers all types of risk facing. Long-term risk perspective. Risk reviewing frequency at shorter time intervals. Link of risk management to business planning highly advanced.	Broad environmental scanning. Risk strategy: risk avoidance, risk prevention, risk reduction, risk transfer, risk insurance. Responsibilities of risk management implementation and development is assigned to the controlling function and other functions. Highly sophisticated risk assessment. Combines qualitative and quantitative methods. Scenario planning. Greater involvement of employees for the risk assessment. Comprehensive contingency and replacement regulations.	Employment of classic project management tools such as network diagram and critical path method. Project planning for the majority of projects carried out. Sophisticated project risk management tools, especially failure mode and effect analysis. Begins to develop a single project risk consolidation.
Examples of Analyser Type Scoring Patterns					
Pattern 1	High	Low	Moderate	Low	Low
Pattern 2	High	Moderate	Moderate	Low	Low
Pattern 3	High	Moderate	Moderate	Low	Moderate
Pattern 4	Moderate	Moderate	Moderate	Low	High
Pattern 5	High	High	Moderate	Low	Low

Strategy and Structure

As the present investigation has revealed, the analyser type includes medium-sized and large companies. Analysers have largely an "other" type of management. In owner-managed businesses often another employee manager is present. In the analyser type the managers mostly have a university-level education. The companies are all ISO-certified.

The analysers are to be found in sectors with growth and innovation potential. They have a clear business strategy which for the most part has been set out in writing. Increased use is made of external advisors for questions concerning business strategy and business management. The analysers are predominantly to be found in the engineering industry and in information technology. The companies' competitors are mainly larger companies and so they operate a niche strategy, with which they are relatively successful.

The relationship with the bank can be described as good. The companies have well-developed business planning systems. Rules covering replacement and contingencies are available.

Business Planning

Analysers have a long-term business planning. The most comprehensive planning systems can be found here. They include a profit plan, financial plan and balance sheet plan (see Sections 4.3.1 and 5.2.3). The sub-plans are linked together. Fully integrated systems can only be found in the large firms. The planning horizon is 3 to 4 years. The short term planning involves preparation at regular intervals of a profit- and liquidity plan. Instruments such as scenario planning and what-if analysis are also applied.

Performance Measurement

Analysers make use of instruments of value-based management. These instruments are also applied for considerations of risk management. The Balanced Scorecard takes on a predominant position here. The outcomes for the other classic instruments of performance measurement do not differ essentially from the other two types, but there is a tendency toward a more formal and more continuous application.

Risk Management Process

Analysers identify many more risk fields than all other types. On average they consider 6 risk fields. Greater effort is also made to identify qualitative risks.

In terms of the frequency of risk identification, short-term considerations clearly predominate. As a rule the risks are checked once a quarter or once a month. The risk monitoring horizon concentrates on a period of up to 2 years. Analysers clearly have the longest risk forecast from all risk types. The identified risks are also directly integrated into the business planning, which is made easier by the well-developed business planning. The information for the top management on the observed risks and their development is largely made by means of the ongoing reporting procedures or, in the large firms, by means of a separate risk reporting procedure.

The analysers aspire to prepare a risk portfolio to estimate the company's overall risk position, although it has not been implemented so far. With high priority, the analyser makes great efforts to implement a risk portfolio (see Section 5.2.5.1).

Risk Management Organization

Within all types, analysers have the most advanced and the most formalized risk management organization.

It is noticeable that the responsibilities for setting up and monitoring the risk management are shared between a much larger number of personnel. There is a sharp reduction in cases where the top management has sole responsibility, and greater use is made of involving the controlling function and the head of the accounting unit for risk management tasks (see Sections 4.3.3.2 and 5.2.5.2). A clear size effect comes into play here since as a rule the micro and small firms do not have such functions. The risk management is also much more formally documented (written down). The documentation often forms part of the quality management manual.

Risk identification involves a much more formal process, with questionnaires and checklists. To some extent risk workshops are also held; they involve the personnel responsible from the various company units and are chaired by the controlling function. Worksheets are utilized for the risk evaluation, with verbal descriptions for the probability of occurrence and exposure to risk. Mathematical/statistical distribution functions are not found here.

The analyser also assigns many more personnel to the continuous risk identification process. The controlling function and the employees from other units are more strongly involved in the management of risk.

Analysers have contingency plans for production and electronic data processing. There are also clear rules available on replacement for the top management. Analysers also deal more intensively with succession planning, with most firms already having established regulations.

Project Risk Management

The analysers employ classic project management techniques. They also prepare an operational project plan in the form of a profit and liquidity plan. Thanks to the

well-developed business planning, the companies are able to integrate the project planning into the overall business planning.

Project risks are taken into consideration for the greater number of individual projects. The types of project risk identified include risks from business processes, planning and design risks, credit risks, quality risks and legal risks. The identification of risks occurs during the bid and planning phases.

More formal procedures are implemented for the identification and assessment of the risks than with the other company types, and greater use is made of the Failure Mode and Effect Analysis method.

The documentation of the project risks is made much more comprehensively. On average several documentation sources are combined (proposal and contract documents, project cost calculation and project controlling).

Only to some extent the single projects are consolidated in terms of the risk aspects. Among all issues of project risk management the project consolidation has the greatest weaknesses, and here analysts see the greatest need for action (see Section 5.2.5.3).

6.1.5 Summary of Types Identified by Scoring Patterns

The type classification presented in the preceding sections will now be used to unveil how the companies from the present empirical investigation are distributed across the three types of risk management practices. This will be done for the scoring approaches to both the questionnaire data and the interview data of Chapters 4 and 5, respectively.

According to the descriptions of Sections 6.1.2 to 6.1.4, the scoring patterns are associated with the respective risk management type reactor, defender/prospector or analyser. The details are displayed in Tables 6.6/6.7 (for the questionnaires) and Tables 6.8/6.9 (for the research interviews).

As a summary of Tables 6.6/6.7, the following Table 6.4 displays the distribution of the three risk management types in the case of the questionnaire scoring. The various scoring patterns occurring only with frequency 1 have been neglected in assigning a type, leading to a type evaluation of 97.3% (general risk management) and 87.3% (project risk management).

Table 6.4 Questionnaire Results: Frequencies of the Types of Risk Management Practices

Type of risk management practices	General risk management		Project risk management	
Reactor	102	46.6%	34	20.5%
Defender/Prospector	52	23.7%	77	46.4%
Analysers	59	26.9%	34	20.5%
Pattern not evaluated	6	2.7%	21	12.7%
Total	219	100.0%	166	100.0%

Concerning general risk management, the defender/prospector and the analyser type both make up about a quarter, while the reactor type clearly dominates with nearly the half of all patterns. On the contrary, project risk management reveals the reactor and the analyser type to have nearly the same share, with the frequency of the defender/prospector type being about twice.

Given the relatively small number of research interviews when compared to the questionnaire sample, in this case the type evaluation is carried out for all occurring scoring patterns (Table 6.5).

Table 6.5 Interview Results: Frequencies of the Types of Risk Management Practices

Type of risk management practices	General risk management		Project risk management	
Reactor	21	55.3%	13	50.0%
Defender/Prospector	10	26.3%	7	26.9%
Analysers	7	18.4%	6	23.1%
Total	38	100.0%	26	100.0%

Regarding the interview results, the type distributions of general and of project risk management reveal a similar structure, which in turn resembles that of general risk management in the questionnaire case. Thus for the questionnaire results the type distribution of project risk management appears to be an “outlier” within all type distributions of the Tables 6.4 and 6.5.

The following detailed Table 6.6 presents the distribution of the scoring patterns of general risk management, as resulting from the questionnaire survey of Chapter 4, together with the assigned types of risk management practices.

Table 6.6 Questionnaire Results: Frequencies of General Risk Management Types Identified by Scoring Patterns

Type of risk management practices	Business planning	Performance measurement	Risk management process	Risk management organization	Frequency	Percentage	Cumulative percentage	Rank
Reactor	M	L	M	L	55	25.1%	25.1%	1
Reactor	M	L	L	L	33	15.1%	40.2%	2
Defender/Prospector	M	M	M	L	24	11.0%	51.1%	3
Analysers	H	L	M	L	21	9.6%	60.7%	4
Defender/Prospector	H	L	L	L	13	5.9%	66.7%	5
Analysers	H	M	M	L	12	5.5%	72.1%	6
Reactor	L	L	L	L	7	3.2%	75.3%	7
Defender/Prospector	M	L	M	M	7	3.2%	78.5%	7
Reactor	L	L	M	L	5	2.3%	80.8%	9
Analysers	H	L	M	M	5	2.3%	83.1%	9
Analysers	H	H	M	L	5	2.3%	85.4%	9
Defender/Prospector	M	L	H	L	3	1.4%	86.8%	12
Analysers	M	M	H	L	3	1.4%	88.1%	12
Analysers	H	L	H	L	3	1.4%	89.5%	12
Defender/Prospector	H	M	L	L	3	1.4%	90.9%	12
Reactor	L	M	M	L	2	0.9%	91.8%	16
Analysers	M	M	H	M	2	0.9%	92.7%	16
Defender/Prospector	M	H	M	L	2	0.9%	93.6%	16
Analysers	M	H	H	L	2	0.9%	94.5%	16
Analysers	H	L	H	M	2	0.9%	95.4%	16
Analysers	H	M	M	M	2	0.9%	96.3%	16
Analysers	H	M	H	L	2	0.9%	97.3%	16
Pattern not evaluated					6*1	6*0.5%	100.0%	23
Total					219	100.0%		

L = Low, M = Moderate, H = High

As Table 6.6 indicates, there is a clear trend within the scoring patterns. The 6 most frequently occurring patterns already cover 72.1% of the recorded patterns. They are to be discussed in greater detail.

The most frequently occurring scoring pattern (M, L, M, L) is associated with reactor type firms (25.1%). Business planning has an average value. Systematic methods of performance measurement are hardly applied. Risk management is still in its infancy; the risk management process has not been comprehensively established, the risk management organization has few formal regulations.

Rank 2 with a share of 15.1% is occupied by the pattern (M, L, L, L) and also viewed as reactor type, with average business planning and the remaining scores being low. These firms have not dealt with the subject risk management to a greater extent.

The scoring pattern (M, M, M, L), covering 11.0% of the surveyed firms, comes third and is associated with the defender/prospector type. Three of the four scoring variables indicate medium sophistication. Methods of performance measurement are more formal (or their use is at least planned). Only the risk management organization has considerable deficits.

Assigned to the analyser type, the pattern (H, L, M, L) comes next. Analyser firms have at their disposal a established business planning, which also considers risks. The risk management process is established to a greater extent, while there is still need for action regarding the risk management organization.

Coming next, the scoring patterns (H, L, L, L) and (H, M, M, L) both cover about the same amount of case and are associated with the defender/prospector and the analyser type, respectively. Both patterns have a business planning of high sophistication. The second pattern indicates a more systematic consideration of instruments of performance measurement and a better integration of the risk management process into the general management system; merely the risk management organization needs improvement.

If, where it applies, the scores for project risk management are additionally considered, the patterns of Table 6.7 result.

Table 6.7 Questionnaire Results: Frequencies of Project Risk Management Types Identified by Scoring Patterns

Type of risk management practices	Business planning	Performance measurement	Risk management process	Risk management organization	Project risk management	Frequency	Percentage	Cumulative percentage	Rank
Defender/Prospector	M	L	M	L	M	34	20.5%	20.5%	1
Reactor	M	L	L	L	M	18	10.8%	31.3%	2
Analyser	H	L	M	L	M	12	7.2%	38.6%	3
Defender/Prospector	M	M	M	L	M	11	6.6%	45.2%	4
Analyser	H	M	M	L	M	11	6.6%	51.8%	4
Defender/Prospector	M	M	M	L	H	9	5.4%	57.2%	6
Defender/Prospector	H	L	L	L	M	8	4.8%	62.0%	7
Reactor	L	L	L	L	M	4	2.4%	64.5%	8
Reactor	M	L	L	L	L	4	2.4%	66.9%	8
Analyser	H	L	M	L	H	4	2.4%	69.3%	8
Reactor	M	L	L	L	H	3	1.8%	71.1%	11
Reactor	M	L	M	L	L	3	1.8%	72.9%	11
Defender/Prospector	M	L	M	M	H	3	1.8%	74.7%	11
Analyser	H	L	M	M	M	3	1.8%	76.5%	11
Reactor	L	L	M	L	M	2	1.2%	77.7%	15
Defender/Prospector	M	L	M	L	H	2	1.2%	78.9%	15
Defender/Prospector	M	L	M	M	M	2	1.2%	80.1%	15
Defender/Prospector	M	L	H	L	H	2	1.2%	81.3%	15
Defender/Prospector	M	M	H	L	M	2	1.2%	82.5%	15
Defender/Prospector	M	H	M	L	M	2	1.2%	83.7%	15
Analyser	H	L	H	M	M	2	1.2%	84.9%	15
Defender/Prospector	H	M	L	L	M	2	1.2%	86.1%	15
Analyser	H	M	H	L	H	2	1.2%	87.3%	15
Pattern not evaluated						21*1	21*0.6%	100.0%	24
Total						166	100.0%		

L = Low, M = Moderate, H = High

Analysing scoring patterns including project risk management scores results in a similar picture as in the general risk management case. It is noticeable that within the 5 most frequently occurring patterns the project risk management component has only average scores; the pattern with rank 6 has high scores. This outcome has

already been observed in the questionnaire results in Chapter 4: Project risk management on the level of single projects has been established relatively well, while the consolidation of project risk developments to give the entire risk exposure has still considerable deficits. It is worth while noting that there are relatively few firms with high scores for project risk management.

As already mentioned in Chapter 5, the scoring approaches of the questionnaire and of the interview results do not allow direct comparison. Based on all 38 research interviews, the adapted scoring (for the quantitative results) was again submitted to an analysis of the scoring patterns. All 38 research interviews were also manually assessed with respect to the sophistication of their risk management practices, which confirmed the formal estimation.

The results for general risk management are included in Table 6.8.

Table 6.8 Interview Results: Frequencies of General Risk Management Types Identified by Scoring Patterns

Type of risk management practices	Business planning	Performance measurement	Risk management process	Risk management organization	Frequency	Percentage	Cumulative percentage	Rank
Reactor	M	L	L	L	9	23.7%	23.7%	1
Reactor	L	L	L	L	6	15.8%	39.5%	2
Defender/Prospector	H	L	L	L	6	15.8%	55.3%	2
Reactor	M	L	M	L	5	13.2%	68.4%	4
Defender/Prospector	H	L	L	M	3	7.9%	76.3%	5
Analyser	H	L	M	M	3	7.9%	84.2%	5
Analyser	H	L	H	L	2	5.3%	89.5%	7
Reactor	L	M	L	L	1	2.6%	92.1%	8
Defender/Prospector	M	L	H	L	1	2.6%	94.7%	8
Analyser	H	L	H	M	1	2.6%	97.4%	8
Analyser	H	H	M	M	1	2.6%	100.0%	8
Total					38	100.0%		

L = Low, M = Moderate, H = High

The interview scoring patterns have a similar structure, when compared to the questionnaire scoring patterns. One must take into account that the research interviews allowed a more comprehensive and more accurate assessment of the details of the management subsystems. This may have led to a stricter estimating of the scores than in the questionnaire case. In addition, interview scoring stronger focuses on issues such as the consolidation of project risks; the corresponding weaknesses in turn reduced the scores. The issues of contingency, replacement and succession are specific for the interview results; again the broad deficits resulted in lower scores (in risk management organization).

Finally, the interview scoring patterns including project risk management are displayed in Table 6.9. As with respect to the questionnaire scoring, they apply only to a reduced number of firms.

Table 6.9 Interview Results: Frequencies of Project Risk Management Types Identified by Scoring Patterns

Type of risk management practices	Business planning	Performance measurement	Risk management process	Risk management organization	Project risk management	Frequency	Percentage	Cumulative percentage	Rank
Reactor	L	L	L	L	L	4	15.4%	15.4%	1
Reactor	M	L	L	L	M	3	11.5%	26.9%	2
Reactor	L	L	L	L	M	2	7.7%	34.6%	3
Reactor	M	L	L	L	L	2	7.7%	42.3%	3
Reactor	M	L	M	L	L	2	7.7%	50.0%	3
Defender/Prospector	H	L	L	L	L	2	7.7%	57.7%	3
Analysers	H	L	M	M	M	2	7.7%	65.4%	3
Analysers	H	M	H	L	L	2	7.7%	73.1%	3
Defender/Prospector	M	L	H	L	L	1	3.8%	76.9%	9
Defender/Prospector	H	L	L	L	M	1	3.8%	80.8%	9
Defender/Prospector	H	L	L	M	L	1	3.8%	84.6%	9
Defender/Prospector	H	L	L	M	M	1	3.8%	88.5%	9
Defender/Prospector	H	L	M	M	L	1	3.8%	92.3%	9
Analysers	H	L	H	M	M	1	3.8%	96.2%	9
Analysers	H	H	M	M	M	1	3.8%	100.0%	9
Total						26	100.0%		

L = Low, M = Moderate, H = High

Regarding again the five most frequently occurring scoring patterns, they cover 50.0% of all occurring ones, and they are all specifications of the reactor type.

The largest percentage (15.4%) refers to the reactor type with the pattern (L, L, L, L, L) where all scoring variables have a bad value. Then the reactor pattern (M, L, L, L, M) follows (11.5%). The essential difference with respect to the leading pattern is an improved business planning of average score and an improved project risk management with medium score.

Next come reactors with the patterns (L, L, L, L, M) and (M, L, L, L, L) where all but project risk management or business planning have low scores, respectively; the exceptions have only average scores.

The fifth position is occupied by the reactor type pattern (M, L, M, L, L) which reveals an improvement of the components business planning and risk management process.

Summarizing, the typology introduced and the description of types with the aid of scoring patterns are an adequate way of describing risk management practices in SMEs. The identified risk management types are in different states of development of their management subsystems and thus need respective improvement (see Chapter 7). Across all risk management types, the most need for action concerns

the organization of risk management, its degree of formalization and the deployment of responsibilities.

Scoring Profiles

The average scoring profile of a risk management type is the graphical representation of the means of the scoring variables for this type. To make the values comparable, the original means were transformed linearly to the same interval of 0 to 10, by using the respective theoretical maximum (see Tables 4.32 and 5.21).

The scoring profiles confirm the idea that, on the average, a defender/prospector is “better” than a reactor and that an analyser is “better” than a defender/prospector. There is some exception in the case of the interviews: here, concerning the dimension of performance measurement, the mean score of defender/prospectors is slightly smaller than the mean score of reactors.

The risk management types are derived from scoring patterns, an association which is independent from the sample being considered. In contrast to that, the average scoring profile of a type reflects the respective scoring patterns occurring to make up this type within a concrete sample. So it is not surprising to come upon some outlier means as described above.

All profile graphs are a kind of zigzag line, alternately decreasing, increasing, decreasing, ... (Only in the case of project risk management the interview profiles show a slight deviation from this pattern.) It means that for each type, on the average, the score (normalized with respect to interval 0 to 10) for performance measurement is lower than the score for business planning, the score for risk management process is again higher than that for performance measurement, and so on.

After the presentation of the profile graphs a brief description of their characteristics follows.

Questionnaire Type Profiles

When discussing average scoring profiles, the cases of general risk management and project risk management must be distinguished (Figures 6.10 and 6.11).

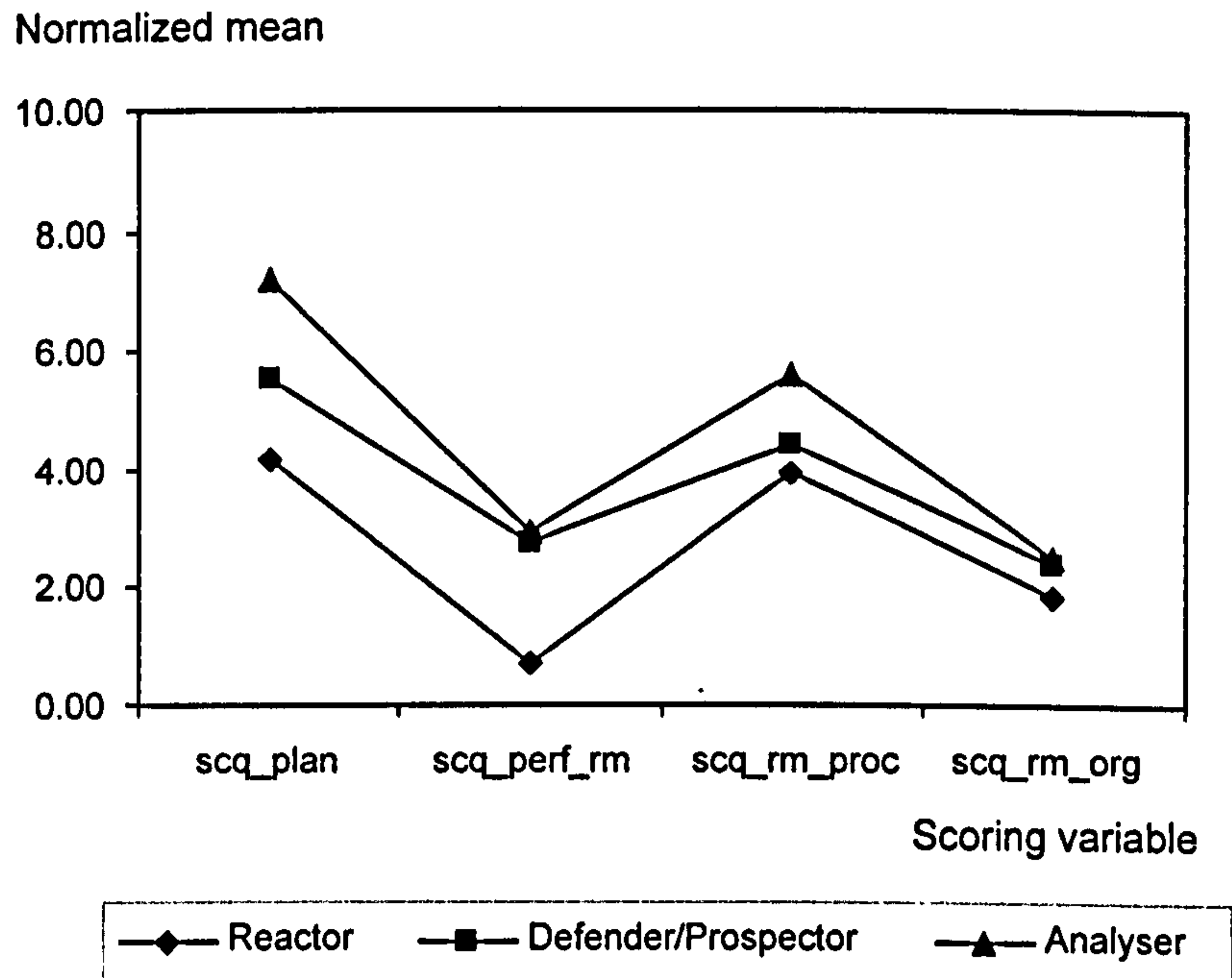
General Risk Management

Figure 6.10 Mean Questionnaire Type Profiles: General Risk Management

The reactor profile for general risk management is clearly below the other types, while the defender/prospector and the analyser profile nearly touch for performance measurement and risk management organization.

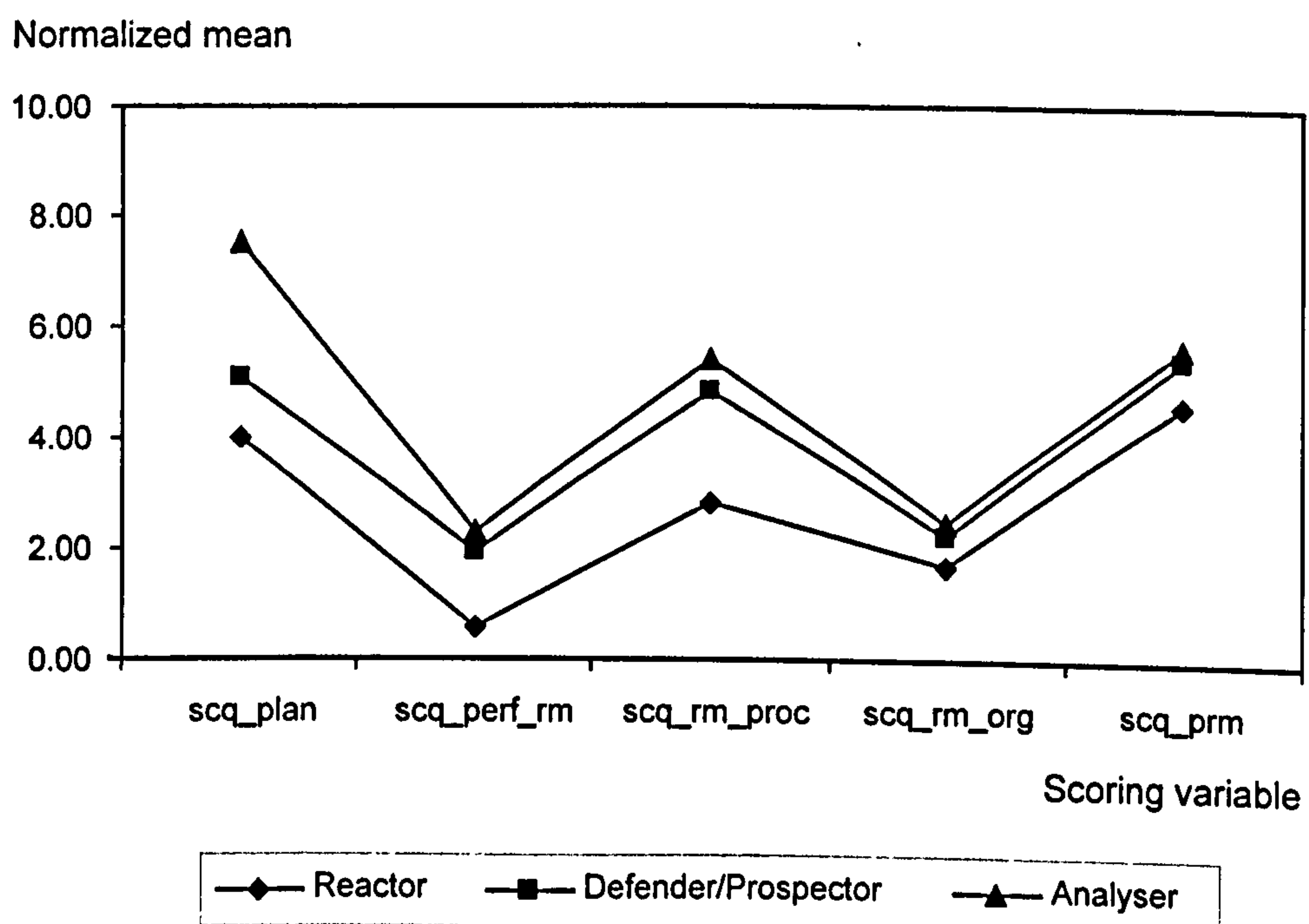
Project Risk Management

Figure 6.11 Mean Questionnaire Type Profiles: Project Risk Management

Again, the reactor profile is clearly the lowest. In the case of project risk management, the average profiles for defender/prospectors and analysers show still more similarity, with the largest deviation occurring for business planning.

Interview Type Profiles

As in the questionnaire case, the average profiles for general risk management and for project risk management must be distinguished (Figures 6.12 and 6.13).

General Risk Management

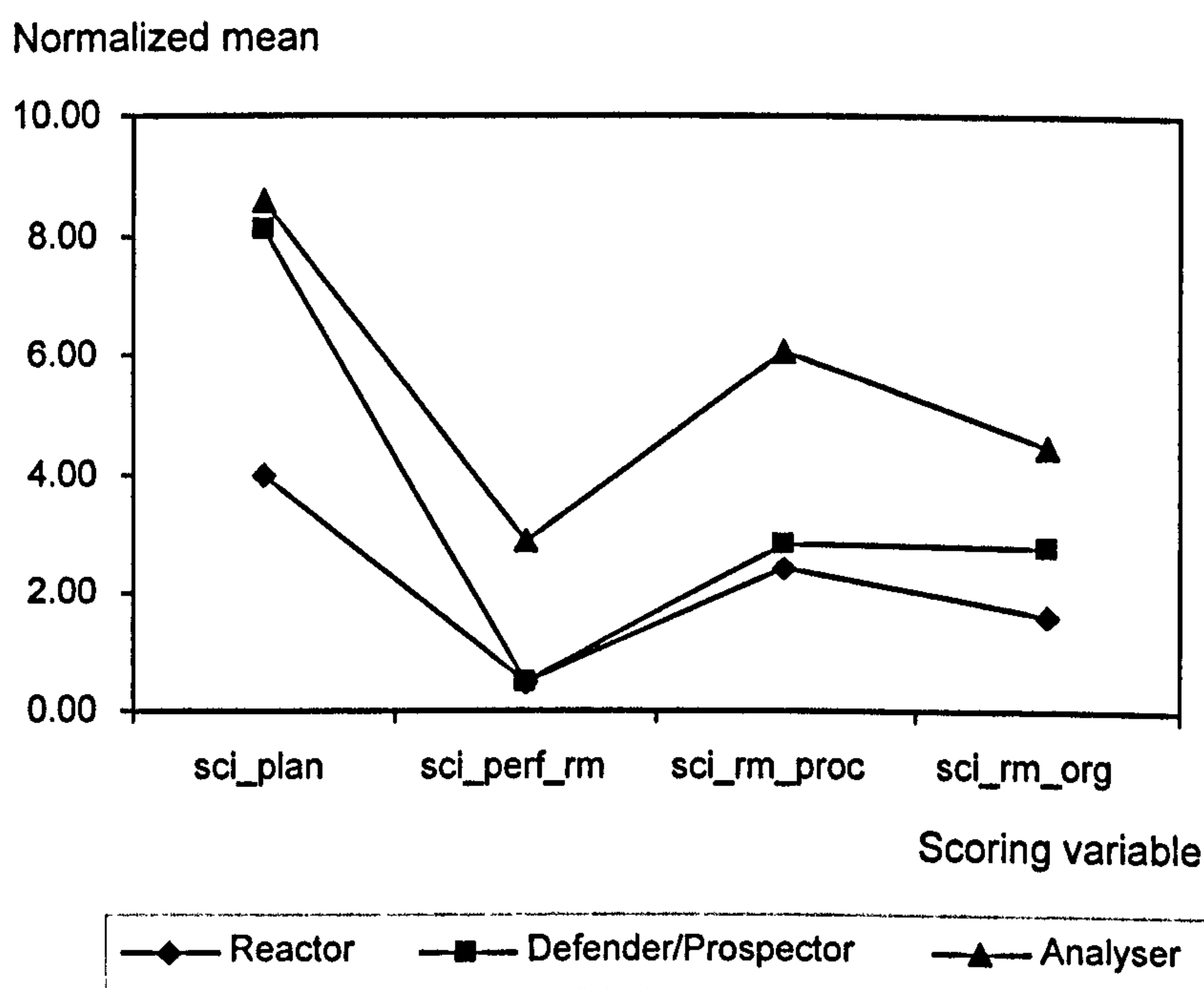


Figure 6.12 Mean Interview Type Profiles: General Risk Management

The average interview scoring profiles of the three types behave differently than the questionnaire type profiles: Now the average reactor and defender/prospector profile are closer, while the analyser profile lies clearly above them (except for business planning).

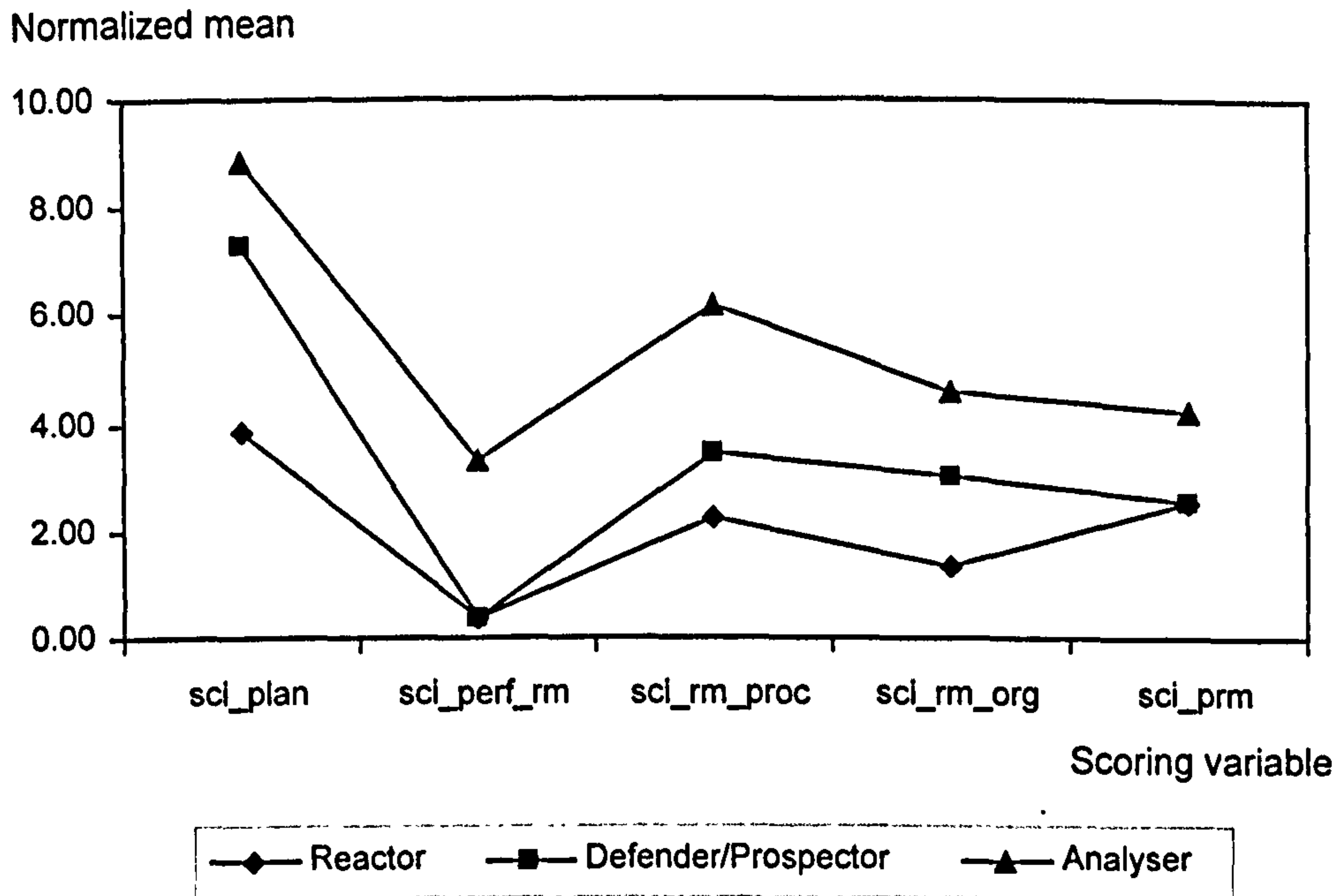
Project Risk Management:

Figure 6.13 Mean Interview Type Profiles: Project Risk Management

Again, the average analyser profile is clearly above the profiles of the defender/prospector and the reactor type, with the same exception for business planning. The defender/prospector profile is not as close to the reactor one as in the case of general risk management. On the average, for the firms being investigated the defender/prospector has a score for performance management which is even slightly below the one for the reactor type.

6.1.6 Types Versus Demographic and Uncertainty Variables

The risk management types are examined with respect to demographic and uncertainty variables.

Questionnaire Scoring Types

Tables 6.14 and 6.15 present the demographic data in the questionnaire case across the types of general and of project risk management (see also Table 4.1).

Table 6.14 Demographic Data of Questionnaire Respondents.
Versus Types: General Risk Management

	Type of risk management practices								Total	
	Reactor		Defender/ Prospector		Analyser		Not evaluated			
Size by annual turnover (Q 1.5)										
Micro (up to 2 million Euros)	8	7.8%	2	3.8%	3	5.1%	3	0.0%	13	5.9%
Small (more than 2 to 10 million Euros)	57	55.9%	31	59.6%	37	62.7%	4	66.7%	129	58.9%
Medium (more than 10 to 50 million Euros)	32	31.4%	17	32.7%	12	20.3%	0	0.0%	61	27.9%
Large (more than 50 million Euros)	0	0.0%	0	0.0%	1	1.7%	0	0.0%	1	0.5%
No statement	5	4.9%	2	3.8%	6	10.2%	2	33.3%	15	6.8%
Total	102	100.0%	52	100.0%	59	100.0%	6	100.0%	219	100.0%
Size by number of employees (Q 1.6)										
Micro (up to 9 employees)	9	8.8%	1	1.9%	1	1.7%	1	16.7%	12	5.5%
Small (10 to 49 employees)	10	9.8%	3	5.8%	10	16.9%	1	16.7%	24	11.0%
Medium (50 to 249 employees)	82	80.4%	45	86.5%	45	76.3%	3	50.0%	175	79.9%
Large (250 to 499 employees)	1	1.0%	3	5.8%	3	5.1%	1	16.7%	8	3.7%
Total	102	100.0%	52	100.0%	59	100.0%	6	100.0%	219	100.0%
Industrial sector (Q 1.1)										
Construction	31	30.4%	19	36.5%	11	18.6%	1	16.7%	62	28.3%
Engineering	33	32.4%	16	30.8%	25	42.4%	3	50.0%	77	35.2%
Information technology	14	13.7%	5	9.6%	12	20.3%	1	16.7%	32	14.6%
Auditing/consulting/training	11	10.8%	7	13.5%	4	6.8%	0	0.0%	22	10.0%
Trade/service/logistics	13	12.7%	5	9.6%	7	11.9%	1	16.7%	26	11.9%
Total	102	100.0%	52	100.0%	59	100.0%	6	100.0%	219	100.0%
Legal form (Q 1.2)										
Unincorporated firm	24	23.5%	11	21.2%	9	15.3%	1	16.7%	45	20.5%
Incorporated firm	78	76.5%	41	78.8%	50	84.7%	5	83.3%	174	79.5%
Total	102	100.0%	52	100.0%	59	100.0%	6	100.0%	219	100.0%
Part of a group (Q 1.3)										
Yes	34	33.3%	21	40.4%	26	44.1%	2	33.3%	83	37.9%
No	68	66.7%	31	59.6%	33	55.9%	4	66.7%	136	62.1%
Total	102	100.0%	52	100.0%	59	100.0%	6	100.0%	219	100.0%
Audited (Q 1.4)										
Yes	73	72.3%	43	84.3%	50	84.7%	4	66.7%	170	78.3%
No	28	27.7%	8	15.7%	9	15.3%	2	33.3%	47	21.7%
Total	101	100.0%	51	100.0%	59	100.0%	6	100.0%	217	100.0%
Early warning system established (Q 1.9a)										
Established	62	60.8%	39	75.0%	49	83.1%	4	66.7%	154	70.3%
Planned	24	23.5%	12	23.1%	8	13.6%	2	33.3%	46	21.0%
Not planned	16	15.7%	1	1.9%	2	3.4%	0	0.0%	19	8.7%
Total	102	100.0%	52	100.0%	59	100.0%	6	100.0%	219	100.0%

Table 6.15 Demographic Data of Questionnaire Respondents.
Versus Types: Project Risk Management

	Type of risk management practices								Total	
	Reactor		Defender/ Prospector		Analyser		Not evaluated			
Size by annual turnover (Q 1.5)										
Micro (up to 2 million Euros)	3	8.8%	3	3.9%	2	5.9%	1	4.8%	9	5.4%
Small (more than 2 to 10 million Euros)	22	64.7%	41	53.2%	21	61.8%	14	66.7%	98	59.0%
Medium (more than 10 to 50 million Euros)	8	23.5%	33	42.9%	7	20.6%	1	4.8%	49	29.5%
Large (more than 50 million Euros)	0	0.0%	0	0.0%	1	2.9%	0	0.0%	1	0.6%
No statement	1	2.9%	0	0.0%	3	8.8%	5	23.8%	9	5.4%
Total	34	100.0%	77	100.0%	34	100.0%	21	100.0%	166	100.0%
Size by number of employees (Q 1.6)										
Micro (up to 9 employees)	4	11.8%	1	1.3%	1	2.9%	2	9.5%	8	4.8%
Small (10 to 49 employees)	4	11.8%	6	7.8%	4	11.8%	6	28.6%	20	12.0%
Medium (50 to 249 employees)	26	76.5%	68	88.3%	27	79.4%	12	57.1%	133	80.1%
Large (250 to 499 employees)	0	0.0%	2	2.6%	2	5.9%	1	4.8%	5	3.0%
Total	34	100.0%	77	100.0%	34	100.0%	21	100.0%	166	100.0%
Industrial sector (Q 1.1)										
Construction	13	38.2%	26	33.8%	7	20.6%	3	14.3%	49	29.5%
Engineering	7	20.6%	27	35.1%	15	44.1%	10	47.6%	59	35.5%
Information technology	5	14.7%	11	14.3%	7	20.6%	5	23.8%	28	16.9%
Auditing/consulting/training	4	11.8%	9	11.7%	2	5.9%	1	4.8%	16	9.6%
Trade/service/logistics	5	14.7%	4	5.2%	3	8.8%	2	9.5%	14	8.4%
Total	34	100.0%	77	100.0%	34	100.0%	21	100.0%	166	100.0%
Legal form (Q 1.2)										
Unincorporated firm	11	32.4%	13	16.9%	5	14.7%	5	23.8%	34	20.5%
Incorporated firm	23	67.6%	64	83.1%	29	85.3%	16	76.2%	132	79.5%
Total	34	100.0%	77	100.0%	34	100.0%	21	100.0%	166	100.0%
Part of a group (Q 1.3)										
Yes	16	47.1%	25	32.5%	15	44.1%	11	52.4%	67	40.4%
No	18	52.9%	52	67.5%	19	55.9%	10	47.6%	99	59.6%
Total	34	100.0%	77	100.0%	34	100.0%	21	100.0%	166	100.0%
Audited (Q 1.4)										
Yes	23	69.7%	61	80.3%	28	82.4%	17	81.0%	129	78.7%
No	10	30.3%	15	19.7%	6	17.6%	4	19.0%	35	21.3%
Total	33	100.0%	76	100.0%	34	100.0%	21	100.0%	164	100.0%
Early warning system established (Q 1.9a)										
Established	18	52.9%	55	71.4%	28	82.4%	14	66.7%	115	69.3%
Planned	11	32.4%	18	23.4%	5	14.7%	5	23.8%	39	23.5%
Not planned	5	14.7%	4	5.2%	1	2.9%	2	9.5%	12	7.2%
Total	34	100.0%	77	100.0%	34	100.0%	21	100.0%	166	100.0%

Annual turnover (Question 1.5), Number of employees (Question 1.6)

Concerning the types identified by the questionnaire scoring, there is a certain size effect. Micro and small firms are more frequently a reactor type. The defender/prospector and analyser show some shift in the direction of medium-sized firms. This holds for both the general and the project risk management.

Industrial sector (Question 1.1)

Concerning general risk management, reactors and defender/prospectors have a similar industry sector distribution. In contrast to that, analysers concentrate more

strongly on the engineering sector. Types of project management reveal a similar picture.

In the construction sector remarkably few analysers can be found.

Legal form (Question 1.2)

Analysers have the smallest share of unincorporated firms. This holds both for the types of general and project risk management.

Part of a group (Question 1.3)

The types reveal no essential differences with respect to being part of a group.

Audited (Question 1.4)

The types reveal no essential differences with respect to being audited.

Early warning system established (Question 1.9a)

Most firms that have already established an early warning system are analysers. Reactors on the other side of the scale cover most of the firms that even do not plan to implement such a system.

Interview Scoring Types

The interview scoring types are discussed just as in the case of the questionnaire types. It should be reminded that the interview data provide an additional set of variables dealing with uncertainty in the business environment.

Demographic data

Tables 6.16 and 6.17 present the demographic data in the interview case across the types of general and of project risk management (see also Table 5.1).

Table 6.16 Demographic Data of the Interview Sample.
Versus Types: General Risk Management

	Type of risk management practices			
	Reactor	Defender/ Prospector	Analyser	Total
Size by annual turnover (I 1.9)				
Micro (up to 2 million Euros)	11 52.4%	2 20.0%	0 0.0%	13 34.2%
Small (more than 2 to 10 million Euros)	4 19.0%	1 10.0%	1 14.3%	6 15.8%
Medium (more than 10 to 50 million Euros)	6 28.6%	6 60.0%	4 57.1%	16 42.1%
Large (more than 50 million Euros)	0 0.0%	1 10.0%	2 28.6%	3 7.9%
Total	21 100.0%	10 100.0%	7 100.0%	38 100.0%
Size by number of employees (I 1.10)				
Micro (up to 9 employees)	9 42.9%	0 0.0%	0 0.0%	9 23.7%
Small (10 to 49 employees)	5 23.8%	2 20.0%	1 14.3%	8 21.1%
Medium (50 to 249 employees)	6 28.6%	3 30.0%	1 14.3%	10 26.3%
Large (250 to 499 employees)	1 4.8%	5 50.0%	3 42.9%	9 23.7%
Very large (500 and more employees)	0 0.0%	0 0.0%	2 28.6%	2 5.3%
Total	21 100.0%	10 100.0%	7 100.0%	38 100.0%
Industrial sector (I 1.4)				
Construction	3 14.3%	0 0.0%	1 14.3%	4 10.5%
Engineering	3 14.3%	2 20.0%	1 14.3%	6 15.8%
Information technology	3 14.3%	1 10.0%	0 0.0%	4 10.5%
Auditing/consulting/training	2 9.5%	1 10.0%	0 0.0%	3 7.9%
Trade/service/logistics	4 19.0%	0 0.0%	0 0.0%	4 10.5%
Other sector	6 28.6%	6 60.0%	5 71.4%	17 44.7%
Total	21 100.0%	10 100.0%	7 100.0%	38 100.0%
Legal form (I 1.7)				
Unincorporated firm	10 47.6%	1 10.0%	0 0.0%	11 28.9%
Incorporated firm	11 52.4%	9 90.0%	7 100.0%	27 71.1%
Total	21 100.0%	10 100.0%	7 100.0%	38 100.0%
Part of a group (I 1.8*)				
Yes	1 4.8%	3 30.0%	3 42.9%	7 18.4%
No	20 95.2%	7 70.0%	4 57.1%	31 81.6%
Total	21 100.0%	10 100.0%	7 100.0%	38 100.0%
Company age (I 1.6)				
0 to 4 years	4 19.0%	0 0.0%	1 14.3%	5 13.2%
5 to 9 years	2 9.5%	1 10.0%	0 0.0%	3 7.9%
10 to 19 years	8 38.1%	6 60.0%	4 57.1%	18 47.4%
20 and more years	7 33.3%	3 30.0%	2 28.6%	12 31.6%
Total	21 100.0%	10 100.0%	7 100.0%	38 100.0%
ISO-audit (I 1.11)				
Yes	8 38.1%	8 80.0%	7 100.0%	23 60.5%
No	13 61.9%	2 20.0%	0 0.0%	15 39.5%
Total	21 100.0%	10 100.0%	7 100.0%	38 100.0%
Owner manager/other manager (I 1.5)				
Owner manager	18 85.7%	3 30.0%	3 42.9%	24 63.2%
Other manager	3 14.3%	7 70.0%	4 57.1%	14 36.8%
Total	21 100.0%	10 100.0%	7 100.0%	38 100.0%
Average number of projects (I 1.12)				
0 to 9 projects	2 15.4%	1 16.7%	2 28.6%	5 19.2%
10 to 19 projects	4 30.8%	0 0.0%	2 28.6%	6 23.1%
20 to 100 projects	3 23.1%	4 66.7%	2 28.6%	9 34.6%
100 and more projects	3 23.1%	1 16.7%	1 14.3%	5 19.2%
No statement	1 7.7%	0 0.0%	0 0.0%	1 3.8%
Total	13 100.0%	6 100.0%	7 100.0%	26 100.0%
Average project duration (I 1.13)				
0 to 5 months	5 38.5%	1 16.7%	1 14.3%	7 26.9%
6 to 11 months	5 38.5%	2 33.3%	1 14.3%	8 30.8%
12 to 23 months	1 7.7%	2 33.3%	5 71.4%	8 30.8%
24 and more months	2 15.4%	1 16.7%	0 0.0%	3 11.5%
Total	13 100.0%	6 100.0%	7 100.0%	26 100.0%

* I 1.8: More than 25% owned by a single holding company

Table 6.17 Demographic Data of the Interview Sample.
Versus Types: Project Risk Management

		Type of risk management practices			
		Reactor	Defender/ Prospector	Analyser	Total
Size by annual turnover (I 1.9)					
Micro	(up to 2 million Euros)	8 61.5%	1 14.3%	0 0.0%	9 34.6%
Small	(more than 2 to 10 million Euros)	2 15.4%	1 14.3%	1 16.7%	4 15.4%
Medium	(more than 10 to 50 million Euros)	3 23.1%	4 57.1%	3 50.0%	10 38.5%
Large	(more than 50 million Euros)	0 0.0%	1 14.3%	2 33.3%	3 11.5%
Total		13 100.0%	7 100.0%	6 100.0%	26 100.0%
Size by number of employees (I 1.10)					
Micro	(up to 9 employees)	6 46.2%	0 0.0%	0 0.0%	6 23.1%
Small	(10 to 49 employees)	4 30.8%	1 14.3%	1 16.7%	6 23.1%
Medium	(50 to 249 employees)	3 23.1%	2 28.6%	1 16.7%	6 23.1%
Large	(250 to 499 employees)	0 0.0%	4 57.1%	2 33.3%	6 23.1%
Very large	(500 and more employees)	0 0.0%	0 0.0%	2 33.3%	2 7.7%
Total		13 100.0%	7 100.0%	6 100.0%	26 100.0%
Industrial sector (I 1.4)					
Construction		2 15.4%	0 0.0%	1 16.7%	3 11.5%
Engineering		3 23.1%	1 14.3%	1 16.7%	5 19.2%
Information technology		3 23.1%	1 14.3%	0 0.0%	4 15.4%
Auditing/consulting/training		1 7.7%	0 0.0%	0 0.0%	1 3.8%
Trade/service/logistics		1 7.7%	0 0.0%	0 0.0%	1 3.8%
Other sector		3 23.1%	5 71.4%	4 66.7%	12 46.2%
Total		13 100.0%	7 100.0%	6 100.0%	26 100.0%
Legal form (I 1.7)					
Unincorporated firm		4 30.8%	1 14.3%	0 0.0%	5 19.2%
Incorporated firm		9 69.2%	6 85.7%	6 100.0%	21 80.8%
Total		13 100.0%	7 100.0%	6 100.0%	26 100.0%
Part of a group (I 1.8*)					
Yes		1 7.7%	2 28.6%	3 50.0%	6 23.1%
No		12 92.3%	5 71.4%	3 50.0%	20 76.9%
Total		13 100.0%	7 100.0%	6 100.0%	26 100.0%
Company age (I 1.6)					
0 to 4 years		3 23.1%	0 0.0%	1 16.7%	4 15.4%
5 to 9 years		2 15.4%	1 14.3%	0 0.0%	3 11.5%
10 to 19 years		6 46.2%	3 42.9%	4 66.7%	13 50.0%
20 and more years		2 15.4%	3 42.9%	1 16.7%	6 23.1%
Total		13 100.0%	7 100.0%	6 100.0%	26 100.0%
ISO-audit (I 1.11)					
Yes		4 30.8%	6 85.7%	6 100.0%	16 61.5%
No		9 69.2%	1 14.3%	0 0.0%	10 38.5%
Total		13 100.0%	7 100.0%	6 100.0%	26 100.0%
Owner manager/other manager (I 1.5)					
Owner manager		11 84.6%	1 14.3%	3 50.0%	15 57.7%
Other manager		2 15.4%	6 85.7%	3 50.0%	11 42.3%
Total		13 100.0%	7 100.0%	6 100.0%	26 100.0%
Average number of projects (I 1.12)					
0 to 9 projects		2 15.4%	2 28.6%	1 16.7%	5 19.2%
10 to 19 projects		4 30.8%	0 0.0%	2 33.3%	6 23.1%
20 to 100 projects		3 23.1%	4 57.1%	2 33.3%	9 34.6%
100 and more projects		3 23.1%	1 14.3%	1 16.7%	5 19.2%
No statement		1 7.7%	0 0.0%	0 0.0%	1 3.8%
Total		13 100.0%	7 100.0%	6 100.0%	26 100.0%
Average project duration (I 1.13)					
0 to 5 months		5 38.5%	1 14.3%	1 16.7%	7 26.9%
6 to 11 months		5 38.5%	2 28.6%	1 16.7%	8 30.8%
12 to 23 months		1 7.7%	3 42.9%	4 66.7%	8 30.8%
24 and more months		2 15.4%	1 14.3%	0 0.0%	3 11.5%
Total		13 100.0%	7 100.0%	6 100.0%	26 100.0%

* I 1.8: More than 25% owned by a single holding company

Size by annual turnover (Issue 1.9), Number of employees (Issue 1.10)

An examination of the interview types with respect to company size reveals a similar picture as in the questionnaire case. This applies to the general as well as to the project risk management. The interview scoring exhibits even stronger that micro and small firms are concentrated on the reactor type.

Industrial sector (Issue 1.4)

The types reveal no essential differences with respect to industry sectors. It is worth mentioning that analysers appear only in the construction sector (1 case), in the engineering sector (1) and the collective “other” sector (5 general / 4 project risk management).

Legal form (Issue 1.7)

The types are distributed similarly as in the questionnaire case. The interviews revealed that even no single analyser type was an unincorporated firm.

Part of a group (Issue 1.8)

Firms which are part of a group with a share of more than 25% are more frequently identified to be a defender/prospector over even an analyser.

Company age (Issue 1.6)

Firms with a company age of 0 to 9 years are clearly more likely to be found among the reactor type.

ISO-audit (Issue 1.4)

In general, ISO-audited firms have a better developed risk management than non-audited ones. So the majority of the audited firms are defender/prospectors or analysers. The analyser type consists exclusively of ISO-audited firms.

Owner manager/other manager (Issue 1.5)

It is remarkable that about 2/3 of the owner-managed firms are reactors. Regarding the defender/prospector type, other managers dominate, while in analyser types owner-managers and other managers are found to about the same amount.

Average number of projects (Issue 1.12)

The types reveal no essential difference with respect to the number of projects.

Average project duration (Issue 1.13)

Firms with an average project duration of 12 to 23 months are more likely to be an analyser.

Uncertainty Variables

Tables 6.18 and 6.19 present for the interview case the uncertainty data across the types of general and of project risk management (see also Table 5.2).

Table 6.18 Uncertainty in the Interview Sample's Business Environment.
Versus Types: General Risk Management

	Type of risk management practices			
	Reactor	Defender/ Prospector	Analyser	Total
External environment (I 2.1)				
Relationship to customers (I 2.1.1)				
Getting better	1 4.8%	0 0.0%	1 14.3%	2 5.3%
Static	10 47.6%	5 50.0%	1 14.3%	16 42.1%
Getting worse	10 47.6%	5 50.0%	5 71.4%	20 52.6%
Total	21 100.0%	10 100.0%	7 100.0%	38 100.0%
Relationship to competitors (I 2.1.2)				
Getting better	0 0.0%	0 0.0%	0 0.0%	0 0.0%
Static	13 61.9%	4 40.0%	2 28.6%	19 50.0%
Getting worse	8 38.1%	6 60.0%	5 71.4%	19 50.0%
Total	21 100.0%	10 100.0%	7 100.0%	38 100.0%
Governmental regulations (I 2.1.3)				
Getting better	0 0.0%	0 0.0%	0 0.0%	0 0.0%
Static	16 76.2%	7 70.0%	5 71.4%	28 73.7%
Getting worse	5 23.8%	3 30.0%	2 28.6%	10 26.3%
Total	21 100.0%	10 100.0%	7 100.0%	38 100.0%
Relationship to bank/Basel II (I 2.1.4)				
Became better	0 0.0%	0 0.0%	1 14.3%	1 2.6%
Static	13 61.9%	5 50.0%	6 85.7%	24 63.2%
Became worse	8 38.1%	5 50.0%	0 0.0%	13 34.2%
Total	21 100.0%	10 100.0%	7 100.0%	38 100.0%
Internal environment (I 2.2)				
State of technology (I 2.2.1)				
Is mature	18 85.7%	6 60.0%	5 71.4%	29 76.3%
Can be improved	3 14.3%	2 20.0%	2 28.6%	7 18.4%
Just introduced	0 0.0%	2 20.0%	0 0.0%	2 5.3%
Total	21 100.0%	10 100.0%	7 100.0%	38 100.0%
State of product (I 2.2.2)				
Is mature	16 76.2%	5 50.0%	4 57.1%	25 65.8%
Can be improved	3 14.3%	4 40.0%	1 14.3%	8 21.1%
Just introduced	2 9.5%	1 10.0%	2 28.6%	5 13.2%
Total	21 100.0%	10 100.0%	7 100.0%	38 100.0%
Shortage of personnel (I 2.2.3)				
No shortage	12 57.1%	8 80.0%	3 42.9%	23 60.5%
Shortage	9 42.9%	2 20.0%	4 57.1%	15 39.5%
Total	21 100.0%	10 100.0%	7 100.0%	38 100.0%
Turnover growth (I 2.3*)				
Strongly increasing	1 4.8%	2 20.0%	1 14.3%	4 10.5%
Slightly increasing	2 9.5%	1 10.0%	0 0.0%	3 7.9%
Static	9 42.9%	5 50.0%	4 57.1%	18 47.4%
Slightly decreasing	5 23.8%	0 0.0%	2 28.6%	7 18.4%
Strongly decreasing	4 19.0%	2 20.0%	0 0.0%	6 15.8%
Total	21 100.0%	10 100.0%	7 100.0%	38 100.0%
External support (I 2.4)				
Certified chartered accountant	6 28.6%	8 80.0%	7 100.0%	21 55.3%
Tax advisor	12 57.1%	1 10.0%	0 0.0%	13 34.2%
Management consultant	0 0.0%	1 10.0%	0 0.0%	1 2.6%
No external support	3 14.3%	0 0.0%	0 0.0%	3 7.9%
Total	21 100.0%	10 100.0%	7 100.0%	38 100.0%

* I 2.3: During the last three years

Table 6.19 Uncertainty in the Interview Sample's Business Environment.
Versus Types: Project Risk Management

	Type of risk management practices			
	Reactor	Defender/ Prospector	Analysers	Total
External environment (I 2.1)				
Relationship to customers (I 2.1.1)				
Getting better	1 7.7%	0 0.0%	1 16.7%	2 7.7%
Static	7 53.8%	4 57.1%	0 0.0%	11 42.3%
Getting worse	5 38.5%	3 42.9%	5 83.3%	13 50.0%
Total	13 100.0%	7 100.0%	6 100.0%	26 100.0%
Relationship to competitors (I 2.1.2)				
Getting better	0 0.0%	0 0.0%	0 0.0%	0 0.0%
Static	8 61.5%	3 42.9%	1 16.7%	12 46.2%
Getting worse	5 38.5%	4 57.1%	5 83.3%	14 53.8%
Total	13 100.0%	7 100.0%	6 100.0%	26 100.0%
Governmental regulations (I 2.1.3)				
Getting better	0 0.0%	0 0.0%	0 0.0%	0 0.0%
Static	10 76.9%	4 57.1%	4 66.7%	18 69.2%
Getting worse	3 23.1%	3 42.9%	2 33.3%	8 30.8%
Total	13 100.0%	7 100.0%	6 100.0%	26 100.0%
Relationship to bank/Basel II (I 2.1.4)				
Became better	0 0.0%	0 0.0%	1 16.7%	1 3.8%
Static	6 46.2%	4 57.1%	5 83.3%	15 57.7%
Became worse	7 53.8%	3 42.9%	0 0.0%	10 38.5%
Total	13 100.0%	7 100.0%	6 100.0%	26 100.0%
Internal environment (I 2.2)				
State of technology (I 2.2.1)				
Is mature	10 76.9%	2 28.6%	5 83.3%	17 65.4%
Can be improved	3 23.1%	3 42.9%	1 16.7%	7 26.9%
Just introduced	0 0.0%	2 28.6%	0 0.0%	2 7.7%
Total	13 100.0%	7 100.0%	6 100.0%	26 100.0%
State of product (I 2.2.2)				
Is mature	9 69.2%	3 42.9%	3 50.0%	15 57.7%
Can be improved	2 15.4%	3 42.9%	1 16.7%	6 23.1%
Just introduced	2 15.4%	1 14.3%	2 33.3%	5 19.2%
Total	13 100.0%	7 100.0%	6 100.0%	26 100.0%
Shortage of personnel (I 2.2.3)				
No shortage	7 53.8%	5 71.4%	2 33.3%	14 53.8%
Shortage	6 46.2%	2 28.6%	4 66.7%	12 46.2%
Total	13 100.0%	7 100.0%	6 100.0%	26 100.0%
Turnover growth (I 2.3*)				
Strongly increasing	1 7.7%	3 42.9%	0 0.0%	4 15.4%
Slightly increasing	0 0.0%	1 14.3%	0 0.0%	1 3.8%
Static	6 46.2%	2 28.6%	4 66.7%	12 46.2%
Slightly decreasing	3 23.1%	0 0.0%	2 33.3%	5 19.2%
Strongly decreasing	3 23.1%	1 14.3%	0 0.0%	4 15.4%
Total	13 100.0%	7 100.0%	6 100.0%	26 100.0%
External support (I 2.4)				
Certified chartered accountant	3 23.1%	6 85.7%	6 100.0%	15 57.7%
Tax advisor	9 69.2%	1 14.3%	0 0.0%	10 38.5%
Management consultant	0 0.0%	0 0.0%	0 0.0%	0 0.0%
No external support	1 7.7%	0 0.0%	0 0.0%	1 3.8%
Total	13 100.0%	7 100.0%	6 100.0%	26 100.0%

* I 2.3: During the last three years

External environment (Issue 2.1)

As Tables 6.18 and 6.19 show, the reactor type exhibits the most negative changes in its external business environment (customers, competitors, governmental

regulation and relationship to banks/Basel II). Here the new regulations according to Basel II have a particular strong impact on a worsening of the firm's relationship to the lending bank.

The defender/prospector type does not suffer from such turbulence of the external environment as the reactor does, except for the Basel II regulations. Concerning Basel II, the banks make greater demands on the defender/prospectors. The analyser is not subject to strong negative changes in its external environment, which holds in particular for the demands in the context of Basel II.

Internal environment (Issue 2.2)

The outcomes of the dynamics of the internal business environment reveal for the reactor very much the same picture as those of its external environment. The reactor's technology is essentially a mature one, with little potential for innovation. Products or services offered by the reactor have reached the maturity stage of the product life cycle. In addition to that, reactors complain about a shortage of personnel.

Regarding the internal environment, defender/prospectors and analysers also exhibit similar outcomes as their external environment results. Compared to reactors, the changes of the internal environment are not so dramatic or these types have developed a strategy to handle them. Both types make efforts to apply new technologies and to develop new products.

Turnover growth (Issue 2.3)

The negative result for the reactor with respect to its external and internal business environment is also found for its turnover growth. Defender/prospectors and analysers have a rather constant development of their turnover or even a slight increase.

External support (Issue 2.4)

For external support all types concentrate on a tax adviser or a chartered accountant. Using a chartered accountant increases from the reactor to the analyser. Reactors most frequently take advantage of a tax advisor, while a management consultant is merely applied by defender/prospectors.

6.2 Type Description of Questionnaire and Interview Examples

In order to further illustrate the risk management typology developed in Section 6.1, for each type three typical companies will now be discussed in detail, based on their respective scoring pattern.

The descriptions are a result of a comprehensive analysis of the respective data, taking into account all available quantitative and qualitative information. The interview transcripts have been treated thoroughly, including the translation of selected quotations to be included in this thesis.

6.2.1 Reactor

The scoring patterns of the reactor type examples to be discussed are presented in Table 6.20.

Table 6.20 Reactor Type Examples

Firm	Business Planning	Performance Measurement	Risk Management Process	Risk Management Organization	Project Risk Management
Interview firm 1	Low	Low	Low	Low	Low
Interview firm 2	Low	Low	Low	Low	Low
Interview firm 22*	Moderate	Low	Moderate	Low	N/A

* Questionnaire participant

Interview No. 1 micro engineering firm

This company is project-based and can be described as involved in the engineering industry. It is owner-managed and has one manager. The owner-manager has a degree in engineering but few business management skills. The book-keeping and the annual financial statements are prepared externally by the tax advisor. The company was set up by the owner 11 years ago; he had previously held positions as an employee. The company has 7 staff and a turnover of less than 2 million Euro.

Strategy and Structure

The conditions in the external business environment have become substantially worse. The customers have become more price-sensitive and at the moment the price decides whether the company's bid is successful or not. Many more suppliers have come onto the market, which causes a considerable pressure on prices. The company is terminating many projects at a substantial loss, but the owner-manager only notices it at the end of the project since there is no project controlling.

The owner-manager is considering closing down the company. A bid was submitted for a large public contract, and the company has just been awarded it. The problem is very large financial resources are needed to be able to begin the project. But since the earnings and liquidity situation is already tight, it cannot be done using the company's own resources and the lending bank is not ready to support the financing. The owner-manager therefore will have to turn down the contract and expects to suffer a considerable contractual penalty as a result. The payment of it will take up all the remaining liquidity and the owner-manager will likely have to declare the company insolvent. Being in this critical situation the interview partner turned to the present author since he wanted to speak with someone about the situation and about what he should do next.

Business Planning

The company does not draw up any business planning. There are two reasons: accounts are prepared by an external tax advisor, and the owner-manager lacks the necessary business management skills to prepare them. The tax advisor gives the manager a business evaluation but it is not discussed between them. The only thing that does happen is a discussion once a year on the annual financial statement.

Performance Measurement

Methods of value-based management are not known.

Risk Management Process

Due to his experience the manager keeps the main risks to be identified (creditworthiness, design- and construction risks) in his head. He relies on his own experience to identify and evaluate the risks. Formal methods are not used. Neither is there any general overview of risks for the company.

Risk Management Organization

The owner-manager alone is responsible for the risk management. There is no written documentation of the risk management. The risk strategy is to bear the risks oneself. As far as possible credit insurance is taken out to cover the credit risks. There are no guidelines on replacement or on contingency situations. Everything is concentrated on the sole manager. Any longer period of absence of

the manager would threaten the existence of the firm. So far no rules on succession are available either.

Project Risk Management

Formal methods for project management are not applied. The projects are planned by the owner-manager himself and he sets out the work plan with its various steps. The employees report orally on the progress of the work at the end of each week. This means that the manager has no real opportunity for control, so he also carries out an inspection himself on site. Neither is any post project calculation made.

Interview No. 2 small trade firm

The company is involved in the trading sector. It is owner-managed and has one manager who is also a master craftsman. The owner-manager has little knowledge of business management methods. The company has been family-owned for more than 100 years. The book-keeping is prepared in-house, the annual financial statement is done by the tax advisor. The company employs 21 workers and has a turnover of less than 2 million Euro.

Strategy and Structure

The conditions in the external business environment have become substantially worse. Competition has become harder and not a lot of profit can be made in this business sector any more. The company is aiming at a strategy of downsizing. Due to high losses of outstanding receivables the liquidity situation is quite tense. To solve the problem, 7 employees are to be dismissed and some of the patents developed by the company sold to larger businesses. The bank has also announced that the company does not fulfil the rating criteria and an external business advisor is to be appointed to set up a business planning in the company and to improve the company management and controlling. In this context the bank now wants to see the company results every three months.

Business Planning

The company doesn't have a business planning; all that happens is that a rudimentary sales plan is prepared with the tax advisor.

Performance Measurement

So far neither business management nor value-based management instruments for company management are used. The beginnings of a turnover and customer analysis have been initiated together with the management consultant.

Risk Management Process

The main risk fields monitored are creditworthiness, business process risks and human resources risks. Formal methods for the identification and assessment of risks do not occur. Risk identification and risk forecasting are only made at sporadic intervals.

Risk Management Organization

The owner-manager alone is responsible for the risk management. A formal risk management has not been established, the reasons given being that the management lacks the necessary knowledge and the company is too small. The risk strategy is to bear the risks oneself. As far as possible credit insurance is taken out to cover the credit risks. There are no guidelines on replacement or on contingency situations. Everything is concentrated on the owner-manager. Any longer period of absence of the owner-manager would threaten the existence of the firm. The successorship is not clear, which could become a problem since the owner is already fairly old.

Project Risk Management

Few projects are carried out although a cost calculation is made for each project. A post calculation is prepared for each project.

Interview No. 22 micro trade firm, questionnaire participant 2004

This company is a sole proprietorship which was set up three years ago by a graduate from a Technical University (holder of a joint degree in business and engineering science). The owner-managed business employs three staff and has a turnover of less than 2 million Euro.

Strategy and Structure

The company's field of activity is the Internet-based sale of games. This involves a range of 8,000 games which when a customer places an order are then ordered

directly from a wholesaler. The conditions in the external business environment have since become much more tense, as Amazon too has now included games in the range of products it sells. There is also strong competition from what are known as “power sellers”. The company suffered a big loss in 2004 when a supplier became insolvent and he insisted on payment in advance for his deliveries.

Business Planning

The accounts are prepared in-house but the tax advisor prepares the annual financial statement. There is no long-term planning system. All that is prepared is a short-term turnover and liquidity plan. The plans are prepared using Microsoft Excel and make quite an acceptable impression. In the opinion of the owner-manager there is a need for improvement here, certainly in terms of the liquidity plan.

Performance Measurement

The basic principles of the Balanced Scorecard concept are known but the method is considered to be too costly for a company of this size. Other value-based instruments for business management are not utilized. Of the other business management instruments available, analyses of customers and analyses of the competition are carried out at sporadic intervals.

Risk Management Process

The main focus is on monitoring the market and financial risks. Formal methods on risk identification and assessment are not employed. Great reliance is based on experience-based knowledge. This includes the application of customer surveys. A general overview of risks for the company is not available.

Risk Management Organization

No formal risk management has been set up. According to the owner-manager a continuous monitoring and analysis of the market is important. The risk assessment is strongly concentrated on the owner-manager. The risk strategy is largely that of bearing the risks oneself. A contingency plan is available for the operational processes. Problems arise when considering the top management: If

both managers become unavailable the company would become unable to operate. So far there are no rules to cover this situation.

Project Risk Management.

No project-based activity.

6.2.2 Defender/Prospector

Examples of the defender/prospector type of risk management practices have the following scoring patterns (Table 6.21):

Table 6.21 Defender/Prospector Type Examples

Firm	Business Planning	Performance Measurement	Risk Management Process	Risk Management Organization	Project Risk Management
Interview firm 3	Moderate	Moderate	Moderate	Low	N/A
Interview firm 11*	Moderate	Low	Moderate	Low	Moderate
Interview firm 24	Moderate	Low	Low	Low	Moderate

* Questionnaire participant

Interview No. 3 medium-sized firm, other sector

This is an established company with a long history. It is a private limited one and generally belongs to the service sector. The company employs 96 staff and has a turnover of less than 10 million Euro, and it is owner-managed. The top management has a degree from a Technical University and additional qualification in business management. The accounts are prepared in-house while the tax advisor prepares the annual financial statement. The company is ISO-certified.

Strategy and Structure

The conditions in the external business environment have become substantially worse. The company's main business sector is subject to a ruinous price competition. Turnover in the main business sector is decreasing strongly. For this reason in 1998 the company opened up a new business line, which is slowly beginning to develop nicely. The lending bank has advised that the company is active in a sector which the bank does not want to support any more, and the company should therefore look for an alternative bank. Altogether the company can be assigned to the prospector type, since it started looking to open up a new business sector in good time in order to escape the difficult competitive situation.

Business Planning

Long-term financial and profit planning are available although they have to be reconciled together by hand. The time horizon is 1 year. Short-term planning and control is covered by a rudimentary profit plan which is based on the current accounts. The liquidity plan is generally in the form of regular monitoring of the status of the bank accounts. The bank has already expressed some criticism of it and asked for more detailed documents on it. A forecast and the what-if function are only used in the profit planning. The balance sheet planning is seen as an important addition, especially with regard to Basel II.

Performance Measurement

The concept of the Balanced Scorecard is not known here, but a very similar system is run which has proved to be a practical management system. The company is considered from different perspectives and appropriate indicators have been developed for each perspective. In this context the risks in each of the perspectives have also been identified and assessed.

Risk Management Process

The main risk categories are: credit, cost of raw materials, human resources. No formal methods are taken for risk identification and assessment. However, the top management meets with the heads of function each week where during some 15 minutes the main topics of customers, suppliers and business processes are discussed. For each function appropriate indicators have been developed; they are then checked, and various ways of reacting have been determined for the event that a specified threshold value is reached. A brief record of the discussions is prepared and then made available to the participants of the meeting. The employees responsible must then report on their respective function at the next meeting. This report must also include statements on the risks and their development. In addition the financial risks are directly assigned to the relevant items in the profit planning. The company would like to further formalize the system, with the aid of the data from the quality management. The company is already on a good path to developing itself into an analyser.

Risk Management Organization

So far no formal risk management has been set up. The top management alone is responsible for questions concerning risk management. However, due to the demand from the bank for a risk management system the company now wants to formalize it a little more. The risk strategy is largely that of bearing the risks oneself. An contingency plan for the IT is available; it is documented in the quality management manual. Rules on replacement and successorship are already available.

Project Risk Management

No project-based activity present.

Interview No. 11 medium-sized engineering firm, questionnaire participant 2002

The company can be described as involved in the engineering industry. It was established in 1947 and today employs 59 employees with an annual turnover of less than 50 million Euro.

The company was forced to declare insolvency 13 years ago. At that time the present owner-manager joined the company as a restructuring manager. Following the successful restructuring the owner-manager took over the whole company in a management buyout.

In the opinion of the owner-manager the causes of the insolvency were the lack of focus on core competences and a lack of marketing/sales activity on the part of the top management of the time. To quote the present owner-manager:

”Sales were managed by technical experts who did not go into the field but waited for customers to ask for an proposal to be submitted. There was also a lack of suitable instruments for business planning and controlling. The sales department was not in a position to say what the machines cost to develop and what price would have to be asked.”

The annual financial statement is audited by a chartered accountant.

Strategy and Structure

The product involves a mature technology where there is little opportunity for innovation. The range of buyers for these products is very transparent. There are therefore only two strategic lines of attack: further optimization of the costs of

production, and expansion into new markets. For this reason another focus is now being opened up on international activity (particularly Asia).

Business Planning

The business planning system is well developed, consisting of a profit planning, financial planning and balance sheet planning. Only the profit and the financial plans are linked together. The company is a single producer so the time horizon is one year. The planning system was developed by the owner-manager himself using Microsoft Excel and it continues to be improved. The development of the Excel-based system took 3-5 years. Ten years earlier the owner-manager worked in the controlling and sales departments of an internationally active company and therefore has very good business management skills.

According to the owner-manager he manages the company only on a profit-planning oriented basis. In managing the company he concentrates on the income statement. The balance sheet planning is indeed prepared but not taken into consideration. Recently – due to the strategy of expansion – he has however noticed that the bank is paying increasing attention to the balance sheet and calculates capital structure ratios here, so he will have to deal more intensively with this topic.

Meanwhile he sees the financial plan as an important instrument of control.

He then said:

“I too first had to learn how cash flow planning works with a single producer. A cash-flow plan is a good form of risk management.”

Various scenarios are worked through in the business plan.

Its sound business planning means that the company can be well managed and still has potential for further development.

Performance Measurement

A knowledge management system was recently introduced to preserve the know-how held by employees who leave the company. No other instruments of value-based management are used.

Risk Management Process

Primarily, experience gained from previous projects serves to identify and assess project risks. To some extent checklists have been developed for the preparation and development of proposals, which also review specified project risks. In addition, an important early warning indicator has been introduced which is constantly monitored: the “measure of incoming orders”.

There is no direct link between risk management and business planning. The manager makes the risk considerations in his own head; they are then to some extent allowed for in the bid calculation.

Risk Management Organization

The responsibility for the risk management lies with the top management. A special risk manager is not seen as being useful for a company of this size. The risk management is not very formalized. According to the owner-manager one important basis for the risk management is provided by the discussions with the employees. For this reason management discussions with the staff take place each week.

An contingency plan is only available for the IT unit. One problem is certainly the question of successorship, for which no guidelines exist at present. Neither are there any rules for representation for the sole owner-manager.

Project Risk Management

Special project management techniques such as critical path networks and bar charts are only used sporadically, for example for very complex projects. Concurrent cost accounting is set up for all projects. A cost and profit plan is prepared for each project. No project liquidity planning is made. The individual project plans are not automatically combined into the overall company business planning. Manual steps are necessary even for the overall view of the projects.

A preliminary calculation is made for each project; the risks being directly reflected in it. The calculation is discussed with the top management and serves as an important instrument in the assessment of risks.

Weekly project discussions are held which include discussions on the development of the project and its risks.

A post calculation is made for each project. It is discussed with the top management in order to learn from the experience gained and to provide a better data base for future projects. This data is also stored in the new knowledge management system.

Interview No. 24 small engineering firm

The company is engaged in the engineering sector. It is owner-managed and has several managers. All have a degree from a Technical University and some business management skills. The company has been in existence for 8 years. The accounts are prepared in-house and the annual statement of accounts prepared by the tax advisor. The company has 45 workers and a turnover of less than 10 million Euro. A management consultant has been active in the company for some years now. As a rule the financial results are analysed with the management consultant every three months.

Strategy and Structure

Turnover in the business sector is showing a strong decline. The company is looking for a new business sector since otherwise its long-term survival would be in doubt. The technology employed is mature and changes to it are hardly possible. The relationship with the bank has worsened. According to the owner-manager this is expressed through increased requirements placed on the reporting and business planning.

Business Planning

A long-term profit and financial planning was set up with the aid of a management consultant. The time horizon is somewhat short-term, plans are established for one year. In addition, for the lending bank a three-year business planning is prepared. Short-term plans are also drawn up for profit and liquidity. Use is also made of a forecast function for the short-term plan.

Performance Measurement

The basic principles of the Balanced Scorecard concept are known but there are no plans to introduce it.

The reason given by the owner-manager was:

“For companies of our size it’s too expensive, the owner has first to become familiar in detail with it himself, and even then there isn’t anybody available who could introduce it.”

A customer and competitor analysis is carried out at irregular intervals. There is also an annual meeting where the future strategic direction is discussed. This began at the encouragement of the management consultant, who facilitates the meeting.

Risk Management Process

The top management does indeed monitor the main risks for the company such as market, finance and human resources, but it does not use any systematic methods. They rely on experience, discussions with customers and the study of technical journals. It is therefore not possible to determine an overall risk position for the company.

Risk Management Organization

So far no formal risk management has been set up. Basel II and the requirements from the lending bank have led the company to develop something in this area for the first time, working with the aid of the management consultant. The owner-manager describes these efforts as follows:

“Which strategic risks we are facing and who is responsible in the company for assessing them.”

The top management alone is responsible for the risk management. The risk strategy is largely that of the company bearing the risk itself, or insuring against it. Rules on replacement for the top management are not available, which presents a significant problem. A succession plan also does not exist yet, being less acute as the managers are an average of only 40 years old.

Project Risk Management

Of the various classic project management techniques available, only time and cost planning is applied. It is prepared manually, without software support. Risk considerations occur during the proposal phase of each project. Formal methods on risk identification and assessment are not used and the risks are not documented in a formal way.

6.2.3 Analyser

The scoring patterns of the analyser type examples are summarized in Table 6.22.

Table 6.22 Analyser Type Examples

Firm	Business Planning	Performance Measurement	Risk Management Process	Risk Management Organization	Project Risk Management
Interview firm 7*	High	Moderate	Moderate	Low	High
Interview firm 10*	High	Moderate	High	High	N/A
Interview firm 13	High	Moderate	Moderate	Moderate	High

* Questionnaire participant

Interview No. 7 small construction firm, questionnaire participant 2002

This owner-managed company is active in the construction sector. The owner-manager has a degree from a Technical University. He set up the company 11 years ago. The company employs 20 staff and has a turnover of less than 10 million Euros. The owner-manager was previously employed as head of production planning in a large company involved in the construction sector.

Although the company is relatively small when compared with the other analysers, it demonstrates very good characteristics in terms of the variables studied when compared with the reactor and defender/prospector companies. Another noticeable feature is that the owner-manager is very interested in questions of business management and has also increasingly taken advice from external consultants such as tax advisors and chartered accountants. The accounts and the annual financial statement are all prepared in-house.

Strategy and Structure

The external business environment has noticeable worsened in the last few years. The construction sector is currently dominated by increased competition. Turnover is slightly declining, which led the company to develop and patent a new product. This new product development is directed at an upper segment of the market, a way of trying to escape the strong pressure on margins in its standard business. The introduction of the product indicated very promising results.

Techniques such as mind mapping were used in the development of the product, in order to be able to agree with the staff what the main cost drivers would be. This approach was also taken to assess the optimization potential in the product. The company is ISO-certified and the owner-manager considers the firm has benefited from the certification and increased the value of the company. The relationship

with the bank is not seen to be a problem since the bank loans have largely been paid back and new investments are only financed with equity capital.

Business Planning

Being relatively untypical for this size, the company has prepared long-term, integrated profit, financial and balance sheet plans with a time horizon of 3 years. Also profit and liquidity are monitored at monthly intervals. Forecasts and scenarios are also employed. Software support is provided by standard planning software.

Performance Measurement

The Balanced Scorecard is known and is already in use. The company has identified the critical success factors for the various perspectives and developed strategic goals. The goals were developed together with the employees and are available to all the staff via the company Intranet. At the moment work is in progress to develop suitable indicators for each perspective. According to the owner-manager, the BSC was necessary since the critical development in the market and the development of a new product line made it necessary to implement a more comprehensive monitoring and control instrument. The BSC was introduced with the support of the chartered accountant. The Target Costing instrument has also been introduced as a strategic instrument.

Risk Management Process

A more comprehensive view appears to be taken of the risk categories. Thus the following risks are constantly monitored: credit, quality, price of raw materials, human resources, investments, research and development, relationship to bank (withdrawal from the sector). Checklists, mind maps, workshops and process descriptions are exercised to identify risks. Mathematical/statistical methods are not exerted in risk assessment. The company attempts to estimate the risks and their financial impacts and notes the risk parameters in the business planning. The staff in the various functions are then responsible for monitoring these risks. The owner-manager co-ordinates the risk identification with the staff responsible in each function. Qualitative risks such as probability of winning a contract, successful acquisition, are also allowed for. There is as yet no general overview of risk for the company, which has already been recognized as a deficiency.

Risk Management Organization

A formal risk management has not been set up but the main risks have been identified and documented in the process description of the quality management. The employees are aware of the risks and documentation is available on how the risks are to be monitored. The process descriptions also document the identified risks and include rules on who is responsible for them. The risk strategy is largely that of bearing the risks oneself. A contingency plan for the electronic data processing is available. Rules on representation for important employees in the company are available. Although one problem here is the owner-manager since he is the central person and there is no one who can stand in for him. The same is true for the succession planning.

Project Risk Management

Project management makes use of capacity planning (reverse time-phased), activity plan and a cost plan. Single project consolidation is not made.

Risk considerations are carried out for all projects, mainly during the proposal phase. The main procedures practised in risk identification are checklists and questionnaires. Documentation of the risks is included in the project cost calculation. However, so far it has not been possible to obtain a general overview of risks for all projects.

Interview No. 10 very large firm, other sector, questionnaire participant 2002

The company is a very large public limited one (AG), being active in the semiconductor sector (waver technology). It now has subsidiaries overseas (USA, UK) and currently has some 640 employees at an annual turnover of more than 50 million Euro.

A personal interview was carried out with staff of the company in January 2002 as part of the pilot study in the development of the questionnaire. At that time the company had less than 499 staff and could therefore more properly be described as an SME. During the personal interview in 2002 it became apparent that little had been done to implement a risk management system. The company had just begun to implement the legal requirements for such a system. By the time of the June 2005 interview a full risk management system had been set up. The period from

2002 to 2005 also saw a generation change in the finance and controlling function. The company is subject to audit and is not listed on the stock exchange.

Strategy and Structure

The conditions in the external business environment have substantially worsened. In particular, there is increased pressure from competition from Asia. The competitors in Germany and around the world are substantially larger and the company is attempting to position itself with a niche strategy. In recent years the company suffered substantial losses due to stock exchange rate risks. Precautions have since been taken in this regard through hedging.

Business Planning

An integrated profit, financial and balance sheet planning is available. The planning horizon is 4 to 5 years. Short-term performance and liquidity plans are prepared. Scenario techniques and a forecast are also exercised. The business planning is set up in the form of a spreadsheet calculation model prepared within the company.

Performance Measurement

The company knows the Balanced Scorecard but does not want to introduce it, concentrating more on introducing the shareholder value. The variable remuneration is also to be linked to the shareholder value. This makes clear that the company does in fact still belong to the SME category since in very large companies the shareholder value has already become part of the standard reporting.

Risk Management Process

The main risk fields are strategy, technology, purchasing and procurement, finance, customers, IT, human resources and legal matters. Standard worksheets have been prepared to identify the various risks; they are documented in the risk manual and are available from the Intranet.

The top management, the head of finance and controlling and the other heads of function and appropriate staff are all responsible for the identification of risks. Each risk is identified with the aid of the identification sheets. The respective exposure to risk and the probability of occurrence are estimated, both broken down

into 4 classes. Mathematical/statistical procedures are not employed. The frequency of risk identification varies according to the type of risk. However, the predominant frequencies are monthly and quarterly. The risk forecast horizon is between 1 and 5 years. The risk manual also sets out the significance thresholds for an ad hoc reporting. The head of finance and controlling co-ordinates the risk identification sheets and organizes the documentation. The information on the risks is provided as part of the normal reporting procedure. An overall risk mapping is not presently prepared but the company is working on developing one. At the moment the main risks are discussed in the monthly management meetings with the executive board.

Risk Management Organization

A formal risk management has been set up and is documented in the risk manual. The executive board is responsible for setting up and updating the risk management system. The head of finance and controlling is primarily responsible for its continuing development. In the future internal audit should also be involved to a greater extent. There is no special risk manager and such a position is not considered to be suitable for companies of this size. The staff responsible have access to the data via the risk manual and the company Intranet. The risk strategy includes insurance cover, transfer and bearing risk oneself. A contingency plan for the production and the IT units is available. The rules on replacement have been prepared in detail.

Project Risk Management

This is no classic project-based business; only research and development projects are carried out, drawing on the classic project management techniques. Risk considerations therefore only occur during the development phase. For risk identification and risk assessment the company primarily makes use of the Failure Mode and Effect Analysis.

Interview No. 13 medium-sized information technology firm

The company is a small public limited one (AG) with 75 staff and an annual turnover of less than 10 million Euro. The public limited company is not listed. It voluntarily prepares quarterly financial statements since an initial public offering

is planned, and the company would like to provide shareholders with detailed information. The annual financial statement is audited by a chartered accountant.

Strategy and Structure

The company has developed innovative and patented product developments for a specific niche market where it currently is the market leader. In recent years the company achieved two-digit growth figures. The competitors are much larger companies which are heavily active in the standard business.

Business Planning

The company prepares a long-term profit and financial planning. The lack of a balance sheet planning is explained by the presence of the quarterly financial statements which include a balance sheet. The time horizon is 4 years. Profit and liquidity-flow are monitored monthly by means of a detailed plan. A forecast function has also been set up.

Performance Measurement

The Balanced Scorecard is understood in outline but the chief financial officer is not convinced of its usefulness. The company would like to concentrate more strongly on the shareholder value in the future.

Risk Management Process

The method of brainstorming is utilized to identify new risk fields. To do it, the executive board and heads of function meet once a month. The following general risk fields are monitored: liquidity, creditworthiness, customer retention, research and development. The following techniques are employed to identify and assess risks: checklists, questionnaires, expert interviews, business planning, European Foundation of Quality Management (EFQM) model, trend analysis. Mathematical/statistical procedures are not used. Customer retention is identified as a qualitative risk.

The company does not presently prepare a risk portfolio. However, it believes that such a portfolio will become important in the future, in order to be able to properly inform the shareholders on the risk situation of the company.

Risk Management Organization

A formal risk management has been partly set up and is documented in the business planning manual. This manual also sets out which risk fields are to be identified, what the escalation criteria are, and what the reporting cycle is to be. The chief financial officer is responsible for setting up the risk management. In 2002, due to the poor development in economic performance and the resulting cancellation of the initial public offering the company suffered a major loss. In addition the market development was not correctly estimated and the resulting staff reduction took place too late. In order to be able to identify such dangers in good time in the future tasks have been reassigned and appropriate risk indicators developed. The risk strategy is to bear the risks themselves. Comprehensive rules on contingency and replacement are also available. Rules on succession are not missing for only a few key positions such as research and development and sales. The company is working on it.

Project Risk Management

The standard project management techniques are exercised consistently for each project. Consolidation of the individual project results is made manually by the controlling function.

Risk considerations are prepared for every project. This occurs during the proposal phase and also at the end of the completed project in the form of a project review. The assessment of the risks is largely made in qualitative terms, with the help of checklists. The company appreciates that there is still need for action to develop a continuous and more formal project risk assessment.

7 Practical Implications

This chapter on practical implications for SME risk management practices will first discuss which deficits appear in the risk management types developed in Chapter 6, and it proposes which measures must be taken if the companies are to continue to develop positively (Section 7.1). Recommendations are given on action which should be taken for a methodical improvement of risk management; these apply equally to all risk management types (Section 7.2). The chapter concludes by presenting details of the components of a holistic risk management framework (see Section 2.1) and comments on their organizational implementation, with an emphasis on project-oriented SMEs (Section 7.3).

7.1 Special Implications for the Identified Types of Risk Management Practices

A summary is given of implications being specific for the risk management types derived in Section 6.1, with explanations on the appropriate action needed to improve their risk management.

The following sections deal with the weaknesses identified within the determinants of the types. Implications are presented how to improve, in order to develop positively. The determinants are addressed in the same order as in Tables 6.1 to 6.3.

7.1.1 Reactor

Concerning the implementation of a risk management, the reactor type reveals the largest need for action.

Strategy and Structure

The reactor is an unstable organization type because it lacks a set of consistent response mechanisms that it can put into effect when faced with a changing business environment. This inconsistency potentially may stem from at least three sources (compare Miles and Snow, 2003, pp. 81-82):

- management fails to articulate a viable organizational strategy
- a strategy is articulated but technology, structure and processes are not linked to it in an appropriate manner
- or management adheres to a particular strategy-structure relationship even though it is no longer relevant to environmental conditions

Hence the most important task for the reactor is a critical review of its strategy (or even formulating a strategy for the first time).

Since the reactor acts frequently in markets with low or no growth potential the search for new markets or business segments is advisable to ensure sustainably the chance of survival.

Another critical point is that the internal structure of a reactor or the technology being applied often is no longer up to date. The first priority is to improve the management structure. Especially in the areas of business planning and controlling essential improvements are necessary. The reactor cannot cope with such extensive changes without external support.

How far the reactor type can show a positive development depends essentially on the management recognizing the sense of urgency and the willingness to make demands on professional assistance.

Business Planning

If the financial accounting is prepared externally this should be done in-house; otherwise any understanding of financial connections would be lacking and the data base for the business planning would not be accessible. If the business planning is drawn up by an external consultant the firms often have difficulties to understand the planned figures. The annual financial statements may still be made by an external consultant, since they additionally require much detailed knowledge (accounting rules and tax regulations).

Concerning the components of a business planning system, the reactor should at least implement an annual financial and profit planning. For a monthly monitoring it would be meaningful to prepare a short-term liquidity and profit planning. The current data could be taken from the accounting to compare within the planning system actual figures with planned figures. The reactor should handle this monitoring by simply calculating differences. An integrated planning system in the form of a master budget might be too challenging for the reactor and should not be considered for the time being.

A specific time horizon for planning cannot be postulated.

In the first place, reactors – which are often administered by more technically-oriented owners or managing directors – must be persuaded of foresighted planning being advantageous. Reactors should take advantage of professional help

by tax advisers or management consultants. In addition to that, increased use should be made of university graduates with management and controlling knowledge. This applies at least to small firms.

Performance Measurement

Instruments of performance measurement that are useful to develop a strategy frequently are not known to the reactor or they are dismissed by the management as not being meaningful.

To develop their own strategy, reactors should first make use of instruments that are seen by business management theory as by now classic, such as SWOT analysis, Ansoff Strategy Matrix, Porter's Five Forces. These instruments might be applied not in pure form but reduced to their core ideas.

If basic tools of performance measurement have been implemented successfully instruments of value-based management – such as the Balanced Scorecard or the shareholder value – can be thought of.

Risk Management Process

To set up a risk management, the reactor type must carry out a systematic and complete assessment of all relevant risk categories. A reactor often has a business organization according to its functions. So the identification of risks should occur along the functional areas. The heads of the functions should be responsible for the risk identification and for a provisional evaluation. After a comprehensive risk identification the heads together with the top management will decide on the risk assessment frequency and on the time horizon of the respective risk category.

For the future monitoring and documentation of the development of risks it is recommended to integrate the risk data into the regular reporting.

Since reactors have few formalized systems and procedures they will have particular difficulties in establishing a risk management. So only a step by step implementation of the risk management process can be proposed. It should be linked as closely as possible with the business planning.

Risk Management Organization

The key to a successful implementation of a risk management system is with the managing director or the owner-manager. Risk considerations often take place

only in the mind of management while the staff of the responsible functions are not involved. A comprehensive risk management is not possible until the responsibility for risk assessment is delegated to the heads of the functional units.

To gain knowledge of risk identification and risk evaluation the training of employees is strongly required. Also the controlling function should be improved. After having been trained themselves, the controlling staff could advise the heads of the functions how to manage risks. This is a cost-effective concept which does not tie too many resources.

As a starting point, adequate methods to assess risks are questionnaires and checklists. In a further step towards a comprehensive risk management specific risk assessment templates should be developed (see the details in Section 7.3.1).

Another critical point concerning risk management organization are lacking contingency and replacement regulations. Reactors mostly have only one managing director who has no one to whom he could hand over responsibility in the case of an urgency. In this context there is strong need for action.

Reactors also have rarely thought about succession planning. The death of the owner-manager would have significant consequences. Often within his family there is no potential successor. So it is recommended that among the employees someone should be built up as successor who could get to know the role with time.

Project Risk Management

To control and monitor the projects the application of classic project planning techniques is recommended (Project Breakdown Structure, resources and time scheduling, cost and profit planning). For the estimation of the project risk potentials, for each project a risk assessment template should be developed (for details see Section 7.3.1).

Furthermore, it is recommended that risk assessment should be extended along the whole project life cycle. Reactors often deal with a project causing an essential loss that they do not perceive until the project termination.

The project documentation must strongly be improved. A project file with a systematic documentation of the project phases would be helpful. The reactor should implement a simple knowledge management system. It should be organized in the form of a data base containing important technical, financial and organizational project data, which can be useful for future proposals.

Having no sound project management, reactors need not think about establishing the consolidation of single project developments.

7.1.2 Defender/Prospector

When compared to reactors, defender/prospectors have taken the first steps in the direction of a holistic risk management.

It is remarkable that firms which, according to the results of this study, have been categorized as defender/prospector either belong to the low side of the scale, being only slightly better than a reactor, or they were found at the high side, on the way to become an analyser.

Strategy and Structure

The business strategy chosen appears to be practicable in order to ensure the firm's chance of survival. The products and the technology being used have only little potential of development.

How the defender/prospector can further develop in a positive way depends strongly on the rapidity of environmental changes. If the external uncertainty rapidly changes the future depends on how the firms can adapt to new environmental conditions.

Business Planning

In addition to existing financial and profit plannings, the defender/prospector should implement a balance sheet planning. Defender/prospectors are often small and medium-sized. Thus for the external financing by a bank it is very important to keep certain assets and capital ratios. As only few defender/prospectors already work with a master budget they should take greater care of co-ordinating the various subplans.

Concerning the methodological aspect, for short-term considerations the business planning should have a forecast function. Long-term business planning should make use of scenario technique.

Performance Measurement

Defender/prospectors do not apply the classic instruments of performance measurement to an essentially greater degree than the reactor type does. They though exploit them less sporadically.

Concerning modern instruments such as the Balanced Scorecard or the shareholder value, defender/prospectors are more open-minded than reactors. This may be due to more staff working in the accounting or in the business management unit. Further efforts are still needed. In this context, a critical factor is the controlling function; it should be extended with respect to personnel.

Risk Management Process

The defender/prospector has established the process of risk assessment a little more formally than the reactor type. Most remarkable is that the employees from the functional areas are integrated to a larger extent into the risk management process.

An essential starting point for the further development for the defender/prospector is that risk assessment templates should be designed, allowing a complete assessment of all relevant risk categories. Defender/prospectors often do not assess all risks being essential for them which may lead to substantial losses.

Another approach could be the implementation of a “risk map” or a “risk portfolio”, which may deliver to the management a compact presentation of the entire risk position. Just as reactors, defender/prospectors generally do not know their entire risk position. Since they have already established some systematic risk assessment, a risk portfolio could – as a first step – be implemented manually. With the business planning further being improved its link to the risk management should be extended.

Risk Management Organization

The employees of the functional units being responsible for risk management must still more intensively be advised to use the risk assessment templates and the methods of risk evaluation. Suitable methods for the assessment of risks are proposed in Sections 7.2 and 7.3. Statistical methods of risk evaluation are inadequate for defender/prospectors.

The controlling function should play a central role for risk management. For external risk management support, the defender/prospector should increasingly fall back on tax advisers and chartered accountants. Since the defender/prospector generally tends to make more use of the support by a chartered accountant, it will be no problem. The defender/prospector type is also more likely to accept investment expenditure with a moderate amount.

The rudimentary steps toward contingency and replacement regulations must further be improved. Succession regulations are widely unsolved. Since, concerning succession, there are no essential differences between the reactor and the defender/prospector types the same propositions as for reactors apply.

Project Risk Management

Regarding general project management, the use of simple project management tools distinguishes the defender/prospector from the reactor. For the majority of their single projects, defender/prospectors also carry out a cost planning and a profit planning.

On the other hand, project risk management of defender/prospectors is very much the same as that of reactors so that the same implications apply. Merely the defender/prospector management shows greater insight that there is urgent need for action to improve project risk management.

7.1.3 Analyser

Analysers are “by definition” already quite good at managing risks. But there still remain important issues where they could improve.

Strategy and Structure

Analyser firms take great care over developing and communicating their business strategy. They continuously are busy with scanning changes in their business environment. Besides cultivating established business segments an analyser aims at building up new ones. Analyser often are not the inventors of the technology being used; they rather pick up innovative and promising ideas of their competitors to exploit them for their own business segment.

To optimize their business organization, analysers to a greater extent make use of external support, an indication that they are continuously busy with improving.

Business Planning

Analysers have the most complex business planning systems of the types being considered. They should give their special attention to a consequent co-ordination of their various subplans. Even larger SMEs often apply self-developed planning systems which are constantly extended. Here more frequent application of standard business planning software is recommended. To estimate planning figures, analysers should take advantage of the scenario technique still more frequently.

Performance Measurement

Concerning general management purposes, analysers already work with modern instruments of performance measurement. They do not always apply them in pure form but adapt them to the specific needs of SMEs.

An important improvement would be the consequent utilization of already established instruments of performance measurement for the purpose of risk measurement. This is particularly sensible with regard to identifying and evaluating qualitative risks.

Among the modern instruments of performance measurement, the Balanced Scorecard is recommended to the analyser to be suitable for risk management.

Risk Management Process

To improve their practices in the sense of a holistic risk management, analysers reveal need for action in two directions.

In the first place the link between risk management and the business planning must further be extended.

Additionally, to monitor the firm's entire risk position a risk map or a risk portfolio should be implemented. In this respect the firms of the present study expressed their greatest need for action.

Risk Management Organization

The analyser has established the responsibilities for risk management company-wide in a rather satisfactory manner. The methods to identify and evaluate risks can judged to be proper. More intensive use could be made, and also other instruments such as quality management could be applied to the risk management.

The risk management should be improved by an integration of the already existing management subsystems.

The responsibility for risk management of the controlling function should further be extended.

Project Risk Management

Analysers have the most advanced project risk management of all types. An important problem to solve remains the development on the company level of an overall risk portfolio. Such a portfolio has been implemented by hardly no firm, and here analysers see clear need for action for the future improvement of project risk management.

7.2 General Implications for the Development of Risk Management Systems

To result in an adequate risk management, the present empirical investigation has revealed that many improvements must be carried out concerning the existing subsystems of the management system. Section 7.2.1 deals with the application of business planning and quality management to the handling of risks. Sections 7.2.2 discusses establishing a risk mapping. Section 7.2.3 treats organizational aspects of risk management. Section 7.2.4 considers how risk management in SMEs can be supported by software applications. Finally, Section 7.2.5 goes into business management knowledge.

7.2.1 Business Planning and Quality Management as a Base for Risk Management

A genuine improving of risk management in SMEs is not possible without the extension of the business planning. On the one hand, the business planning with its permanent planned/actual comparison of planning parameters is already a relatively good form of risk management; plan deviations are immediately visible and can be appropriately analysed. If the business planning system also has a forecast function then critical deviations from the plan can be made visible and recognized early enough. This allows the timely introduction of counter-measures. On the other hand, the increased application of the business planning for risk management purposes provides a cost-effective alternative for SMEs. In addition, a comprehensive business planning is the only understandable opportunity for

SMEs to make visible the effects of the risks on the target figures of profit and liquidity.

The present empirical investigation has further revealed that companies which have already implemented a quality management system have been more successful in implementing the risk management process. The great advantage for risk management is that the important business processes are analysed and documented in the framework of the quality management. This documentation comprises the corresponding “process-owners” and also the critical measures which the personnel monitor.

Thus the risk assessment can be based on the process description. On the one hand, this does away with the laborious documentation and identification of the business processes. It is possible to sit down with the “process-owners” in the company, identify the important risks in the processes and agree on suitable measured parameters. Often important risks are identified and documented as early as the process description stage of the quality management. On the other hand, the utilization of the process description also supports a systematic and comprehensive identification of risks. The documentation of the risk management process can also form part of the quality management manual. The quality management system also offers suitable methods for risk assessment. The best known is the Failure Mode and Effect Analysis, which can be applied to both processes and products (see Franke, 2005, p. 188).

In the mid-term, the risk data collected could also be used to set up a company-wide knowledge management system, in the form of a knowledge database. Here the risk data could be first informally collected along the business processes. Finally, another structuring can be made. The structured data can then be taken as the basis for decisions for the development of new products and as a source of information for new employees (see Alquier and Tignol, 2006, pp. 275-276).

SMEs are recommended to become familiar with quality management, which offers two benefits. First, the application of quality management standards ensures a careful analysis of the business processes in terms of the potential for optimization. Second, as already described, a process documentation supports the risk management process. In SMEs quality management procedures should also lead to a greater level of acceptance by the employees, since risk management does not appear as a new “management hype” but as a natural component of the

quality management system. Of course this does not mean that all companies need to subject themselves to an expensive ISO certification audit. It would be quite sufficient if the basic components of quality management were to be implemented in a manner which appears suitable for the company.

7.2.2 Consolidation of Risks to Estimate the Entire Risk Exposure

The most worrying finding of this empirical investigation is that the great majority of the surveyed firms did not have any possibility of correctly estimating their overall risk situation. In particular, given the rapidly changing conditions in the business environment, it presents a significant threat since it is not possible to make a realistic determination of the overall risk position. The companies simply have to blindly trust that the top management is aware of all the main risks. For companies with project-based activity this fact is particularly serious since they cannot determine the risk situation due to the number of projects being already in progress. Risk assessments may indeed be made for individual projects but they are mainly based on experience gained from completed projects. As a rule, risk assessment is made only during the proposal phase. There is no integration of project risk assessments into the risk assessment on the overall company level. The management can only rely on the respective project manager to keep his project under control and to know the essential risks. There arises the problem that the management loses track of the firm's overall risk situation.

The majority of the SMEs interviewed saw the greatest need for action for their risk management here. The reason always given is a lack of time and lack of the appropriate methods. This step toward a risk mapping can, however, only be implemented if a systematic risk identification and risk assessment is carried out across the company.

7.2.3 Organizational Aspects of Risk Management

As the empirical investigation also revealed, the owner-managers demonstrate a high level of risk awareness and, thanks to their expertise of the business sector and the market, are often well able to appreciate the risks to their companies. A large problem, however, is that they do not document their risk handling and that the implicit knowledge is kept in the managing director's head.

But not sharing knowledge has significant implications on the survivability of the company. Any longer-term absence of the often sole managing director makes the company utterly unable to act. This is not only due to the absence of any deputy in the company authorized to sign. The heavy involvement of the owner-manager in the day-to-day business operations and his often sole development of the acquisition and sales activities mean that the employees have absolutely none of the knowledge and skills needed to be able take on the representation. Very often the employees do not even know why the owner-manager is asking for appropriate data or key figures. This lacking knowledge can lead to considerable problems, not only in the event the owner-manager is absent for a longer period of time, but also as the company grows. The owner-manager will not be able to continue keeping an overview of all the things happening in the company let alone control it with information in his head. If no suitable formal planning and control systems are set up at this point then the continuing successful development of the company becomes very doubtful.

The owner-managers should therefore, as a matter of urgency, implement two ways of improving the situation. One is the formal regulation of the powers of representation and thus an increased delegation of tasks to the employees. The other is closely connected with the rules on representation, namely the often unclear question on who would inherit the company. Where no successor from the family circle is available the owner-managers should at a very early stage look for suitable candidates among the senior staff and then involve such staff in the executive board of the company. It ensures both a corresponding motivation and continuity in the development of the company.

The delegation of risk management responsibilities is also important for another reason: it would allow negative company developments and crises in the company to be recognized at an early stage and ensure more effective communication of them to the executive board. Smallman and Weir (1999) point out that just in the state of crisis a well-developed communication system is essential. Such a crisis can better be overcome if the staff who perceive a critical development directly at its origin communicate it immediately to the management (pp. 37-39).

For the practical implementation of a risk management system it is recommended that the managing director together with the responsible employees from the various functions assemble in a workshop to produce a risk inventory. In this way

a joint decision is made as to which risks are important, who should monitor them and which counter-measures could be taken. Following such a workshop the employees responsible and the executive board should meet at regular intervals with each of the employees responsible providing a brief report on the risk situation. For SMEs such a meeting could be held once a month or once a quarter. The co-ordination and documentation of the workshops could be made by the employee from the accounting unit. Medium-sized firms already have a controlling function which can take over the risk handling tasks. The risk information is then included in the normal reporting procedure.

7.2.4 Software Support for Risk Management

The investigation has revealed that special risk analysis tools, which are offered as stand-alone programs or add-in solutions, have no meaning for SMEs. Such software solutions involve high expenditure, and they presuppose a substantial level of knowledge of statistics. It cannot be assumed that such a level of knowledge exists in SMEs, and the great majority of the companies surveyed make no investments for the risk management.

It must also be remembered that risk simulation be made by add-in solutions such as Crystal Ball or @RISK require the availability of Excel worksheets for the company business planning and project plans (see for example Leopoulos et al., 2006, p. 327). As the present research has displayed this is not the case for micro and small firms.

For SMEs statistical risk analyses have only little relevance for another reason, since most firms have not a sufficiently large database for a reliable statistical evaluation (see Münzel and Jenny, 2005, p. 53). There also seems to be little sense in the procedure suggested for SMEs by Leopoulos et al. (2006) "... to 'buy' only the results of such risk analysis tools for their important projects rather than investing in people and know-how acquisition in order to perform the risk management process in-house" (p. 327). The great aversion of SMEs toward external consultants and the fear of giving company know-how to outsiders stands in the way of relying on external expertise.

Also not suitable for SMEs are special programs for risk management which, beside offering the possibility of analysis, also support reporting opportunities. The reason is that SMEs often have no controlling function, and the scarce staff

resources mean there is no time to maintain this type of program. Further such risk management software is more comprehensive than the needs of the companies would require¹. Risk management software also is faced with serious problems of acceptance, since yet another program has to be fed with data where already so much data has to be collected and prepared for the reporting procedure and for the business planning.

Another approach would appear more sensible here: The process of risk identification and assessment using checklists and identification sheets can be easily transferred to spreadsheet calculation programs and databases. The decisive advantage is that the checklists and risk worksheets can be continuously modified to match requirements in terms of the development and knowledge on risk management. The risk management software solutions can indeed be modified to meet individual requirements but these modifications are mostly more time intensive and cause considerable additional costs.

The application of different software products must be criticized since they are “island solutions” and the risk information is not centrally collected. Whether risk information is passed on therefore depends on each employee. How (or whether at all) the top management is informed of the risks then depends on how well the employees carry out the task. This disadvantage can largely be avoided by linking the risk management with the business planning. The identified risks are assigned to the appropriate items in the business planning, which assures coherence of the risk management information.

Where not yet available, the procurement of an off-the-shelf business planning software is recommended. Such standard software has now become cost-effective for SMEs as well. These planning programs as a rule offer what-if analyses and scenario techniques. Thus SMEs can in a kind of “game-playing” approach test their way forward, varying the important planning parameters more closely towards the critical values and their effects on the company targets of profit and liquidity.

Modern planning systems also allow different scenarios to be stored with comments. One important precondition for the identification of the overall risk position is the allocation of the risks to the appropriate items in the business plan.

¹ Münzel and Jenny (2005, pp. 152-154) in their book include a useful checklist on what should be considered when selecting appropriate risk management software for SMEs.

Business planning software also offers a reporting procedure containing information on the risks, so that it can be integrated into the normal reporting cycle. Planning systems are often run with a “signal function” which highlights critical developments, thus contributing to a good visual presentation (Friedemann, 2004; Gleißner et al., 2004, p. 37).

The development of a company’s own business planning system, based on spreadsheet calculations, is not recommended. Having grown to a certain size (say, medium-sized or larger), the company’s structures already reach a certain degree of complexity, so that the programming of a master budget requires considerable business management and computer skills. In addition, such a development is very subject to error, as was clearly expressed in the research interviews. Often the firms were no longer able to properly maintain their planning system.

7.2.5 Business Management Knowledge

The following discussion concern general business management issues, not necessarily risk management ones. The clear lack of business management skills on the part of the managing directors was a key finding, which is especially true of the owner-managers. As a rule, owner-managers have a good background of technical experience. While working in another company, the idea matured that they should become independent and set up their own business, often overlooking the risks being associated with the planned activities. Provided they do not take up any state grant or any support facilities related to establishing a business, they are not obliged to go through a training course in setting up a business. Such courses provide training in basic business management skills such as financing and businesses planning.

The author of the present work does not consider an obligation to attend such courses as appropriate. The task of providing support should more strongly be borne by the universities and chambers of commerce, which should offer appropriate training courses and attempt to strengthen ties with founders of new businesses. Concerning potential founders among their students, the universities should provide training as early as possible since here a good basis can be established for the later founding or managing of a company.

But additional support is also necessary for SMEs which have already been established. This is especially important in view of the relationship with the

lending bank. As was frequently expressed during the interviews, it is often the managing directors of micro and small firms who are not in a position to correctly discuss the financial situation with the banking staff. The interviews also revealed that financing by the lending bank had never failed merely on the grounds that the data on the business plan was weak, but largely due to the lacking communications skills of the owner-managers, concerning business management issues. As the interviews demonstrated the lending bank often was not convinced that the owner-manager could manage an expansion of his business properly. If the respective monitoring instruments (a sound business planning, for example) were lacking a loan would not be granted.

For micro and small firms, external management consultants do not provide an adequate solution since these companies often have had bad experience of working with consultants. Moreover, the companies are very cost-sensitive. The seminars offered by professional trainers often far exceed the cost budget seen as acceptable for SMEs. The only solution here is the employment of university graduates with degrees in business management studies. However, in this regard a great deal of effort will be needed to convince the management of SMEs led by technical experts. The companies prefer to invest in technical staff positions rather than setting up a new position for someone with a degree in business management. A new staff with a Bachelor of Business Management qualification would not only be able to help with the business planning and the risk management system, he could also support the managing director in the sales activities, which are often carried out by the managing director alone.

7.3 Holistic Risk Management Framework

This section describes the main components needed to set up a holistic project risk management in SMEs. A special focus has been placed on the practical implementation. Examples are presented as to how the appropriate instruments should be structured (Section 7.3.1). In conclusion suggestions are given on the organizational implementation of the risk management project (Section 7.3.2).

7.3.1 Components of a Holistic Risk Management Framework

Figure 7.1 displays the special characteristic of risk management in project-based companies. The literature on project risk management states that the special feature in companies with project-based activity is the duality of the risk

management levels (see Lachnit, 1994, p. 24; Guserl, 1996; Guserl, 1999, p. 426; Tah and Carr, 2000).

On the one hand, there is the identification and assessment of the risks at the overall company level. But, on the other hand, risk identification and assessment also have to be carried out for each individual project. Without single project risk assessment it is not possible to decide whether – given the risk situation resulting from projects already entered into – another project can be coped with at all. The special challenge for risk management in project-based companies is therefore combining the estimation of the overall company risk and the estimation of the project risks. The preparation of such an overall view of risk is much more difficult than for companies without any project-based activity.

Another challenge is the need to continuously update the estimates of individual project risk evaluations. As can be seen from Figure 7.1, a project can be divided into the 4 classic phases of conceptualization, planning, execution and termination. In each of these phases a risk review should be made.

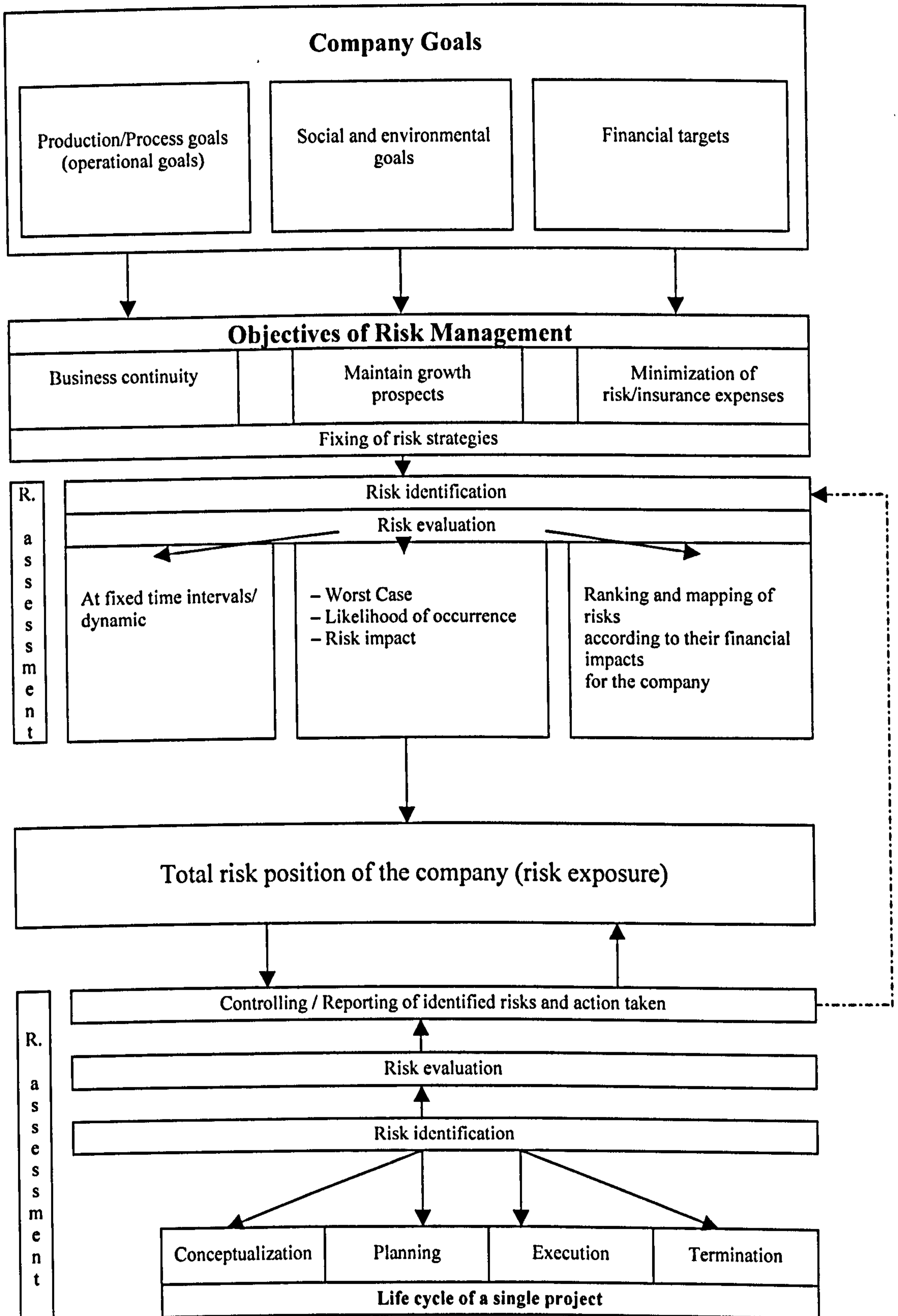


Figure 7.1 Risk Management Framework

Source: based on Guserl (1996; 1999) but heavily modified and extended

Given the complexity of building a risk management system, it is recommended that a modular structure be followed. The business planning should be developed into an integrated system (overall company planning module). Another module should be added in the form of a consolidation of single project plannings (project planning module). The project planning module must then be linked with the overall company planning. Such an approach leads to a simplified risk management. The existence of a profit and liquidity plan for each project means that the deviation between planned and actual situation can be studied. This already allows a simplified analysis to be made as to which risks led to the deviation between actual and planned situations.

Figure 7.2 gives an overview of the input and output modules which will be discussed in the following paragraphs.

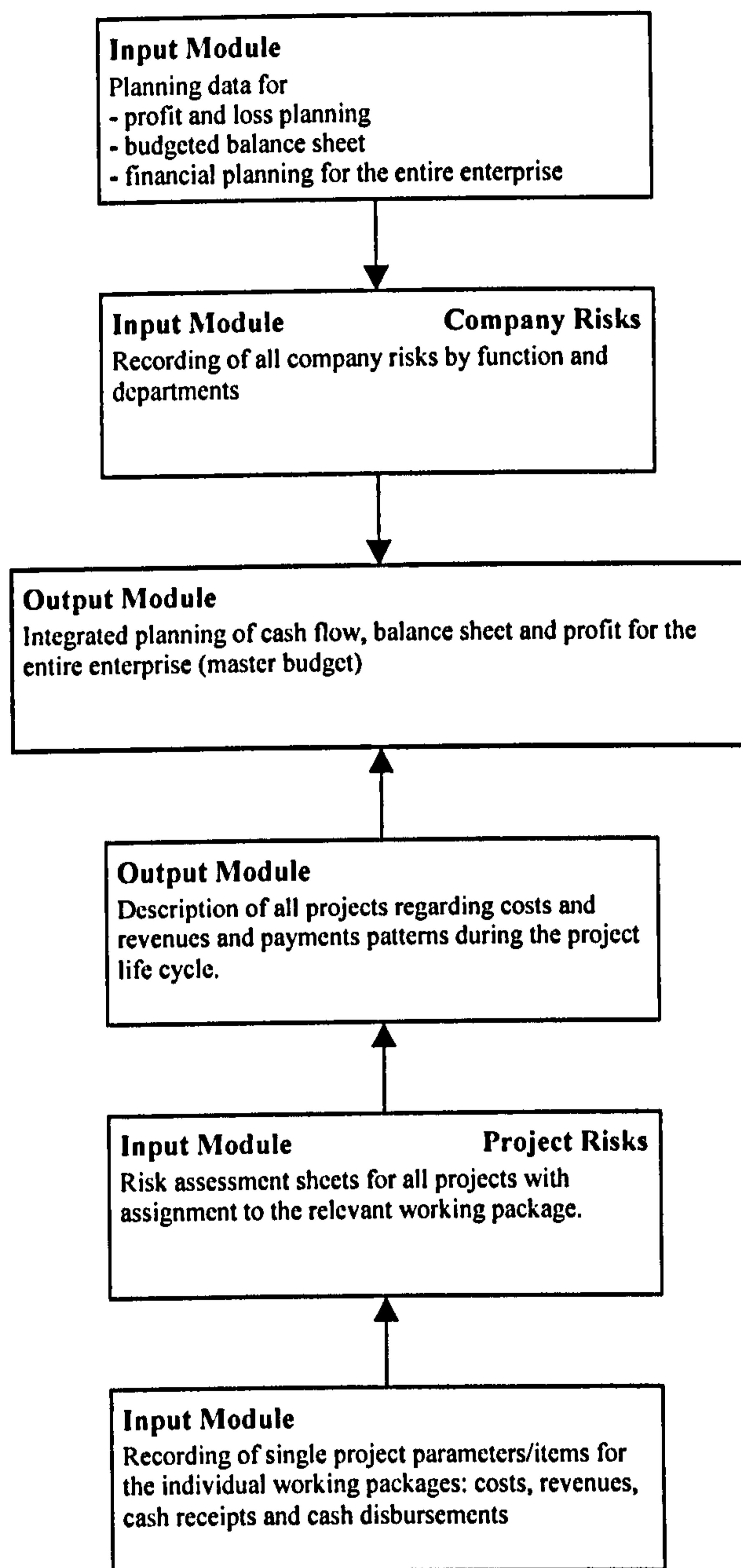


Figure 7.2 Input and Output Modules of the Risk Management Framework.

Once the individual project planning module and the overall company planning module have been set up, the risk identification module should be established. The following notes explain how the risk input module should be implemented at the overall company level. The project risk module is then presented.

Risk Analysis at the Overall Company Level

With the input module “overall company risks” a common identification template is suggested with the following inputs, in order to ensure a company wide

systematic and complete risk identification along the various functions. The following overview delivers a summary of the essential elements which will be discussed below (Figure 7.3).

1. Number
2. Risk description
3. Risk type: financial, operational, organizational and management risks; external/internal and qualitative/quantitative classifications
4. Relation to master budget entries
5. Risk assessment for severity and probability of occurrence
6. Definition of ratio, measure for monitoring of risks
7. Definition of thresholds for early warning actions
8. Determination of risk strategy/actions
9. Responsible employee for risk monitoring

Figure 7.3 Input Module for Risk Assessment: Company level

To make easier the co-ordination of the risk assessment templates from the various functional areas, a standardized structure for the templates on the company level is proposed. This has the advantage that the responsible employees are always familiar with the templates and could take over without any problems the risk assessment in another functional area. Since just in SMEs the staff often are responsible for various functional areas the application of the risk assessment templates is strongly supported.

The risk assessment template on the company level qualifies a risk with respect to its source as external or internal. The categorization is carried out by the employee who is responsible for the assessment of these risks. A brief description of the risk and its qualitative and quantitative classification is added.

An estimation of the impact of the risk follows. A classification into risk classes or the amount of loss is preset in verbal manner, respectively. To illustrate the class descriptions percentage figures ranging from 0% to 100% are added.

For risks that are immediately quantifiable a possible loss (in Euros) can be filled in. Here it is suitable to ask for a 3 class estimation: worst case, base case, best case. This would make possible an easy going through risk scenarios on the overall company level.

In the next step it is determined which positions of the business planning an identified risk figure is linked with. If an identified risk can be associated with several positions of the business planning, its financial impact should be split according to the effect it exercises on the respective position. The main aim of this association is to make the impacts of risks on the firm's development obligatory and transparent.

After the identification of all relevant risks within the functional areas and the processing (by the controlling function, for example) of the completed risk assessment templates the discussion of the management with the heads of the functions on the identified risks and their relevance follows.

This provisional link of risk figures with the business planning also supports the determination of suitable indicators to measure and monitor risks.

The risk assessment is accompanied by the determination of the observable figure for measuring the respective risk. This monitoring should be carried out by the employee who is responsible for risk assessment. He is closest to the risks in question and can make suitable suggestions concerning their assessment.

If a systematic risk assessment is carried out for the first time, the estimation of thresholds for the ad hoc reporting as well as the fixing of countermeasures should be carried out in discussions between the management and the heads of the functional areas. In this way a common knowledge of the impact of the various risks can be achieved. Finally, the responsibilities for a continuous monitoring of risks as well as the time interval for risk revision is fixed.

As described in Section 7.3.2, a first formal risk assessment should be repeated after about 6 months, to make corrections. In future, the formal risk assessment should be carried out once a year.

Risk Analysis at the Individual Project Level

Enterprises that are project-oriented need a separate risk identification and risk evaluation for their single projects. As outlined in Section 7.2.2, the challenging task is the consolidation of single project risk assessments to result in an overall risk assessment. To support the consolidation procedure, a risk assessment template for single projects is proposed, being essentially identical compared to the risk assessment template designed for the company level. Figure 7.4 presents its contents.

1. Number
2. Risk description
3. Risk type:, financial operational, organizational and management risks; external/internal and qualitative/quantitative classifications
4. Assignment to the respective work package(s)
5. Risk assessment for severity and probability of occurrence
6. Relation to master budget entries
7. Definition of ratio, measure for monitoring of risks
8. Definition of thresholds for early warning actions
9. Determination of risk strategy/actions
10. Responsible employee for risk monitoring

Figure 7.4 Input Module for Risk Assessment: Project level

The first three entries of the assessment templates for the company level and for the project level are identical.

On the level of a single project it is important that the risks are assigned to work packages and the corresponding activities. If a project risk is assigned to several work packages a splitting should be fixed with the percentage share of each of the work packages involved. The impact of projects risks on profit is determined just as in the case of risk assessment on the company level.

In addition, the identified project risks should be linked with the corresponding positions of the company's business planning, which supports the consolidation of the impact of single project risks.

The remaining entries of the project risk assessment template are in accordance with the entries on the company level.

Project risk assessment templates should be prepared and cultivated for each single project. The assessment of project risks should be integrated into the project file and be monitored by the employee responsible for risk management. After the termination of a project essential risk information from the project risk assessment templates can be transferred to a project data base. Thus for future projects the knowledge and the experience how to handle project risks can be made exploitable to the employees.

The improvement in the direction of an integration of all single project risks into the business planning must be an iterative process. In a first step, to determine the

potential loss resulting from all projects the identified relevant project risks should be summarized manually. This may be in the form of summary tables, being essentially a condensed kind of project risk assessment template. The summary tables could be visualized graphically by a risk portfolio.

In a later step, risks from single projects can be consolidated to give the company's overall risk position. To support this procedure and to make the context for the staff easier to understand, project risk assessment should in any case include the assignment of project risks to the corresponding positions of the business planning. The standardized structure of the project risk assessment templates will support the later transfer of project risks into the company's planning system.

7.3.2 Recommendations for the Process of Implementation

The limited resources in SMEs mean that a phase concept is recommended for setting up a formal risk management. As mentioned in Section 7.3.1, this permits a phased introduction of the risk management components.

The introduction of the risk management should be organized as a project, in which the classic project organization criteria are applied. The project must be sponsored by the executive board in order to give it backing. It should be managed by the controlling function, if one exists. For companies without a controlling function the task should be mainly carried out by the personnel responsible for accounting.

The project team should also include the heads of the functions. In SMEs flat organizational hierarchies predominate. So the project team should normally consist of not more than 4 to 5 people. Most of the SMEs interviewed make use of external support through the tax advisor or chartered accountant. For that reason the latter should be involved as knowledge stewards at intervals during the establishment of the risk management. The tax advisor and the chartered accountant can make an evaluation of the risk management modules implemented so far.

The concept of a phased introduction is recommended on another ground as well. In SMEs initial success in terms of the newly established risk management must be present; otherwise SMEs rapidly lose interest in it and turn to other activities (see, for example, Hudson et al., 2001, p. 112; Münzel and Jenny, 2005, pp. 128-137; Hudson Smith and Smith, 2006, p. 5). Statements on the time required to introduce

such a risk management are difficult to make since this substantially depends on the size of the company and the pre-systems which already are available (such as business planning, quality management). Münzel and Jenny (2005, p. 129) point out that a period of at least 6 months can be expected for the introduction of a risk management system in medium-sized SMEs. In their project a controlling function was available which was largely responsible for dealing with the implementation. For companies without such a controlling function a much longer project duration can be expected.

The course of the implementation project and its main milestones can be taken from Figure 7.5, which also lists the personnel being responsible.

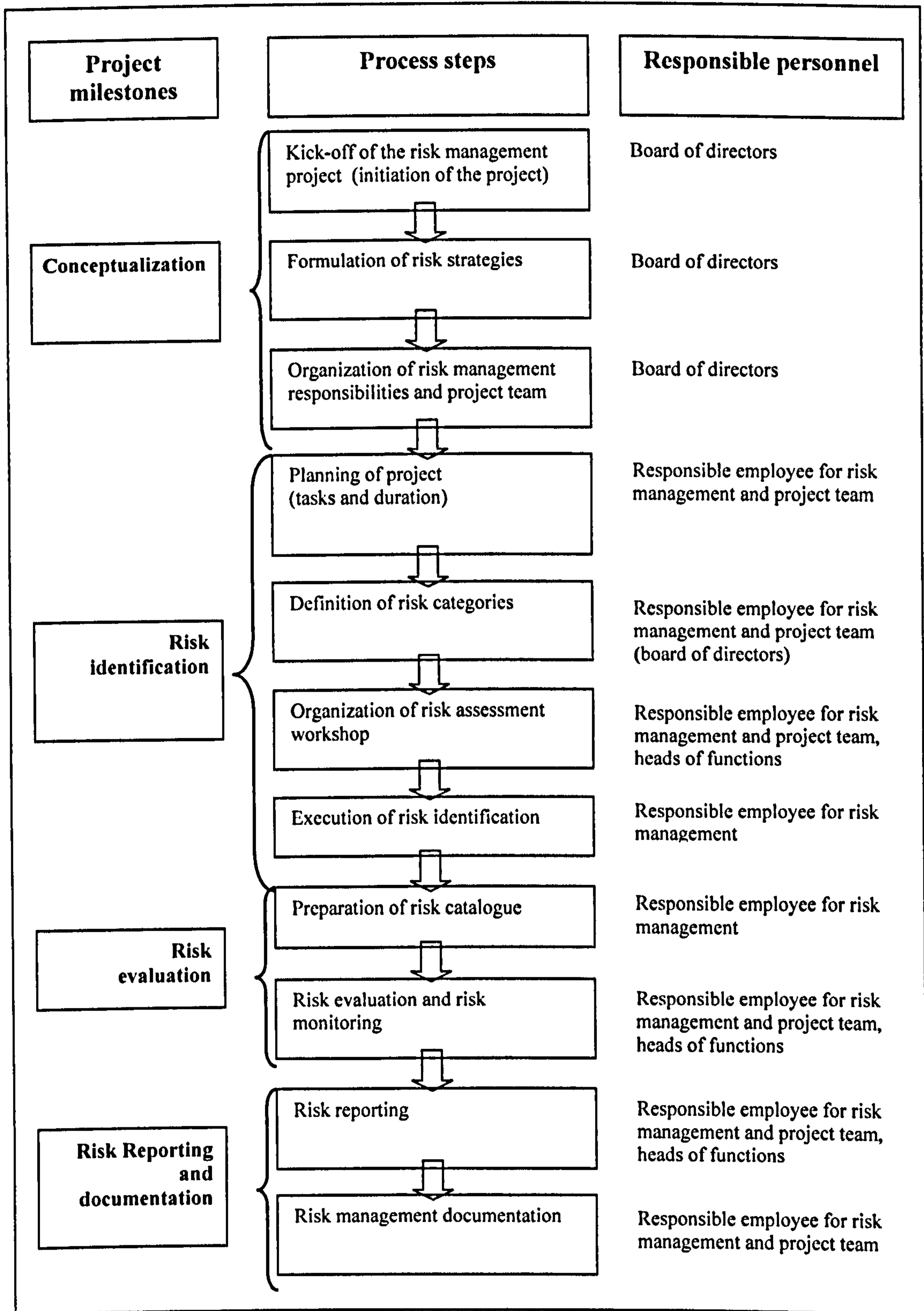


Figure 7.5 Phases in the Establishment of a Risk Management System

The project team should consist of the managing director and an employee from the controlling or accounting function. The controller or the accountant should be responsible for facilitating the project.

It would also help the initiation of the “risk management” project if at least at the beginning the tax advisor or certified accountant should be involved for developing the concept of the risk management system.

The employee responsible for risk management must be appointed at the start of the project. After the general preliminaries there follows the preparation of the risk inventory for the whole company. Here the executive board and the controlling function first specify the main strategic and operational risk categories. A rough prioritization of the risk categories should then be made.

The identified risk categories are then analysed in a first workshop involving the executive board and the heads of function. The flat organizational structure of SMEs means that such a workshop should consist of not more than 4 to 5 employees. As the literature has revealed (see, for example, De, 2005, p. 198; Krämer, 2003, p. 92), SMEs are organized in a functional way. So the members of a workshop would be the personnel responsible from the purchasing, production and selling and administration units.

In order to simplify the preparation of the risk inventory, the controlling function should prepare identification forms for each functional unit, taking as a starting point the risks developed so far with the executive board. The aim of the workshop is to check whether the main risk fields have been identified and which risks have yet to be added. Finally, a joint decision is made on how the risks are to be measured and on what the critical threshold values should be. Again the employee responsible for the risk monitoring should be appointed.

In a second workshop the results of the first one should be discussed and the final version of the risk catalogue approved. Finally, agreement should be reached on the measures to be taken if the critical threshold values are reached. The results of the second workshop could include developing the risk portfolio for the whole company based on the risk catalogue prepared. The identified and assessed risks are entered manually into a portfolio with the axis labels “financial impact” and “probability of occurrence”. It is done without drawing on mathematical or statistical procedures. A verbal description is sufficient here, with the levels low, average, high, threatening.

After having assessed the relevance of the risks, the classification of the risks in the risk portfolio for the overall company can be made. This allows to assess the present level of risk of the company. The process of preparing the risk portfolio

would have to be somewhat intensive if a continuous and thus current estimate of the level of risk for the company were to be made. It can only be simplified through the link between risk management and business planning discussed earlier.

The last step of establishing a risk management system is the definition of the risk reporting. The risk reporting process should be integrated into the general reporting procedure. An ad hoc report is provided for when the critical thresholds are reached. For SMEs it is sufficient if information on the risks is provided as part of the monthly reporting. SMEs can also apply the annual review to go over the risk inventory prepared. To make sure that no major risks are overlooked during the preparation of the first risk inventory and to check that the indicators specified for measuring the risks are appropriate, it is recommended that another review of the risk inventory be made after 6 months. A review can then be carried out at yearly intervals. The main rules for the risk management system introduced should be set down in writing. If a quality management manual is available the opportunity can be taken to include the documentation in it.

8 Conclusion

This chapter presents a summary of the most important findings of the present investigation (Section 8.1). Then it points out the limitations of the research approach and indicates the need for further research (Section 8.2).

8.1 Summary of Research Findings

Section 8.1.1 summarizes the essential findings of this study. Section 8.1.2 delivers an overview of the scoring approach being developed and the typology for risk management practices derived from it.

8.1.1 Questionnaire and Interview Results

The main purpose of this thesis was to investigate the current state of risk management practices in the main industries of German SMEs. It explored which factors must be viewed as critical for establishing a risk management system and which techniques are currently applied to managing risks (see Section 1.4).

The company size is an essential factor to distinguish the sophistication of risk management systems. With increasing size risk management is carried out more systematically, with the responsibilities being delegated to more personnel.

The industrial sector has only limited differentiation power. One can merely state that sectors with a more elaborate technology such as engineering, information technology or auditing have already made stronger efforts on risk management. In contrast to that, the sectors construction and trade are rather lagging.

Another factor for judging risk management is the personality of the owner or the managing director. Here the educational background and the interest in business management topics play an important role, with owner-managers showing more deficits than other managers. The interviews have revealed that some owner-managers have quite a fatalistic attitude toward risk management.

A danger that must not be underestimated emerges from the fact that just micro and small firms often have only one managing director. If he is unable to act, for example by illness, the company is existentially in danger, as long as no replacement regulations have been fixed. Owner-managers are often not willing to delegate responsibility; they even reject to be eased of day-to-day business

operations. With increasing company size the problem becomes less dramatic, but regulations for replacement and succession are generally established badly.

The questionnaire survey has demonstrated that SMEs have considerable deficits regarding formal methods of risk management. The research interviews have revealed the deficits still more clearly. Within all size classes, the firms are unable to determine the company's entire risk position. In micro and small firm, the managing director has the opinion that he can get an overview on risks entirely in his mind. This becomes still more problematic if the firm also deals with projects.

The present thesis also had the aim to investigate the state of business planning and how risk management is linked with it. The investigation has impressively shown that firms having a good business planning also apply it for a systematic and company-wide risk assessment. Without an integration into the existing business planning systems risk management would only remain mere "empty talk" and of no value for the firm. The employees would not see its benefit, they would only think of it as an additional workload. However, the investigation has also revealed that business planning in SMEs is developed only in a rudimentary way.

Modern instruments of performance measurement such as the Balanced Scorecard or the shareholder value have little meaning for SMEs. The interviews demonstrated that the concept of the BSC appears impressing by its simplicity. But applying it requires considerable business management knowledge and the support of specialists, which micro and small firms cannot provide.

Applying the ISO quality standards seems to be a useful instrument for establishing risk management in SMEs. The systematic documentation and the structured proceeding for documenting the business processes are a good starting point. This link between quality management and risk management does not require so much knowledge of methods and can be transferred into action more easily.

The controlling function is essential for improving risk management organization in SMEs. The results of the questionnaire and the research interviews have shown that firms having a controlling unit use to assign it to implement risk management. In firms having a controlling function the risk management process and the methods of risk assessment are significantly better established. There is a size effect with respect to having a controlling unit: controlling currently plays a role only for medium-sized and for larger firms.

SMEs exhibit a certain aversion toward management consultants or at least ask for external support less frequently than large firms. This study uncovers that certified chartered accountants and tax advisors play an essential role considering the implementation of risk management in SMEs. Especially small and medium-sized firms expect from professional bodies not only the preparing or the auditing of the annual financial statements, but also a consultation on risk management issues. Because of the heterogeneity of SMEs, this is a challenge, since chartered accountants and tax advisors cannot simply offer to SMEs the same concepts as for large firms. They must adapt the risk management methods to the special needs of SMEs.

8.1.2 Scoring and Typology

This study has proposed scoring approaches to assess the sophistication of risk management practices, focusing on the five components that constitute a holistic risk management, as understood by the author (see Section 2.1). The scores within the components display the following tendencies:

- Business planning: relatively high scores
Profit and loss planning and financial planning dominating; non-integrated subsystems as a rule.
- Performance measurement: particularly low scores
Balanced Scorecard most frequently appreciated.
- Risk management process: medium scores
Link of business planning and risk management weakly established.
- Risk management organization: particularly low scores
Responsibilities and contingency/replacement/succession planning weakly fixed.
- Project risk management: medium scores
Consolidation of single project risk assessments weakly developed.

Both the questionnaire and the interview scoring approaches lead to very much the same tendencies.

Each firm is assigned a scoring pattern, by assembling the scoring figures associated with the above components of a holistic risk management. Similar scoring patterns are associated with one of the following types of risk management practices: reactor, defender/prospector or analyser.

Reactor

The reactor type reveals the strongest weaknesses and has considerable difficulties to perceive critical developments early enough. Decision-making is concentrated on a single managing director (mainly the owner-manager), which may considerably affect the company's chances of survival.

Reactors most frequently are micro or small firms. Concerning industries, a reactor are more likely to be found in mature market segments, which are strongly influenced by competitors. These are industries such as construction and trade/service/logistics.

The reactor type of risk management practices suffers from the pressure of lending banks to improve its planning and monitoring systems.

Defender/Prospector

Most defender/prospector type firms are small ones. To an increased extent the owner-managers have an academic degree, even though often with a technical background.

The defender/prospector is also most frequently found in market segments that do not grow very strongly. The industries are also more classic, such as construction, trade and logistics and, partly, engineering.

A decisive difference, compared to the reactor type, is the defender/prospector's more elaborate business planning.

The defender/prospector must disclose the state of its risk management and the keeping of standards to the lending bank. This includes contingency, replacement and succession regulations.

Analyser

With only a few exceptions, analysers are medium-sized firms. Their managing directors are mainly employees, with a good knowledge of business management. The analysers' risk management is the most elaborate one of all types. So these firms have the best chances of developing successfully.

Analysers are mainly found in growth-oriented industries such as IT and auditing and partly in engineering. They concentrate on market niches. As a rule, their competitors are larger firms.

The largest challenge for analysers is the consolidation of single project risks to obtain the company's overall risk position.

Among all types, analysers have the fewest problems with their lending bank.

8.2 Limitations and Further Research

Section 8.2.1 indicates future research topics that could inspire the development of a holistic risk management for SMEs. A special focus is on the importance of the management behaviour and its impact on the development of a risk management system. Section 8.2.2 then discusses modifications of the scoring approach proposed by this study, concerning the risk management issues being covered as well as methodical topics. Finally, Section 8.2.3 contains a critical evaluation of the research design being used.

8.2.1 Holistic Risk Management and Management Behaviour

This study has treated risk management practices in selected industries of German SMEs, in the light of a holistic risk management approach (see Section 2.1). To a great extent, the industries were project-oriented. So further studies could deal with other industry sectors, not focusing so strongly on project-type firms.

A revised questionnaire should also cover the estimation of the internal and external business environment. Thus changes in the business environment and their impact could be determined. The research interviews have already taken into account these issues.

The research interviews have demonstrated that the attitude and the behaviour of the owner-manager has an essential influence on the successful development of the risk management in SMEs.

A revised questionnaire could investigate the influence of the owner-manager's educational background, age and gender on the managing of risks. Furthermore, it would be interesting to know whether the state of risk management depends on the owner-manager having formerly been self-employed or building up his first own business.

It would be important to determine how the implementation of a risk management system affects the development of the company's performance. Based on the research interviews, the present study could not answer this question conclusively.

To investigate the influence of risk management on the company's performance, a longitudinal study would be necessary, observing the development over a period of several years.

The proposals of Section 7.3 concerning the framework of a holistic risk management have been deduced from the literature analysis and the author's own work experience in the auditing and consulting sector. They are also supported by the analysis of the questionnaire and interview findings (Chapters 4 and 5). Of course they need an empirical justification. The practicality of such a framework has to be tested in an SME by implementing it and observing its suitability over a longer period of time.

Furthermore, the framework may constitute an approach for the development of IT solutions for risk management in SMEs. A particular challenge will be the linking of single project considerations with the company's overall risk consideration.

The research interviews have impressively revealed that SMEs see the necessity to implement a risk management system and that they feel a considerable deficit of knowledge. Another field of work would therefore be to develop and test risk management training programmes for SMEs. The programmes could range from a first familiarizing SMEs with risk management issues to information on implementing and running a risk management system.

8.2.2 Scoring Approach and Risk Management Typology

The scoring approach offered in this study is the first one that allows a comprehensive assessment of risk management practices. It needs further justification in two directions: First, it must be checked whether the number of scoring variables is adequate or a modification is needed. Second, the construction of the scoring variables itself could be varied, which concerns the issues being covered as well as the weighting that combines these issues.

It should be mentioned that, comparing the questionnaire and the interview scoring, this study itself presents an example of such a modification of the scoring approach.

The inestimable advantage of a scoring approach as presented here is its transparency which allows other researchers an easy modification to adapt it to their specific needs.

The present study has derived from the questionnaire and the interview scoring approaches three types of risk management practices, with the aim of describing in a compact way the respective activities and needs for improvement. Such a typology requires further validation. So it must be verified that the number of types (3 in contrast to the original 4 types of Miles and Snow [1978]) is indeed adequate.

The identification of types has been carried out by the researcher alone. This procedure could be refined and validated by additional external support (other researchers, self-estimation of the firms being addressed).

It would also be interesting to transfer the typology for risk management practices that has been developed for German SMEs to other countries. Thus cross-country studies could detect whether cultural differences have an influence on the firms' risk management practices.

8.2.3 Research Design

Empirical SME research in Germany faces several problems. First, there is the data source itself. After extensive enquiries by the author the German Hoppenstedt database for SMEs (2002) has proven to be the most adequate database for a nationwide sample.

The Hoppenstedt database is updated continuously but with a time lag of at least one year. So basic data such as annual turnover and the number of employees are likely not to reflect the current state. At the moment of publication some firms also might have closed or become insolvent.

Regarding size classes, the research object of German SMEs has a very inhomogeneous structure. This study aims at covering the total range of SMEs, including also the class of micro firms. But micro firms constitute the overwhelming majority of SMEs (see Table 3.4). A representative sample must therefore be relatively large to contain at least a usable number of cases that are not micro firms. Moreover, because of few disclosure requirements financial data of micro firms are difficult to obtain. As a consequence, many studies simply neglect this important company size class. In contrast to that, the present investigation dealt with micro firms, accepting a sample bias. It is pointed out that the interview sample deals with a larger percentage of micro firms, when compared to the questionnaire survey.

For future studies it would be interesting to focus exclusively on the class of micro firms. Such a research project would require to invest considerable time in collecting data. It would be easier to start with a regional study than nationwide since for a local approach one can get data from various data sources such as regional chambers of industry and commerce or chambers of crafts.

At the time when this study started (2002) only little knowledge on risk management in SMEs was available. The aim was to gain in a first approach a broad overview of the current state of risk management practices in German SMEs. It can best be achieved nationwide by a questionnaire survey; a larger number of interviews held in all parts of Germany would have been too time-consuming.

The postal questionnaires served to obtain general information on the aspects of risk management which are fundamental for a holistic approach. To gain deeper insight, an additional research method had to be chosen: Further details were inquired by intensive discussions during research interviews.

Despite their time restrictions, the SMEs being contacted by the interviews proved to be more willing to participate in an interview than to fill in a questionnaire. Research interviews are time-consuming but they allow a very detailed access to complex issues such as risk management. Future SME research should therefore make more use of interviews.

Many of the interviewed SMEs were very interested in working together with the author of the present thesis on future research projects. For instance, these firms could be candidates for longitudinal studies to investigate the influence of risk management on the company's performance (see Section 8.2) or to validate the risk management framework proposed in Section 7.3.

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