Risk Reporting in the Banking Sector: Risk Exposure versus Risk Management

By Kathrin Kureck

This paper investigates the formulation of risk reporting and its influence on individuals' information processing and judgment and decision-making. In Germany, disclosing companies provide much more information about their risk management system and less about their risk exposure. It is questioned whether this formulation is appropriate to inform the users sufficiently according to the legislators' aim – i. e., that risk reporting should provide useful information for individuals to decide independently about their current and prospective financial engagement. Using an experimental approach and basing on recent exploratory research another content-related arrangement is examined. The current study shows how another formulation of risk reporting, namely providing more risk exposure and fewer risk management system information, can reduce individuals' cognitive strain and the possibility of an overload, and can lead to improved performances in individuals' judgment and decision-making.

1. Introduction

Risk reporting entails conveying information about the companies' risk situation – i. e., which risks the companies are exposed to and how they cope with or avoid them. Their customers naturally expect to receive such information looking at risk reports; however, in reality risk reporting is rarely sufficient, as it largely focuses on management system insights instead. Numerous studies showed that risk management system information are predominant at the expense of information about the risk exposure (e. g., Dobler et al. 2011). This applies in particular in the banking sector and constitutes a crucial point that has to be scrutinized since risks cannot be easily inspected from institutes' outsiders. Instead, the bank clients have to trust on what is mandatorily disclosed.

How risks have been reported has evolved over time. Risk reporting is liable to a variety of regulations. For a long time, it was argued that the provision of more information facilitates users' decision-making, resulting in stricter requirements and expanded disclosure (Norr 1976). Empirical evidence has shown that expanded disclosure in response to new requirements such as SEC's FRR No. 48 is effective (e. g., Roulstone 1999). The risk reports have expanded over time. However, previous research has indicated a negative impact of expanded disclosure on individuals' decision-making process (e. g., Ashton 1974). For instance, a study by Casey (1980) showed that a higher information load beyond a certain level did not improve the accuracy in decision-making. Information overload is a possible consequence. Numerous studies have previously investigated this problem in various disciplines (for a review, e. g., Roetzel 2018). Therefore, it is questionable whether the excessive expansion of disclosure requirements appropriately meets the legislator's aim – i. e., that the purpose of risk reporting is to provide useful information to external stakeholders (Adler et al. 2001).

Certainly, considering how important the time factor is in preparing the financial statements it is simpler to just describe the current risk management system (RMS) and to provide less information about the risk exposure (RE), which requires the generation of specific details. An information procedure like this, however, is not sufficient. To shed light on this issue, this paper exemplarily concentrates on investigating German savings banks. A recent study revealed that more than 75 % of the provided information in savings banks' risk reports only addresses their risk management and the standards they have to comply with, while the risks they are exposed to is only described in the remainder (less than 25 %) (Türr 2014). Recently, an exploratory study showed that, for German savings banks, the RE information in particular is relevant for in-



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dividuals' assessments, but that too much irrelevant information causes overstraining and negatively affects individuals' information processing (Kureck and Homölle 2018). It must be assumed that the structure of savings banks' risk reports does not correspond to the information needs of users. Arguably, it is better to provide information orientated towards users' needs instead of simply delivering huge amounts of information. Accordingly, the current study aims to show how another content-related arrangement of risk information, namely providing more RE and fewer RMS information cues, can reduce individuals' cognitive strain and the possibility of overload, and can lead to improved performances in individuals' judgment and decision-making (JDM).

Information processing theory and especially knowledge gained about cognitive limits, is crucial in this study (Miller 1956; Schroder et al. 1967; Newell and Simon 1972). Cognitive fit theory addresses these fundamental findings and shows that individuals' decision-making performance depends on the match between the problem representation and the problem-solving task (Vessey 1991). The addressee of risk reporting should be able to make informed judgments and decisions based on information provided according to legislator's aim – i. e., representing the problem-solving task. The risk report information is considered as the problem representation. If the provided information does not fit the problem-solving task – i. e., the individuals' requirements making informed assessments – the individual will need to use excessive cognitive capacity to achieve the goal of a good performance (Vessey 1991).

To examine the information processing of individuals in this study, the focus is on nonprofessional, private investors or depositors. The important relationship between savings banks and depositors is shown not only by the high proportion of deposits that make up savings banks' total capital (75.9 % in 2017) but also by the regional principle that applies in Germany (DSGV 2018). This means that the banks' business operations focus on people living and economizing in a certain region. In addition, savings banks hold the highest share of private deposits in Germany (36.8 % in 2017) (DSGV 2018). Nonprofessional, private investors have already been recognized as addressees of financial reporting by both national and international standard setters and own their explicit interest concerning their understanding of financial reports and how financial reporting affects them (Levitt 1998). Furthermore, depositors' potential to influence the going concerns of savings banks is a crucial topic: Berger and Turk-Ariss (2015) identified significant depositor discipline in the U. S. as part of the market discipline prior to the financial crisis; prior to this, Thiry (2009) investigated and provided evidence for depositor discipline in German savings banks.

In this paper, the effect of a manipulated risk-information ratio (RIR) is investigated via an experiment. Different risk reports with a content-related differentiation concerning the relation of RMS information and RE information were developed and five versions of risk reports consisting of realistic statements were generated. This investigation included not only the impact on individuals' JDM performance but also a possible effect on their perceived information load (IL) and cognitive load (CL). The results of structural equation modelling in this study provide strong evidence for a negative impact of irrelevant information on individuals' decision-making performance. The provision of risk information with an increasing RIR – more RE and fewer RMS information cues – reduces the cognitive strain to which addressees are exposed. Therefore, one can conclude that the relative supply of more RE and less RMS information results in an improved performance in participants' JDM.

This study contributes to the existing literature in several ways. First, it presents new insights into behavioural risk-reporting research. The majority of empirical studies investigating the effects of risk information have followed a capital market-oriented approach. They have focused on capital market reactions and, thus, provided only aggregated investor behaviour (e. g., Linsmeier et al. 2002; Kravet and Muslu 2013). Behavioural research provides insights into disaggregated behaviour regarding the JDM of the individual (e. g., Hodder et al. 2001; Koonce et al. 2005b). Second, this study concentrates on banks' risk reporting. To date, empirical research in this field has been scarce (e. g., Ball and Fang 2010), although the effects of savings banks' risk reporting in particular on depositors, as mentioned above, is an important issue. Third, this study addresses the narrative character of risk reporting. Former studies have focused on presentation forms and selected data using realistic risk information in many forms but have neglected the mainly narrative character of risk reporting (e. g., Hodder et al. 2001; Koonce et al. 2005a). This study focuses on the real structure and arrangement of risk reports and examines the effects on individuals' JDM, which leads to the fourth contribution: this is the first study to examine the structure of risk reporting by manipulating the contents. This study provides evidence for the negative impact of irrelevant information on investors' information processing and performance. It is recommended that banks should formulate a more balanced risk reporting oriented towards the users' needs to avoid individuals' cognitive overstraining, which will have a positive impact on their information processing and improved performance in terms of judgments and decisions. An information supply oriented towards users' needs can also contribute to a more appropriate and realistic assessment by those external to the bank and counteract the negative and critical attitude towards banks in society.

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The paper is organized as follows. A literature review is provided in Section 2. The content of risk reporting is presented in Section 2.1., followed by a discussion of extant empirical research in risk reporting and the contribution in this area in Section 2.2. Section 3 provides the institutional background (Section 3.1.) and the theoretical background of the study (Section 3.2.). Subsequently, the research hypotheses are generated in Section 4. After an explanation of the data and the methodology in Section 5., the results from the structural equation model are provided in Section 6. The paper concludes with a discussion of the results in Section 7.

2. Literature Review

2.1. Descriptive research on risk reports' structure

Empirical research considering the informational content of risk reporting represents a fundamental starting point in this study. A comprehensive review of risk-reporting literature concerning the informativeness of risk reporting is provided by Elshandidy et al. (2018). Recent research has pointed out that, based on the legal requirements and several recommendations, risk reports contain two informational components (Kajüter and Winkler 2003; Türr 2014): the RMS; and the RE. Risk reporting of German savings banks' is dominated by information about the RMS, accounting 75 % of the informational content. This information predominately concerns the banks' risk controlling and strategy. The banks' RE receives 25 % of the informational content. These statements are dominated by information about risk assessments and the risk bearing capacity (Türr 2014). The relationship between the two components of risk reporting content is questioned in this study with regard to its expediency to fulfil the legislators' aim of providing useful information to the addressees.

Using these two informational components, the banks report on their overall risk and the different risk categories: counterparty credit risk; market risk; liquidity risk; operational risk; and sundry risk (Yong et al. 2005; Türr 2014). The risk categories counterparty credit risk and market risk represent the substantial risks in savings banks' risk reports and, therefore, constitute the largest part (Löw and Lorenz 2001; Helbok and Wagner 2006; Linsley and Shrives 2006; Bischof 2009). The majority of risk information is of a qualitative rather than a quantitative nature (Löw and Lorenz 2001; Yong et al. 2005; Linsley and Shrives 2006; Türr 2014). It is asserted, therefore, that risk reporting has a narrative character. This fundamental characteristic – as even adopted in this study – has to be considered in more detail as it has often been neglected in extant empirical research.

2.2. Impact-oriented research on risk reporting

Regarding the effects of risk information, the reporting has usually been investigated using two different approaches: the capital market-oriented approach; and the behavioural approach. Most empirical research has followed the *capital market-oriented approach* and focused on the aggregate behaviour of investors by studying market reactions. Prior studies have investigated the effects and the usefulness of market-risk disclosure practices. They have looked at the sensitivity indices that are expected to represent investors' reactions to firm's disclosed risk information (Rajgopal 1999; Linsmeier et al. 2002; Thornton and Welker 2004). Only a few authors examining the market effects of risk information, especially for banks, have focused on the usefulness of value-at-risk data within U. S. banks' market-risk disclosure (Chipalkatti and Datar 2006; Hirtle 2007; Ball and Fang 2010).

These studies have basically attributed usefulness to risk information, with regard to the aggregate reactions of capital-market participants. Selective aspects of risk disclosure have been considered only in the form of quantitative market-risk information. The narrative character and, therefore, the predominate part of risk disclosure has been neglected. In this paper, the narrative character of risk disclosure is taken into account to develop research material exhibiting every fundamental part of savings banks' risk reporting.

Several recent studies addressed the narrative character of risk reporting and utilized textual analysis tools to explore the usefulness of risk information. The effects on investors' perception of risk information, measured as the volatility of stock returns, by referring to the number of risk-related words and sentences in annual reports was investigated (Kravet and Muslu 2013; Campbell et al. 2014; Elshandidy and Shrives 2016).

However, the capital market-oriented approach does not take into account the individual and his decision-making processes (Coenenberg and Haller 1993). Since the extrapolation of individual behaviour from market reactions is not advisable, another approach must be chosen to focus on disaggregated behaviour of the individual.

This paper, therefore, follows a *behavioural approach* that focuses on the individuals and tries to shed light on their information processing. To date, the impact of risk reporting on individuals' JDM has rarely been investigated: Hodder et al. (2001) examined the effects of the SEC's Financial Reporting Release No. 48, examining the different reporting formats and measurement bases affecting investors' JDM. Koonce et al. (2005a) implemented several experiments with regard to judgments and decisions based on risk information and recommended balanced reporting about risks and opportunities; and Koonce et al. (2005b)

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pointed out that investigations into the effects of risk-related information should include a behavioural, as well as a decision-theoretic, risk component.

However, none of these studies focused on any particular kind of investor and simply used student samples. In this study, the nonprofessional investor (the depositor) is examined. In addition, extant behavioural research has only examined risk-related, quantitative information but not risk reporting itself. Only very specific aspects of risk disclosure have been investigated and the narrative character has not been taken into account. This study closes this research gap by examining savings banks' risk reporting, respecting its narrative character and studying the disaggregated effects on depositors.

Kureck and Homölle (2018) presented initial exploratory research using think-aloud protocols. The study gained a first insight into how individual readers perceive and process risk information. The results indicated that the relation between RE and RMS information cues does not conform to the informational needs of the addressees. The authors mention addressees' different needs expressed by more detailed information about the bank's RE instead of excessive information about its management. This disparity between the real risk reporting and the needs of its users represents the origin of this study.

3. Institutional and theoretical background

3.1. Legal requirements and recommendations

This study focuses on savings banks' risk reporting in Germany. These risk reports are based on the German Commercial Code (Handelsgesetzbuch, HGB) and are part of the management report (Lagebericht) published with the financial statements. The aim of risk reporting is to inform the addressees about the bank's RMS and RE and to provide useful information so that addressees can estimate the bank's risk situation and make informed judgments and decisions.

§§ 340a (1), 289 (1) HGB require the provision of information about the bank's RE results. The banks have to assess and explain the expected development of their business with reference to the essential risks. Different risk categories have to be described as far if they are relevant for addressees' judgments of the banks' current and future performance. Pursuant to § 289 (2) No. 2b of the HGB, the price risks, credit risks, liquidity risks, and cash flow risks to which the bank is exposed must be referred to, relating the use of financial instruments. Additional guidance is offered by the German Accounting Standard (GAS) 20 and recommends distinguishing between the risk categories of counterparty credit risks, liquidity risks, market risks, operational risks, and sundry risks, whereby these categories include risks resulting not only from financial instruments. Although the GAS are designed for group financial reporting, the application of these standards for individual financial statements is suggested in the literature and verified by empirical findings (Bieg 2010; Türr 2014).

The obligation to provide information about the bank's RMS stems from §§ 340a (1), 289 (2) No. 2a HGB. Risk-management aims and methods in relation to the use of financial instruments must be referred to. This includes methods to hedge every important transaction. Further content structuring is provided in the GAS 20. Within the RMS the risk strategy and functional and organizational aspects in terms of description of the RMS have to be reported. This is valid for the whole bank and for every risk category.

Regulations for capital market-oriented companies are irrelevant because the savings banks, whose data were used in this and the basic studies, did not trade debt instruments in capital market.

3.2. Individuals' information processing

To examine which information achieves the legislators' aims for banks' risk reports most effectively this study follows an information-processing-centred view. Roetzel (2018) systematized recent studies examining information processing and (over)load in three categories: the human-centred view examining the individuals' characteristics; the technology-centred view examining impacts of technological characteristics; the information-processing-centred view considering information, task, and condition characteristics. According to the systematization of Roetzel (2018), this study examines information (over)load as a „search obstacle". The approaches of the human memory

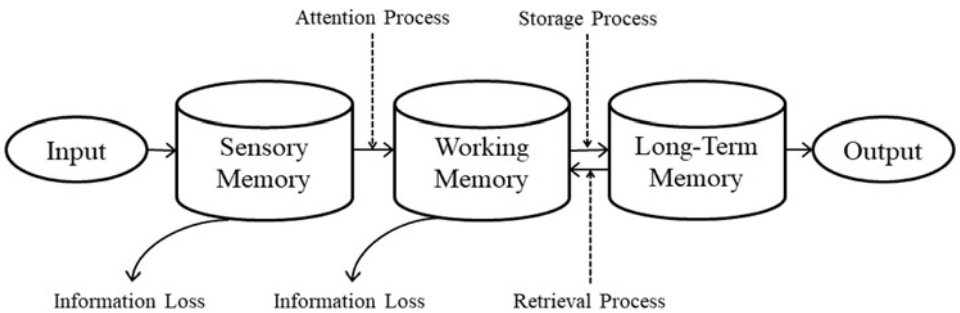


Fig. 1: Human memory system (following Atkinson and Shiffrin 1968)

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system Atkinson and Shiffrin (1968) and the human information processing theory (Miller 1956; Schroder et al. 1967; Newell and Simon 1972) are the basis for this approach. The basic model is shown in *Fig. 1*.

Considering the problem-solving process, the information cues are presented by the input within the memory system. In the attention process the information has to be transferred from sensory memory to working memory. The storage-and-retrieval process connects working memory and long-term memory. The problem solution is represented by the output of the model. The information processing as a whole is subject to information loss – i. e., when the limited capacity of sensory and working memory is reached or when the individual is not able to connect the new information cues with prior knowledge or to create new schemata. The fundamental work by Miller (1956) pointed out the limited capacity of individuals' working memory. Individuals can only combine and integrate limited sets of information cues during the problem-solving process, which varies widely due to many factors such as amount, complexity, and content-related arrangement.

Based on the findings from information-processing research, the theory of cognitive fit, introduced by Vessey (1991), took a closer look at the human problem-solving process running in working memory. The theory deals with the effects of the interaction between some kind of problem representation and a problem-solving task on individuals' decision-making performance. In this study, according to the legislator's aim (see *Section 3.1.*), the problem is that the individual has to assess the banks' risk situation to make informed judgments and decisions (*problem-solving task*). The primary source of risk information is the banks' risk reports that provide the *problem representation*. The fit between these determines individuals' performance. The model of cognitive fit is shown in *Fig. 2*.

Problem representation and problem-solving task are the primary inputs in the model. The problem solution, as the outcome, results from the relationship between them. The arrows in the model represent the running processes. Problem representation and problem-solving task are cognitively perceived and brought together in human working memory to create a mental representation and to develop the problem solution (Vessey 1991). The theory posits that the better the interaction between the inputs, the better the problem solution.

Basically, the mental representation constitutes how the problem is represented in individuals' working memory. When the information from the problem representation matches the problem-solving task, a consistent problem-solving process occurs – i. e., the information offered matches the information needed and the individual thus formulates a clear mental representation (Vessey 1991). A cognitive fit between the inputs leads to efficient problem-solving performance. A mismatch between problem representation and problem-solving task, however, leads to an unclear strategy. The individual either formulates a mental representation from the problem representation with the need to transform the information to derive a problem solution or the individual formulates a mental representation from the problem-solving task with the need to search for the relevant information and transform it to arrive at a problem solution. The performance without cognitive fit is worse in either case (Vessey 1991).

Inputs and outcomes from the model are held in working memory, which exhibits a limited capacity (Miller 1956; Simon 1978). When the information cues have to be selected and transformed, less information can be perceived in total. The need to transform information to arrive at a problem solution uses more of the working memory's capacity, which reduces its ability to perceive more information cues. A cognitive fit allows more information cues to be included in the problem-solving process. The more information is perceived, the better is the individual's performance in the problem-solving process.

4. Research hypotheses

4.1. Impact of differentiated risk-information ratio on judgment and decision-making

The aim of banks' risk disclosure is the provision of useful information for addressees' JDM. Therefore, the issues that are relevant for the bank should be provided in an appropriate and understandable manner. Extant research

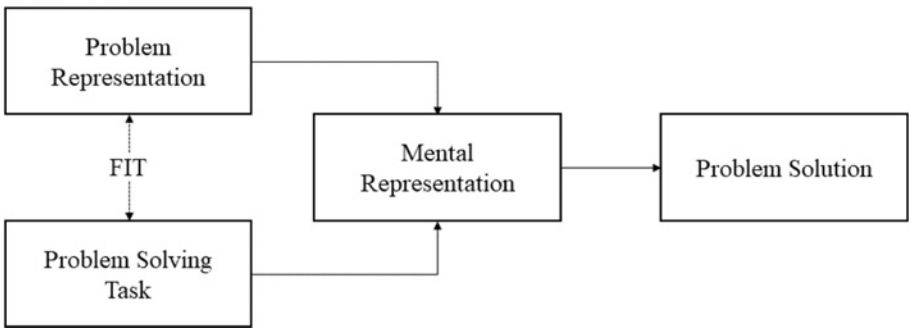


Fig. 2: Model of cognitive fit (following Vessey 1991)

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has indicated an insufficient information supply for non-professional addressees Kureck and Homölle (2018), although an expanded disclosure practice has been established (Bischof 2009; Türr 2014).

Vielmeyer (2004) showed that additional information not published so far can change individuals' decision-making situations. The challenge is to provide the proper information cues. The information cannot be used effectively when it is insufficient or not comprehensively prepared and unintentional effects could be the consequence. These occur when the causal relationships cannot be determined from the information (Vielmeyer 2004). The theory of cognitive fit deals with the relationship between the problem (assessment of the bank's risk situation), its representation (risk information offered) and the equivalent fit. Addressees of risk information should be able to assess the risk situation of a bank adequately with the help of the risk information published. For this purpose, the provided information has to fit the requirements of the addressee to enable them to make such assessments. If this is not the case, the users would not be able to formulate efficient mental representations and derive adequate problem solutions. Pursuant to the theory, the problem-solving task has to fit the problem representation. The better the fit, the better the mental representation and, therefore, the better the task performance. A better information supply oriented towards the needs leads to a superior solution.

Kureck and Homölle (2018) provided initial evidence regarding which information cues are actually needed and which ones may cause not intentional effects: an oversupply of RMS information was reported, whereas the individuals apparently required more information about the bank's RE to make adequate assessments. A different content-related structure for risk reporting was recommended. This suggestion is investigated in this study. It is examined whether different problem representation – i. e., a different risk-reporting structure, oriented towards addressees' needs – better fit the individuals' task to make informed judgments and decisions based on the risk information provided. It is hypothesized that a different informational structure in risk reporting would improve users' JDM. An adequate information supply would require a higher RIR, including more RE information and less RMS information. Such an arrangement oriented towards users' needs should result in more accurate evaluations.

The strength of the information cues' influence on JDM depends on the individual and emerges in the course of the information reception. Consequently, to what extend information is useful depends on the individual's information perception, which comprises the development and the outcome of the information processing (Tergan 1986; Wirth 1997). The text – the risk information – itself only affects the information reception, whereas the JDM represents the outcome of the information processing. The processing and the perception of important characteristics must precede the measurement of adequate assessments based on information provided. To gain insight into the processing of the provided risk information, this study therefore investigates the individuals' risk perception as a mediator in the model.

Not only the mediating role of risk perception is investigated but also risk propensity as control variable (Sitkin and Pablo 1992; Sitkin and Weingart 1995). *Risk perception* is defined as the individual's assessment of the risk inherent in a decision-making situation and subsequent effects. Risk propensity is the tendency of an individual either to take or to avoid risks. The higher a decision-maker's risk propensity, the lower the level of perceived situational risk (Sitkin and Weingart 1995).

The perception of risks plays a crucial role in decision-making because of its impact on individuals' behaviour (Sitkin and Pablo 1992). An individual's risk perception within a problem-solving situation can lead to overestimating or underestimating risks and to exhibit unwarranted confidence or self-doubt concerning their judgments and decisions (Slovic et al. 1980; Bazerman 1986; March and Shapira 1987). Risk perception depends on how the individual experiences and understands the source of risk (Oltedal et al. 2004). Therefore, risk perception relies on the presented stimuli, the situational context, and the individuals' characteristics. The situational context is prescribed within the online experiment and is considered as stable. The individual characteristics are investigated with the help of control variables such as the risk propensity. According to the problem-solving task, the risk perception measure thus focuses on the influence of the different presented stimuli – the arranged risk information.

Pursuant to recent research, the influence of RE information should be investigated in more detail since it could have greater impact on individuals' JDM in the considered context than RMS information. In particular, the importance of these information cues results from the legislators' aims to provide useful information that allows addressees to assess the risks of the bank's future performance. A lack of this information results in uncertainty and greater risk perception (Dobler 2005; Linsley and Shrives 2006). Therefore, the provision of more RE information (higher RIR) is related to the clarification of the bank's risk situation and results in individuals' higher performance and more positive (higher) JDM (see *Fig. 3*).

H1: An increasing risk-information ratio improves individuals' judgment and decision-making fully mediated by risk perception.

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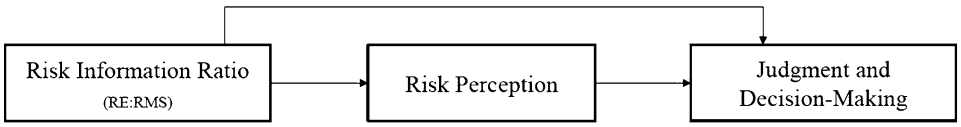


Fig. 3: Basic research model

4.2. Influence of individuals' information load and cognitive load

The theoretical background in this study points out the limited capacity of individuals' working memory and that individuals can only combine and integrate limited sets of information cues during the problem-solving process. When the individual must cope with too much irrelevant information that does not match the problem representation unintentional effects may occur, such as an overload and its consequences. Overload occurs when the cognitive limit is reached. As a consequence, mental and temporal efforts increase (Keller and Staelin 1987) followed by problems in information selection and integration (Jacoby et al. 1977). When working memory is consumed by a large amount of information that is not useful for the individual, the adequate processing of relevant information is impeded and an overload is produced. This leads to dissatisfaction, disregard, and negative JDM (Malhotra 1982; Schick et al. 1990; Bawden 2001). A remodelling of information towards individuals' needs that embeds more useful and relevant information cues thus has a positive impact on JDM.

It is assumed that an increase in the number of irrelevant information cues to be processed leads to higher IL. More working memory is consumed. Information overload occurs due to the limited capacity when the individual is exposed to a vast amount of information he cannot process, which results in a decline in user performance and information loss. Additionally, CL consumes working memory when completing a task (Sweller 1988). CL is influenced by the task design and its processing requirements and not only by the information itself. Cognitive overload may occur when the individual is not able to connect actual information with prior knowledge (Chen et al. 2011). IL and CL should be considered together (Rose et al. 2004; Chen et al. 2011).

In *Fig. 4*, the connection between information (over)load and cognitive (over)load is provided with the help of the structure of the memory system (Atkinson and Shiffrin 1968; Chen et al. 2011). IL usually occurs in the attention process when information cues are transferred from sensory memory to working memory. If the limited capacity of sensory and working memory is reached, information loss ensues. CL occurs in the storage and retrieval process connecting working memory and long-term memory. When the individual is not able to connect the new information cues with prior knowledge or to create new schemata, information loss ensues. IL is the precursor of CL in this model.

A structure of risk information adequately oriented towards users' needs can counteract an overload. It is hypothesized that an increase of RIR reduces IL and CL and thereby positively influences the participants' JDM because the effectiveness of information largely depends on to what extent the information cues are used (Jacoby et al. 1977).

H2: An increasing RIR improves individuals' JDM mediated by a decreasing IL and CL.

4.3. Influence of perceived expertise and trust

Closely linked to the perception of risk is the perception of credibility (Eisend 2006). In this study, credibility is investigated as an inherent problem of risk disclosures. Dobler (2008) has already pointed out that a rational outsider doubting the credibility of disclosed risk information will ignore it. Hence, if the risk information is not perceived as credible, it will not have a positive effect on JDM. The influence of credibility on risk perception has been investigated by, for example, Trumbo and McComas (2003), who found that information sources with low credibility led to greater perceived risk. Credibility has usually been investigated through perceived expertise and trustworthiness. See, for example, Hovland et al. (1953) and Ohanian (1990) and, for an overview, Newell and Goldsmith (2001). To consider the causal relationships of the construct credibi-

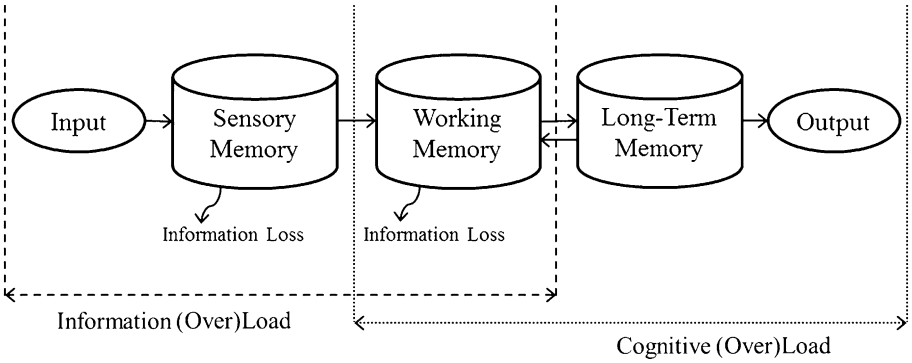


Fig. 4: Connection between information (over)load and cognitive (over)load (following Atkinson and Shiffrin 1968 and Chen et al. 2011)

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lity, perceived expertise and trust are examined separately.

According to Kureck and Homölle (2018), a decrease of RMS information (higher RIR) can reduce the individuals' perceived expertise. Thus, the risk information can no longer signal appropriate safety and trust in the bank and its information decreases accordingly. Viklund (2003) pointed out that trust is an important determinant of risk perception and Flynn et al. (1992) specifically examined the negative impact of low trust causing high risk perception in individuals' behaviour. A strong relationship between disclosed risk management activities and perceived trust was found by Peters et al. (1997), who additionally provided evidence for the perception of trust dependent on perceived expertise.

Taken together, it can be derived from former studies that there is evidence for the connection between: risk-management information and perceived expertise; perceived expertise and trust; and trust and risk perception. More RE information and less RMS information, therefore, and thus a higher RIR, result in reduced perceived expertise, which entails reduced trust in the bank. The perceived trust in, and expertise of, a bank, however, have a positive impact on individuals' assessments, resulting in better JDM.

H3: An increasing RIR increases risk perception mediated by decreasing perceived expertise and trust in the bank.

H4: Perceived expertise of the bank and trust in the bank improves individuals' JDM.

5. Data and method

5.1. Research design and sample properties

To test the hypotheses, an online experiment was conducted. A 1×5 between-subjects design was chosen. The treatment consisted of a risk report from a German savings bank. Five different relationships between RMS and RE information cues were investigated concerning their effects on addressees' assessments. The participants were randomly assigned to one of the five experimental conditions.

The prepared stimulus material contained risk report extracts with information about the RE and the RMS. Based on the exploratory results of Kureck and Homölle (2018), typical and supposedly relevant information were used for the experiment. In total, the risk-report information clearly showed a stable risk situation; therefore, a positive choice was consistent (see *Appendix A*). Besides information about the bank overall, detailed information cues about counterparty credit risk and market risk were given. Since these two risk categories are the most important ones (see *Section 2.1.*), this study is constrained to the investigation of information cues concerning credit and market risk within the experimental condition. Every information cue used was a real statement from German savings banks' risk reports. The material was limited to one page of text. Each experimental group received 12 statements containing overall bank information and information about the two risk types (equal shares with the unit of sentences) (see *Appendix B*). These three text blocks, in turn, consisted of RE and RMS information in different ratios. The first group contained only RMS information cues. The second group reflected the reality of current reports and included 75 % RMS and 25 % RE information (see the model in *Appendix C*). The third and fourth groups were manipulated by varying the ratio to 50 % for both categories and a reversal of the ratio, with 25 % for RMS and 75 % for RE information. The fifth group contained only RE information cues.

For participants' recruitment e-mail distribution lists were used and several thousands of students as well as employees were invited to participate in the research project. In the course of the experiment, all participants had to read the provided risk information and then make assessments based on the information read. They had to judge the economic and the risk situation of the bank and decide whether to deposit their money into that bank, to recommend the bank to friends, to decide whether the choice was a good idea both now and in the future. Subsequently, the participants answered the questionnaire, including the construct items used in the model. They were asked to fill out the questionnaire completely, honestly, and conscientiously. The participants were instructed to thoroughly consider the information given, to visualize the situation as if it was real, and to perform the task. Finally, they were asked to provide their demographic details. On completion, they were debriefed and thanked. All individuals participated voluntarily without being paid.

In total, 149 questionnaires were included in the investigation. The sample consisted of 89 men (59.7 %) and 60 women (40.3 %). Participants' ages ranged from 19 to 74 years; the mean age was 32.56 with a standard deviation of 13.915. A total of 48.3 % of the sample were students, 38.9 % were employees, and 4.7 % were self-employed. Moreover, 63.8 % of the sample stated that they were a customer of a savings bank.

5.2. Measurement and operationalization

For operationalization of the dependent variables, mainly established scales adjusted to the problem definition were used (see *Tab. 1*). According to former research the JDM was measured by constructing questions adapted to the requirements of the underlying problem space (Sitkin and Weingart 1995). Sitkin and Pablo (1992) already emphasised that in risky decision-making situations the personal component must be included. Taking into account the per-

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sonal environment of the individual leads to better and more authentic assessments of the situation. The adapted items were generated according to the given situation of finding a personal bank and pretested in advance. Furthermore, IL was measured following Sproles and Kendall (1986) and Williamson and Eaker (2012) and CL was measured following Paas (1992) and Paas et al. (2003). The operationalization of risk perception was based on the results from Koonce et al. (2005a) following the psychometric model of Fischhoff et al. (1978). The measure of perceived credibility was based on Newell and Goldsmith (2001). Trust was measured following Steinmann (2013).

To estimate the structural model, it was opted for partial least squares structural equation modeling (PLS-SEM) (Wold 1982) rather than covariance-based structural equation modelling (Jöreskog 1978) because of the data and model characteristics. This method is particularly suitable when the complexity of the model is high, as the SEM in this study contains six constructs. Also, PLS works efficiently with small sample sizes, such as ours still achieving great statistical power. The method handles formative as well as reflective measurements, as used both were used in this study, as well as single-item constructs, such as CL (Hair et al. 2017). In this context, it does not lead to estimation problems or improper or non-convergent results. Moreover, the method is appropriate for research that focuses on prediction (Reinartz et al. 2009).

6. Results

Since there is no overall goodness-of-fit criterion to express the quality of PLS models (Hair et al. 2012), the measurement models, as well as the structural model, have to be assessed independently (Henseler et al. 2009).

6.1. Evaluation of the measurement models

The endogenous constructs in the model were measured by means of reflective indicators (Jarvis et al. 2003). The constructs easily met the common threshold of 0.70 for composite reliability (Hair et al. 2012) and Cronbach's alpha values greater than the threshold of 0.70, which indicates a high internal consistency of the measurement models (Nunnally 1978). The relationships between the indicators and constructs were significant. The indicators showed very high loadings of above 0.70, signalling indicator reliability with one exception: within the construct risk perception (RP) one outer loading did not meet the threshold of 0.70. Analysing its impact, however, led to the indicator being retained. Convergent validity of the models was indicated by average variance extracted values of above 0.50 (Hair et al. 2012). Thus, the constructs fulfilled the quality criteria for models' performance (see *Tab. 1*).

To assess the discriminant validity of the constructs, different approaches were applied. The cross loadings were

Latent Variables	Average Variance Extracted	Composite Reliability	Cronbach's Alpha	Indicator	Factor Loadings
Judgment and Decision-Making (JDM)	0.859	0.961	0.945	Would you deposit your money with the MUSPA?	0.928
				Do you think choosing the MUSPA is a good idea?	0.952
				Would you recommend the MUSPA to friends?	0.898
				Do you think deciding upon the MUSPA is a good choice for the future as well?	0.930
Information Load (IL)	0.772	0.953	0.941	It is hard for me to get an overview of the presented information.	0.864
				It is hard for me to figure out the relevant information.	0.856
				It is hard for me to concentrate because of all the information I have to assimilate.	0.892
				I feel overstained with the presented information.	0.893
				I have to assimilate so much information that it confuses me.	0.894
				I am stressed out by the volume of information I have to manage.	0.872
Cognitive Load (CL)	1.000	1.000	1.000	Please rate the difficulty of the task.	1.000
Risk Perception (RP)	0.572	0.870	0.814	The risk are controllable for the MUSPA.	0.699
				A decision to use the MUSPA would entail financial danger for me.	0.760
				Choosing the MUSPA would have negative consequences on my future financial situation.	0.794
				I am worried about the MUSPA's risk situation.	0.821
				I assess the risk situation of the MUSPA as frightening.	0.701
Perceived Expertise (EXP)	0.885	0.958	0.935	The MUSPA has a great amount of experience.	0.921
				The MUSPA is skilled in what it does.	0.945
				The MUSPA has a great expertise.	0.956
Trust (TRU)	0.907	0.967	0.949	I am sure that the MUSPA is reliable.	0.950
				I am sure that the MUSPA acts with integrity.	0.945
				I am sure that the MUSPA is trustworthy.	0.962

Tab. 1: Latent Variables' Measurement Models

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investigated, which reveal that no indicator loads higher on the opposing endogenous construct (Hair et al. 2012). The Fornell-Larcker-criterion was examined and compared the square root of the constructs' average variance extracted with the construct correlations, which revealed that each construct shared more variance with its own block of indicators than with another construct with a different block of indicators (Fornell and Larcker 1981). Finally, the Heterotrait-Monotrait Ratio (HTMT) was checked, based on the average heterotrait-heteromethod correlations (correlations of indicators across constructs measuring different phenomena) relative to the average monotrait-heteromethod correlations (correlations of indicators measuring the same construct) testing whether HTMT was not equal to 1 (Henseler et al. 2015). Since neither of the confidence intervals included the value 1 for HTMT, every criterion indicated discriminant validity for all constructs.

6.2. Evaluation of the structural model

In evaluating the quality of the structural model, the target constructs' percentage of variance explained (R^2) is a key criterion (Ringle et al. 2011). With a value of 0.669 for JDM, the explanatory power of the model was substantial when considering all predictive constructs are perception constructs. The effect size f^2 showed a large value for risk perception (RP) (f^2=0.410), a medium value for trust (TRU) (f^2=0.114), and small value for expertise (EXP) (f^2=0.055) and CL (f^2=0.026). It showed how much the predictor constructs contributed to the R^2 value of the target construct JDM in the structural model (Hair et al. 2017). After running blindfolding procedures involving an omission distance of seven, the Stone-Geisser values Q^2 were obtained (Geisser 1974; Stone 1974). All values were above the threshold of zero (0.167 for RP, 0.473 for TRU, 0.266 for EXP, 0.508 for CL, and 0.534 for JDM), thus indicating the model's predictive relevance (Henseler et al. 2009). Finally, the standardized root mean square residual (SRMR) introduced by Henseler et al. (2014) to validate the model by measuring the squared discrepancy between the observed correlations and the model-implied correlations was provided with a satisfactory value of 0.067.

In the next step, the basic model was assessed. *Tab. 2* provides the detailed results of the structural equation modelling and an overview is shown in *Fig. 5*. A significant and negative link was found between RIR and RP (p<0.05). The link between RP and JDM was significant, strong, and negative (p<0.000). The direct effect of RIR on JDM was insignificant, as hypothesized in *H1*. Accordingly, the indirect effect was checked, which was significant and positive (p<0.05). It showed the influence of RIR on JDM, which was fully mediated by RP, and provides *strong evidence for H1*. The indirect effect of RIR on JDM provided the mediation result with a significant value of 0.168 (p<0.05). The results show that an increasing RIR – the provision of more risk exposure information cues – results in lower risk perception. Consequently, the individuals make more positive judgments and decisions.

When assessing the relationships regarding the latent variables IL and CL, a significant and negative link between RIR and IL (p<0.1) was found, as hypothesized in *H2*. Further, IL had a significant, strong, and positive impact on CL (p<0.000) that, in turn, indicated a significant and negative effect on JDM (p<0.05). These results provide *evidence for H2* and the deduced relationship between IL and CL according to *Fig. 4*. It is demonstrated that an increasing RIR results in lower IL and CL. The provision of more RE and fewer RMS information cues put lesser strain on the individuals. That results in more positive judgments and decisions.

Furthermore, when assessing the hypothesized relationship regarding EXP and TRU, though the path coefficients indicated the hypothesized relationship no significant ef-

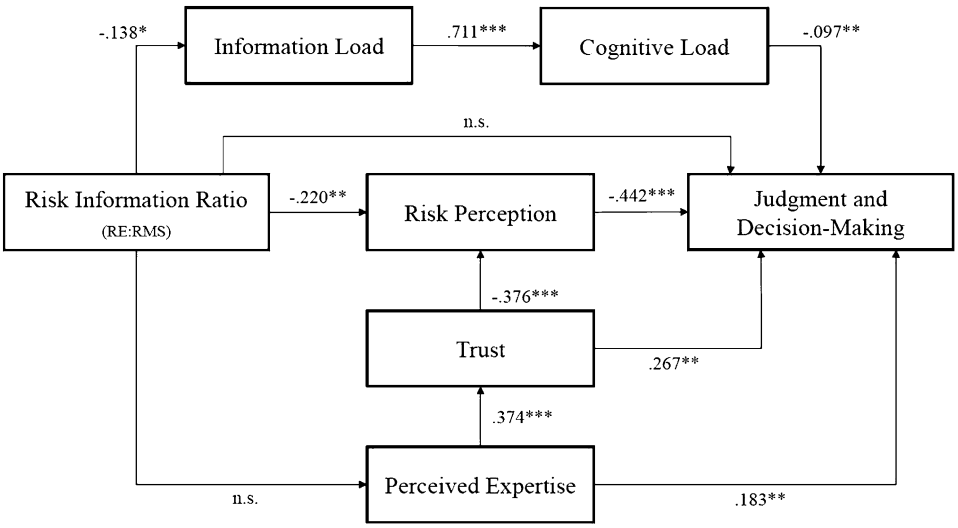


*Fig. 5: Results of structural equation modelling (***p<0.000; **p<0.05; *p<0.1)*

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Structural Relation	Path Coefficient	Sample Mean	Standard Deviation	t-Value	p-Value
RIR → RP	-0.220	-0.218	0.073	3.028	0.002 (**)
RP → JDM	-0.442	-0.445	0.077	5.716	0.000 (***)
RIR → IL	-0.138	-0.139	0.075	1.829	0.067 (*)
IL → CL	0.711	0.710	0.044	16.135	0.000 (***)
CL→ JDM	-0.097	-0.094	0.047	2.068	0.039 (**)
RIR → EXP	-0.106	-0.108	0.069	1.543	0.123 (n.s.)
EXP → TRU	0.374	0.367	0.092	4.048	0.000 (***)
TRU → RP	-0.376	0.379	0.090	4.164	0.000 (***)
EXP → JDM	0.183	0.181	0.084	2.167	0.030 (**)
TRU → JDM	0.267	0.265	0.102	2.611	0.009 (**)

Tab. 2: Structural Model Estimates

Structural Relation	Path Coefficient	Sample Mean	Standard Deviation	t-Value	p-Value
AGE → CL	-0.113	-0.113	0.051	2.215	0.028 (**)
AGE → EXP	-0.118	-0.117	0.064	1.823	0.068 (*)
RProp → RP	-0.203	-0.205	0.082	2.269	0.014 (**)
RProp → IL	-0.360	-0.364	0.066	5.432	0.000 (***)
REP→ EXP	0.354	0.357	0.062	5.737	0.000 (***)
REP → TRU	0.408	0.413	0.068	5.967	0.000 (***)
SAT → RP	-0.221	-0.226	0.081	2.734	0.006 (**)
SAT → IL	-0.284	-0.283	0.075	3.779	0.000 (***)
SAT → EXP	0.370	0.367	0.068	5.472	0.000 (***)
SAT → TRU	0.165	0.165	0.061	2.705	0.007 (**)
SAT → JDM	0.103	0.100	0.056	1.826	0.068 (*)

Tab. 3: Control Variables

fect was found between RIR and EXP, *contradicting H3* in part, which indicated that the RIR had no significant effect on the individuals' perceived expertise of the bank in this study. Moreover, that EXP had a significant, strong, and positive effect on TRU was found. A significant and negative link was also found between TRU and RP ($p<0.000$) and a significant and positive relationship was found between EXP and JDM ($p<0.05$) as well as TRU and JDM ($p<0.05$) that provides *evidence for H4*. The results show that the higher the individuals' trust in the bank, the lower their risk perception. In summary, both trust and perceived expertise demonstrated a positive effect on the final assessments and led to more positive judgments and decisions.

Finally, the results indicated RP as the most important mediator and predictor for JDM in the model. An additional analysis of group differences indicated no influence of being a savings banks' client or a client of another bank.

In addition, several control variables were examined. The summarized results of the effects of the control variables in the model are shown in *Tab. 3*. Indications that the AGE of the participants influenced their cognitive load and their perceived expertise were found – i. e., older participants stated lower task difficulty and attributed a lower expertise to the reporting bank. A second control variable was the risk propensity (RProp), measured following Sitkin and Weingart (1995) and Meertens and Lion (2008), which had a negative impact on risk perception and IL. The more risk-seeking an individual, the lower his risk perception. The more risk-seeking, the lower is the IL. Another control variable was the reputation of the bank (REP), measured with the help of competence and likeability (or sympathy) following Schwaiger (2004), which strongly affected perceived expertise and trust. Finally, the scale for individuals' satisfaction with the information supply (SAT), based on Gustafsson et al. (2005) and Trumbo (1999), affected every latent variable in the model except for CL – i. e., the higher the individuals' satisfaction with the information supplied, the lower the risk perception and IL, the higher the perceived expertise, the greater the trust in the bank, and the better the JDM of the participants overall. This result points out the importance of a more appropriate risk disclosure, oriented towards users' needs, to create greater satisfaction and reflects the connection between problem representation and problem-solving task.

7. Discussion and conclusion

In this paper, different content-related arrangements concerning the ratio of RE and RMS information in savings' banks risk reporting was investigated. The varied ratio be-

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tween RE and RMS information cues was considered with regard to the influence on individuals' information processing and JDM.

With respect to the research goal and *H1*, the hypothesized indirect effect of RIR on JDM is significant and positive, which means the higher the share of RE information cues within the report the more positive the individuals' JDM. This is an important finding indicating that a risk communication oriented towards the addressees' needs, which means providing more RE information and less RMS information, results in plain and better judgments and decisions.

Regarding the impact of IL and CL on individuals' JDM in this context, the results provided strong evidence for *H2*. A larger share of RE information in risk reports reduced the cognitive strain to which the individuals were exposed and the probability of an overload. This is important when considering the negative effects a possible overload could entail as described in Section 4.2. The banks could counteract these effects by reporting more information cues to explain their RE and to enhance transparency. The risk of an overload can be reduced by an appropriate reporting oriented towards users' needs by delivering more RE information cues and streamlining the delivering of RMS information cues.

Analysing the hypothesized relationships between the RIR, EXP, and TRU the findings were mixed. First, RIR had no significant effect on EXP in this study, which contradicts *H3* and means the pure availability of RMS information does not lead significantly to a higher perceived expertise. Thus, there is no evidence for the relation as hypothesized and suggested by Kureck and Homölle (2018).

Nevertheless, EXP significantly drove TRU and showed a significant positive effect on JDM, as hypothesized in *H4* and, therefore, is an important variable in the model to predict individuals' risk perception and their final assessments. Moreover, it was found that EXP and TRU were strongly driven by the reputation of the bank and the individuals' satisfaction with the information supply. These findings indicate that individuals' attitudes towards the bank still have an important role and the banks should always try to satisfy their customers.

The results contribute to the existing research, presenting new insights into the impact-oriented risk-reporting research using a behavioural approach. The results point out the value of integrating human information processing research into the accounting context; namely the study provides evidence for the negative impact of irrelevant risk information on individuals' information processing and performance. Against the background of the legislators' aim to provide useful information in order to make informed decisions, the reporting practice should focus more clearly on a transparent and convincing presentation of companies' risk exposure. That could be achieved by generating and disclosing more quantitative risk information cues, without neglecting a convincing description of their risk management system by streamlining the RMS information and presenting it in a convincing manner. Disclosing companies should formulate a more appropriate risk reporting, oriented towards the users' needs, to avoid individuals' cognitive overstraining. The message should be presented in a context that also includes the appropriate data, using a uniform and appropriate presentation within the framework of a logical structure. If they do so, there will not only be a positive impact on their information processing but it will also result in more straightforward and reliable JDM. A reliable demeanour is the basis for a stable customer relationship.

The findings of this study are subject to some limitations. The first point of criticism arises from the sample. It is tried to take account of the small sample size by using the PLS method that is robust even with a small number of cases (Hair et al. 2017). In addition, the sample consisted of 48.3 % students. Former research has shown that students are good surrogates in decision-making studies (Ashton and Kramer 1980). An analysis of group differences indicated no influence of being a student on the results in this study. Nevertheless, future studies should aim to create homogenous samples to improve the generalizability of the results.

The second point of criticism results from the stimulus material. Although it was used only realistic risk information, the provided risk report did not correspond to the reality in terms of amount of information that is usually presented in a real risk report. This problem is due to developing an experimental examination and it is considered only as a minor problem as the aim was only to investigate the impact of the basic structure of the risk report. However, this fact suggests to take into account further specific information cues and their effects in future research to get more detailed results and insights into individuals' information processing.

Another point of criticism relates to several characteristics of the individual which were not taken into account in this study. Individual attitudes, understanding, political orientation, or prior knowledge could be crucial aspects, which could be decisive for possible deviations in information processing entailing interesting questions for future research. A substantial contribution could be the inclusion of an expanded theory of cognitive fit that takes into account a individuals' problem-solving skills (Vessey and Galletta 1991).

Furthermore, this study considered only the risk reporting of savings banks but did not take into account differences in comparison to, for instance, capital market-oriented

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banks' and companies' risk reporting. These risk reports are certainly different and should be considered in future research. Nevertheless, the problem of risk reports being overloaded with RMS information also exists in other banking groups and companies and provides important issues for further research against the background of this study.

Appendix

A: Experimental Material

A1: Task Formulation

The banks' core business is to take deposits and to provide loans. In the course of the financial crisis it became clear that it was necessary to look more closely when deciding on a bank. Imagine you are looking for a new bank. In the following you are provided with an overview of the MUSTER-Sparkasse (MUSPA) as a potential institute. The risk report of the MUSPA is provided. With the help of the provided information you are asked to make an assessment of the bank.

A2: Stimulus Material

Overall Risk Management System (1) The MUSPA exhibits an appropriate risk management system with regard to amount, complexity, and risk content. (2) The risk controlling is an essential management task for the MUSPA. (3) Within the annual risk inventory the future utilization of the risk limits due to stress-tests results is examined. (4) Also it is checked whether there are findings about additional risks that are not yet components of our risk classification.

Counterparty Credit Risk Management System (5) The management of counterparty credit risks is a fundamental part of the overall risk management system. (6) The economic counterparty credit risk is quantified on the basis of the credit risk model Credit Portfolio View (CPV). (7) This is a software tool to identify, measure, and constitute counterparty credit risks in a credit portfolio. (8) The portfolio approach used allows the taking into account of interactions between the different credit transactions and diversification effects in the credit portfolio.

Counterparty Credit Risk Exposure (9) Issuer bonds from so called PIIGS-countries Portugal, Ireland, Italy, Greece, and Spain constitute 73.6 million EUR or 5.9 % of the overall portfolio of other lending business at the end of the year. (10) The MUSPA no longer shows Greece exposure, after the debt relief and the following compulsory exchange of Greek government bonds. (11) In the course of the year, the MUSPA reduced an appreciable share of PIIGS exposures by selling Spanish and Portuguese bonds. (12) Overall, we assess the taken counterparty credit risk to be acceptable.

Market Risk Management System (13) Due to the MUSPA's balance sheet structure the management of interest-change risks for the bank as a whole strategically constitutes the main focus of market risks. (14) To estimate the interest-change risks, interest surplus is compared and analysed in a holistic consideration based on different interest-change scenarios. (15) A large variety of scenarios enables the gathering of additional risk information with variations of interest surplus around the expected value of planned interest result. (16) The consideration of determined risk values for interest margin risk is holistically made within the risk controlling.

Market Risk Exposure (17) The strategic requirements for risk-bearing capacity were complied with at all times in 2015. (18) Existing loss or risk potentials are completely secured by the available risk-covering assets. (19) By comparison to the preceding year, the risk-covering assets could further be reduced by 5.3 million EUR. (20) Overall, we assess the market risk taken to be acceptable.

Overall Risk Exposure (21) As in previous years, the counterparty credit risks and the market risks are classified as essential risks due to the business model of the MUSPA being a universal credit institution. (22) All risks taken by the MUSPA in 2015 were secured by risk coverage potential at all times. (23) No existential risks were identified that are not acceptable for the MUSPA. (24) The results of the stress-tests did not provide any scenarios that could be existential for the MUSPA.

B: Distribution of Sentences

The cells include the appropriate sentences provided to the experimental groups. RIR = risk information ratio; RE = risk exposure; RMS = risk management system; O = overall; CR = counterparty credit risk; MR = market risk.

RIR (RE:RMS)	0:100	25:75	50:50	75:25	100:0
O RMS	(1) (2) (3) (4)	(1) (3) (4)	(1) (3)	(1)	
CR RMS	(5) (6) (7) (8)	(6) (7) (8)	(6) (7)	(6)	
CR RE		(9)	(9) (10)	(9) (10) (11)	(9) (10) (11) (12)
MR RMS	(13) (14) (15) (16)	(14) (15) (16)	(14) (15)	(14)	
MR RE		(17)	(17) (18)	(17) (18) (19)	(17) (18) (19) (20)
O RE		(22)	(22) (23)	(22) (23) (24)	(21) (22) (23) (24)

C: Example for RIR 25:75

Risk Report of the MUSPA from 31st December 2015

(1) The MUSPA exhibits an appropriate risk management system with regard to amount, complexity, and risk content. (3) Within the annual risk inventory the future utilization of the risk limits due to stress-tests results is examined. (4) Also it is

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checked whether there are findings about additional risks that are not yet components of our risk classification.

Risks

Counterparty Credit Risk

(6) The economic counterparty credit risk is quantified on the basis of the credit risk model Credit Portfolio View (CPV). (7) This is a software tool to identify, measure, and constitute counterparty credit risks in a credit portfolio. (8) The portfolio approach used allows the taking into account of interactions between the different credit transactions and diversification effects in the credit portfolio. (9) Issuer bonds from so called PIIGS-countries Portugal, Ireland, Italy, Greece, and Spain constitute 73.6 million EUR or 5.9 % of the overall portfolio of other lending business at the end of the year.

Market Risk

(14) To estimate the interest-change risks, interest surplus is compared and analysed in a holistic consideration based on different interest-change scenarios. (15) A large variety of scenarios enables the gathering of additional risk information with variations of interest surplus around the expected value of planned interest result. (16) The consideration of determined risk values for interest margin risk is holistically made within the risk controlling. (17) The strategic requirements for risk-bearing capacity were complied with at all times in 2015.

Overall Assessment

(22) All risks taken by the MUSPA in 2015 were secured by risk coverage potential at all times.

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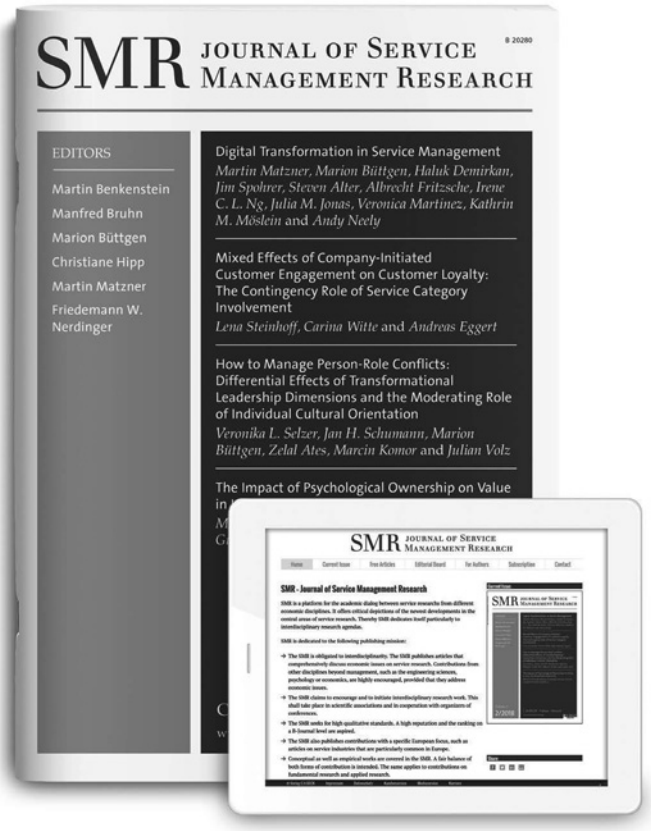
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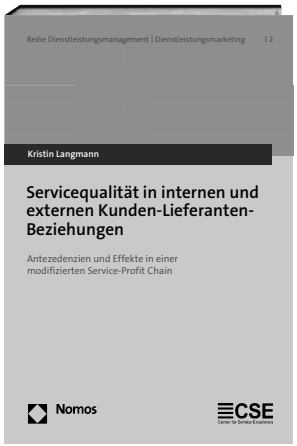
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