

# Enterprise Risk Management in Germany

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## **Abstract**

The enterprise risk management (ERM) approach promises to manage corporate risks holistically, as opposed to the silo perspective in traditional risk management frameworks. There is evidence that different economic and regulatory environments profoundly shape the implementation of ERM in different countries. To understand better the specific situation in Germany, this chapter presents an analysis on the current application, the regulatory environment, and the development over time of ERM in Germany. Finally, we highlight some important avenues for further research on ERM in Germany and beyond.

## **Keywords**

Enterprise Risk Management (ERM), Corporate Risk, Legislation, Regulation, Germany, Mittelstand, Family Business

## 1. The German Economy

Different economic and regulatory environments have been found to shape the implementation of enterprise risk management (ERM) in different countries worldwide (Bledow *et al.*, 2019; Bromiley *et al.*, 2015; Lechner and Gatzert, 2018; Sassen, 2014). To obtain a deeper comprehension of ERM in specific countries, a closer understanding of the socio-economic environment is needed. This chapter focusses on ERM in Germany and aims to point out the factors that shape the implementation of such a management approach in German firms as well as the outcomes of such implementation.

The economic situation in Germany constitutes part of the broader ERM environment. At the time of writing, Germany is the largest economy in Europe and the fourth largest in the world in terms of gross domestic product (GDP). This GDP is largely earned in the service (69%), manufacturing (24%), and construction (6%) sectors (Statistisches Bundesamt, 2019). The latest “Fortune Global 500” list includes 27 German companies, with the top 10 being Volkswagen, Daimler, Allianz, BMW Group, Siemens, Deutsche Telekom, Bosch Group, Uniper, Munich Re Group, and Deutsche Post DHL Group (Fortune 500, 2020). According to the global competitiveness index of the World Economic Forum, Germany ranks fifth (out of 137 countries) among the most competitive countries in the world (World Economic Forum, 2018). In particular, the automotive, commercial vehicle, electrical engineering, mechanical engineering, and chemical industries are considered the most competitive sectors of German industry worldwide.

In line with this high level of competitiveness in many industries, Germany is one of the largest exporters globally. With \$310 billion of exports in 2016, Germany recorded the highest trade surplus in the world. The majority of Germany’s foreign trade is with other industrialized countries. The nation’s top ten export goods are vehicles, machinery, chemical goods, electronic products, electrical equipment, pharmaceuticals, transport equipment, basic metals, food products, and rubber and plastics (Statistisches Bundesamt, 2019).

Over 99% of all German companies can be considered as belonging to the German Mittelstand. It is commonly accepted that the Mittelstand is comprised of small and medium-sized enterprises (SMEs), which are largely family owned and privately held. That is, unlike the United States, for instance, the share of publicly traded companies is smaller in Germany and German firms are more debt-financed than American firms. These financing preferences also have their implications for ERM and related research, since the number of public German firms

facing capital market pressure and providing public reporting due to their listing is smaller in Germany than in Anglo-Saxon countries (Vitols, 2001).

Regardless of their capital structure, German Mittelstand firms are widely recognized for their innovativeness, especially in the areas of products, processes, and service innovations. At the same time, such firms are often not well known to the general public, which makes them “hidden champions” (Simon, 2009). Many German Mittelstand enterprises overcome their lack of access to human resources due to their local embedding. That is, geographical decentralization is a specific feature of the German economy and is evident across regions. It is not unusual for global, market-leading Mittelstand companies to be located in smaller towns and villages at least 100 km from major city centers. This is made possible by several factors. Firstly, Germany has a central location in Europe. Furthermore, a dense and modern transportation network facilitates this decentralization. This includes an extensive freeway network (Autobahn), a network of high-speed trains (ICE), and several large ports and airports (De Massis *et al.*, 2018). Due to the high importance of Mittelstand firms in Germany, we will also look at their implementation of ERM below.

## **2. ERM Environment in Germany**

### **2.1 Legislation and Regulation**

In Germany, the most important legal forms for large public and private businesses are those of the stock corporation (German: Aktiengesellschaft or AG) and the limited liability company (Gesellschaft mit beschränkter Haftung or GmbH). Unlike nonincorporated firms, these corporations are taxed at the business level (Falkenhausen and Steefel, 1961). Most of the following risk management legislation and regulation focusses on these two primary types of legal forms.

German stock corporations and larger limited liability companies rely on a two-tier system. That is, unlike the one-tier system in countries such as the United States, the management board (in German: the Vorstand for AGs or the Geschäftsführung for GmbHs) is separated from the supervisory board (in German: the Aufsichtsrat). Both boards have their specific duties and individuals cannot be part of both boards at the same time. Most importantly, the management board is responsible for managing the firm, which includes establishing a suitable system that enables the early detection of risks (e.g., Sassen, 2014). In turn, the supervisory board selects

the members of the management board, can be a source of advice for top managers, and monitors the management board (e.g., Dienes and Velte, 2016). The latter duty includes the need to monitor the firm's risk management system (Sassen, 2014).

In general, German regulations regarding risk management are more based on hard law as compared with countries such as Australia and the United States, where risk management regulation is more grounded in quasi-legal standards and shaped by supervisory institutions such as the Australian Securities Exchange (ASX) Corporate Governance Council and the Securities Exchange Commission (SEC) in the United States (Bledow *et al.*, 2019). In line with this notion, the development of corporate risk management in Germany has been significantly influenced by the Act on Control and Transparency in Business (KonTraG), followed by the German Auditing Standard 340 (IDW PS 340) on early risk detection systems. The KonTraG was passed by the German Bundestag on March 6, 1998 and came into force on May 1, 1998. The central component of KonTraG and a main catalyst for the further development of risk management in Germany is Section 91 (2) of the German Stock Corporation Act (AktG) (Gleißner, 2018). This section makes the establishment of an early warning system obligatory and requires the management board to take suitable measures — in particular, the establishment of a monitoring system — that facilitate the early identification of developments that may jeopardize the firm's continued existence (Section 91 (2) AktG). A violation of these duties that leads to severely negative outcomes may also represent a personal liability risk for members of the management board (Gleißner *et al.*, 2019). The KonTraG is not only concerned with stock corporations, as it is generally assumed that it has spillover effects on other legal forms, including those that are not publicly listed (Freidank and Sassen, 2012), which includes the GmbH, the legal form of most larger Mittelstand firms (Klein, 2000).

The wording of the KonTraG only contains explicit requirements for the early risk detection system as part of the overall risk management system. This early detection system is meant to inform corporate managers about risks at an early stage: in particular, the risks associated with a decision (e.g., an investment) should be clear before the decision is made. It should also be clear what implications this decision could have for the future scope of risks, and the system should thus indicate any development that could endanger the firm's existence (Gleißner, 2020). However, how exactly corporate managers should deal with the risks and their control, and how they should include risk in their decisions, is not explained by the legal text.

This gap is addressed by the German Auditing Standard 340 (IDW PS 340), in which the Institute of Public Auditors in Germany (IDW) specifies the requirements for a risk management system to be in line with the KonTraG. This standard was first adopted on June 25, 1999 as a response to the introduction of KonTraG. Although auditing standards do not have a legal character in Germany, they regularly determine business practice, as they are interpreted as principles of proper external auditing. In particular, in cases of recourse, their non-observance may be interpreted to the detriment of the auditor (Freidank, 2012). IDW PS 340 includes the following aspects with regard to a risk management system: (1) determination of risk areas, (2) risk identification and risk analysis, (3) risk communication, (4) assignment of responsibilities and tasks, (5) establishment of a monitoring system, and (6) documentation of measures taken (Gleißner *et al.*, 2019).

A further important step in legislation on risk management was made with the adoption of the German Accounting Law Reform Act (BilReG). The BilReG came into force in 2004 and brought major changes, ones that expanded the framework for the mandatory application of risk management, and it was primarily codified in the German Commercial Code (HGB). The approach of the KonTraG, which had mostly focused on negative developments, has been expanded by the BilReG by including potential positive future developments. That is, following the reform, reporting not only needed to include risks but also opportunities (Section 289 (1) Sentence 4 HGB) (Dobler, 2005). An additional innovation of the BilReG was that corporations were obliged to provide information in their management reports on the risks associated with their financial instruments and on the risk management objectives and methods used to manage these risks (Section 289 (2) HGB). Further legal provisions for risk management in Germany were made by the German Accounting Law Modernization Act (BilMoG), which was enacted in 2009. In the BilMoG, the term ‘risk management’ was used for the first time in German legislation (Section 289 (5) HGB). In addition, the BilMoG introduced the need for stock corporations’ audit committees to monitor their corporation’s risk management system (Section 107 (3) AktG) (Kort, 2010).

Despite these steps towards more sophisticated risk management, several empirical analyses of risk management systems implemented in German business practice reveal that the requirements of IDW PS 340 are often not fully met, even though audit certificates have been issued for the respective firms (e.g., Angermüller and Gleißner, 2011; Hoitsch *et al.*, 2006; Hofmann and Fink, 2019; Ulrich *et al.*, 2018). For instance, one issue identified in many German risk management studies is that the audit of risk management has so far focused

primarily on organization and processes (e.g., the processes for risk analysis, risk monitoring, or risk reporting). However, whether the methods used here are at all suitable to meet the (legal) objectives of risk management has not been sufficiently considered. A consequence is that many firms, despite featuring sophisticated risk management processes and organization, show serious methodological deficits. For example, the lack of an adequate method for risk aggregation makes it impossible to assess whether “existentially threatening developments” can arise from the combination of individual risks. Likewise, the implemented risk management systems often lack a systematic and integrative focus on strategic risks and focus too much on operational risks (Gleißner *et al.*, 2019). The former is, however, a defining feature of ERM systems (e.g., COSO, 2017), which exemplifies that just because the German legal requirements are met does not necessarily mean that firms fully follow an ERM approach.

Motivated by such shortcomings in practice, the German Institute of Internal Auditors (DIIR), a non-profit association promoting internal auditing in Germany, published the new Audit Standard No. 2 for internal audits of risk management in November 2018. At present, this standard remains the most advanced attempt to address the multitude of new developments in risk management for non-financial firms since the financial crisis in 2008, as it aims to integrate them into an audit standard that is focused on meeting all central legal requirements discussed above. In this respect, this DIIR standard is more advanced than the abovementioned standard for external auditing (IDW PS 340), which, for example, does not deal with the question of whether and to what extent risk analyses are also included in significant business decisions (Gleißner *et al.*, 2019).

More advanced regulation has recently been published for financial service firms also, such as banks and insurance companies. Besides the general German Banking Act (Kreditwesengesetz), the so-called Minimum Requirements for Risk Management (MaRisk) is a source of new regulation (Sassen, 2014). The latest edition of the MaRisk was published in late 2017 by the Federal Financial Supervisory Authority (BaFin), and is based on the European Union’s Capital Requirements Directive IV and thus includes more prescriptions for financial institutions’ risk management systems. For instance, the MaRisk now prescribe the establishment of an adequate risk culture and include new requirements for risk reporting (Reuse and Frère, 2017; Stein and Wiedemann, 2019).

In general, it can be concluded that regarding risk management, the German legislator attaches importance to the early identification of risks, the systematic tracking of risks, and the

information in the management reports on the measures taken to avert risks. The focus is on cooperation between the management board, the supervisory board, and the external auditor with regard to monitoring the early detection system. As indicated above, however, the German legislation does not require the establishment of a full ERM system. While the general diligence of a prudent businessman instilled in German business legislation may be seen as a de-facto obligation to set up integrated risk management systems, only the obligation to provide information on the risk management system and what general purposes this system should fulfill are prescribed. Consequently, the type and scope of the measures to be implemented depend on the individual risk situation of the respective company and are within the organizational judgement of the management and supervisory boards (Section 86 (3) HGB).

## **2.2 Professional Associations**

As reflected by the brief history provided above on legislation and regulation, risk management is a rather young discipline in Germany. This may explain why the major professional association focusing on risk management, the Risk Management & Rating Association (RMA), is still rather small when compared with professional associations focusing on longer standing business functions. For instance, the Internationaler Controllerverein (ICV), a Germanic professional association focused on management accounting and control topics, has about 6,000 members at the time of writing, while the RMA, which was created through a merger of the Risk Management Association and the Federal Association of Rating Analysts in 2019, has only 670 members. However, when considering that the root organization of the RMA was only founded in 2005 (RMA, 2020), its growth in terms of members seems considerable. These members include public and private firms as well as individuals from practice and research contexts.

Similar to other professional associations, the RMA aims to serve as a platform for information, inter-company dialogue, and the further development of risk management and rating in Germany. As part of this general mission, the RMA also offers educational programs such as an ERM training program, which is held in cooperation with the University of Würzburg. It also organizes an annual congress and offers publications on risk management, which are geared towards disseminating key ideas around risk management and their application in practice. For this purpose, the RMA has also partnered with other professional associations such as the ICV. Surprisingly, however, the RMA is not (yet) part of the Federation of

European Risk Management Associations (FERMA), where another organization, the Gesamtverband der versicherungsnehmenden Wirtschaft (GVNW), is representing Germany. The GVNW is much older than the RMA, but is – unlike most other FERMA members – very much focused on the insurance industry, and thus carries a less generalist scope than the RMA.

Another German-speaking source of information regarding risk management is RiskNET, which considers itself to be the leading online German-speaking competence center and knowledge pool around the topic of risk management and compliance. According to self-declaration, the RiskNET website records more than two million page views per month and the RiskNET eLibrary contains professional articles totaling more than 50,000 pages. Similar to the RMA, it also offers seminars around risk management and an annual conference. To date, more than 20,000 participants have attended RiskNET’s seminars (as of January 2020) (RiskNET, 2020).

To summarize, there is a growing community of professionals interested in risk management topics in Germany. Similar to risk management associations in other European countries, none of the main associations and knowledge providers in Germany exclusively focus on ERM. However, all of them provide information and educational programs on ERM, which may be interpreted as a sign that these associations and knowledge providers show some interest in the dissemination of the ERM approach in Germany.

### **2.3 Research on ERM**

Similar to the numbers of professionals, the quantity of researchers interested in risk management is also clearly growing in Germany. Various research universities such as the Friedrich–Alexander University Erlangen–Nürnberg, the Karlsruhe Institute of Technology, the Ludwig Maximilian University of Munich, the Technische Universität Dresden, the University of Hohenheim, the University of Münster, the University of Siegen, and the University of Würzburg have established chairs, institutes, or research groups around risk management topics. In addition, there are also similar research groups at many German universities of applied Science, which tend to be focused more on practice-oriented teaching rather than being research-driven.

Amongst other risk management topics, some of these research groups show interest in and publish research on ERM, of which the main findings will be synthesized below. However, the

approaches and underlying paradigms differ widely. For instance, some groups are focused on financial service firms such as banks and insurance companies (e.g., Erlangen-Nürnberg, Munich), while others are more focused on translating legislative and regulatory demands regarding risk management for corporate practice, which is in line with a long-standing normative stance in Germanic business research (cf. Messner *et al.*, 2008). Still others promote holistic concepts on the management of risks. Amongst the latter, researchers at the University of Siegen have suggested an alternative to ERM; that is, the risk governance approach. This approach shares some commonalities with ERM, but is more focused on strengthening the coupling of risk management with corporate governance, so that risk topics are not only discussed at the operational level, but in the most important bodies of corporate governance, which should enable a more strategic steering of risks (e.g., Stein and Wiedemann, 2016; Stein *et al.*, 2019). Based on this general idea, there has emerged a research network and an annual conference on risk governance (e.g., Hiebl, 2019; Hiebl *et al.*, 2018). While this network around risk governance and research on risk management and ERM more generally has grown in recent years, it seems fair to summarize that in Germany, there has not yet evolved a similarly large research organization like the American Risk and Insurance Association (ARIA) based in the United States.

### **3. Empirical Evidence on ERM in Germany**

#### **3.1 Determinants of ERM Implementation in Germany**

Results from empirical studies on German organizations have revealed several characteristics that determine the implementation of ERM systems in Germany. Given the non-existence of legislation or regulation that demands German firms to implement ERM (see above), a major challenge for all these studies is the lack of an explicit, binding disclosure of ERM implementation, as firms often do not provide adequately detailed information about their risk management systems. As indicated above, this is particularly true for the many German Mittelstand firms, who are mostly privately held and generally known to be rather secretive and thus hard to research (Berghoff, 2006; Pielsticker and Hiebl, 2020; Stamm and Lubinski, 2011). The empirical literature is therefore faced with the challenge of collecting information on whether an ERM system has been implemented and to what extent. The necessary information can be gathered either through reviewing public sources (for public firms) or collecting field information, for instance through surveys (Gatzert and Martin, 2015).

Potentially due to these challenges in data collection, published evidence on determinants of ERM implementation in Germany remains scarce. In fact, on this topic, we could only localize one study based on archival data (Lechner and Gatzert, 2018), five studies based on survey data (Altuntas *et al.*, 2011; Henschel, 2006; Henschel and Durst, 2016; Hiebl *et al.*, 2019; Schwaiger *et al.*, 2018), and one study combining archival and survey data (Altuntas *et al.*, 2019). An overview of their results is presented in Table 1.

**Table 1.** Determinants of ERM adoption and maturity in Germany

<b>Effect on ERM</b>	<b>Determinants</b>	<b>References</b>
<i>Increases</i> the likelihood of ERM adoption or maturity	Firm size	Altuntas <i>et al.</i> (2019); Henschel (2006); Henschel and Durst (2016); Hiebl <i>et al.</i> (2019), Lechner and Gatzert (2018), Schwaiger <i>et al.</i> (2018)
	Affiliation with heavily regulated industry sectors (i.e., banking, insurance, energy)	Altuntas <i>et al.</i> (2011); Lechner and Gatzert (2018)
	International diversification	Lechner and Gatzert (2018)
	Profitability	Lechner and Gatzert (2018)
	Time since ERM adoption	Schwaiger <i>et al.</i> (2018)
<i>Decreases</i> the likelihood of ERM adoption or maturity	Higher level of leverage	Lechner and Gatzert (2018)
	Status as family firm	Hiebl <i>et al.</i> (2019)
	Family CEO	Hiebl <i>et al.</i> (2019)

The first study, that of Lechner and Gatzert (2018), is focused on major German listed firms. This archival study identified ERM adopters based on a keyword search in annual reports, and found that 72% of the analyzed firms adopted ERM in 2013. The authors find that firm size, firms' international diversification, profitability, and an affiliation with the heavily regulated banking, insurance, or energy sectors are all positively related to ERM adoption, while higher levels of leverage are negatively related to ERM adoption in German listed firms.

Similar to Lechner and Gatzert (2018), the studies by Altuntas *et al.* (2019) and Schwaiger *et al.* (2018) also observed the positive influence of firm size, but unlike Lechner and Gatzert (2018), these two studies investigated either ERM maturity (Schwaiger *et al.*, 2018) or ERM quality (Altuntas *et al.*, 2019) as their dependent variables. In addition to firm size, Schwaiger *et al.* (2018) also found that firms that have established risk management for a longer time already show higher ERM maturity scores. While the study by Schwaiger *et al.* (2018) did not find a significant effect of firm ownership on ERM, the study by Hiebl *et al.* (2019) found such an effect. The findings by Hiebl *et al.* (2019) indicate that family businesses and companies

with a family CEO have significantly lower ERM application rates compared with non-family businesses and companies with a non-family CEO. In addition, Hiebl *et al.*'s (2019) study confirms the positive effect of firm size on ERM adoption. From these findings, it can be concluded that as family businesses grow and increasingly hire non-family executives, it can be expected that formalized practices such as ERM will follow. For the Hiebl *et al.* (2019) study, it must however be noted that the results are not based on German firms only, but also include evidence on Austrian companies. Since both countries have a similar socio-economic environment, we see no reason why these results would not be attributable to the German situation, which is why we have included this study in our brief overview here.

The industry effect found by Lechner and Gatzert (2018) well fits the results of Altuntas *et al.* (2011). This survey-based study does not really offer cross-sectional evidence on the determinants of ERM, but takes a deeper look at various aspects of ERM implementation in the German insurance industry. Indeed, it finds that while in 1999 only one of the insurers in the sample used a company-wide risk model, in 2009 this figure was already at 74%, which signals a wide dispersion of ERM in the industry. In addition, Altuntas *et al.* (2011) find that in 2009, almost all surveyed insurance firms (89%) featured a risk strategy. These results indicate that, over time, large German insurance firms have increasingly implemented ERM systems.

Similar to Altuntas *et al.* (2011), the survey study by Henschel (2006) does not specifically look at the determinants of ERM, but rather analyzes how German SMEs organize their risk management more generally. Henschel's (2006) findings show that only a few SMEs have established a comprehensive business planning system and that the link between their risk management and business planning is not well developed. The handling of risks is rather rudimentary and, if performed at all, the main responsibility for the organization of risk management usually lies in the hands of the SME top managers. That is, a dedicated risk manager is rarely found in SMEs. According to Henschel's study, most SMEs review their risks on a quarterly basis only, and smaller companies tend to do so on a bi-annual basis only. Henschel (2006) further finds that the SMEs' risk management time horizon is concentrated on a short-term period of one to two years. From this study, it can thus be concluded that back in the mid-2000s, only a few German SMEs had implemented an ERM system (Henschel, 2006). Ten years later, a follow-up survey by Henschel and Durst (2016) found similar results, not only for German SMEs, but also for Scottish and Chinese SMEs.

### **3.2 Outcomes of ERM Implementation in Germany**

Studies on the outcomes of ERM in German firms are even less numerous than those on the determinants of ERM. In fact, we could only identify three studies providing some evidence on outcomes of ERM in Germany (Altuntas *et al.*, 2019; Hiebl *et al.*, 2019; Lechner and Gatzert, 2018). The results of the study by Lechner and Gatzert (2018) show a significantly positive impact of ERM on shareholder value measured as Tobin's Q. The study by Altuntas *et al.* (2019) on German insurance firms reveals why such a positive effect of ERM on value may be realized. The authors find that “ERM positively moderates the relationship between a firm’s extent of diversification and its revenue scope efficiency” (p. 30). They view this finding as indicative of ERM’s ability to facilitate economies of scale, since it can help to identify and manage interdependencies between risks in larger firms. These risks may level each other out, resulting in less equity capital needed for the studied insurers to reach their insolvency targets for a given number of projects. Thus, larger firms may need less capital per project due to ERM, which resembles economies of scale.

In contrast to Altuntas *et al.* (2019) and Lechner and Gatzert (2018), the survey study by Hiebl *et al.* (2019) does not really focus nor theorize on the outcomes of ERM. However, this study does provide some evidence on the relationship between ERM adoption and a typical outcome variable – firm performance. For their sample of Mittelstand firms, Hiebl *et al.* (2019) find no significant correlation between ERM implementation and firm performance. They view this finding as indicating that in contrast to larger firms, small family businesses in particular do not derive net benefits from the application of formal ERM methods.

### **4. Discussion, Implications, and Outlook**

This chapter has sought to give an overview on ERM in Germany – in particular, the socio-economic environment and existing research. Our findings show that while researchers and professional associations in Germany (e.g., the RMA) show an increasing interest in and promote the activities of ERM, German legislation and regulation has not yet prescribed firms to adopt full ERM systems. However, recent years have seen a series of new regulations (e.g., DIIR Standard No. 2, MaRisk) that adopt several aspects of ERM and bring current regulatory requirements in Germany closer to ERM ideals.

Our review of empirical research on ERM in Germany shows that very few German firms have reaped the potential benefits of ERM. So far, it is mainly larger and listed firms, especially those from the banking and insurance industries, that have adopted ERM (Altuntas *et al.*, 2011; Lechner and Gatzert, 2018). These larger firms have also been found to benefit from ERM (Altuntas *et al.*, 2019; Lechner and Gatzert, 2018). Smaller firms, including those from the German Mittelstand, and especially family-led firms, still show low ERM adoption rates (Hiebl *et al.*, 2019; Henschel and Durst, 2016; Schwaiger *et al.*, 2018). Overall, these findings mostly echo those published in international ERM research. That is, review studies by Bromiley *et al.* (2016) and Gatzert and Martin (2015) observe that many international ERM studies have found that firm size is positively related to ERM adoption and that the implementation of ERM brings with it positive effects for firm performance and value. At the same time, most studies included in such reviews are based on listed firms, and so evidence on privately held firms, such as most German Mittelstand firms, remains scarce.

The evidence summarized above that such smaller German firms show rather low ERM adoption rates does not necessarily imply that these smaller firms should heavily invest in ERM, as such investments are quite costly and small firms often do not have the necessary resources to invest in such professional management practices (Falkner and Hiebl, 2015; Hiebl and Mayrleitner, 2019; Hiebl *et al.*, 2019). However, growing regulatory pressures and evidence that ERM can be value-enhancing might at least imply also that German Mittelstand firms need to think about how they could reap the benefits of ERM.

Apart from such practical implications, our brief review reveals that empirical ERM research is still scarce in Germany. Consequently, there remains extensive room for further ERM research. As indicated above, the German economy depends on the innovativeness of its Mittelstand firms (De Massis *et al.*, 2018). Despite the resource restrictions of these firms, they regularly show high innovativeness. We could theorize that this is partly due to very effective risk management processes, as riskier and less promising innovation endeavors may be identified and sorted out early in the process (cf. Duran *et al.*, 2016). At the same time, we see low application rates of formal ERM processes. So it may be that German Mittelstand firms have their idiosyncratic way of managing risk holistically (cf. Hiebl *et al.*, 2018), but we still do not yet know whether this is the case and how this may function. Researching such topics may thus not only increase our general understanding of risk management and Mittelstand firms, but may also generate insights into how ERM prescriptions, such as those of COSO

(2017) that are geared towards larger firms, could be translated for smaller firms. Eventually, we may find that we need separate or amended ERM advice for smaller firms.

Besides such research on ERM in the German Mittelstand, there are many findings from international research where we do not yet know whether they hold in the German setting. For instance, relatively strict risk-management-related regulation in the United States, such as the Sarbanes-Oxley Act (SOX) (Bledow *et al.*, 2019), may have led to research finding higher levels of ostensible ERM adoption or maturity in such countries. In turn, most existing studies on the (positive) outcomes of ERM have been conducted on firms listed in the United States (Gatzert and Martin, 2015). While Lechner and Gatzert (2018) could identify the value-enhancing effects of ERM in Germany, the scarcity of findings on the outcomes of ERM in the country (see above) leaves open the question of whether findings on firms listed in the United States can unanimously be transferred to European countries operating in a different regulatory environment. Further research is needed to address such questions. This is not only true for ERM outcomes, but also for the antecedents of ERM. Consequently, it remains interesting to see how ERM further develops in Germany and how research can contribute to a closer understanding of ERM in the country.

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