Return on Investment from Supplier/Risk Management

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Abstract

Purpose – *The purpose of this paper is to examine and outline the impact of the supplier management maturity on the supplier management performance.*

Design/methodology/approach – *The study conceptualizes four dimensions (strategy & governance, organization & structure, process & systems and people) for the supplier management maturity and tests the relationship between supplier management maturity and supplier management performance (costs, quality, risk and innovation). Data for this study are collected from 98 purchasing consulting experts. The relationships proposed in the theoretical framework are tested using structural equation modeling.*

Findings – *The empirical results and findings from this research indeed substantiate the notion that elaborate supplier/risk management approaches contribute significantly to the improvement of supplier management performance and organizational competitiveness.*

Research limitation/implications – *This study is based on a group of purchasing consulting experts with an outside in view. Further studies should include participants from various industries to improve the representativeness of this study.*

Practical implications – *Results from the study suggest to practitioners that increasing the maturity of their supplier management organization and people leads to higher returns from the organizational performance in terms of cost, quality, risk and innovation.*

Originality/value – *This paper contributes in three ways to the discussion on how supplier management maturity affects the organizational performance. First by developing a theoretical model and testing it with empirical data using experience from the past, secondly by shedding more light on specific implications of empirical findings on different industries and lastly by predicting the main benefits contributing to the supplier management maturity in the near future.*

Keywords: supplier relationship management, supplier management, supplier management performance, supplier management maturity.

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Introduction

In today's challenging and competitive business environment companies focus more and more on their core competencies by reducing the vertical integration of their value chain towards a leaner organization. Outsourcing activities also attempt to leverage supplier's capabilities and technologies to achieve competitive advantages (Nair *et al.*, 2015; Zimmer *et al.*, 2016). However, this also increases the dependency on suppliers and the necessity of trust in the supplier's attitudes and behavior. Therefore, the importance of their performance plays a key role in those kinds of business relationships (Kannan and Tan, 2002). The management of supplier relationships therefore becomes more crucial for the overall success of companies especially with suppliers of strategic relevance (Carr and Pearson, 1999; Chen *et al.*, 2004). Supplier management processes like supplier selection, supplier development, supplier performance and risk management are essential to manage supplier relationships effectively (Kannan and Tan, 2002; Nair *et al.*, 2015). This means allowing companies to optimize their supply base, reduce overall costs, assure product- and service quality and to mitigate risk to improve bottom line profitability.

A number of studies have been published, outlining the positive impact of supplier management on the organizational and company performance (Al-Abdallah *et al.*, 2014; Carr and Pearson, 1999; Carr and Pearson, 2002; Ellram *et al.*, 2002; Kannan and Tan, 2002; Li *et al.*, 2006; Wagner *et al.*, 2012). As prior studies mainly focused on the impact of the organizational performance either in the presence or absence of supplier management practices, this study aims to shed more light on the performance of supplier management related to the level of the maturity of the supplier management framework.

Therefore, in this paper, we examine the extent to which the supplier management maturity as part of the purchasing maturity (Rozenmeijer *et al.*, 2003; Schiele, 2007) impacts the economic efficiency in terms of the supplier management performance (Li *et al.*, 2006). The basic assumption is that organizations with a higher

supplier management maturity (input) achieve better organizational performance (output) in terms of e.g. profitability, competitiveness, etc. (Schiele, 2007).

The remainder of the paper is structured as follows. The next section provides a literature review about supplier/risk management, -maturity and -performance. Further the substantive relationships among the study variables are developed and hypotheses are stated. Next the research methodology and analysis, including the data collection procedure, hypotheses testing and results are explained. Then based on the study findings discussions and managerial implications are presented. Finally, a conclusion is given highlighting the limitations of the study along with suggestions for further research.

Theory and research hypotheses

Supplier/risk management

From a resource-based view, a company continually seeks to maintain its competitive advantage by managing its key resources and competencies (Oliver, 1997). The resources characteristics that lead to a competitive advantage include whether resources are scarce, valuable, reasonably durable, and difficult to imitate (Barney, 1991). The resource based view proposes that resource selection and accumulation are a function of both the company decision making and external strategies and -influences. External influences are considered strategic industry factors that impact the company, including buyer and supplier power (Oliver, 1997). As suppliers increasingly provide larger portions of the value delivered to the customer and can grant access to new technologies and innovation, the supplier/risk management becomes a focus activity and could even become a competitive advantage for the company (Monczka *et al.*, 2011). Supplier/risk management can also impact product costs, ensure the supply of reliable and frequent deliveries, improve the quality of products and mitigate risks to improve and sustain the competitive advantage of the company (Al-Abdallah *et al.*, 2014; Helmold and Terry, 2016; Hofbauer *et al.*, 2012).

For Hofbauer *et al.* (2012) supplier management includes a six step approach: Supplier scouting, supplier evaluation, supplier classification, supplier development, supplier selection and supplier integration. For Helmold and Terry (2016) the supplier management includes the supplier strategy with a supplier classification, supplier selection, supplier evaluation, supplier development, supplier integration and supplier controlling. Kannan and Tan (2002) describe three dimensions, which underlie supplier management: effective supplier selection, innovative supplier development and meaningful supplier performance assessment. For Nair *et al.* (2015) supplier management activities like supplier selection and supplier evaluation are contributors to purchasing performance. Zimmer *et al.* (2016) propose a framework for supplier management, which includes supplier selection, supplier development and supplier monitoring. For Appenfeller and Buchholz (2011) supplier management contains four steps: supplier analysis, supplier evaluation, supplier classification and supplier development. For Monczka *et al.* (2011) supplier relationship framework

consists of supplier performance, supply base rationalization including supplier segmentation, supplier relationship management and buyer-supplier development.

According to the literature the following main steps for a supplier/risk management framework can be derived: 1. Supplier portfolio management and supplier classification (Day *et al.*, 2010; Olsen and Ellram, 1997; Wagner and Johnson, 2004), 2. supplier selection (Ittner *et al.*, 1999; Kannan and Tan, 2002; Nair *et al.*, 2015), 3. supplier assessment and monitoring (Dey *et al.*, 2015; Kannan and Tan, 2002; Talluri and Sarkis, 2010), 4. supplier development (Chen *et al.*, 2015; Larsson, 2005; Noshad and Awasthi, 2014), 5. supplier integration (Haartman and Bengtsson, 2015), 6. supplier innovation (Wagner and Bode, 2014; Winter and Lasch, 2016) and 7. supplier risk management (Giunipero and Eltantawy, 2004; Tummala and Schoenherr, 2011; Zsidisin, 2003).

Supplier management maturity

Over the past two decades, purchasing functions of many companies improved their managerial maturity by growing from a purely buying function to a more strategic function (Carr and Pearson, 1999; Chen *et al.*, 2004; Paulraj *et al.*, 2006). Rozenmeijer *et al.* (2003) define purchasing maturity as the "level of professionalism in the purchasing function". A purchasing maturity model, which describes different levels of an organization, is expected to reach for greater sophistication (Schiele, 2007). A purchasing maturity model should cover the relevant dimensions which describe the degree of maturity precisely, like strategic planning, organizational status and role, process orientation and availability of information systems, quality/skills of people in purchasing, cross functional collaboration and the level of collaboration with suppliers (Cousins *et al.*, 2006; Gelderman and van Weele, 2005; Schiele, 2007; van Weele, 2008/2010). Schiele (2007) describes in his model four levels of maturity: 1. best practice activities/tools/methods are known in the organization, 2. position/person is assigned to the task, 3. the process for task completion is defined, documented and well applied 4. cross functional integration throughout the company is given while basic requirements are met. Increasing the level of maturity throughout the purchasing organization by moving the purchasing staff from a nonstrategic to a strategic function enables them to contribute more value to the company by involving key suppliers in the company's planning process. However, this also requires changes in certain activities, like getting more involved in the company's strategic planning process rather than doing clerical work, and proactively seeking opportunities rather than conducting routine activities. Changing from a nonstrategic to a strategic function will in most cases not only require changes in structures and processes but especially in the level of skills and therefore professional development for the purchasing staff (Carr and Pearson, 2002; Carr and Schmeltzer, 2000). As an indispensable component of the purchasing function, supplier management can significantly contribute to a higher purchasing maturity. Similar to purchasing maturity, it contains the dimensions like strategy, organizational structure, processes and systems as well as the competency and skill level of the people (Cousins *et al.*, 2006; Paulraj *et al.*, 2006; Schiele, 2007). Based on this reasoning, we offer the following hypothesis:

H1: The level of a supplier/risk management process/framework maturity is dependent on the definition of a clear strategy and establishment of a functioning governance

H2: The establishment of a mature supplier/risk management process/framework is dependent on an established organizational structure

H3: Processes and systems with sufficient digitalization support lay the foundation for a more mature supplier/risk management process/framework

H4: A more mature supplier/risk management process/framework is dependent on the assignment of dedicated resources with certain competencies

Supplier management performance

A number of published studies indicate that greater maturity in the purchasing and supply management function is associated with better performance of the company (Al-Abdallah, 2014; Carr and Person, 2002; Carr and Schmeltzer, 2000; Chen *et al.*, 2004). In this case performance of the company is often related to financial performance indicators like income, profit, return on investment or market performance (Carr and Pearson, 1999; Li *et al.*, 2006). More mature supply management organizations foster the company's performance by pushing for supplier base reduction, collaborative negotiations, level of communication with suppliers, implementation of supplier evaluation systems and buyer-supplier relationships (Carr and Pearson, 1999; Chen *et al.* 2004; Coban, 2012; Li *et al.*, 2006; Paulraj *et al.*, 2006). Schiele (2007) shows a significant relationship between supply management maturity and cost savings indicating that supply management organizations with higher level of maturity outperform lower level organizations in terms of costs. In his model, Gonzalez-Benito (2007) also lists quality, flexibility and delivery as measures for supply management performance. Li *et al.* (2006) relate in their study the outcomes from effective supply management practice (price/cost, quality, delivery dependability, product innovation and time to market) to competitive advantages of the organization which supports the organizational performance. For Paulraj *et al.* (2006) the supply management maturity does not only have impact on the performance of the buyer's company in terms of cost, quality, flexibility and delivery but also on the performance of the supplier. Accordingly, we hypothesize the following:

H5: A higher supplier/risk management process/framework maturity leads to greater cost reduction concerning purchased parts

H6: A higher supplier/risk management process/framework maturity leads to less quality issues concerning vendor parts

H7: Early supplier integration into product development, established by a mature supplier/risk management process/framework leads to shorter innovation cycles and therefore lower innovation costs

H8: A mature risk management established by a mature supplier/risk management process/framework, leads to fewer production disruption costs and greater availability of purchase parts

Research methodology

Measurement model

Based upon the findings of the literature review, the main contributors to the supplier management maturity are the purchasing strategy and governance, the organizational structure, the availability of processes and information systems and the quality of people in purchasing, allowing a certain level of collaboration with suppliers. In turn, as previous studies have demonstrated, a higher performance outcome from supplier management is measured by realized cost reductions, less quality issues from supplier parts, less disruption costs, greater availability of parts and shorter innovation cycles with lower innovation cost. From these considerations, we developed our research model (Figure 1) with supplier management maturity as the independent variable and supplier management performance as the dependent variable. The purchasing strategy and governance, organizational structure, processes and systems, and people in this model represent the latent exogenous measurement variables. The latent endogenous measurement variables are represented by cost savings, supplier quality, supplier risk and supplier innovation.

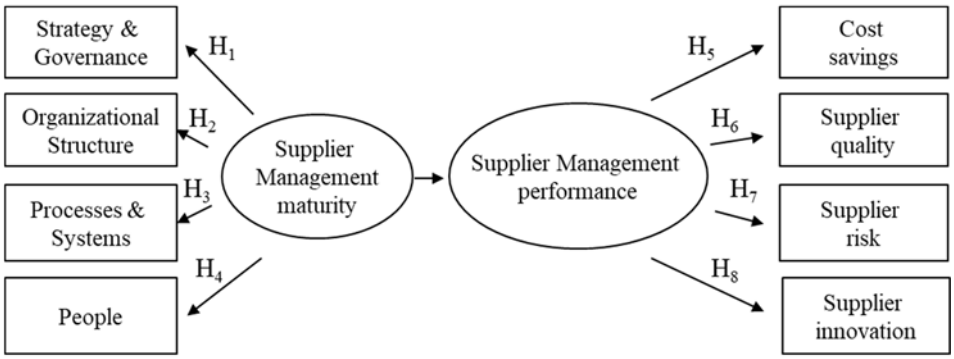

Figure 1. Measurement model on the economic efficiency of the supplier/risk management framework

Survey instrument

The survey instrument was setup in two sections. In the first section the items tapping the theoretical construct of the supplier management framework were adapted and built from existing scales and conceptual works from the purchasing strategy literature (Gonzalez-Benito, 2007; Nair, 2015; Paulraj *et al.*, 2006). The items were graded on a five-point Likert scale with anchors ranging from strongly disagree (1) to strongly agree (5) in order to ensure high statistical reliability among the questionnaire responses. With respect to the independent variable (supplier management maturity),

questionnaire recipients were asked to indicate the changes in supplier management performance, as the dependent variable.

In the second section the questionnaire recipients were also asked to select from a pre-defined list (see Appendix I) those three industries, which in their opinion have currently the highest supplier/risk management maturity and in addition to name the main benefits (cost, quality, risk or innovation) contributing to their maturity as of today and in the near future. Further, they were asked to list those three industries that in their opinion need to invest immediately and most extensively to improve their maturity and to name the most urgent areas (strategy and governance, organizational structure, processes and systems or people) they need to invest immediately and in the near future.

The survey questionnaire (see Appendix I) was tested for ambiguity, clarity, and appropriateness prior to the survey. According to the guidelines of DeVellis (2016) the questionnaire was discussed with academics and pre-tested by six supplier/risk management experts/practitioners. The questionnaire was modified based on the feedback received from the academics and practitioners. To improve the response rate, the survey was based on the general principles recommended by Dillman (1991; 2000) and Edwards *et al.* (2014).

Data collection

The study utilized a database including 250 global purchasing consulting experts. Prior to the global online survey regional sponsors were asked to give notice to the questionnaire recipients in their region of the imminent arrival of the survey and to highlight the importance of this study. The survey contained an introduction on how to fill out the questionnaire and it was color coded for the recipients to ease the task of reading and answering the questions. Four weeks after sending the original email with an online link to 250 global purchasing consulting experts, a follow-up email with the link was sent again to the non-respondents.

From the 250 global purchasing consulting experts who were invited 98 (39%) responded to the online survey. From the 98 respondents 43 (43 %) are located in the EMEA (Europe, Middle East and Africa) region, 32 (33 %) in the Americas (North, Middle and South America) and 23 (23 %) in ASPAC (Asia Pacific). Table 1 shows the distribution of the participants per role (Managing Directors, Managers and Staff Members) among the three regions.

Table 1. Survey respondents according to their role

	Managing Directors		Managers		Staff Members		Total
EMEA	4	4%	20	20%	19	19%	43
AMERICAS	4	4%	13	13%	15	15%	32
ASPAC	7	7%	8	8%	8	8%	23
Total	15	15%	41	42%	42	43%	98

Results for the measurement model

The reliabilities of supplier management maturity and supplier management performance were assessed by computing the Cronbach's alpha coefficient with SPSS and calculating the average variance extracted and the composite reliability. Cronbach's alpha indicates the homogeneity of a scale and in general varies between 1 (perfectly homogeneous scale) and 0 (absolutely non-homogeneous scale). A general condition for statistical analysis is an alpha between 0.6 (cut-off) and 0.9 (Cronbach, 1951; Nunnally, 1978; Weiber and Mühlhaus, 2010). As outlined in Table 1, Cronbach's alpha value for the supplier management performance is above 0.60 but for the supplier maturity Cronbach's alpha value with the 0.57 is below the cut off. The average variance extracted represents the average amount of variance that a construct explains and should be greater than 0.5 and a common cut off value for the composite reliability is 0.7 (Bagozzi and Yi, 1988; Fornell and Larcker, 1981). The composite reliabilities are above the 0.7 cut off. The average variances extracted explain with 0.48 and 0.44 less than 50% of the variance of construct. The fact that Cronbach's alpha for supplier management maturity and the average variance extracted are marginally beneath the cut off probably does not disqualify the model approach as a whole, because in all likelihood it is due to the relatively low number of measurement items (Field, 2017). The construct validity was assessed via exploratory factor analysis (EFA) using principal component analysis with varimax rotation (Field, 2017). The factors loaded in compliance with their underlying constructs during EFA. The eigenvalues for these factors are above the 1.0 cut off point. The factor loadings were also above the cut-off point of 0.4 (Hair *et al.*, 1998) with loads from 0.54 for strategy up to 0.76 for risk. As all items load respectively to one factor, unidimensionality is given via the EFA (Field, 2017; Weiber and Mühlhaus, 2010).

Table 2. Reliability coefficients and factor loadings

Construct / Item	Cronbach α	Factor loads	Eigenvalue	Average variance extracted (AVE)	Square root AVE	Composite reliability
Supplier Management Performance	,63		1,91	,48	,69	,79
1. Cost		,69				
2. Quality		,68				
3. Innovation		,64				
4. Risk		,76				
Supplier Management Maturiy	,57		1,76	,44	,66	,76
5. Strategy and Governance		,54				
6. Organizational Structure		,74				
7. Process and System		,63				
8. People		,72				

Table 3 displays the correlation between all independent and dependent variables. The level of significance of the correlations for the item's organizational structure, people, processes and systems and strategy and governance provide insights that they seem to impact the supplier management performance to a greater extent.

Table 3. Correlation among variables

Construct / Item	Mean	SD	1.	2.	3.	4.	5.	6.	7.	8.
Supplier Management Performance										
1. Cost	3,92	,81	1							
2. Quality	4,22	,84	,25**	1						
3. Innovation	4,26	,76	,32**	,25*	1					
4. Risk	4,30	,75	,37**	,48**	,33**	1				
Supplier Management Maturiy										
5. Strategy and Governance	4,33	,82	,24**	,19*	,13	,23*	1			
6. Organizational Structure	3,36	,96	,37**	,21*	,30**	,24**	,14	1		
7. Processes and Systems	4,09	,86	,21*	,19*	,22*	,12	,17	,24**	1	
8. People	4,18	,79	,19*	,35**	,19*	,36**	,22*	,31**	,24**	1

** Correlation significant at p < 0,01 level (two-tailed)
* Correlation significant at p < 0,05 level (two-tailed)

For the testing of the hypotheses, a structural equation modeling approach was applied utilizing the software package lavaan (Rousseel, 2012). The structural equation modeling simultaneously measures multiple relationships among independent and dependent variables in one model. Structural equation modeling is designed to test causal relationships suggested by theory. In a structural equation model, a path identifies a causal link between two variables and this link indicates that one variable is influenced by the other (Weiber and Mühlhaus, 2010). The structural equation modeling was expanded to include latent variables. A latent underlying variable represents factors that cannot be directly observed and must be measured by a set of manifest variables respectively indicators (Backhaus *et al.*, 2011). The theoretical framework in Figure 1 illustrates the hypothesized relationships among the variables supplier management maturity and supplier management performance. As recommended by a number of researchers multiple criteria were utilized to assess the model fit (Schreiber *et al.*, 2006).

Overall the model has a good fit with $\chi^2/df = 0.810$; goodness of fit [GFI] = 0.989; adjusted goodness of fit [AGFI] = 0.979; Bentler comparative fit index [CFI] =1.000; root mean square residual [RMSR] = 0.057 and root Mean Square Error of Approximation [RMSEA] = 0.000. Figure 2 presents the results of the eight hypothesized relationships (H1-H8). All of the hypothesized relationships were found to be significant. Most of the R^2 values are above 0.30 and therefore within an acceptable range except for strategy and governance and processes and systems. These two values are considered to be weak (Chin, 1998).

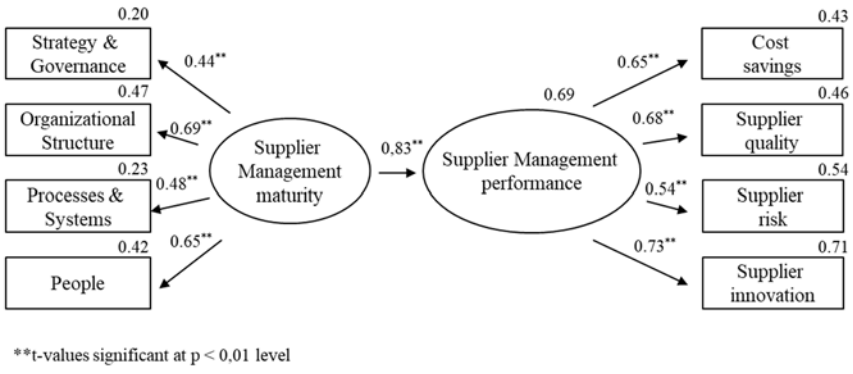

Figure 2. Structural model on the economic efficiency of the supplier/risk management framework

As a conclusion it can be stated that the following cause-effect propositions have been empirically substantiated: the maturity variables of the organization and the people have a significant impact on all four of the performance variables: cost, quality, innovation and risk. The maturity variables of processes and systems and strategy and governance have a significant impact on three of the four performance variables respectively.

Overall, it can be concluded that our theoretical model has been empirically confirmed to an acceptable extent.

Results of highest maturity with main benefits and urgent needs for investment per industry

The second part of the survey overall revealed that currently the main benefits from more mature supplier management organization are related to quality assurance (38%), cost reduction (29%) and risk mitigation (24%). Currently innovation contribution (8%) is not perceived as one of the main contributors with others (1%). The perception changes when taking the perspective into the near future. The benefits from more mature supplier management organizations in the near future are clearly related to innovation contribution (43%) and continually to risk mitigation (21%). Cost reduction (17%), quality assurance (17%) and others (1%) seem to contribute less in the future. When looking at some of the more mature industries (Figure 3), this trend is also visible on an industry level.

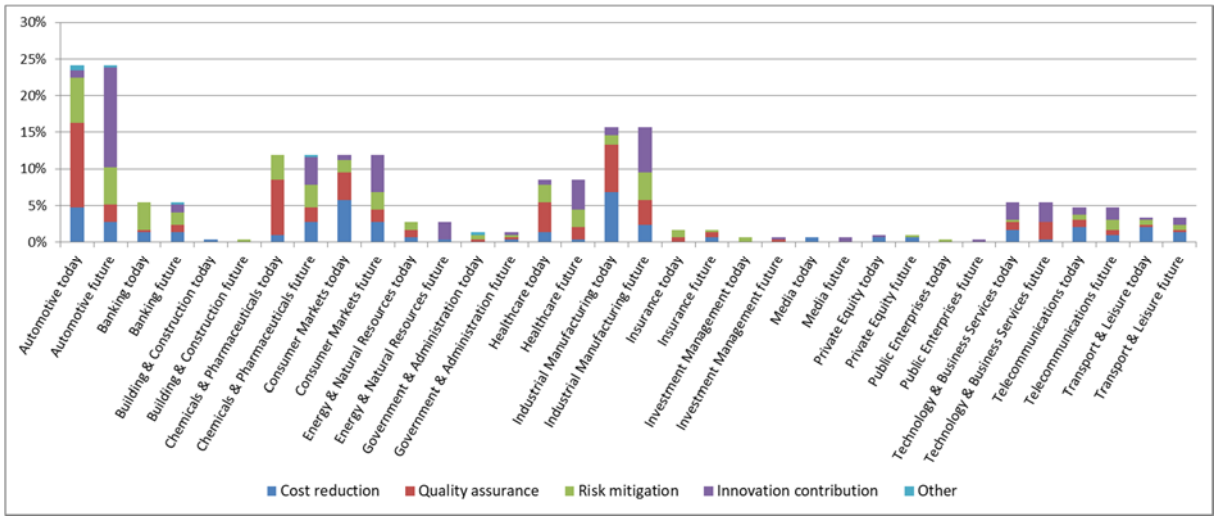

Figure 3. Supplier/risk management maturity and main benefits, currently and in the near future

For investments to improve the maturity of supplier/risk management currently, the areas of strategy and governance (39%), processes and systems (33%) are perceived as urgent and needed. Organizational structure (17%) and people (10%) are less in focus. In the near future investments in processes and systems (33%) will remain a main topic together with growing focus in the people (27%) area. Organizational structure (18%) remains on a steady level but strategy and governance (21%) seem to be less of a main topic in the future.

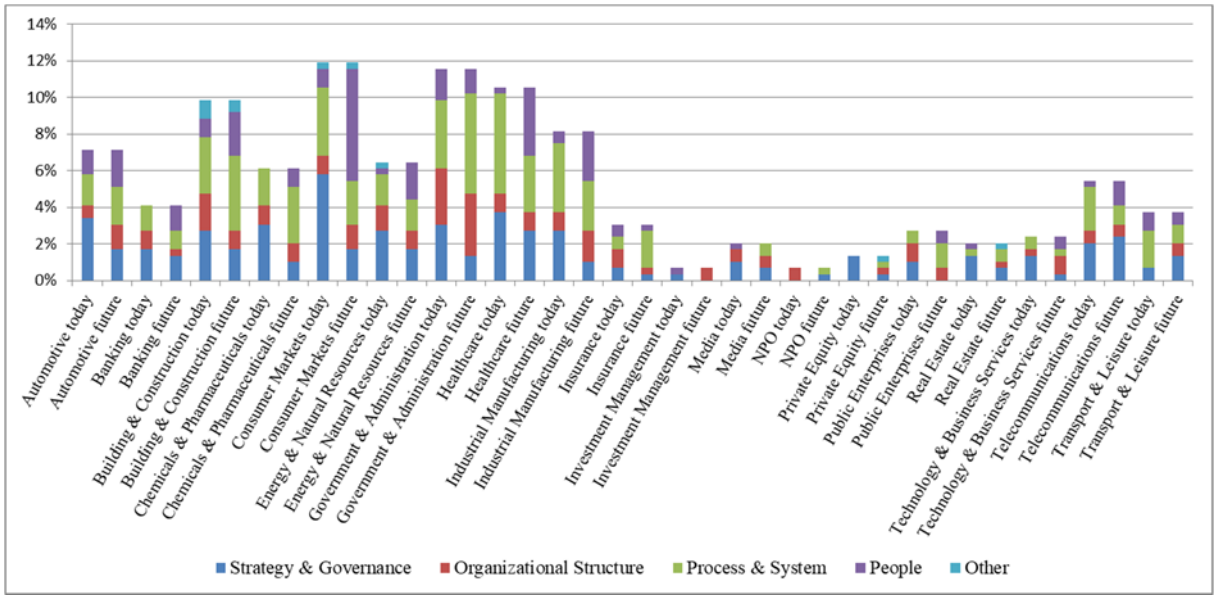

Figure 4. Expected investment in supplier/risk management and main areas, currently and in the near future

These trends are also visible throughout the industries where investments are expected, which is clearly demonstrated by the figures above (Figure 4).

Discussion

Contribution to state of research

The empirical findings of this study show a significant relationship between the supplier management maturity level and returns from organizational performance. The results also indicate that firms can improve their supplier management performance through an increased level of the supplier management maturity. In general this study advocates that firms need to embrace advanced levels of supplier management maturity since supplier management can play a pivotal role in delivering superior supplier management performance.

Hypotheses H01 to H04 state that the supplier/risk management maturity depends on the formulation of a clear strategy and the establishment of a functioning governance (H01), the restructuring or reorientation of the organization (H02), the redesign of existing processes with sufficient digitalization (H03) and the assignment of dedicated resources with certain competencies (H04). The hypotheses 1 and 3 show to some extent a lower significance in the correlations and the path analysis than hypotheses 2-4, but overall the hypotheses support the notion that an improvement of the supplier management maturity positively impacts the supplier management performance, which can be seen in Figure 2.

The empirical findings of this study also provide insights in supporting H05 to H08, meaning that a higher supplier/risk management maturity enables a better supplier management performance, resulting in greater cost reduction (H05), less quality issues (H06), shorter innovation cycles (H07) and fewer disruption costs (H08) and

therefore allow for return on investment from the supplier management organization. These results are also in line with other studies, which came to a similar conclusion that higher supplier management maturity leads to better purchasing performance in terms of cost, quality, innovation and risk management (Gonzalez-Bentio, 2007; Li *et al.*, 2006; Nair *et al.*, 2015).

Further, the study revealed that industries like automotive, industrial manufacturing, chemicals & pharmaceuticals and the consumer markets seem to be currently among the more mature ones from a supplier/risk management point of view. According to our findings the main current benefits for the companies with a more mature supplier/risk management are to quality assurance, cost reduction and risk mitigation whereas in the near future the main benefits are expected from innovation contribution and risk mitigation (Figure 3). For investments to improve the maturity of supplier/risk management currently, the areas of strategy and governance and processes and systems are in focus. In the near future processes and systems will remain a main area for investments together with a growing focus on the people area (Figure 4).

For Monczka and Petersen (2012), areas like strategic cost management and procurement and supply organization structures are currently among the most important/implemented strategies. For them this is the case, as they most likely can be executed within the supply management function or together with business functions. Strategies that require significant integration from suppliers (i.e. supplier innovation contribution), are currently among the less important/implemented ones. Similar to our findings, Monczka and Petersen (2012) see human resources development (people) as one of the strategies, most critical in improving the company's competitive performance and concluded that innovation through supplier management and human resources development are strategies to look for in the future.

Managerial implications

Several observations can be made regarding the relationship between supplier/risk management maturity and its impact on the supplier management performance. All four supplier/risk management maturity dimensions: people (capabilities), organizational structures, processes and systems and strategy and governance show significant correlations (Table 3) with the supplier management performance. This indicates that an evolution in these dimensions supports the improvement of supplier management performance and therefore ultimately company performance (Carr and Pearson, 2002). To generate a starting point for the enhancement of the maturity in the people dimension, Schiele (2007) recommends analyzing job descriptions and competency profiles, procedures for recruiting and integrating new personnel and mechanisms for performance appraisal and career development. For the organizational dimension, roles and responsibilities with interfaces and the structure and mandates of procurement should be reviewed. For processes and systems the emphasis of assessment is on the early involvement of the supplier in the development process and the cross functional involvement of procurement (e.g. R&D). Assessing these criteria per dimension leads in the first step to identify the level of the as-is

maturity and in the next step to specify appropriate measure to improve the level of supplier management maturity.

Further, the results of the survey predict a need for the improvement of the people and processes and systems dimension (Figure 4) in the near future. Recognizing recent trends in procurement and supply management, triggered by topics like the digital transformation (Gracht *et al.*, 2016; Karumsi and Prokopets, 2018), this seems to be confirmed. The increasing efforts of companies to digitize their purchasing and supplier management processes will enable them to process more nonstrategic/operational task through the system and therefore free up the purchasing staff to spend more time on strategic tasks.

Conclusions

Our research study was supposed to develop and provide basic theoretical insight into the dependency resp. interdependencies between supplier/risk management approaches and company performance in business transactions. Therefore a cause-effect model was formulated, pointing out a set of interdependent and dependent variables concerning the relationship between supplier/risk management maturity and supplier/risk management performance. In order to determine whether our theoretical model actually meets reality we conducted an empirical study to test the relevant hypotheses via a survey among business professionals in the relevant fields.

As a result it can be confirmed that the constitutional variables of supplier/risk management maturity, organizational structure, people, processes and systems and strategy and governance do have a significant impact on supplier/risk management performance in terms of cost, quality, risk and innovation. Schiele (2007) outlines a quantifiable relationship between supplier management maturity and purchasing costs. This enables a calculation of the return on investment in supplier management maturity in a similar way for quality cost or disruption cost from risk exposure.

Secondly, our empirical investigation provided knowledge about the state of the art and the expected future benefits of supplier/risk management approaches in relevant industries. Right now quality assurance, cost reduction and risk mitigation seem to have a decisive impact on supply management performance. For the future it is expected that innovation management and risk mitigation may play a pivotal role.

Currently the areas of strategy and processes and systems are perceived as the dominating investment areas, whereas in the near future processes and systems and increasingly human resources management activities are expected to gain importance.

As with all studies, this research has some limitations. The empirical part of this study is based on a group of purchasing consulting experts with an outside-in view on companies and industries. One could argue that the consulting experts do not have enough long term industry and company specific insights to evaluate the level of supplier/risk management maturity and performance although this is one of the core tasks in consulting. Nevertheless, further studies may include participants from various industries to improve the representativity of this study and to close this gap. Further, the study enables for calculation of the return on investment in supplier management maturity in terms of quality cost or disruption cost from risk exposure. But to quantify the value from supplier innovation, additional extended empirical research maybe necessary to consolidate or modify our findings.

In sum, our research efforts again suggest that there is a strong cause-effect relationship observable between relevant managerial tools, processes, structures and heuristics and the overall business performance and competitiveness in general. This result is in line with a number of similar concepts and findings, but also is supposed to stimulate continuing research and practical efforts.

References

Al-Abdallah, G. M.; Abdallah, A. B.; Bany Hamdan, K. (2014). The Impact of Supplier Relationship Management on Competitive Performance of Manufacturing Firms. International Journal of Business and Management 9 (2).

Appelfeller, W.; Buchholz, W. (2011). Supplier Relationship Management. Strategie, Organisation und IT des modernen Beschaffungsmanagements. 2. Aufl. Wiesbaden: Gabler, p. 402.

Backhaus, K.; Erichson, B.; Plinke, W.; Weiber, R. (2011). Multivariate Analysemethoden. Eine anwendungsorientierte Einführung. 13. Aufl. Berlin, Germany: Springer, p. 583.

Bagozzi, R. P.; Yi, Y. (1988). On the evaluation of structural equation models. Journal of the Academy of Marketing Science 16 (1), pp. 74–94.

Barney, J. (1991). Firm resources and sustained competitive advantage. Journal of Management 17 (1), pp. 99-120.

Carr, A. S.; Pearson, J. N. (1999). Strategically managed buyer–supplier relationships and performance outcomes. Journal of Operations Management 17 (5), pp. 497–519.

Carr, A. S.; Pearson, J. N. (2002). The impact of purchasing and supplier involvement on strategic purchasing and its impact on firm's performance. International Journal of Operations & Production Management 22 (9), pp. 1032–1053.

Carr, A. S.; Smeltzer, L. R. (2000). An Empirical Study of the Relationships among Purchasing Skills and Strategic Purchasing, Financial Performance, and Supplier Responsiveness. The Journal of Supply Chain Management 36 (3), pp. 40–54.

Chen, I.; Paulraj, A.; Lado, A. (2004). Strategic purchasing, supply management, and firm performance. Journal of Operations Management 22 (5), pp. 505–523.

Chen, L.; Ellis, S.; Holsapple, C. (2015). Supplier Development: A Knowledge Management Perspective. Know. Process Mgmt. 22 (4), pp. 250–269.

Chin, W. W. (1998). Issues and opinion on structural equation modeling. Management Information Systems Quarterly 22, pp. 7–16.

Coban, O. (2012). The impact of strategic purchasing on supply chain performance of the bottled water industry in Turkey. European Journal of Business and Management 4 (8), pp. 57–64.

Cousins, P. D.; Lawson, B.; Squire, B. (2006). An empirical taxonomy of purchasing functions. International Journal of Operations & Production Management 26 (7), pp. 775–794.

Cronbach, L. J. (1951). Coefficient Alpha and the Internal Structure of Tests. Psychometrika 16 (3), pp. 297–334.

Day, M.; Magnan, G. M.; Moeller, M. M. (2010). Evaluating the bases of supplier segmentation: A review and taxonomy. Industrial Marketing Management 39 (4), pp. 625–639.

DeVellis, R. F. (2016). Scale development. Theory and applications. 4th ed., p. 262.

Dey, P. K.; Bhattacharya, A.; Ho, W.; Clegg, B. (2015). Strategic supplier performance evaluation: A case-based action research of a UK manufacturing organisation. International Journal of Production Economics 166, pp. 192–214.

Dillman, D. A. (1991). The Design and Administration of Mail Surveys. Annual Review of Sociology 17 (1), pp. 225–249.

Dillman, D. A. (2000). Mail and telephone surveys. The tailored design method. 2nd ed. New York: John Wiley, p. 464.

Edwards, M. L.; Dillman, D. A.; Smyth, J. D. (2014). An Experimental Test of the Effects of Survey Sponsorship on Internet and Mail Survey Response. Public Opinion Quarterly 78 (3), pp. 734–750.

Ellram, L. M.; Zsidisin, G. A.; Siferd, S. P.; Stanly, M. J. (2002). The Impact of Purchasing and Supply Management Activities on Corporate Success. The Journal of Supply Chain Management 38 (1), pp. 4–17.

Fornell, C.; Larcker, D. F. (1981). Evaluating Structural Equation Model with Unobservable Variables and Measurement Error. Journal of Marketing Research 18 (1), pp. 39-50.

Field, A. P. (2017). Discovering statistics using IBM SPSS statistics. 5th edition. London: SAGE Publications Ltd, p. 1070.

Gelderman, C. J.; Van Weele, A. J. (2005). Purchasing Portfolio Models: A Critique and Update. The Journal of Supply Chain Management 41 (3), pp. 19–28.

Giunipero, L. C.; Aly Eltantawy, R. (2004). Securing the upstream supply chain: a risk management approach. International Journal of Physical Distribution & Logistics Management 34 (9), pp. 698–713.

González-Benito, J. (2007). A theory of purchasing's contribution to business performance. Journal of Operations Management 25 (4), pp. 901–917.

Gracht, H.; Giunipero, L. C.; Schüller, M. (2016). Future-proof procurement-Now or never: the big procurement transformation. Berlin: KPMG AG, p. 59.

Haartman, R. von; Bengtsson, L. (2015). The impact of global purchasing and supplier integration on product innovation. International Journal of Operations & Production Management 35 (9), pp. 1295–1311.

Hair, J. F.; Black, W. C.; Babin, B. J.; Anderson, R. E. (2014). Multivariate data analysis. 7th ed. Upper Saddle River, NJ: Prentice Hall, p. 785.

Helmold, M.; Terry, B. (2016). Lieferantenmanagement 2030. Wertschöpfung und Sicherung der Wettbewerbsfähigkeit in digitalen und globalen Märkten. Wiesbaden: Gabler, p. 160.

Hofbauer, G.; Mashhour, T. (2009). Lieferantenmanagement. München: Oldenbourg, p. 200.

Ittner, C. D.; Larcker, D. F.; Nagar, V.; Rajan, M. V. (1999). Supplier selection, monitoring practices, and firm performance. Journal of Accounting and Public Policy 18 (3), pp. 253–281.

Kannan, V. R.; Tan, K. C. (2002). Supplier Selection and Assessment: Their Impact on Business Performance. The Journal of Supply Chain Management 38 (4), pp. 11–21.

Karumsi, D.; Prokopets, L. (2018). Delivering value in procurement with robotic process automation. Delaware: KPMG LLP, p. 19.

Larsson, J. (2005). Development of suppliers and supply chains. Supplier development as a purchasing strategy. Jönköping: International Business School (JIBS Research Reports, 2005-3), p. 118.

Li, S.; Ragu-Nathan, B.; Ragu-Nathan, T. S.; Subba Rao, S. (2006). The impact of supply chain management practices on competitive advantage and organizational performance. The International Journal of Management Science 34 (2), pp. 107–124.

Monczka, R. M.; Choi, T. Y.; Yusoon, K.; McDowell, C. P. (2011). Supplier Relationship Management: An Implementation Framework. Arizona: CAPS Research, p. 93.

Monczka, R. M.; Petersen, K. J. (2012). The Competitive Potential of Supply Management. Supply Chain Management Review, pp. 10–18.

Nair, A.; Jayaram, J.; Das, A. (2015). Strategic purchasing participation, supplier selection, supplier evaluation and purchasing performance. International Journal of Production Research 53 (20), pp. 6263–6278.

Noshad, K.; Awasthi, A. (2014). Supplier quality development: A review of literature and industry practices. International Journal of Production Research 53 (2), pp. 466–487.

Nunnally, J. C. (1978). Psychometric theory. 2nd ed. US: McGraw-Hill, p. 640.

Oliver, C. (1997). Sustainable competitive advantage: Combining intuitional and resource-based views. Strategic Management Journal 18 (9), pp. 697-713.

Olsen, R. F.; Ellram, L. M. (1997). A portfolio approach to supplier relationships. Industrial Marketing Management 26 (2), pp. 101–113.

Paulraj, A.; Chen, I. J.; Flynn, J. (2006). Levels of strategic purchasing: Impact on supply integration and performance. Journal of Purchasing and Supply Management 12 (3), pp. 107–122.

Rosseel, Y. (2012). Lavaan: An R Package for Structural Equation Modeling. Journal of Statistical Software 48 (2), pp. 1-36.

Rozemeijer, F. A.; Weele, A.; Weggeman, M. (2003). Creating Corporate Advantage through Purchasing: Toward a Contingency Model. The Journal of Supply Chain Management 39 (1), pp. 4–13.

Schiele, H. (2007). Supply-management maturity, cost savings and purchasing absorptive capacity: Testing the procurement–performance link. Journal of Purchasing and Supply Management 13 (4), pp. 274–293.

Schreiber, J. B.; Nora, A.; Stage, F. K.; Barlow, E. A.; King, J. (2006). Reporting Structural Equation Modeling and Confirmatory Factor Analysis Results: A Review. In: The Journal of Educational Research 99 (6), pp. 323–338.

Talluri, S.; Sarkis, J. (2002). A model for performance monitoring of suppliers. International Journal of Production Research 40 (16), pp. 4257–4269.

Tummala, R.; Schoenherr, T. (2011). Assessing and managing risks using the Supply Chain Risk Management Process (SCRMP). Supply Chain Management: An International Journal 16 (6), pp. 474–483.

Van Weele, A. J. (2008). Purchasing & supply chain management. Analysis, strategy, planning and practice. 4. ed. London: Thomson, p. 364.

Van Weele, A. J. (2010). Value Creation and Purchasing Strategy. Forum Issue 4, pp. 34–35.

Wagner, S. M.; Bode, C. (2014). Supplier relationship-specific investments and the role of safeguards for supplier innovation sharing. Journal of Operations Management 32 (3), pp. 65–78.

Wagner, S. M.; Grosse-Ruyken, P. T.; Erhun, F. (2012). The link between supply chain fit and financial performance of the firm. Journal of Operations Management 30 (4), pp. 340–353.

Wagner, S. M.; Johnson, J. L. (2004). Configuring and managing strategic supplier portfolios. Industrial Marketing Management 33 (8), pp. 717–730.

Weiber, R.; Mühlhaus, D. (2010). Strukturgleichungsmodellierung. Eine anwendungsorientierte Einführung in die Kausalanalyse mit Hilfe von AMOS, SmartPLS und SPSS. Heidelberg, Germany: Springer, p. 314.

Winter, S.; Lasch, R. (2016). Recommendations for supplier innovation evaluation from literature and practice. International Journal of Operations & Production Management 36 (6), pp. 643–664.

Zimmer, K.; Fröhling, M.; Schultmann, F. (2015). Sustainable supplier management – a review of models supporting sustainable supplier selection, monitoring and development. International Journal of Production Research 54 (5), pp. 1412–1442.

Zsidisin, G. A. (2003). A grounded definition of supply risk. Journal of Purchasing and Supply Management 9 (5-6), pp. 217–224.

Further reading

Lambert, D. M. and Schwieterman, M. A. (2012), "Supplier relationship management as a macro business process", Supply Chain Management: An International Journal, 17 (3), pp. 337–352.

Van Weele, A. J. and van Raaij E. M. (2014), "The future of purchasing and supply management research: About relevance and rigor", Journal of Supply Chain Management, 50 (1), pp. 56-72.

Appendix I

Questionnaire for the 'Return-on-Investment in Supplier/risk Management' survey:

Welcome and Introduction

Welcome to this global survey on supplier/risk management. Supplier/risk management is a holistic process framework that aims to manage supplier relationships and risks. Next to managing supplier risk, this framework also includes proactive supplier segmentation and strategy development, supplier qualification and

onboarding, supplier performance assessment and development and supplier innovation.
The purpose of this survey is to understand your perception of supplier/risk management in relation to:

1. The supplier/risk management process/framework across industries
2. The benefits of this supplier/risk management process/framework for corporations, and
3. The investment that is required for a supplier/risk management process/framework.

Please note that the survey consists of **10 questions** and will take you **no more than 15 minutes** to answer it. For the first 8 questions you will be asked to select how much you agree with the statement on a scale from 1 to 5, with 1 being in strong disagreement and 5 being in complete agreement. For these questions please select a number from the list. For the final 2 questions, you will be asked to either select an answer from the drop down list, or type in your own answer.

Before filling out the survey, please fill in the details below:

- How many years have you been working in the industry and/or as a consultant: 0-5 years; 5-10 years; 10-15 years; above 15 years
- Which region do you focus on most: EMEA, ASPAC and Americas
- Which industries do you have the most exposure to – please list the up to three industries:

- □ Automotive
- □ Banking
- □ Building & Construction
- □ Chemicals & Pharmaceuticals
- □ Consumer Markets
- □ Energy & Natural Resources
- □ Government & Administration
- □ Healthcare
- □ Industrial Manufacturing
- □ Insurance
- □ Investment Management
- □ Media
- □ NPO
- □ Private Equity
- □ Public Enterprises
- □ Real Estate
- □ Technology & Business Services
- □ Telecommunications
- □ Transport & Leisure

Survey

Each of following 8 questions includes a statement about supplier/risk management. You will be asked to select from a scale of 1 (strongly disagree) to 5 (strongly agree) to demonstrate to what extent you agree with this statement.

1. To what extent do you agree or disagree with the statement: A higher supplier/risk management maturity level leads to greater cost reduction concerning purchased parts.

□ 1 strongly disagree/ □ 2-disagree/ □ 3-indifferent/ □ 4-agree/ □ 5-strongly agree

2. To what extent do you agree or disagree with the statement: A higher supplier/risk management maturity level leads to less quality issues concerning vendor parts.

   1 strongly disagree/ 2-disagree/ 3-indifferent/ 4-agree/ 5-strongly agree

3. To what extent do you agree or disagree with the statement: Early supplier integration into product development established by a mature supplier/risk management process/framework, leads to shorter innovation cycles and therefore to lower innovation costs.

   1 strongly disagree/ 2-disagree/ 3-indifferent/ 4-agree/ 5-strongly agree

4. To what extent do you agree or disagree with the statement: A mature risk management established by a mature supplier/risk management process/framework, leads to fewer production disruption costs and a greater availability of purchased parts.

   1 strongly disagree/ 2-disagree/ 3-indifferent/ 4-agree/ 5-strongly agree

5. To what extent do you agree or disagree with the statement: Establishing a more mature supplier/risk management process/framework requires defining a clear strategy and establishing a functioning governance.

   1 strongly disagree/ 2-disagree/ 3-indifferent/ 4-agree/ 5-strongly agree

6. To what extent do you agree or disagree with the statement: Establishing more mature supplier/risk management process/framework requires restructuring or reorientation of current organization.

   1 strongly disagree/ 2-disagree/ 3-indifferent/ 4-agree/ 5-strongly agree

7. To what extent do you agree or disagree with the statement: The redesigning of existing processes with sufficient digitalization support lays the foundation for a more mature supplier/risk management process/framework.

   1 strongly disagree/ 2-disagree/ 3-indifferent/ 4-agree/ 5-strongly agree

8. To what extent do you agree or disagree with the statement: A more mature supplier/risk management process/framework requires assignment of dedicated resources with certain competences.

   1 strongly disagree/ 2-disagree/ 3-indifferent/ 4-agree/ 5-strongly agree

The following 2 questions will ask for your perception on supplier/risk management situation and future status regarding to different industries.

9. Please list the three industries which, in your opinion, currently have the most mature supplier/risk management process/framework. Please also name the main benefit that you feel these industries are seeing as a result of their mature supplier/risk management process/framework as of right now, and the main benefit that they will see these processes/frameworks in the near future.

Please type in the box your own answer if none of the benefit areas in the drop-down list matches.

Industry A: (drop-down list industries)

Benefit areas – Nowadays (drop-down list benefits or free text)

Benefit areas – In five years (drop-down list benefits or free text)

Industry B: (drop-down list industries)

Benefit areas – Nowadays (drop-down list benefits or free text)

Benefit areas – In five years (drop-down list benefits or free text)

Industry C: (drop-down list industries)

Benefit areas – Nowadays (drop-down list benefits or free text)

Benefit areas – In five years (drop-down list benefits or free text)

Drop-down list answers for industries: Automotive; Banking; Building & Construction; Chemicals & Pharmaceuticals; Consumer Markets; Energy & Natural Resources; Government & Administration; Healthcare; Industrial Manufacturing; Insurance; Investment Management; Media; NPO; Private Equity; Public Enterprises; Real Estate; Technology & Business Services; Telecommunications; Transport & Leisure

Drop-down list answers for benefit areas: cost reduction; quality assurance; risk mitigation; innovation contribution

10. Please list the three industries which, in your opinion, need to investment immediately and most extensively in their supplier/risk management processes/frameworks. Please also name the urgent area that each of these industries should invest in both immediately, and in the near future.

Please type in the box your own answer if none of the investment areas in the drop-down list matches.

Industry D: (drop-down list industries)

Investment areas present: (drop-down list benefits or free text)

Investment areas in five years: (drop-down list benefits or free text)

Industry E: (drop-down list industries)

Investment areas present: (drop-down list benefits or free text)

Investment areas in five years: (drop-down list benefits or free text)

Industry F: (drop-down list industries)

Investment areas present: (drop-down list benefits or free text)

Investment areas in five years: (drop-down list benefits or free text)

Drop-down list answers for industries: Automotive; Banking; Building & Construction; Chemicals & Pharmaceuticals; Consumer Markets; Energy & Natural Resources; Government & Administration; Healthcare; Industrial Manufacturing; Insurance; Investment Management; Media; NPO; Private Equity; Public Enterprises; Real Estate; Technology & Business Services; Telecommunications; Transport & Leisure

Drop-down list answers for investment areas: strategy & governance; organization & structure; process & system; people & change

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