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**Balanced Scorecard diffusion from a social network  
perspective. The effects of interlocking directorates  
on the use of balanced scorecard practices**

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## **Abstract**

This study examines the influence of the social networks of the board of directors on the use of Balanced Scorecard (BSC) practices. Combining insights from research on social networks in management and literature on organizational innovativeness and accounting, our theoretical framework suggests that interlocking directorates influence the likelihood of BSC use. Modelling variation in the relationship between interlocking board members and making a distinction between different ways of BSC use, we measured the effects of the interlock ties of the executive and supervisory board members in a two-tier system on the use of the BSC as a strategic performance measurement tool in companies' annual reports. Using data from 149 companies listed on the Dutch stock exchange, our results suggest that director experience with BSC practices on other boards influences firm's use of the BSC. Firms with board members who have experience with BSC practices in other firms they are associated with, have a higher probability to use this strategic performance measurement tool in their own firm too. Experience of the CEO is relevant for information disclosure about customers, while members of the supervisory board, especially the chairman, seem to promote additional information about internal business processes and learning and growth.

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## **1. Introduction**

The Balanced Scorecard (BSC) is an important recent administrative innovation which is supposed to allow top managers to better measure and manage their companies' key organizational processes resulting in an improved competitive market position and company performance (Kaplan and Norton, 1992, 1996, 2001, 2004). Empirical evidence suggests that this concept is widely used in large organizations in the United States and throughout Europe, i.e. 20-30% of the larger firms investigated have adopted a BSC (Ittner, Larcker and Randall, 2003; Speckbacher, Bischof and Pfeiffer, 2003). However, as is the case with other administrative innovations, the BSC lacks physical component and detailed implementation instructions. As a consequence, this strategic performance measurement system is open to multiple interpretations resulting in variation in the way this innovations is used in practice (Malmi, 2001; Speckbacher, Bischof and Pfeiffer, 2003; Chenhall, 2005). It also suggests that its implementation and use are complex, and the positive influence on organizational performance uncertain (Ittner, Larcker and Randall, 2003; Davis and Albright, 2004; Ittner, 2008). To advance firm's knowledge about the effectiveness of this innovation and its competitive advantages, firm's top management decision makers may want to obtain additional information to decide whether to adopt and use the BSC. This information should help to reduce uncertainty and risks associated with their decisions to implement this innovation, and increase their understanding of how the tool might fit organization's needs and opportunities effectively. However, relatively little is known about which sources of information influence a company's decision to use this strategic performance measurement system.

This paper focuses on the influence of interlocking directorates on administrative innovativeness in general and on the BSC in particular. An interlocking directorate occurs when a person affiliated with one organization sits on the board of directors of another organization (Mizruchi, 1996). The social network literature emphasizes the role of board interlocks as a source of inter organizational information exchange about potential and effective innovative corporate practices (Carpenter and Westphal, 2001). From an informational perspective, board interlocks are influential in corporate decision making and control relative to other sources of information because of the trustworthy, credible, and consequently persuasive nature of the information they convey (Useem, 1984; Haunschild, 1993; Mizruchi, 1996; Davis, 1996; Geletkanycz and Hambrick, 1997; Gulati and Westphal, 1999; Carpenter and Westphal, 2001; Rogers, 2003; Borgatti and Foster, 2003). However, in accounting literature little attention has been paid to the influence of board interlock ties

among organizations through key decision makers of one organization sitting in the boards of others on accounting innovativeness. It is not clear how a focal firm's decisions are influenced by exposure of their key decision makers to experiences of other organization which made similar decisions.

In this paper we examine the influence of interlocking directorates on the use of the BSC as a strategic performance measurement tool in the companies' annual reports. We investigate the role of the interlock ties of executive and supervisory board members in supporting use of the BSC, and how this role was affected by the positions of the members in the board. Directors often work for several firms, which allow them to bring experience from one firm to another. Exposure to the experiences of other firms may provide them with valuable information which they use in their own firm to influence organizational behaviour. The idea of the paper is to identify the cross-firm diffusion of BSC practices, using information of the interlocks of firms' board of directors and their external auditors. We apply this approach to companies in a small region, i.e. Dutch firms, since relatively small communities are characterized by a high degree of interlocking relationships (Carroll and Fennema, 2002). We use data from 149 companies listed on the Dutch stock market to identify interlocking directorates and to assess use of the BSC as a strategic performance measurement tool in the companies' annual reports. Our results suggest that experiences of board members with similar decisions in other companies affect firm's use of the BSC. Firms with board members who have experience with this strategic performance measurement tool in other firms they are associated with, have a higher likelihood to use BSC practices in their own firm too. Experience of the CEO is relevant for information disclosure about customers, while members of the supervisory board, especially the chairman, seem to promote additional information about internal business processes and learning and growth. The external auditor's experience matters for provision of information on financial aspects. These findings suggest that the social networks in which firms are embedded profoundly influence their conduct and use of particular organizational practices, stressing the importance to pay attention to the influence of intra organizational and interpersonal relations next to economic and organizational factors in driving organizational change.

This study is related to the literature in several ways. First, it is related to the accounting literature and the social network research on management. Despite the fact that management accounting research has investigated factors that affect accounting innovations like ABC (Shields, 1995) and TQM (Westphal, Gulati and Shortell, 1997), little research has been undertaken towards understanding the influence of social network ties of board members

on their decisions to use such administrative innovations. Social network literature, on the other hand, emphasizes the role of social factors such as intra organizational and interpersonal relations rather than economic and organizational factors in facilitating the spread of innovations. From a network perspective board interlock ties to other firms are a form of social capital that provides access to information that flows through the network. Board interlocks have been found to influence many organizational practices, including governance practices (Davis, 1991), merger and acquisition (Haunschild, 1993), organizational structures (Palmer, Jennings and Zhou, 1993), and CEO compensation (Geletkanycz, Boyd and Finkelstein, 2001). This study contributes to both types of literature by examining whether and how board interlock ties facilitate administrative innovation diffusion, i.e. BSC usage.

Second, this study is related to the literature on interlocking directorates. Despite the general assumption in empirical interlock research that all ties affect outcomes uniformly, results show that some interlocks are more influential than others. Haunschild and Beckman (1998) made a distinction between interlock partners in similar and dissimilar industries to show that some interlocks are more influential than others. In this paper we specify and model variation in the positions of the interlocking board members in a two-tier system, i.e. executive and supervisory board members, to examine their differential influence on BSC usage.

Third and closely related to the previous issue, this study adds to the literature on administrative innovations (Rogers, 2003). In contrast to technical innovations that tend to be determined by their tangible design and content, administrative innovation's intangibility has been found to lead to serious variation in its interpretation and use (e.g. Benders and Van Veen, 2001). This study takes into account that under the same label, the BSC can and will be used in different ways involving many different functional areas and strategic performance indicators (Malmi, 2001; Olson and Slater, 2002; Speckbacher, Bischof and Pfeiffer, 2003; Braam and Nijssen, 2004; Ax and Bjørnenak, 2005). We examine the influence of heterogeneity among board interlocks on the use of the four measurement perspectives of the BSC described by Kaplan and Norton (1992).

Finally, in spite of the fact that the primary focus of interlock research is on the effects of direct network ties, empirical evidence suggests that indirect network ties – or third-party ties – can also influence company's decisions to use various organizational practices (Gulati and Westphal, 1999). In this paper we study whether experiences of firm's external auditor with BSC practices in related firms influence company's use of this accounting-based strategy control tool. The auditor's influence is indirect because the organizations' top management

decision makers receive the information about BSC use in related firms second-hand. On the other hand, the interlocks arguments should apply for the firm's external auditor because the auditor is exposed to innovative organizational practices in other firms and the auditor can use this experience to influence company's management and supervisory board on use of such corporate practices.

The remainder of the article is structured as follows. First, we review related literature and develop hypotheses regarding the influence of interlocking directorates on firm's use of BSC practices. Next the research method is described, and the results are presented and discussed. Finally, we draw conclusions, discuss limitations of our study, and point out directions for further research.

## **2. Literature review and development of hypotheses**

The board of directors generally has a dominant position in shaping an organization's strategy and management control systems (Hambrick and Mason, 1984). The BSC offers them a strategic management tool for describing and implementing corporate strategy using a comprehensive set of financial and non-financial strategic performance measures covering the measurement perspectives financial, customer, internal business, and learning and growth orientation (Kaplan and Norton, 1992, 1996, 2001, 2004; Drew and Kaye, 2007). However, like other administrative innovations, the BSC lacks detailed "product specifications". As a consequence, the tool can be and is used in different ways, which make its implementation complex (Ahn, 2001; Malmi, 2001; Malina and Selto, 2001; Ax and Bjørnerak, 2005). In addition, research shows that different ways of BSC use may have different effects on company performance, i.e. BSC use that complements corporate strategy positively influences company's competitive position and company performance, while BSC use that is only loosely related to the strategy may decrease it (Ittner, Larcker and Randall, 2003; Davis and Albright, 2004; Braam and Nijssen, 2004; Chenhall, 2005; Ittner, 2008). As a result, firm's top management decision makers may want to obtain additional information to decide whether and how to use this strategic performance measurement system. This information should help to reduce uncertainty and risks associated with their decisions to implement and use this innovation, and increase their understanding of how the tool might fit organization's needs and opportunities effectively.

The social network literature emphasizes the role of board interlocks as an influential source of inter organizational information exchange about such potential effective innovative corporate practices (Useem, 1984; Mizuchi, 1996; Davis, 1996; Carpenter and Westphal,

2001; Borgatti and Foster, 2003; Rogers, 2003). Exposed to the practices in other firms, interlock ties to other firms are potentially influential channels to convey trustworthy, credible and valuable information about other firms. They provide opportunities to share strategic information and learn about innovations that might fit unique organizational needs and opportunities (Geletkanycz and Hambrick, 1997; Haunschild and Beckman, 1998; Gulati and Westphal, 1999; Carpenter and Westphal, 2001; Borgatti and Foster, 2003). Interlocks enable board members to achieve a ‘business scan’ of latest business practices, observing innovative practices in other firms, and witness firsthand the consequences of those practices (Useem, 1984). Moreover, direct contact with an innovator may help to clarify whether and how a specific innovation might fit unique organizational needs and opportunities, thus reducing uncertainty and risks associated with the innovation (Haunschild, 1993). For these reasons, network research in management suggests that inter organizational and interpersonal network ties are key antecedents to consider when explaining the spread of information about an innovation across organizations and their effects on the adoption and use of organizational innovations (Borgatti and Foster, 2003; Mizruchi, 1996; Rogers, 2003). Consequently, firms that are interlocked with current adopters will be more likely to adopt and use themselves (Rogers, 2003; Mizruchi, 1996). Related studies have used board interlocks to explain the adoption of organizational innovations, including governance practices (Davis, 1991), merger and acquisition (Haunschild, 1993), organizational structures (Palmer, Jennings and Zhou, 1993), and CEO pay premiums (Geletkanycz, Boyd and Finkelstein, 2001). This evidence suggests that firms are more likely to make changes in their performance measurement practices if their key decision makers have ties to leaders of other firms engaging in similar innovative practices (Haunschild, 1993; Westphal and Zajac, 1997; Gulati and Westphal, 1999). Hence,

*H1: BSC use in a firm is positively related to use of BSC practices in other companies to which the firm is related via their board interlocks.*

In empirical research on board interlocks all interlock ties were generally treated as equal connections that facilitate the exchange of information between firms. However, the governance literature suggests that interlocks may not uniformly affect outcomes. Heterogeneity among board interlock members may affect the extent in which they convey information and how they influence decisions about adoption and use of various organizational practices (Haunschild and Beckman, 1998; Carpenter and Westphal, 2001; Borgatti and Foster, 2003). In this paper we examine the influence of the interlocks of the



executive and supervisory board members in a two-tier structure on specific ways of use of the BSC. In a two-tier structure the executive is responsible for the administration of the firm, while the supervisory board is charged with monitoring and controlling management's decision making to protect shareholders' interests. However, agency theory emphasizes that the supervisory board is less well informed than the management board because the former board wholly consists of outsiders. As a result, executive and supervisory board members, who may have different goals and objectives, may differently affect the way of use of the BSC as a strategic performance measurement system focusing on financial and non-financial strategic performance indicators in different perspectives to realize their goals and objectives (Drew and Kaye, 2007; Braam, Benders and Heusinkveld, 2007). Their exposures to the experiences with similar decisions in other companies via their interlock ties may confirm and enforce their decisions about how to use the BSC in a specific way. To uncover differential effects, we investigate the effects of the interlock ties of executive and supervisory board members on the use of the four measurement perspectives of the BSC described by Kaplan and Norton (1992), as well as the influence of the interlocks of the CEO, the CFO, other members of the executive board, the chairman of the supervisory board and the other members of the supervisory board on company's use of these perspectives. Hence,

*H2: Use of the specific measurement perspectives of the BSC in a firm is positively related to use of these perspectives in other companies to which the firm is related via their board interlocks.*

*H3: The positive correlation of the use of the specific measurement perspectives of the BSC in a firm with the use of these perspectives in others firms to which there is a board interlock depends on the positions of members in the board.*

### **3. Research method**

#### **3.1 Data**

The data used in this paper were collected using two databases: (1) data on general firm information and information about the interlock ties of executive and supervisory directors and auditors from Osiris; (2) data on financial and non-financial strategic performance indicators in companies' annual reports from AnnualReports. These data were subsequently merged yielding a complete data set.

We restricted our data to companies in a small region, i.e. Dutch companies since relatively small communities are characterized by a high degree of interlocking relationships (Mizruchi, 1996; Carroll and Fennema, 2002). The companies selected met the following criteria: they were publicly listed on the NYSE Euronext Amsterdam in 2004, had their headquarters in the Netherlands, and had a two-tier structure. Our sample comprises 149 Dutch companies.

For a comprehensive measurement system to be a BSC, it should contain financial and non-financial strategic performance measures that cover the original four measurement perspectives described by Kaplan and Norton (1992) (Malmi, 2001; Speckbacher, Bischof and Pfeiffer, 2003). To assess a company's use of the BSC as strategic performance measurement system, we used publicly available data from annual reports. An important advantage of these data is that we can assess the variety of ways how the firms selected effectively use a comprehensive set of financial and non-financial strategic performance measures. Measuring actual use of the BSC is important since the assessment of its formal use may result in biased results (Ittner, Larcker and Randall, 2003). Companies that formally say to have adopted such a tool may not effectively use it but may have adopted the tool for other reasons like legitimacy (Westphal, Gulati and Shortell, 1997). In addition, firms that actually use the BSC may not explicitly mention that they use this strategic performance measurement system or use other names for similar practices (Chenhall, 2005).

## **3.2 Measurement of variables**

### *3.2.1 Dependent variables*

BSC usage as strategic performance measurement system was measured using a 68-item scale adapted from Hoque and James (2000), Maltz, Shenhar and Reilly (2003), and Chenhall (2005). The instrument comprised financial and non-financial strategic performance measures covering the four scorecard perspectives described by Kaplan and Norton (1992), i.e. financial, customer, internal business, and learning and growth orientation, using respectively 20, 17, 12 and 19 strategic performance indicators with dichotomous scales ('yes' or 'no'). Appendix A presents a full overview of the items used classified per perspective. Two independent raters assessed the scores on these performance indicators using content analysis. An indicator receives a score of '1' if the annual report provides relevant information about this measure, otherwise '0'. To compute a standardized outcome for each of the four measurement perspectives, the scores of each individual question referring to this information category were added and divided by the number of questions. This results in a score between 0–1; 0

indicating a poor score on a BSC perspective, while an outcome of 1 implies excellence. For each annual report assessed, the standardized outcomes for the perspectives were added and divided by four to construct a measure for overall BSC usage. Figures 1–5 show the distributions of the total BSC scores and the sub scores on the four BSC perspectives.

[Insert Figures 1–5]

### *3.2.2 Independent variables*

The main independent variables of interest are the average and maximum total BSC scores and the sub scores on the four BSC perspectives of the companies to which the firm is related via the interlocks of the board of directors and its external auditor.

To identify the interlocking directorates we used the Osires data base which provides the names of all board members in the firm in our sample, with their function within the firm. After correcting differences in spelling of the name of the same person, we matched for each board member within a firm, all the other firms in which this person was also a board member. Based on these relationships, we calculated the average and maximum scores on the four perspectives for a certain member in each of his/her related firms. These numbers thus indicate the average and most extensive use in the annual report of a certain facet of the BSC in any of the other firms of a board member.

To aggregate these outside experiences of all board members to figures on firm level, we clustered the functions of the board member into five categories:

- 1) CEO;
- 2) CFO;
- 3) Other member of the board;
- 4) Chairman of the supervisory board;
- 5) Other member of the supervisory board.

Per firm, first, we assessed the average and maximum BSC scores for all these categories. Second, we computed the average or the maximum scores for board members in the executive board (1, 2, or 3) versus members of the supervisory board (4, 5). Third, we assessed the average and maximum BSC experiences for the board of directors as a whole. For measuring the interlock scores related to firm's external auditor, we used a similar approach.

Finally, in our study measures are missing if firm's board members or their auditor do not have interlocks. To eliminate potential biases caused by these missing variables we included dummy variables. These variables are equal to 1 if the board members and the auditor of the focal firm do not have interlocks, otherwise 0. The dummy coefficients can be

interpreted as the effects of not having experience with the BSC in related firms on firm's use of the BSC. The average and maximum (sub) scores for BSC experiences in other firms can be regarded as an estimate of the influence of interlocks among the firms that have interlock ties (Allison, 2001: 13-14).

### *3.2.3 Control variables*

We included the natural logarithm of total employees or total assets, and industry dummies as control variables. The natural logarithm of total employees and/or total assets was included to proxy for the size of the company. Contingency theory suggests that larger companies have to provide more financial and non-financial information to meet the requirements and expectations of their interested parties than their smaller counterparts. Consistently, empirical evidences suggest that larger firms are more likely to use BSC practices than smaller firms (Hoque and James, 2000; Speckbacher, Bischof and Pfeiffer, 2003). The industry dummies were included to control for industry effects on BSC use.

### **3.3 Analysis**

To assess the effects of interfirm network ties on the use of BSC practices, we used linear regression analysis and the dummy variable adjustment method (Allison, 2001). The dummy variable adjustment method produces optimal estimates for missing predictors in a regression analysis in situations in which data about a variable are missing because the unobserved values simply do not exist, i.e. the firm does not have board or auditor interlock ties (Allison, 2001: 125).

To check the robustness of our results, we performed similar regression analyses with different measures of BSC use, i.e. average and maximum total BSC scores and the sub scores in the four perspectives, and different control variables.

## **4. Results**

Table 1 presents the distribution of the sample firms across industry – using the 2-digit SIC codes – and size, and shows the number of positions of the executive and supervisory board members in their own company and in other firms they are associated with.

[Insert Table 1]

Table 2 presents the correlation between total BSC score and the sub scores on the four perspectives with and without correction for size effects. Table 2 shows that the correlations between the total BSC score and the sub scores with and without correction for

size effects ranged from respectively 0.512 and 0.439 for the financial perspective to 0.846 and 0.830 for the learning and growth perspective, indicating acceptable internal levels of consistency.

[Insert Table 2]

The results in Table 3 panel A and B provide support for hypothesis H1, which predicts that BSC use in a firm is positively related to use of BSC practices in other companies to which the firm is related via their board interlocks. Using both the average and maximum total BSC scores of the interlocking firms as measures of the experience of the board of directors with BSC practices in the related firms, the results are consistently positive and significant. These findings suggest that interfirm network ties of board members positively affect company's use of the BSC. However, no significant influence was found of the experiences of the external auditor with use of the BSC in related firms on firm's use of this strategic measurement tool.

In addition, the analyses in the panels A and B also show that the results are robust. The relationships between a firm's use of the BSC and the average and maximum experiences of the board of directors with BSC practices in related firms are consistently positive and significant when using different control variables. In the remainder of this study we use the average BSC (sub) scores as the measure of the influence of interfirm network ties.

[Insert Table 3]

The results in Table 4 show support for hypothesis H2, which predicts a positive relationships between use of the four specific measurement perspectives of the BSC in a firm and use of these perspectives in firms to which the firm is related via its board interlocks. The results show that the experiences of board members with use of the perspectives customer and learning and growth in related firms is relevant for firm's information disclosure in these perspectives. In addition, the results show a significant influence of the experiences of the external auditor with use of the financial perspective in related firms on firm's information disclosure in the financial perspective. These findings suggest that use of the perspectives customer and learning and growth is directly related to experiences of board members with use of these perspectives in related firms, while use of the financial perspective is indirectly related through the interlock ties of the firm's external auditor.

[Insert Table 4]

Table 5 presents the results regarding the relationship between firm's use of specific measurement perspectives of the BSC and the experiences of firm's executive and supervisory board members and its external auditor with use of these perspectives in other

firms they are associated with via their interlocks. These results show that experience of the CEO is relevant for information disclosure about customers, whereas the chairman of the supervisory board seems to promote additional information about internal business processes and learning and growth. Experience of the other members of the supervisory board is also relevant for information disclosure in the learning and growth perspective. The external auditor's experience matters for provision of information on financial aspects, while the interlock ties of the other members of the supervisory board negatively moderate this effect. No significant influence was found of the board interlock ties of the CFO and other members of the executive board on specific BSC use. Consequently, these findings provide partial support for H3, which predicts that the positive correlations of the use of specific measurement perspectives of the BSC in a firm with the use of these perspectives in others firms to which there is a board interlock depend on the positions of members in the board. The findings suggest that the interlock ties of the CEO, the chairman of the supervisory board and the other members of the supervisory board influence strategic performance measurement in the customer perspective and information disclosure about internal business processes and innovation. Disclosure of information in the financial perspective is positively related to use of this perspective in other companies to which the firm is indirectly related through interlocks ties of its external auditor, while experiences of the other members of the supervisory board negatively affect this relationship.

[Insert Table 5]

## **5. Conclusion and Discussion**

This paper has investigated the role of the social networks of the board of directors in supporting BSC use, and how this role was affected by the positions of the members in the board. Consistent with our general expectations, our findings show that director experience on other boards does affect decision making about strategic performance measurement. Firms with board members who have experience with BSC practices in other firms they are associated with, have a higher probability to use the BSC in their own firm too. Members of the supervisory board, especially the chairman, seem to promote additional information about internal business processes and innovation. Experience of the CEO is relevant for information disclosure about customers, while the external auditor's experience matters for provision of information on financial aspects. These findings suggest that the social networks provide access to intra organizational information that is important in driving organizational change.

The networks of relationships in which firms are embedded profoundly influence their conduct and use of particular organizational practices. In addition, the results stress the importance to pay attention to the influence of intra organizational and interpersonal relations next to economic and organizational factors in explaining the diffusion of administrative innovations like the BSC.

This study has several limitations. Two of these limitations are the use of cross sectional data of a small community which limit the generalizability of our findings, and the assumption made in the empirical part of paper that the members of the board of directors uniformly affect the decisions to use the BSC. Regarding the latter, powerful actors in the board may form dominant coalitions to control the decision making processes (Hambrick and Mason, 1984; Zajac and Westphal, 1996; Golden and Zajac, 2001). Consequently, the influence of social networks of some members of the board could be more influential than the information from other interlock partners (Finkelstein, 1992). Another limitation of this paper is its focus on the inter organizational social networks of the board of directors, ignoring the contributions of other actors via intra organizational ties on the diffusion of BSC practices (Mizruchi, 1996). Organizational actors like the managers at business and departmental levels may influence BSC use as strategic performance measurement tool as well.

This study, which is exploratory in nature, leaves ample room for further research. First, future research could test and expand the research model using larger national and international samples to provide further insight into the external validity of the findings. Second, further studies may look at the extent to which dominant coalitions within the board of directors use their power and authority to influence the diffusion of organizational innovations in general and accounting innovations in particular. Finally, the analysis performed in this study could be complemented with the effects of indirect networks ties of other groups of actors which potentially can influence the diffusion of particular organizational practices. Increased understanding of the direct and indirect role of both inter organizational and intra organizational social networks of the firm's key decision makers on the diffusion of innovative organizational practices may help to reap the benefits that Kaplan and Norton promised in their writings.

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Figure 1  
Distribution of the total BSC scores

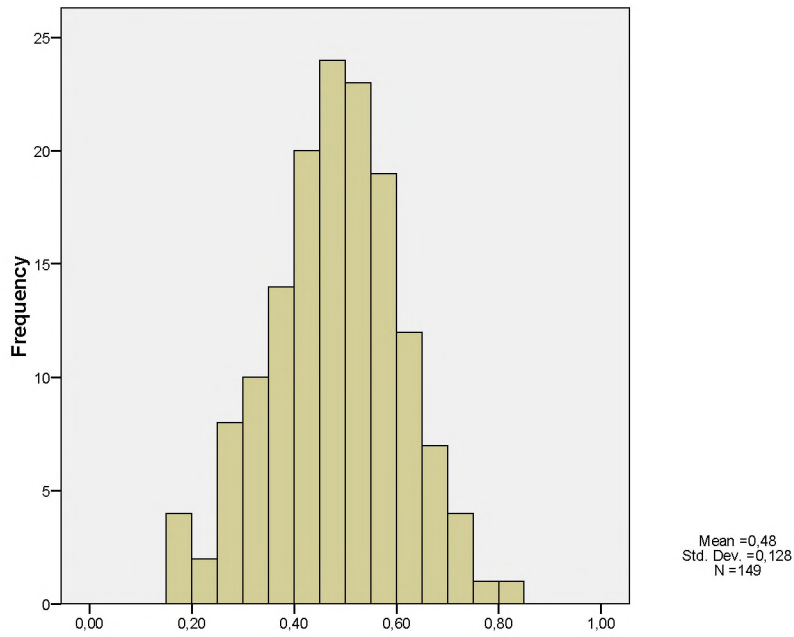


Figure 2  
Distribution of BSC scores on the customer perspective

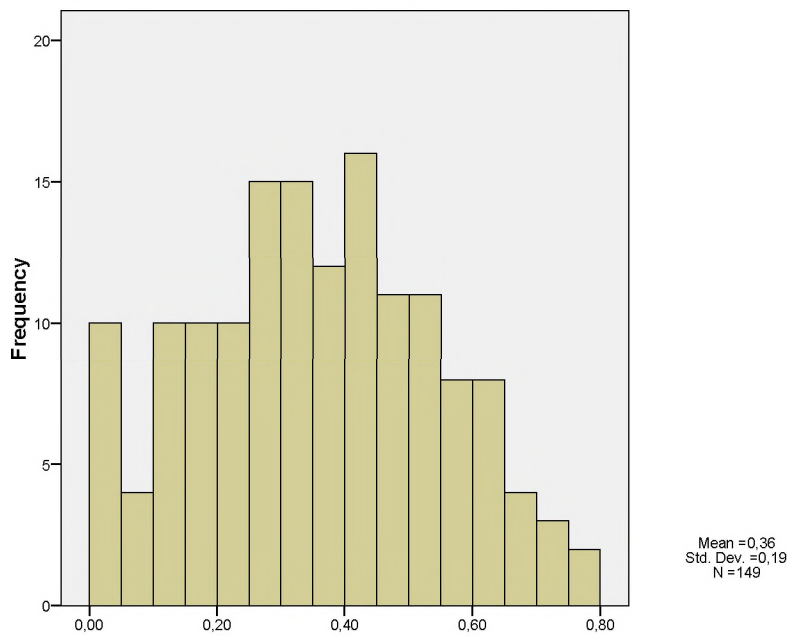


Figure 3

Distribution of the BSC scores on the internal business perspective

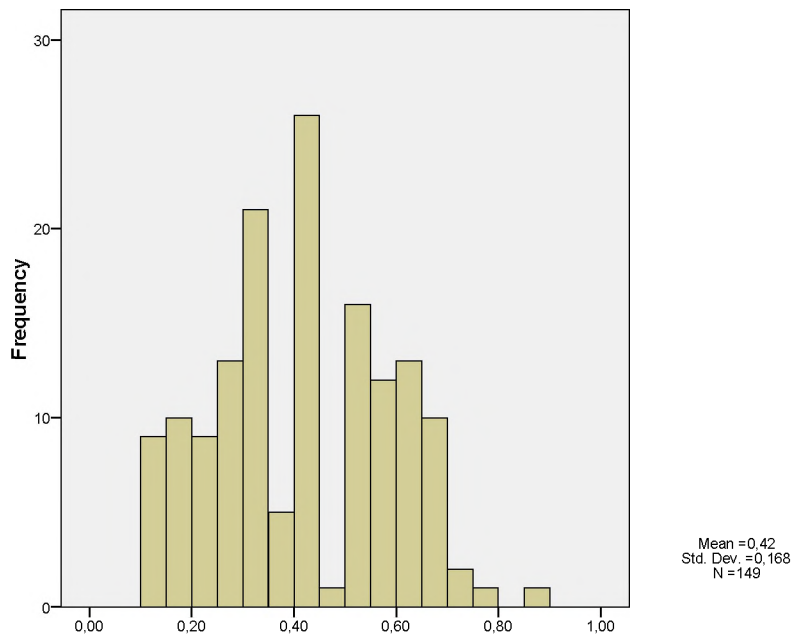


Figure 4

Distribution of the BSC scores on the learning and growth perspective

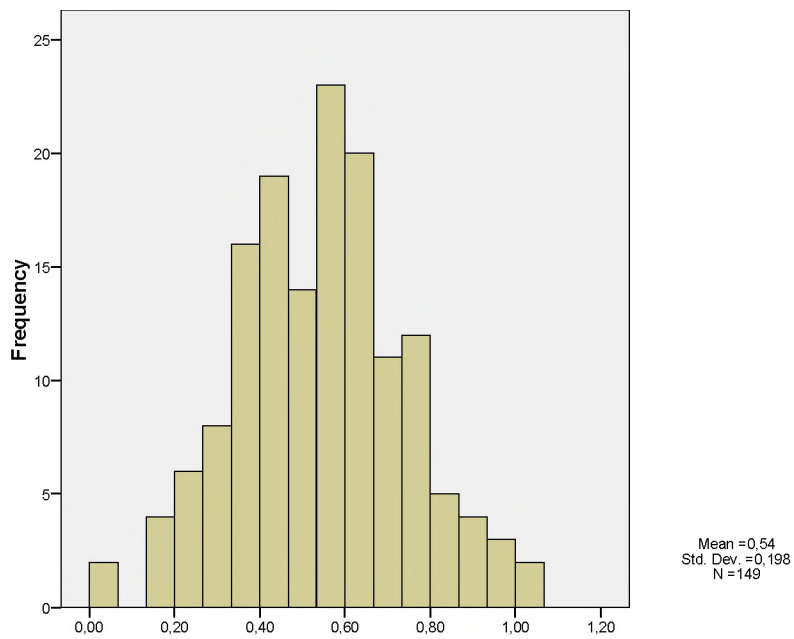


Figure 5

Distribution of the BSC scores on the financial perspective

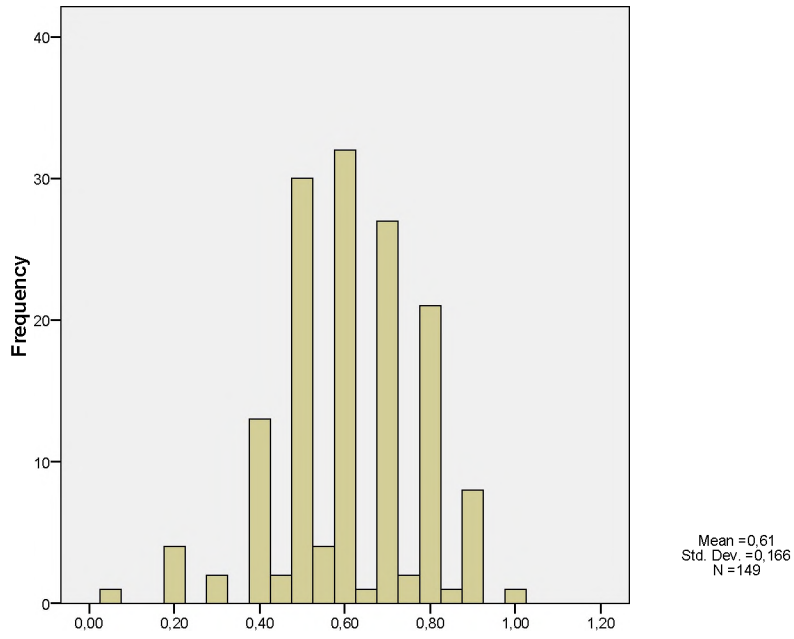


Table 1 Sample characteristics

## Panel A: Firm characteristics

Industry	Number of firms	Company size			
		No of employees		Assets per employee	
		mean	sd	mean	sd
Mining and construction	8	24875	37994	274	403
Manufacturing	68	13284	38112	220	221
Transportation and communication	16	15464	37940	4551	10790
Wholesale trade	15	10661	13941	185	220
Retail trade	11	25540	45147	3648	3142
Finance and Insurance	31	11501	39340	260	734
Total	149	14410	36724	946	3871

## Panel B: Number of positions of the executive and supervisory board members in own and other firms they are associated with

Board positions	Total	No positions in other firms in data set	Number of board positions in related firms			
			1	2	3	$\geq 4$
			CEO	156	135	13
CFO	145	143	2	0	0	0
Other members of the board of directors	430	407	19	4	0	0
Chairman of the supervisory board	150	104	19	16	11	0
Other members of the supervisory board	450	315	72	38	22	3
Total	1331	1104	125	62	35	5

Table 2

Correlation between the total BSC Score and the sub scores on the four perspectives, with and without correction for size effects

Panel A: Pearson correlation coefficients without correction for size effects

	Total	Customer	Internal-processes	Learning and growth	Financial
Total	1.000				
Customer	.731***	1.000			
Internal-processes	.722***	.374***	1.000		
Learning and growth	.846***	.449***	.636***	1.000	
Financial	.512***	.201**	.035	.266***	1.000

Panel B: Pearson correlation coefficients with correction for size effects

	Total	Customer	Internal-processes	Learning and growth	Financial
Total	1.000				
Customer	.688***	1.000			
Internal-processes	.710***	.323***	1.000		
Learning and growth	.830***	.382***	.610***	1.000	
Financial	.439***	.101	-.041	.185**	1.000

\*\*\* =  $p < 0.01$  (2-tailed); \*\* =  $p < 0.05$  (2-tailed); \* =  $p < 0.10$  (2-tailed)

Table 3

Relationship between the total BSC score and the average and maximum experience of board members and auditors with the BSC in other firms they are associated with

Panel A: Relationships based on average experience

		1		2		3
Constant	.083	.795	.095	0.855	.127	1.070
Average experience of board members with the BSC in related firms	.339	2.631**	.345	2.642***	.336	2.633***
No board member in other firms	.149	2.173**	.152	2.190**	.150	2.190**
Average experience of auditor with the BSC in related firms	.189	0.972	.189	0.972	.219	1.126
No auditor in other firms	.049	.493	.051	0.508	.073	.723
Ln(employees)	.019	3.909***	.021	2.724**	.020	4.178***
Ln(Assets)			-.002	-0.323		
Sector dummies	No		No		Yes	
F-statistic	9.053***		7.515***		4.895***	
Adj. R <sup>2</sup>	.214		.209		.240	



Table 3 (Continued)

Panel B: Relationships based on maximum experience

		1		2	
Constant	.128	1.351	.142	1.389	.162
Maximum experience of board members with the BSC in related firms	.264	2.521**	.271	2.540**	.279
No board member in other firms	.122	1.993**	.125	2.018**	.129
Maximum experience of auditor with the BSC in related firms	.162	.854	.164	.857	.203
No auditor in other firms	.038	.387	.040	.408	.065
Ln(employees)	.018	3.650***	.020	2.638***	.019
Ln(Assets)			-.003	-.373	
Sector dummies	No		No		Yes
F-statistic	8.935***		7.424***		4.939***
Adj. R <sup>2</sup>	.211		.207		.242

\*\*\* = p < 0.01 (2-tailed); \*\* = p < 0.05 (2-tailed); \* = p < 0.10 (2-tailed)

3

1.465

2.681\*\*\*

2.147\*\*

1.070

.660

3.873\*\*\*

Table 4

Relationship between the scores on the specific measurement perspectives of the BSC and the average experience of the board members and the external auditor with these perspectives in other firms they are associated with

	Customer		Internal Business		Learning and Growth		Financial	
Constant	.096	.918	.203	1.703*	.065	.478	.211	1.754*
Average experience of board members with specific BSC perspective	.271	1.947*	.070	.557	.379	2.862***	.003	.363
No board member in other firms	.097	1.532	.016	.248	.202	2.383**	-.024	-.261
Average experience of the auditor with specific BSC perspective	-.208	-.931	.206	.865	.206	.945	.023	2.491**
No auditor in other firms	-.035	-.380	.007	.062	-.016	-.119	.284	2.365**
Ln(employees)	.030	4.159***	.014	2.142**	.021	2.763***	.013	1.990**
F-statistic	5.237***		2.509**		6.611***		5.376***	
Adj. R <sup>2</sup>	.125		.049		.159		.129	

\*\*\* = p < 0.01 (2-tailed); \*\* = p < 0.05 (2-tailed); \* = p < 0.10 (2-tailed)

Table 5

Relationship between the total BSC score and the scores on the specific measurement perspectives of the BSC and the average experience of the executive and supervisory board members and the external auditor with the BSC and its specific perspectives in other firms they are associated with

	Total BSC score		Scores on the specific measurement perspectives of the BSC							
			<i>Customer</i>	<i>Internal Business</i>	<i>Learning and growth</i>	<i>Financial</i>				
Constant	-.414	-1.345	-.250	-.808	.051	.109	-.457	-.813	.118	.297
Average experience of the CEO with specific BSC perspective	.293	1.245	.416	1.868*	.210	.904	.093	.418	.000	.007
Average experience of the CFO with specific BSC perspective	.643	.880	.135	.079	.544	.353	.391	.352	.027	.876
Average experience of the other executive board members with specific BSC perspective	-.111	-.421	.009	.030	-.245	-.799	.283	1.146	.006	.446
Average experience of the chairman of supervisory board with specific BSC perspective	.360	2.391**	.072	.383	.306	1.912*	.469	2.955***	.003	.441
Average experience of the other supervisory board members with specific BSC perspective	.196	1.359	.210	1.392	-.214	-1.554	.272	1.789*	-.020	-1.233**
No CEO in other firms	.139	1.112	.182	1.469*	-.031	-.293	.063	.443	.014	.062
No CFO in other firms	.324	1.151	.164	.623	.342	.765	.110	.194	.245	.714
No other executive board member in other firms	-.025	-.188	.044	.374	-.108	-.0799	.223	1.430	.106	.650
No chairman of supervisory board in other firms	.170	2.131**	.026	.324	.138	1.821*	.244	2.398**	.010	.095
No other supervisory board member in other firms	.060	.778	.017	.250	-.115	-1.633	.127	1.337	-.303	-1.605**
Average experience of auditor with specific BSC perspective	.144	.743	-.218	-.955	.188	.773	.111	.458	.264	2.249**
No auditor in other firms	.029	.287	-.024	-.250	.002	.017	-.081	-.552	.021	2.031**
Ln(employees)	.018	3.439***	.029	3.658***	.006	.830	.021	2.595**	.017	2.372**
F-statistic	4.375***		2.668***		2.443***		3.190***		2.950***	
Adj. R <sup>2</sup>	.229				.112		.161		.146	

\*\*\* = p < 0.01 (2-tailed); \*\* = p < 0.05 (2-tailed); \* = p < 0.10 (2-tailed)

## Appendix A

### Strategic performance measures

#### Financial perspective

- 1 Sales growth
- 2 Net income
- 3 Extra ordinary results
- 4 Return on total assets
- 5 Cash flows from operations
- 6 Current ratio
- 7 Liquidity ratio
- 8 Solvency ratio
- 9 Gearing
- 10 Dividend distribution
- 11 Stock exchange rate
- 12 Price earnings ratio
- 13 Earnings per share
- 14 Fluctuation of the shares
- 15 Turnover rate of capital invested
- 16 Return on capital employed
- 17 Average remuneration
- 18 Average cost of employee
- 19 Profit per employee
- 20 Tax growth or decline

#### Customer perspective

- 1 Market share
- 2 Customer satisfaction
- 3 Marketing activities
- 4 Number of customer complaints
- 5 On-time delivery
- 6 Percent shipment returned due to poor quality
- 7 Warranty repair cost
- 8 Customer response time
- 9 Cycle time from order to delivery
- 10 After-sales services and support
- 11 Customization of products and services to customer needs
- 12 Sustainability of client or customer relationships
- 13 New customers of clients acquired
- 14 Number of orders or contracts acquired
- 15 Turnover segmentation to market segments
- 16 Market share growth related to sales growth
- 17 Sales growth related to marketing activities

#### Internal business perspective

- 1 Manufacturing lead-time
- 2 Order delivery time
- 3 Use of quality control systems (like TQM)
- 4 Dropout rates and waste
- 5 Staff competency requirements
- 6 Safety requirements
- 7 Capacity utilization
- 8 Labour efficiency variance
- 9 Material efficiency variance
- 10 Cost reduction of operational processes
- 11 Efficiency of logistics
- 12 Percentage defective products shipped

#### Learning and growth perspective

- 1 Introduction of new products or services
- 2 Number of new patents or licenses
- 3 Time to market of new products
- 4 Influence of changing market conditions
- 5 Influence of changing technological conditions
- 6 Changes in product design
- 7 Investments in research and development
- 8 Speed development of new products
- 9 Employee growth
- 10 Employee segmentation
- 11 Training programs
- 12 Hours of employee (re)training
- 13 Employee satisfaction
- 14 Employee tenure
- 15 Employee remuneration policy
- 16 Sickness and absence policy
- 17 Qualified leadership
- 18 Knowledge sharing systems
- 19 Interactive control systems