

# **An Empirical Study of Network-Oriented Behaviors**

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## **Abstract**

This study is concerned with the extent to which *network-oriented behaviors* directly and/or indirectly affect firm performance. We posit that a firm's interactive behaviors in relation to an embedded network structure are key mechanisms that facilitate the development of important organizational capabilities in dealing with business partners. Such network-oriented behaviors, which are aimed at affecting the position of a company in the network, are consequently important drivers of firm performance, rather than the *network structure* alone. We develop a conceptual model that captures network-oriented behaviors as a driving force of firm performance in relation to three other key organizational behaviors, i.e. customer-oriented, competitor-oriented and relationship-oriented behaviors. We test the hypothesized model using a data set of 354 responses collected via an on-line questionnaire from UK managers, whose organizations operate in business-to-business markets in either manufacturing or services sectors. Based on the research results all the hypothesized relationships are supported, except the moderation effect of technological turbulence on the relationship of network-oriented behaviors and relationship portfolio effectiveness. The research results indicate that a firm's network-oriented behaviors positively impact on the development of customer-oriented and competitor-oriented behaviors. They also foster relationship coordination with its important business partners within the network. In addition, the effective management of the firm's portfolio of relationships is found to mediate the positive impact of network-oriented behaviors on firm profitability.

## **Keywords**

Network-oriented behavior; business-to-business markets; structural equation modelling; latent interaction

## INTRODUCTION

A firm's business relationships are some of the most important sources of competitive advantage from a resource dependence perspective (Pfeffer & Salancik, 1978; 2003). They provide combinations of resources embedded in these relationships, which are unique and difficult to imitate by the competition (Gulati, Nohria & Zaheer, 2000; Spector, 2006; Zaefarian, Henneberg & Naudé, 2011). This has an important implication for firms operating in business-to-business markets, since they need to develop strategies for collaborating with both their customers and suppliers within the business network (Day, 2000). However, overly relying on established relationships and overlooking the critical aspect of introducing new relationships might lead to a lack of novel information and resources needed for innovation success (Uzzi, 1996; 1997). Therefore, a firm's ability to change the formation of its relationship portfolio in response to changes in the wider business network has strategic implications for its performance (Baum, Cowan & Jonard, 2013; Cui & O'Connor, 2012; Gulati *et al.*, 2000).

Such business networks have a profound impact on firms' performance (Jack, 2005; Uzzi, 1996). Although the causal link between a focal firm's network position, i.e. its varied business relationships with partners in its portfolio, and its performance, has been researched from a *structural perspective*, empirical evidence regarding this link with regard to *behavioral issues* is still missing (Baum *et al.*, 2013). Salancik (1995) suggests that the fact that relationships and interactions are taken as given in network analyses might have contributed to this lack of behavioral research. Based on the resource dependence theory (Pfeffer & Salancik, 1978), we argue that there is a need to study this pivotal causal relationship from a firm's behavioral perspective. Firms have the ability to proactively seek the resources they need. Through doing so, they can potentially change their relationship portfolio, and with it, their position in the network, by managing their interactions and business relationships (Johanson & Mattsson, 1992; Salancik, 1995; Stevenson & Greenberg, 2000). On the other hand, firms' behaviors are also shaped by their web of relationships, which constitute the network structure (Granovetter, 1985; Rivera, Soderstrom & Uzzi, 2010). Firms embedded in the network are all assumed to be "*perceiving and opportunity-seeking actors*" in the sense that their actions are based on their perception of their surroundings and their intention to sense and seize opportunities afforded by the network (Kilduff & Krackhardt, 1994, p. 88). However, the way in which a firm responds to other actors changes the dynamics of the network (Kilduff & Krackhardt, 1994; Porac, Thomas & Baden-Fuller, 2011). Firms attempt to shape their networked environment by changing the pattern of their interactions with their counterparts in order to grasp the network dynamics and further capitalize on these dynamics based on their understanding of the network (Andersson & Mattsson, 2010). The mutual influences between a focal firm and its business network are an on-going interactive process, manifested in the interactions between the firm and its counterparts, which are either directly or indirectly connected to it (Håkansson & Ford, 2002).

In this context it is important to consider that from a strategic perspective, firms interact differently within their business relationships, in that they have different behavioral options open to them. They can *actively shape* the network through strong- or weak-tie relationships based on the anticipated business outcomes (Thornton, Henneberg & Naudé, 2013). However, the resulting interaction behaviors do not necessarily contribute to firm performance, as the outcomes of such acts cannot be foreseen (Ford *et al.*, 2003; Thornton *et al.*, 2013). Furthermore, firms can *reactively sense* network dynamics, which can be seen as part of a firm's ability to respond to the network. This set of sensing behaviors relate to learning from, and utilizing of the context in which its important counterparts are embedded (Ford & Mouzas, 2013).

Following this argument, we posit that a firm's interactive behaviors in relation to an embedding network structure are key mechanisms that facilitate the development of important organizational capabilities in dealing with its business partners. Such *network-oriented behaviors* (Thornton *et al.*, 2013) are consequently important drivers of firm performance, rather than the *network structure* alone (Salancik, 1995). This proposition provides the starting point and research objective for our study: it is concerned with the extent to which network-oriented behaviors directly or indirectly affect firm performance. Building on the existing literature of network theory and business-to-business marketing, this research contributes to the literature in two ways. First, it conceptualizes and validates a nomological model in which network-oriented behaviors are posited as the drivers of other important firm behaviors towards their important counterparts in the network, such as customer-oriented, competitor-oriented and relationship-oriented behaviors. This is important as it enhances our understanding of how different organizational behaviors oriented towards different aims are interacting (Day, 1994). Secondly, this study establishes the role of firms' network-oriented behaviors in driving firm performance from a behavioral perspective. This is important as it directly provides managerial guidance about which behaviors *vis-à-vis* the wider business network firms should focus on in order to optimally sense the network dynamics and seize the opportunities (Gulati *et al.*, 2000).

This study aims at providing a conceptual model that outlines how a firm can utilize different organizational behaviors to understand its customers and competitors, and coordinate with its important business partners within the network. This framework provides an explanation as to how these strategic behaviors contribute to firm performance, either directly or indirectly. The argument will develop as follows: Through a concise review of relevant literature, we develop a conceptual model that captures network-oriented behaviors as a driving force of firm performance in relation to three other key organizational behaviors (i.e. customer-oriented, competitor-oriented and relationship-oriented behaviors). Next, we outline our empirical research design and test the hypothesized model using a data set of 354 responses collected from UK managers, whose organizations operate in business-to-business markets in either the manufacturing or services sectors. Lastly, we conclude with a discussion of theoretical and practical implications of the study, acknowledge the limitations, and provide directions for future research.

#### BUSINESS INTERACTIONS AND NETWORK-ORIENTED BEHAVIORS

Firms are unavoidably embedded in business networks (Ford *et al.*, 2003). The general consensus in the network literature is that networks have some properties that allow firms to achieve certain economic outcomes, such as faster knowledge transfer and more effective resource utilization (Achrol & Kotler, 1999; Granovetter, 2005; Jack, 2005). This is done by mobilizing other actors, such as customers or suppliers, in the network (Mouzas & Naudé, 2007; Zaefarian *et al.*, 2011). Furthermore, such mobilizing activities, i.e. interacting and building relationships with business partners, are linked to specific behaviors by a firm and thus economic outcomes are influenced by the way in which firms interact with others (Granovetter, 1985). We conceptualize such interaction behaviors as *network-oriented behaviors*. They are derived from the need of a firm to *sense* its position in the network (i.e. the opportunities and threats associated with its direct and indirect business relationships) and *seize* the opportunities derived from this position accordingly (Thornton *et al.*, 2013). Thorelli (1986) suggests that one of the key issues related to such 'networking' is the positioning of a firm in the network by changing its portfolio of relationships. Therefore, it can be assumed that firms' ability to maneuver themselves in the networks differ, depending on how well they use network-oriented behaviors, and that such differences will help generate insights related to firm performance differences (Zaheer & Bell, 2005).

Given the importance of such network-oriented behaviors, most studies in the existing network literature adopt *structural network measures*, such as the centrality and density of a focal firm's network, to understand firm performance differences (e.g. Hagedoorn, Roijakkers & Van Kranenburg, 2006; Hendry & Brown, 2006; Zaheer & Bell, 2005). Therefore, empirical research that focuses on *firms' behaviors* towards their networks is still scarce (Ford & Mouzas, 2013). There are, however, some studies that discuss network-oriented behaviors, e.g. under the name of organizational networking (Thornton *et al.*, 2013) or business networking (Ford *et al.*, 2003; Ford & Mouzas, 2013). These studies adopt an Industrial Network Approach (INA), which allows researchers to understand how firms interact with others in order to cope with organizational problems at hand by utilizing 'external' resources and reconfiguring the combination of them (Håkansson, 1982; Håkansson & Snehota, 1989). Such behaviors have also been conceptualized as actions taken by a firm to change the formation of its network in favor of its business aims (Smith & Laage-Hellman, 1992). Initiating, maintaining and terminating relationships as part of a portfolio approach have been identified as important capabilities that enable firms to effectively form a pool of accessible resources that are embedded in their relationship portfolio (Cui & O'Connor, 2012; Mitrega *et al.*, 2012; Zaefarian *et al.*, 2011). In this context Thornton *et al.* (2013) conceptualize organizational networking as sets of anticipated outcome-driven behaviors, specifically *information acquisition, opportunity enabling, strong-tie resource mobilization and weak-tie resource mobilization*. Each of these dimensions reflects manifested behaviors, which capture a distinct way in which firms utilize their relationships in an attempt to achieve their anticipated goals. First, information acquisition refers to a firm's tendency to use both strong-tie and weak-tie relationships in order to obtain desired information for making informed decisions. Secondly, opportunity enabling relates to a firm's conscious acts to sense the opportunities by strategically interacting with relevant parties in its network. Thirdly, strong-tie resource mobilization is utilized by a firm to adjust, transfer and pool resources across various established relationships in order to address certain firm challenges. Finally, weak-tie resource mobilization refers to the ability to mobilize resources that are linked to firms' less established relationships.

This conceptualization is in line with our research objective of conceptualizing the way in which firms interact with their embedding network. We therefore use the four behavioral dimensions by Thornton *et al.* (2013) to conceptualize network-oriented behaviors related to a focal firm's business relationships, be they direct or indirect.

## A MODEL OF ORGANIZATIONAL BEHAVIORS AND FIRM PERFORMANCE

### NOMOLOGICAL MODEL DEVELOPMENT

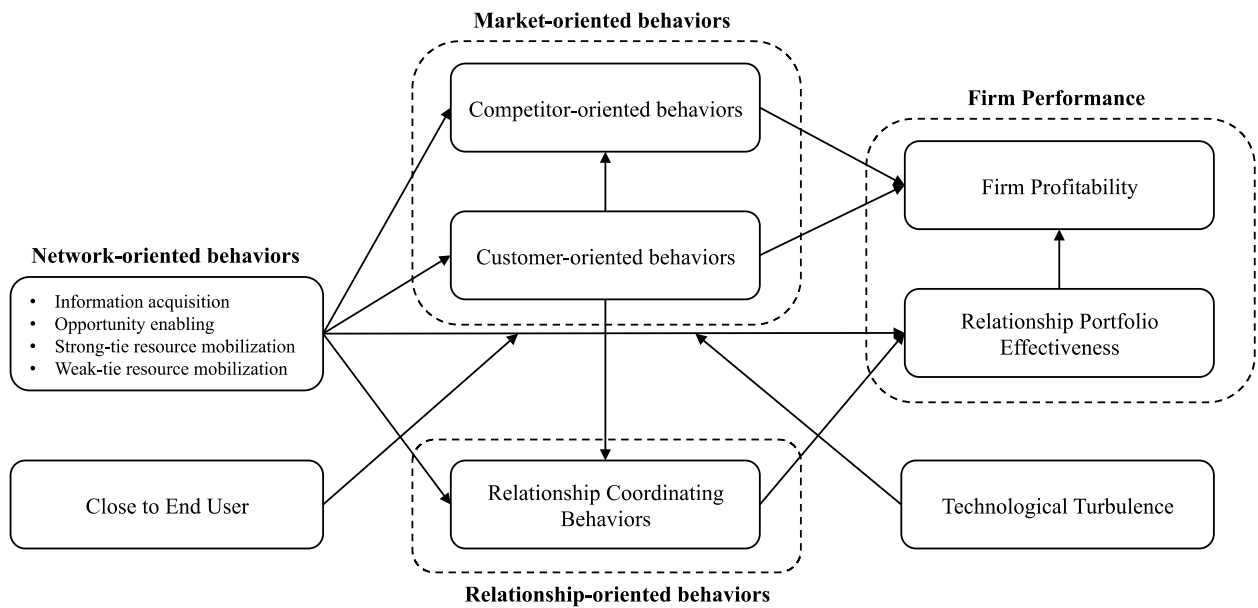
The extant literature has established the role of different organizational behaviors for driving firm performance; in this context *market-oriented behaviors* have been identified as key drivers of favorable firm performance (Jaworski & Kohli, 1993; Narver & Slater, 1990). However, empirical evidence also suggests that these behaviors are moderated by contextual factors (e.g. Cadogan, Kuivalainen & Sundqvist, 2009; Ellis, 2006; Kirca, Jayachandran & Bearden, 2005), or have no influence on firm performance (e.g. Grewal & Tansuhaj, 2001). A longitudinal study by Kumar *et al.* (2011) provides evidence that market oriented-behaviors have recently become a prerequisite for any firm to compete in the market place, rather than a competitive advantage. Furthermore, being market-oriented could be a mere 'self-portrait' rather than a true representation of a market-centric approach (Deshpandé, Farley & Webster Jr., 1993).

Besides market-oriented behaviors, *relationship-oriented behaviors* are also seen as key drivers of firm performance in the business-to-business marketing literature (e.g. Morgan & Hunt, 1994; Palmatier, Dant & Grewal, 2007; Palmatier *et al.*, 2008). This is backed by a

stream of research on business relationships based on the Industrial Network Approach which focuses on the interconnectedness of the business relationships within which a firm is embedded (e.g. Ritter & Gemünden, 2003; Walter, Auer & Ritter, 2006). Similarly, in the literature on strategic management the main focus has moved from the resource-based view to a relationship-centric approach of business relationship management. However, in addition to this movement from a monadic firm-centered view to a dyadic relationship-centered perspective, Vargo and Lusch (2011) as well as Anderson, Håkansson and Johanson (1994) argue that dyadic business relationships need to be placed in a wider context. Without an understanding of the important direct and indirect actors surrounding the focal firm, i.e. the *network context*, the understanding of firms' market- and relationship-oriented behaviors is only limited.

We therefore posit *network-oriented behaviors* as antecedents of the constructs of market- and relationship-oriented behaviors. Firms are able to understand their key players in a broader context through network-oriented behaviors, i.e. the sensing and seizing behaviors as described by Thornton *et al.* (2013), which will allow the focal company to make better decisions in relation to customers and competitors (Thorelli, 1986). This issue relates to the fact that when managing relationships successfully in a dyadic sense, the interconnectedness of all these relationships as part of a focal firm's relationship portfolio needs to be managed in a holistic way (Hoffmann, 2007; Roseira, Brito & Henneberg, 2010; Vargo & Lusch, 2011). Network-oriented behaviors facilitate such coordination of different relationships as part of a relationship portfolio approach, based on an understanding of the available resources and opportunities (e.g. opportunities for synergies) that lie beyond the direct dyadic relationships of a firm (McEvily & Zaheer, 1999; Rowley, 1997).

However, these effects of network-oriented behaviors are likely amplified in a fast moving technological environment (Achrol & Kotler (1999), e.g. the level of technological turbulence has become an important contextual factor in affecting the effectiveness of firms' endeavors to respond to markets (Jaworski & Kohli, 1993; Kumar *et al.*, 2011). On the other hand, the effectiveness of network-oriented behaviors is also posited to be affected by how well a focal firm interacts with the end users of a firm's offerings. Firms that are able to interact and/or understand their indirect final customers might utilize their network-oriented behaviors in a more effective way (Henneberg, Mouzas & Naudé, 2009). Following the aforementioned key areas of research, we derive a nomological model, as depicted in Figure 1, based on three key construct groups: (1) network-oriented behaviors as a driver of market-oriented and relationship-oriented behaviors, (2) the effects of market-oriented and relationship-oriented behaviors on firm performance, and (3) the direct role of network-oriented behaviors in relation to firm performance. Technological turbulence as well as closeness to end-users are included as important moderating constructs on the effect of network-oriented behaviors.



**Figure 1 Conceptual model**

NETWORK-ORIENTED BEHAVIORS AS DRIVER OF MARKET- AND RELATIONSHIP-ORIENTED BEHAVIORS.

Network-oriented behaviors are defined as “activities/routines/practices, which enable firms to make sense of and capitalize on their networks of direct and indirect relationships” (Thornton *et al.*, 2013, p. 1155). Following this conceptualization, we define the construct of network-oriented behaviors as a set of behaviors using direct and indirect, which can be either strong-tie or weak-tie relationships, in order to achieve four different anticipated outcomes. In other words, it is the combination of these four dimensions of networking, information acquisition, opportunity enabling, strong-tie resource mobilization and weak-tie resource mobilization, which represent a firm’s network-oriented behaviors. It is important to note that these behaviors have to be understood as a systemic whole, e.g. the utilization of strong-tie and weak-tie relationships are complementary (Tiwana, 2008). In his empirical study Uzzi (1996) suggests that the balanced use of strong-tie and weak-tie relationships can minimize a firm’s failure rate, which means that the use of these two types of relationships need to be examined in combination rather than isolation. Following a similar argument, Tiwana (2008) argues that it is imperative to go beyond dyadic relationships of a firm and consider the portfolio of both strong-tie and weak-tie relationships, which resemble its network structure, particularly when assessing firm performance.

*Market-oriented behaviors* are derived from the behavioral market orientation concept developed by Narver and Slater (1990), which includes customer orientation, competitor orientation and inter-functional coordination. Most studies have treated these three components as the manifestations of a firm’s market orientation based on a reflective measurement model. This way of conceptualizing market orientation is not without criticisms (Cadogan, Souchon & Procter, 2008) as it implies that the three components of market-oriented behaviors are *interchangeable* and *replaceable*. Therefore, the uniqueness of these three components is not accounted for. This, in our view, neglects the important and distinct implications of how a firm’s customer and competitor-oriented behaviors are affected by, and affect other constructs when placed within a nomological model.

We focus on customer and competitor-oriented behaviors as part of a market orientation since these capture a firm’s market-oriented behaviors on the basis that customers and competitors are two key players in a firm’s network environment (Mattsson, 1997; Möller &

Halinen, 1999). We are particularly interested in how network-oriented behaviors affect firm's behaviors towards these two network actors. First, *customer-oriented behaviors* refer to firms' tendencies to continuously create superior value for their customers based on a sufficient understanding of customers' business environments (Narver & Slater, 1990). Secondly, *competitor-oriented behaviors* refer to firms' tendencies to continuously seek to sense competitor actions and respond to them timely and appropriately (Narver & Slater, 1990). The means by which a firm generates the necessary information and mobilizes certain resources (e.g. knowledge) in order to appropriately recognize, address and respond to customer needs and competitor actions have not been well articulated in the literature. Kohli and Jaworski (1990) merely describe in their seminal work that "*a customer focus involves obtaining information from customers about their needs and preferences [...] it goes far beyond customer research*" (p. 3). They also stress that the necessary information for understanding customers' current and future needs to include "*exogenous market factors (e.g., competition, regulation)*" (p. 3). In essence, behaviors aimed at going beyond direct interaction partners, i.e. network-oriented behaviors, are driving the process of recognizing, addressing and fulfilling customer needs.

Through its unique network position a firm can potentially obtain useful, possibly critical, information by interacting with its web of different types of relationships, be they well established or newly formed (Uzzi, 1996). Such network-oriented behaviors comprise different aspects: Strong-tie relationships foster effective tacit or complex information transfer and resource mobilization across relationships, because of their established trust mechanism. On the other hand, weak-tie relationships provide a bridge that links novel information and resources to the focal firm. The combination of these two types of relationships to a certain extent would increase a firm's success rate (Uzzi, 1996), since it can better understand its customers as well as its competitors by means of seeking information dispersed in the network that help 'contextualize' the identified issues at hand. We therefore hypothesize that:

*H1: A firm's network-oriented behaviors positively affect its customer-oriented behaviors.*

*H2: A firm's network-oriented behaviors positively affect its competitor-oriented behaviors.*

*Relationship-oriented behaviors* refer to a firm's activities to coordinate with its counterparts based on involved parties' mutual goals (Walter *et al.*, 2006). Relationship-oriented behaviors are not specific to customers; rather they are also intended for suppliers, as well as other relevant business partners. The resource mobilization within a confined set of established relationships will allow firms to more effectively coordinate with each partner due to the level of trust and relational norms that have been established (Wuyts, Dutta & Stremersch, 2004; Zaefarian *et al.*, 2011). In addition, the understanding of the resource constellations surrounding the focal firm and the ability to mobilize resources via network-oriented behaviors allows the firm to utilize the available resources pooled from its relationship portfolio (Håkansson & Ford, 2002; Mouzas & Naudé, 2007). This has two strategic implications. First, firms are able to reconfigure the combinations of the available resources based on its goals (Hoffmann, 2007; Roseira *et al.*, 2010). Secondly, they can identify other desirable resources that are not currently within the direct reach of the firms (Hoffmann, 2007). The contextual understanding of the resources embedded in the network and the ability to configure/reconfigure those resources through the use of network-oriented behaviors will allow a firm to make decisions as to whether or not to adjust the levels of relationship investments with each existing business partner, given their mutual goals. We thus hypothesize:

*H3: A firm's network-oriented behaviors positively affect its relationship-oriented behaviors.*

## THE EFFECTS OF MARKET- AND RELATIONSHIP-ORIENTED BEHAVIORS

The effects of market-oriented and relationship-oriented behaviors have been well established and documented through empirical evidence in the literature (for a summary see Liao *et al.*, 2011). Therefore, we treat the resulting hypotheses as an integral part of the overall nomological model, which helps to conceptualize the impact of different firm behaviors on firm performance. Firm performance in this study refers to two different outcomes, namely financial performance and relational performance, the latter of which is particularly applicable for business-to-business studies (Bhappu & Schultze, 2006). *Financial performance* is based on a firm's assessment of its profitability compared to its competition, in line with Venkatraman and Ramanujam (1986). *Relational performance* refers to the overall effectiveness of a firm's relationship portfolio (Johnson, Sohi & Grewal, 2004).

Being customer-oriented has been the pivot of the argument as to why businesses exist in that "*to satisfy the customer is the mission and purpose of every business*" (Drucker, 1973, p. 79). Being customer-oriented allows firms to more effectively deal with other important business partners in order to satisfy customers' need (Smirnova *et al.*, 2011). Customer-orientated behaviors therefore inform firms' relationship coordinating activities that aim at better satisfying those needs. This is done, for example, through activities of demand chain integration (Jüttner, Christopher & Godsell, 2010). Hence:

*H4: A firm's customer-oriented behaviors positively affect its relationship-oriented behaviors.*

In addition, customer-orientated behaviors help firms to become more aware of competition since satisfying customers require the identification of a competitive advantage over major competitive offerings and also relate to how firms react to competitor's activities (Narver & Slater, 1990). Our next hypothesis is thus:

*H5: A firm's customer-oriented behaviors positively affect its competitor-oriented behaviors.*

The majority of the extant literature shows that more market-oriented firms perform better in their financial outcomes (Greenley, 1995; Jaworski & Kohli, 1993; Narver & Slater, 1990) and innovation success (Deshpandé *et al.*, 1993; Narver, Slater & MacLachlan, 2004). However, there is no specific empirical evidence to support the notion that both customer- and competitor-oriented behaviors independently lead to a superior profitability due to the fact that these two constructs are often conflated within the overarching market orientation construct. For example, Deshpandé *et al.* (1993) base their conceptualization of 'customer orientation' on the combination of Narver and Slater (1990) 'customer orientation' and 'competitor orientation', and provide evidence that of a positive effect on firm performance. We can therefore hypothesize that:

*H6: A firm's customer-oriented behaviors positively affect its financial performance.*

*H7: A firm's competitor-oriented behaviors positively affect its financial performance.*

Ample evidence in the literature of business-to-business marketing suggests that effective relationship management allows firms to achieve favorable relational outcomes, such as customer trust (Palmatier *et al.*, 2008) and cooperation (Morgan & Hunt, 1994), as well as beneficial financial outcomes, such as customer value capture (Palmatier, 2008) and business performance (Smirnova *et al.*, 2011). In addition, Johnson *et al.* (2004) suggest that a firm's ability to manage relationship activities and initiate cooperation with business partners increases the effectiveness of the overall relationship portfolio. Given the evidence in the literature, we posit that firms' abilities to coordinate their business relationships allow them to develop a holistic view of their relationship portfolio and facilitate the optimized use of the resources within these portfolios, hence:

*H8: A firm's relationship-oriented behaviors positively affect its relationship portfolio effectiveness.*

## THE ROLE OF NETWORK-ORIENTED BEHAVIOR ON FIRM PERFORMANCE

The existing literature has yet to provide evidence on whether firms' networking efforts can produce certain desired outcomes. Ford *et al.* (2003) contend that firms' attempts to change their network position cannot be linked directly to any intended outcomes, as the affected business interactions are dynamic and fluid as well as complex. However, although a firm's network-oriented behaviors might not result in direct contributions to its financial performance, it is plausible to posit that a firm's strategic activities within its network, i.e. its network-oriented behaviors, help the overall effectiveness of its relationship portfolio (Hoffmann, 2007). Particularly, resource mobilization across various relationships fosters the effectiveness of its relationship exchanges based on its 'network horizon', i.e. the firm's vision through which it grasps the dynamics in the network (Holmen & Pedersen, 2003). Here, for a firm's relationship portfolio to be effective, the sensing and seizing aspects of network-oriented behaviors allow the firm to effectively utilize the pooled resources that are embedded in this portfolio (Thornton *et al.*, 2013). We therefore hypothesize:

*H9: A firm's network-oriented behaviors positively affect its relationship portfolio effectiveness.*

It is widely recognized that the ability to manage business relationships effectively is a key driver of a superior firm performance (Morgan & Hunt, 1994; Palmatier, 2008; Palmatier *et al.*, 2008). These business relationships provide a firm with unique access to information, resources and opportunities that are crucial for firm success (Burt, 2000; Zaefarian *et al.*, 2011). This uniqueness of resources embedded within the specific constellation of a relationship portfolio facilitates leveraging and utilizing different configurations of these resources (Zaheer & Bell, 2005). These competitive advantages created from a firm's effective relationship portfolio lead to a higher likelihood for a firm to strategically succeed (Gulati *et al.*, 2000). The next hypothesis is therefore:

*H10: A firm's relationship portfolio effectiveness positively affects its firm profitability.*

### MODERATING EFFECTS

Based on the nomological model of Figure 1, certain moderating factors are included. However, we focus on the innovative aspects of the model, i.e. the effect of network-oriented behaviors (while other possible moderation effect, such as those affecting market, competitor, or relationship-oriented behaviors are not included). If a firm's network-oriented behaviors can help generate effective relationship portfolio, the question arises as to under which conditions these network-oriented behaviors are more or less likely to be successful in facilitating an effective relationship portfolio. We hypothesize one contextual factor and one firm-specific factor to amplify the relationship of network-oriented behaviors on relational performance.

Network-oriented behaviors are said to be crucial in specific contexts, for example a highly volatile environment in relation to technological developments (Möller & Halinen, 1999; Mouzas & Naudé, 2007). When technologies change rapidly within a firm's environment, its ability to sense these dynamics and seize the opportunities will better enable the firm to utilize its existing relationship portfolio, and possibly change the formation of the portfolio in order to effectively compete in such a dynamic environment (Hagedoorn *et al.*, 2006). We hypothesize that:

*H11: The higher the technological turbulence, the stronger the positive effect of network-oriented behaviors on relationship portfolio effectiveness.*

Firms operating in business markets are commonly not in direct contact with the end users of the end product/service offerings to which they contribute, as their offerings (e.g. a component) may be only one part of the final offering to the customer. Alternatively, in the case of equipment, their offerings might only help transform resources into a final offering. A firm could be very 'far' away from the end users, if it is located at a more upstream position.

The difference in firm position has an important implication related to how much insight it can gather through networking from its direct business partners about aspects further afield in the network, such as final customer preferences (Rowley, 1997; Wu, 2008). This issue of ‘closeness’ to the final customer relates to how closely a firm is located in the network in relation to the end users of the offering on the one hand, but also to how much, or how easily a firm interacts with the end users. However, there exist instances where it is not possible for a firm to interact with the end users due to contractual constraints with its direct customer.

We postulate that when firms are able to interact with the end users of their offerings, or are close to the end users, their network-oriented behaviors will more effectively affect their relationship portfolio effectiveness. Under such conditions, firms are likely to utilize their network-oriented behaviors strategically to more effectively utilize the relationship portfolio, hence:

*H12: The closer a firm is to its end users, the stronger the positive effect of network-oriented behaviors on relationship portfolio effectiveness.*

## RESEARCH DESIGN

We chose UK services and manufacturing firms as the research context to study their behaviors towards their network, their relationships, and their customers and competitors. Given the fact that these firms are facing intensifying global competition from other developing countries, the ability to leverage and mobilize resources in their networks becomes critical (Achrol & Kotler, 1999). This context is therefore well suited to the present study. In the following sections, we will detail the process of data collection, data diagnostics, measurement instrument development, and the validation of the measurement model. Data analysis was carried out using a combination of SPSS (ver. 20.0) and Mplus (ver. 7.11).

### SAMPLING AND DATA COLLECTION

We conducted a web-based survey using Qualtrics, an integrated platform for survey design and data collection. A panel database of managers working across a wide range of sectors in the UK was utilized as a sampling frame for this study. Research invitations were sent to the potential respondents in the sampling frame in four batches between July and August 2013. We purposefully utilized three filtering questions to select suitable respondents from the sampling frame. The respondents were allowed to participate in this study if (1) their companies operated predominately in business-to-business markets, (2) their self-rated knowledgeability about the business relationships of the companies they represent is more than 4 out of a scale of 1 (poor) to 7 (excellent), and (3) their companies are within either the services or manufacturing sectors. Out of 6715 potential respondents contacted, a total of 1379 possible respondents were eligible for taking part in this study. After deleting the screen-out and incomplete responses, the survey resulted in 413 completed responses, a response rate of 29.9%. However, to ensure the quality of the dataset, we further eliminated responses completed in less than 5 minutes, which yields 354 valid responses for the subsequent analyses. The threshold of 5 minutes was decided as the cut-off point of a ‘valid’ response based on a pre-test which showed that faster results indicated ‘pattern responses’ (Fricker *et al.*, 2005).

Table 1 summarizes the profile of the respondents and their organizations. A total of 68.4% of the 354 respondents come from service industries, while 31.6% of them work in the manufacturing sector. In terms of their organizational size, 29.1% and 27.7% of them, respectively, are classified as small and medium businesses, while large businesses account for 43.2%. With regard to respondent characteristics, almost half of the respondents are at a position of middle to top management (44.6%), followed by owner or joint-owner (18.9%), managing director (15.0%) and other top-level directors (13.3%). In addition, just over half of

the respondents have more than 10 years of managerial experience (53.4%), while 20.6% and 26.0% of them have 0-5 years and 6-10 years experience, respectively.

**Table 1 Profile of the respondents**

<b>Firm profile</b>		<b>Respondent profile</b>			
	Frequency	Percentage (%)		Frequency	Percentage (%)
<i>Industry</i>			<i>Job position</i>		
Services	242	68.4	CEO	16	4.5
Manufacturing	112	31.6	Owner or joint-owner	67	18.9
<i>Number of employees</i>			Managing director	53	15.0
1-49	103	29.1	Other top-level director	47	13.3
50-249	98	27.7	Middle/high level manager	158	44.6
250-999	58	16.4	Others	13	3.7
1,000 and above	95	26.8	<i>Yr. of managerial experiences</i>		
<i>Yr. of establishment (market presence)</i>			0-5	73	20.6
0-10	114	32.2	6-10	92	26.0
11-20	110	31.1	11-15	63	17.8
21-30	54	15.3	16-20	47	13.3
31-40	25	7.1	21 and above	79	22.3
41 and above	51	14.4			

#### DATA DIAGNOSES

*Normality* is a fundamental assumption in any multivariate data analysis. A two-step approach was taken to assess the normality assumption of the data. First, an univariate normality test was undertaken by assessing the absolute values of skewedness and kurtosis of each indicator regarding the key constructs of the hypothesized structural model. The result shows that in most cases the absolute values range from 0.026 to 2.227, with the majority being below 1. Overall, the diagnosis of skewedness and kurtosis indicates that the data is moderately non-normal. In addition, both the Kolmogorov-Smirnov and Shapiro-Wilks tests show that all indicators for the key constructs have a distribution that significantly deviates from the normal distribution. Secondly, the multivariate normality test based on Mardia skewedness and kurtosis coefficients indicates that the actual sample values are significantly different from the estimated value. This leads us to conclude that there is evidence to suspect the data is moderately non-normal. Nevertheless, the advancement of estimation methods ensures the robustness of assessing non-normal data. In line with the data diagnosis, the conventional estimation method, maximum likelihood, which is robust for normally distributed data, will not be used in the subsequent structural path tests. Instead, maximum likelihood parameter estimates with standard errors and a mean-adjusted chi-square (Satorra-Bentler chi-square) test statistics that are robust for non-normal data will be employed (Satorra & Bentler, 2001).

*Homoscedasticity*, a key assumption of equal levels of variance across variables, needs to be met when the data includes different groups of respondents. It ensures that “*dependent variables exhibit equal levels of variance across the range of predictor variable(s)*” (Hair *et al.*, 2007, p. 83). As the data was collected from two key industry sectors, services and manufacturing, the Levene test was performed to assess the dispersion of variances in the key variables across these two groups. Non-significance of the Levene statistic for all constructs suggests that there are equal levels of variance across dependent and independent constructs.

We used an extrapolation method (e.g. comparing early and late responses) to assess possible non-response bias in the data (Armstrong & Overton, 1977). We use the first and the fourth quartiles based on the time between completion of the survey and the time they were invited as early and late respondents. The late respondents are assumed to approximate non-respondents. Both key respondent profile variables (company size, job position and years in the current job position) and the main construct variables (network-oriented, customer-

oriented, competitor-oriented and relationship-oriented behaviors) were compared across early and late response groups, using a series of independent t-tests to compare means of continuous variables and  $\chi^2$  difference tests for categorical variables. The results of these tests show no significant difference across these two groups, which lead us to conclude that nonresponse bias is not a concern for our data.

#### CONSTRUCT MEASUREMENTS

We adapted most measures from the existing literature as prior studies provide satisfactory reliability and validity results. A seven-point Likert scale, labeled at the two endpoints, 1 = ‘completely disagree’ and 7 = ‘completely agree’, was used for most multi-item measures that reflect underlying constructs, unless otherwise stated. The full list of measures can be found in Appendix A in which factor loading for each indicator and Cronbach’s  $\alpha$  for each measure can be found.

*Network-oriented behaviors* is a second-order formative construct, measured by four reflective first-order constructs based on a previous empirical study<sup>1</sup> (currently under review). The four key components are information acquisition, opportunity enabling, strong-tie resource mobilization and weak-tie resource mobilization, which are measured by four reflective indicators respectively. These four components with reflective indicators will be modeled to form the overarching organizational networking behaviors, i.e. as a second order formative construct. Based on the empirical results of our previous study, the measurement model produces a good fit (RMSEA = 0.041, SRMR = 0.048, NFI = 0.98, CFI = 0.99, IFI = 0.99, GFI = 0.93, AGFI = 0.91) and shows that all four components (standardized coefficients are 0.29\*\*\*, 0.28\*\*\*, 0.42\*\*\*, 0.18\*\* respectively) are significant contributors to the second-order formative construct through the validation process of a multiple indicators and multiple causes (MIMIC) model (Diamantopoulos & Winklhofer, 2001).

*Customer-oriented behaviors* and *competitor-oriented behaviors* are adapted from Narver and Slater (1990). These two constructs are part of their market orientation operationalization in relation to the two key counterparts in a focal firm’s network environment. The components of customer orientation and competitor orientation, plus a third aspect of inter-functional coordination, each measured by reflective indicators, are mostly used to reflect the market orientation construct. However, more recent literature has disputed this approach, claiming that the three components should be modeled to form market orientation (i.e. as a second order formative construct), because they are not interchangeable (Cadogan *et al.*, 2008). While being aware of these discussions, in line with the evidence provided by Sigauw and Diamantopoulos (1995), we treat customer-oriented behaviors and competitor-oriented behaviors as two separate constructs that are measured reflectively by their respective three indicators.

*Relationship-coordinating behaviors* is measured with four items adapted from Walter *et al.* (2006). These indicators tap into the extent to which a focal firm coordinates resources and activities according to the match of resources and activities with each partner, which can be its customer or supplier.

We developed a new scale for one of the moderation variables, *closeness to end user*, based on two items measuring the extent to which a focal firm feels close to the end users of their offerings, with which it only has indirect relationships. In addition, we adapted constructs for technology turbulence, competitive intensity and market turbulence from Jaworski and Kohli (1993), each of which has three items.

There are two performance variables in the measurement model. The relational performance is measured by *relationship portfolio effectiveness*, which is adapted from

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<sup>1</sup> This study was initiated to operationalize the construct of organizational networking based on the typology developed by Thornton *et al.* (2013).

Johnson *et al.* (2004). Three items are used to measure the effectiveness of a focal firm's overall relationship portfolio. The financial performance is measured by *firm profitability* with three items adapted from Venkatraman (1989) that indicate a focal firm's assessment of its profitability position in relation to competition.

We also employed a range of control variables. *Industry growth* is measured by a single item indicating the overall industry growth in the UK ranging from poor to excellent (7 point scale). *Market presence* is measured by a single item indicating the number of years that a firm has been established in the UK. *Firm size* is measured by number of employees (based on 10 categories).

#### ASSESSING THE MEASUREMENT MODEL

The measurement model as a whole was assessed by a confirmatory factor analysis using Mplus (ver. 7.1) in order to establish the level of model fit. All 11 constructs are modeled as reflective measurements (including four first-order constructs that form the second-order formative construct of network-oriented behaviors) based on their respective theorized factors. The measurement model specification allows each construct to covariate with all others. The model fit indices are as follows;  $\chi^2(574) = 881.169$  ( $p < 0.000$ ), comparative fit index (CFI) = 0.96, Tucker-Lewis index (TLI) = 0.95, root mean square error of approximation (RMSEA) = 0.039 and standardized root mean square residual (SRMR) = 0.036. A significant  $\chi^2$  can be expected and still indicates a good model fit, when the sample size is more than 250 (sample size = 354 in our study) and the observed variables are more than 12 (number of items in the measurement model = 37) (Hair *et al.*, 2008). In addition, the ratio of  $\chi^2$  / degree of freedom at 1.54 ( $< 2$ ), indicates a very good fit (Hair *et al.*, 2008). We therefore conclude that these indices are in support of a good measurement model fit.

For assessing the convergent validity of all the constructs in the measurement model we closely follow a comprehensive procedure proposed by Hair *et al.* (2008). First, all the items have factor loadings above 0.7 (0.71-0.92) (see Appendix A), which is well above the cut-off point of 0.5. According to the results presented in Table 2, average variance extracted (AVE) by each factor (0.63-0.80) is well above the cut-off point of 0.5. All factors show very good levels of internal consistency, as their composite reliability (CR) is between 0.86-0.92, which is well above the suggested threshold of 0.6-0.7 as a minimum. Based on the above evaluation, we conclude that the measurement model has satisfied the criteria of convergent validity. In addition, correlations between any given two factors are substantially smaller than 1, and the AVE for any given two factors is greater than the squared correlation between these two factors (Fornell & Larcker, 1981). Therefore, all factors in the measurement model display adequate discriminant validity.

**Table 2 Statistics for convergent and discriminant validity**

	CR	AVE	1	2	3	4	5	6	7	8	9	10	11
1. Information Acquisition	0.89	0.67	<b>0.67</b>										
2. Opportunity Enabling	0.89	0.68	0.59	<b>0.68</b>									
3. Strong-tie Resource Mobilization	0.89	0.68	0.49	0.47	<b>0.68</b>								
4. Weak-tie-Resource Mobilization	0.87	0.63	0.57	0.57	0.48	<b>0.63</b>							
5. Customer Orientation	0.90	0.75	0.35	0.43	0.40	0.27	<b>0.75</b>						
6. Competitor Orientation	0.86	0.68	0.37	0.49	0.48	0.51	0.56	<b>0.68</b>					
7. Relationship Coordination	0.92	0.74	0.53	0.58	0.38	0.50	0.65	0.57	<b>0.74</b>				
8. Relationship Portfolio Effectiveness	0.91	0.77	0.41	0.43	0.42	0.29	0.50	0.42	0.53	<b>0.77</b>			
9. Firm Profitability	0.92	0.80	0.25	0.21	0.27	0.21	0.17	0.28	0.22	0.45	<b>0.80</b>		
10. Close to End Users	0.88	0.79	0.32	0.31	0.18	0.23	0.28	0.35	0.37	0.38	0.18	<b>0.79</b>	
11. Technological Turbulence	0.91	0.77	0.25	0.28	0.28	0.38	0.21	0.25	0.28	0.20	0.18	0.11	<b>0.77</b>

Notes: AVE in bold on the diagonal; squared correlations between constructs below the diagonal.

Common method bias is assessed next. The general consensus suggests that wherever possible a procedural prevention should be taken in the first place to mitigate the threat of such bias derived from common methods, such as same source data (e.g. self-report survey). We have carefully designed certain aspects of the measurement instrument based on our assessment of the possible sources of method variances (Spector, 2006). For example, we intentionally randomized question order to break up the causal relationships of the substantive constructs under study (Podsakoff *et al.*, 2003). We also used Likert as well as semantic scales interchangeably and appropriately without overloading respondents cognitive tasks by using 7-point rating scales throughout when applicable (Podsakoff, MacKenzie & Podsakoff, 2012). We employed a knowledgeability question at the beginning of the on-line questionnaire to ensure that only those respondents who are capable of answering the following questions will continue filling out the questionnaire (Spector, 2006).

The statistical assessment of common method bias involves two steps as part of the most widely used Harman's single factor test using both exploratory factor analysis (EFA) and confirmatory factor analysis (CFA). First, in the EFA all the items in the measurement model were entered and the result reveals that the first factor does not explain the majority of the variance (47%), considering the number of constructs are relatively great. Secondly in the CFA we compared the theorized multi-factor measurement model against a single-factor model with all indicators loaded on it. The single factor-solution produces a significantly inadequate fit ( $\chi^2(665) = 3318.49$  ( $p < 0.000$ ), CFI= 0.66, TLI = 0.64, RMSEA = 0.110, SRMR = 0.083) compared to the multi-factor solution. The  $\chi^2$ -difference test (Satorra-Bentler scaled) shows that the hypothesized measurement model fits the data significantly better than the single-factor model ( $p < 0.001$ ). Given the procedural remedies we have taken and the results of the above analyses, we reasonably conclude that common method bias is not cause for concern in the assessment of the hypothesized structural model.

#### ASSESSING HYPOTHESIZED STRUCTURAL MODEL

We modeled the four components of network-oriented behaviors as formative indicators based on *a priori* theory (based on our previous study). One fundamental issue of any formative measurement is the extent of multicollinearity among the formative indicators, the presence of which will make it difficult to assess the unique contribution from each of them (Diamantopoulos & Winklhofer, 2001). To assess multicollinearity, four multiple regressions were performed. In each of them a formative indicator was regressed on the remaining three in order to obtain the variance inflation factors (VIF). The VIF ranges from 1.820 to 2.192, which is well below the suggested threshold of 10 (e.g. Hair *et al.*, 2008), and within the more stringent cutoff point of 3 (Petter, Straub & Rai, 2007). Multicollinearity therefore does not pose a threat for modeling organizational networking behavior as a formative measurement, the disturbance term of which has been set to 0, in line with the specification of a formative measurement embedded in a structural model.

#### MAIN EFFECTS

We test the structural equation model containing all the hypothesized direct effects using Mplus with an adjusted maximum likelihood estimation as noted. The model provides a good fit:  $\chi^2(df = 185) = 377.633$  ( $p < 0.000$ ), CFI= 0.95, TLI = 0.94, RMSEA = 0.054, SRMR = 0.047). Almost all hypothesized paths are statistically significant and in the expected direction except one path related to the relationship of customer-oriented behaviors on firm profitability (see Table 3). First, as can be seen from Table 3 network-oriented behaviors positively affect customer-oriented ( $\beta_1 = 0.68$ ,  $p < 0.01$ ), competitor-oriented ( $\beta_2 = 0.44$ ,  $p < 0.01$ ) and relationship coordinating behaviors ( $\beta_3 = 0.41$ ,  $p < 0.01$ ), in support of H1, H2 and H3 that network-oriented behaviors are indeed a driver of other firm behaviors.

Secondly, customer-oriented behaviors have positive impact on relationship coordinating behaviors ( $\beta_4 = 0.54, p < 0.001$ ), and competitor-oriented behaviors ( $\beta_5 = 0.46, p < 0.001$ ) in support of H4 and H5. In contrast, we found no evidence to support H6 as customer-oriented behaviors have no significant effect on firm profitability ( $\beta_6 = -0.18$ ). We also found that competitor-oriented behaviors positively affect firm profitability ( $\beta_7 = 0.21, p < 0.05$ ), in support of H7. Also, we found support for H8: relationship-coordinating behaviors positively affect portfolio effectiveness ( $\beta_8 = 0.51, p < 0.001$ ).

Finally, we examine the role of network-oriented behaviors in relation relationship portfolio effectiveness ( $\beta_9 = 0.30, p < 0.05$ ), as well as the effect of the latter on firm profitability ( $\beta_{10} = 0.47, p < 0.001$ ). The results support both H9 and H10.

**Table 3 Hypothesis test: main effects**

Hypothesized path	Standardized coefficient	z-value	Hypothesis
<i>Effect of network-oriented</i>			
Network-oriented → customer-oriented	0.68	2.76**	H1
Network-oriented → competitor-oriented	0.44	2.69**	H2
Network-oriented → relationship coordinating	0.41	2.54**	H3
<i>Effect of market-oriented &amp; relationship-oriented</i>			
Customer-oriented → relationship coordinating	0.54	8.16***	H4
Customer-oriented → competitor-oriented	0.46	6.13***	H5
Customer-oriented → profitability	-0.18	-1.65	H6
Competitor-oriented → profitability	0.21	2.16*	H7
Relationship coordinating → portfolio effectiveness	0.51	5.31***	H8
<i>Effect of network-oriented → firm performance</i>			
Network-oriented → portfolio effectiveness	0.30	2.15*	H9
Portfolio effectiveness → profitability	0.47	5.18***	H10
<i>Control variables → firm performance</i>			
Market presence → profitability	-0.03	-0.62	-
Industry growth → profitability	0.42	7.69	-
<b>Proportion of variance explained (R<sup>2</sup>)</b>		<b>Model fit index</b>	
Customer-oriented behaviors	46%	$\chi^2$ (df)	377.633 (185) ( $p < 0.000$ )
Competitor-oriented behaviors	67%	$\chi^2$ /df	2.04
Relationship coordinating behaviors	76%	CFI	0.95
Network-oriented behaviors	n/a	TLI	0.94
Portfolio effectiveness	59%	RMSEA	0.054
Profitability	57%	SRMR	0.047

z-value is the unstandardized coefficient divided by its standard error (Byrne, 2012). A value of greater than 1.96 indicates the value is significantly different from zero based on a 95% confidence level.

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

In addition, we also test whether portfolio effectiveness mediates (1) the effect of network-oriented behaviors on firm profitability, and (2) the effect of relationship coordinating behaviors on firm performance. We test the mediation effect by using path analysis within the model with two further previously non-hypothesized direct relationships of (1) and (2). With regard to (1), the result shows that while network-oriented behaviors do not affect firm profitability directly, the full mediation effect of the relationship through portfolio effectiveness is positive and significant ( $p < 0.05$ ). Similarly, given the direct relationship of (2) is non-significant, the test of the mediation effect corroborates that portfolio effectiveness fully mediates the impact of relationship coordinating behaviors on firm profitability ( $p < 0.001$ ).

#### MODERATION EFFECTS

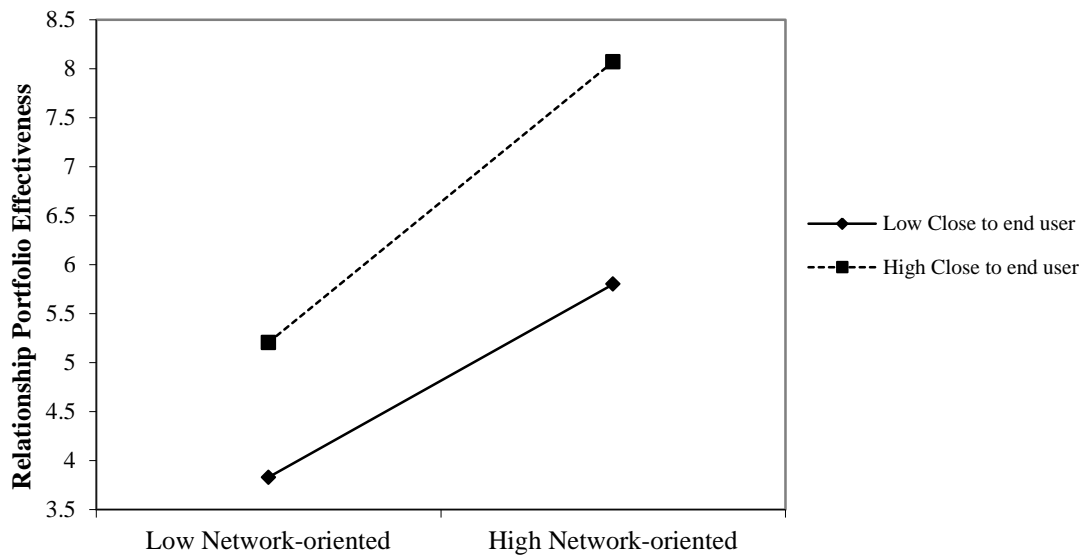
Although we do not expect the causal relationships in the overall structural model to differ under the influence of the contextual factors, we treat them as control variables and see whether the model holds for large as well as small firms, and for low and high levels of environmental volatility. To test changes in causal relationships across different groups, multi-group analyses were used. We utilize a composite variable from market turbulence, technological turbulence and competitive intensity (Kohli & Jaworski, 1990) to denote the level of volatility in a firm's business environment. We take a median split to form two groups: lower ( $n = 177$ ) and higher volatility ( $n = 177$ ). After partial metric invariance was established (Hair *et al.*, 2008), we specify a structural model allowing all path parameters to be freely estimated across two groups, against which a model is also specified with all path constrained across two groups. A  $\chi^2$ -difference test (Satorra-Bentler Scaled) between these two models ( $\chi^2 (df) = 13.26 (10)$ ,  $p = 0.21$ ) reveals that there is no difference in model fit, which means that the causal relationships do hold across lower and higher volatility groups.

The same procedure was carried out to assess whether the model holds across smaller and larger firms. Again we use a median split for 10 categories of firm size (measured by the number of employees) to form two groups: smaller firms with employees under 249 ( $n = 201$ ) and larger firms with employees more than 250 ( $n = 153$ ). A  $\chi^2$ -difference test (Satorra-Bentler scaled) between the freely estimated model and the constrained model ( $\chi^2 (df) = 34.04 (10)$ ,  $p < 0.001$ ) indicates that the causal relationships in the structural model do not hold across smaller and larger firms. The most notable differences based on a loose multi-group comparison, using the same model estimated separately in the two groups, are the paths for customer-oriented and competitor-oriented behaviors on firm profitability. Strikingly, for smaller firms, competitor-oriented behaviors do not contribute to firm profitability ( $\beta = 0.20$ ,  $p = 0.071$ ), whereas for the larger firms, the same set of behaviors significantly and strongly affect firm profitability ( $\beta = 0.52$ ,  $p < 0.001$ ). Furthermore, customer-oriented behaviors have no impact on smaller firms' profitability ( $\beta = -0.15$ ,  $p = 0.21$ ); whereas the same behaviors have a significant and negative impact on larger firms' profitability ( $\beta = -0.48$ ,  $p < 0.001$ ). While this is an intriguing finding, we will refrain ourselves from further elaborating these results since it is out of the scope of this study.

In order to test the two hypothesized moderation effects, we employ a Latent Moderated Structural Equations approach (LMS) with adjusted maximum likelihood estimation specifically developed for dealing with "*the distributional characteristics of the nonnormally distributed joint vector in a latent interaction model*" (Klein & Moosbrugger, 2000, p. 473). LMS is a relatively robust method for assessing interaction effects embedded in a structural model (Little, Bovaird & Widaman, 2009). We have also taken the decision to adopt this approach over a multi-group analysis on the basis that the latter does not allow us to assess multiple interaction effects, neither does it take into account the measurement errors in the structural model. Since Mplus is used for testing the latent interaction effects, we closely follow Muthén (2012) and Muthén & Asparouhov (2003) for model specification and result interpretation.

Within the direct effect model we added the two moderation constructs, i.e. closeness to end users and technological turbulence, on which the dependent constructs, relationship portfolio effectiveness and firm profitability are regressed, according to H11 and H12. We specified two interaction terms, network-oriented behaviors and closeness to end users, and relationship portfolio effectiveness and technological turbulence, on which relationship portfolio effectiveness and firm profitability are regressed. Note that Mplus is capable of handling a structural equation model with multiple latent interactions, using the LMS approach. However, Mplus only provides unstandardized coefficients and very limited model fit output. Although it does not allow assessing the effect size ( $R^2$ ), it does allow for testing the hypothesized multiple interaction effects in the direct effect model. The results show that

the relationship of network-oriented behaviors on relationship portfolio effectiveness is strengthened by the degree of end user closeness ( $p < 0.01$ ), but not by the level of technological turbulence. Therefore, H11 is supported, whereas H12 is not. The unstandardized coefficients of network-oriented behaviors ( $b = 0.107$ ,  $p < 0.001$ ), closeness to end users ( $b = -0.223$ ,  $p = 0.117$ ) and their interaction term ( $b = 0.030$ ,  $p < 0.01$ ) were used to calculate the predicted values of relationship portfolio effectiveness based on high and low values (+1 and -1 standard deviation) of the two dependent constructs (Aiken & West, 1991; Dawson, 2013). The predicted values are depicted in Figure 2, which shows that the relationship of network-oriented behaviors on relationship portfolio effectiveness is strengthened by a high degree of end user closeness (the dotted line) compared to a low degree of end user closeness (the continuous line).



**Figure 2 Moderation effect on network-oriented behaviors-relationship portfolio effectiveness relationship**

## DISCUSSION AND IMPLICATIONS

We set out to understand, from a resource dependence perspective, whether a firm's network-oriented behaviors in response to its network environment help it to perform better (Pfeffer & Salancik, 1978; Salancik, 1995). The consensus in the network literature suggests that firms that are better positioned in the network perform better than their counterparts that occupy worse positions. However, it is also evident that firms with a similar network position have different levels of performance (Zaheer & Bell, 2005). One explanation for this relates to the fact that the network position of a firm can be strategically changed through network-oriented behaviors by changing either the structure of the relationship portfolio or the patterns of interactions with interaction partners (Gulati, 1999; Robert, 1992). On the other hand, the actions by others in the network can also change a focal firm's network position (Ford & Håkansson, 2006). Network-oriented behaviors are therefore strategic acts that have the purpose of responding to the dynamics of the network and proactively creating ways of leveraging resources (Thornton *et al.*, 2013).

Against this backdrop of a theoretical framework, we offer a conceptual model that outlines how a firm can utilize different organizational behaviors, specifically its network-oriented behaviors, to understand its customers and competitors, and coordinate with its important business partners within the network. This framework provides an explanation as

to how firms' strategic behaviors contribute to firm performance, either directly or indirectly. The following discussion of the results from our empirical analysis of this conceptual model is structured around the three themes underlying our nomological model, followed by managerial implications, limitations and future research directions.

#### NETWORK-ORIENTED BEHAVIORS AS A DRIVER OF MARKET- AND RELATIONSHIP-ORIENTED BEHAVIORS

Network-oriented behaviors are hypothesized in this study as the driving force of a firm's behaviors towards its direct customers and its competitors, and the relational interactions towards its important business partners. This is partly built on Day's (1994) theory of a market driven firm, including the concept of market orientation. He argues that from a strategic management perspective, a market driven firm should be equipped with both 'customer linking' and 'market sensing' behaviors. He also suggests that a firm's market orientation needs to be enhanced by its constant learning that brings about the development of necessary capabilities and competencies for sustaining its organizational success.

It is evident from our study that a firm's network-oriented behaviors positively affect its customer-, competitor- and relationship-oriented behaviors, and explain a large proportion of the variances of these constructs (46%, 68% and 77%, respectively). Our findings therefore provide empirical evidence for Day's (1994) argument in that network-oriented behaviors as sensing and seizing activities, which are the configuration of four broad sets of goal-driven behaviors, namely information acquisition, opportunity enabling, strong-tie resource mobilization and weak-tie resource mobilization. Note that all of these four formative indicators significantly contribute to the overall network-oriented behaviors (standardized coefficients are 0.22, 0.44, 0.29, 0.21), which largely corroborates the result of Thornton *et al.* (2013).

#### THE EFFECTS OF MARKET- AND RELATIONSHIP-ORIENTED BEHAVIORS

Although assessing the effects of market- and relationship-oriented behaviors is not our main contribution, some relevant aspects vis-à-vis firm performance need to be mentioned. We deviate from the predominant approach of aggregating different components of market-oriented behaviors, and treat customer- and competitor-oriented behaviors as two separate constructs. The results show that customer-oriented behaviors have no direct influence on a firm's financial performance, whereas competitor-oriented behaviors have a significantly positive impact. This is somewhat surprising against the backdrop of the extant literature suggesting that the core of market-oriented behaviors is a 'customer focus' with some even arguing that a customer orientation is analogous to a market orientation (Deshpandé & Farley, 1998; Deshpandé *et al.*, 1993). It is evident from more recent studies that market orientation does not necessarily lead to a superior firm performance. Cadogan *et al.* (2009) show that the impact of market orientation on performance is an inverted U shape, which implies that being overly market-oriented can be detrimental to a firm's success. Grewal and Tansuhaj (2001) conclude that a firm's market orientation has a negative effect on firm performance after an economic crisis. In addition, the effect is weakened by demand and technological uncertainty and is strengthened by competitive intensity.

A multi-group analysis based on firm size reveals that for smaller firms customer-oriented behaviors have no impact on financial performance, whereas the same behaviors have a significant negative impact on larger firms' profitability. For smaller firms being market-oriented or not is independent of how they perform, since they rely on the effective use of their relationship portfolio to sustain their financial performance. This may imply that due to the resource constraints of smaller firms, they need to leverage their counterparts' resources in order to compete in the market place, in line with the resource dependence theory (Pfeffer & Salancik, 1978). Larger firms, on the other hand, face a negative impact on their financial

performance from being customer-oriented, whereas other organizational behaviors, such as understanding their major competition in the market and utilizing their relationship portfolio effectively, are both important in driving financial performance.

A firm's relationship-oriented behaviors, i.e. its ability to coordinate with its important partners, positively affects the effectiveness of its overall relationship portfolio, which in turn serves as an influential factor that contributes to a firm's financial performance. However, the multi-group analysis, again based on firm size, reveals that in the case of smaller firms competitor-oriented behaviors do not contribute to their financial performance ( $\beta = 0.20$ ,  $p = 0.071$ ), whereas for larger firms, the same set of behaviors significantly affect firm profitability ( $\beta = 0.52$ ,  $p < 0.001$ ).

In this context, our findings echo Kumar *et al.* (2011) that market oriented-behaviors have gradually become a prerequisite for any firm to compete in the market place, rather than a competitive advantage. Furthermore, being market-oriented could be a mere 'self-portrait' rather than a true representation of a market-centric approach (Deshpandé *et al.*, 1993). Our finding is certainly not to suggest that firms should not be customer-focused, but rather that a customer focus is essential according to our research result particularly for firms to develop their competition awareness and foster coordination with important business partners in order to better utilize resources to fulfill customer needs.

#### THE ROLE OF NETWORK-ORIENTED BEHAVIORS ON FIRM PERFORMANCE

The network-oriented behaviors are outward facing and can be seen as a constant evolving learning mechanism that represent a firm's orientation towards its network context (Day, 2000; Thornton *et al.*, 2013). This learning mechanism is not directly a 'profit spinner', i.e. a driver of firm profitability, but rather it serves as an enabling force of other organizational behaviors (market, competitor and relationship specific ones) (Day, 2000). However, besides these indirect effects, network-oriented behaviors also directly affect relationship portfolio effectiveness, which is in itself an important driver of firm profitability. Network-oriented behaviors serve to effectively impact the way in which a firm coordinates with its important partners. Through network-oriented sensing and seizing efforts firms are more likely to recognize the scarce resources in the network and how they can be mobilized by effective coordination with business partners (Cui & O'Connor, 2012; Mouzas & Naudé, 2007). Thus, these network-oriented behaviors have a bearing on the effectiveness of a firm's relationship portfolio. Strong-tie resource mobilization fosters resource synergies within the existing relationship portfolio (Roseira *et al.*, 2010), and prompts an understanding of redundant resources within the existing portfolio (Hagedoorn *et al.*, 2006). The effectiveness of the overall relationship portfolio also benefits from introducing new relationships based on network-oriented behaviors. This approach fosters the use of novel resource combinations through weak-tie resource mobilization, which provides new opportunities for a firm (Burt, 2000; McEvily & Zaheer, 1999).

Our research results suggest that network-oriented behaviors do not affect a firm's financial performance directly. However, their indirect impact on financial performance through relationship portfolio effectiveness on the one hand, and other organizational behaviors on the other, provides important theoretical contribution towards explaining firm performance in business networks. The effect of network-oriented behaviors on portfolio effectiveness is strengthened by a firm's degree of end user closeness, but not by the technological turbulence, according to our latent interaction model results. First, this implies that regardless of the levels of technological turbulence, network-oriented efforts are influential for a firm to increase the effective use of the existing relationships within its relationship portfolio. Secondly, when a firm is able to understand the end users of its offerings by being close to them, the sensing and seizing as part of network-oriented behaviors can be utilized to form a superior understanding of demand chain integration and

thereby allows for an optimization of the effectiveness of the firm's relationship portfolio (Jüttner *et al.*, 2010).

#### MANAGERIAL IMPLICATIONS

Our study suggests that firms operating in business-to-business markets need to strategize in networks (Holmen & Pedersen, 2003), i.e. they need to show behaviors *beyond* customer, competitor and relationship orientation. We offer three implications for the practitioner based on the research findings. First, firms need to take a configuration approach to the planning of their network-oriented behaviors as the four dimensions are complimentary to each other (Meyer, Tsui & Hinings, 1993; Vorhies & Morgan, 2003). As such, our study supports Thornton *et al.*'s (2013) suggestion that "*firms need to carefully plan these different types of networking activities/routines/practices, using a portfolio approach, to maximize the utility their network context can afford*" (p. 1163).

Secondly, the presence of a firm's customer-oriented behaviors is not necessarily fostering a superior financial performance, but rather, firms need to beware of competition within the context of the network. Competitor-oriented behaviors can be better gaged and adjusted through assessing how competitor actions are likely to impact the existing use of resources for fulfilling current and future customer needs. Thirdly, rather than focusing on business partners in a dyadic sense, i.e. via individual relationship management activities, firms need to plan their interactions with each business partner, which include activity adjustment, knowledge exchange and resource configuration, based on the overall picture of other direct as well as indirect relationships. This signifies that a relational portfolio approach within the context of the network is necessary. This will allow firms to plan their relationships with each important business partner accordingly, including the interactions between these relationships, which will in turn fosters a more effective use of relationship portfolio (Johnson *et al.*, 2004; Roseira *et al.*, 2010).

Lastly, firms may try to get to understand the end users of their offerings, although some firms might find it difficult even to identify them since the demand chain might be lengthy in some instances. Although empirical evidence regarding firms' considerations of their indirect customers is limited (Henneberg & Mouzas, 2008), the understanding of possible value creation in the context of the wider demand network is an important managerial issue (Henneberg & Mouzas, 2008). Our findings show that when firms feel that they are close to their end users, their network-oriented behaviors are more effective in impacting on overall relationship portfolio effectiveness. This can be achieved through three means. First, a firm can gather relevant information about the end users of its offerings from its direct customers. This could be relatively effective if these relationships are well established, which allows effective transfer of valuable information (Uzzi, 1996). Secondly, a firm can gather insights directly from the end users of its offerings with the help of its direct customers, who can act as a go-between to provide a bridge for the interactions (Smith & Laage-Hellman, 1992). Thirdly, if the existing relationships do not allow such interactions, a two step-leverage can be employed to form new relationships with relevant parties in the network in order to be closer to the end users (Burt, 2000; Gargiulo, 1993).

#### LIMITATIONS AND FUTURE RESEARCH DIRECTIONS

Any research study exhibits certain limitations, based on one's research design choices. We would like to focus on two such limitations. First, industry specifics may have affected our findings in some way, based on our choices of the research setting. We chose both manufacturing and services sectors for our study based on the evidence of the measurement invariance test in our prior research. The results of the pre-study show that there exist no significant differences in the way managers in these two sectors use network-oriented behaviors. We are mindful that differences could be significant even among different

industries in the manufacturing or the services sector. However, the non-significant Levene statistics of all variables suggest that there are equal levels of variance across dependent and independent constructs, which means that we can be confident in the assessment of the causal relationships among the constructs. Secondly, the use of Mplus as the main tool for assessing the latent interaction effects does not allow us to further evaluate the standardized coefficients and the effect size of the interactions. Because of this limitation, we can only state that the significant interaction effect suggests that the hypothesis is supported, but we cannot ascertain whether or not the interaction has a substantial effect on the outcome. Although we did provide the interaction plot to show the effect, this is only for interpretational purpose, rather than precisely assessing the strength of the interaction and how much variance of the outcome variable has been explained by the interaction term (Aiken & West, 1991; Dawson, 2013).

In relation to the first limitation, we propose that future research could duplicate this study in different research settings, such as in a specific industry. Although there is no evidence to suggest that technological turbulence affects the effectiveness of a firm's network-oriented behaviors, a comparison of the specific configurations of the four different sub-dimensions of network-oriented behaviors between firms in a high-technology industry with much environmental turbulence and those firms in traditional industries with low-degree of turbulence in the network represent an interesting avenue for further research. Based on configuration theory, this would also mean that identifying different 'recipes for success', i.e. equifinal configurations of network-oriented behaviors within and across industries (Doty, Glick & Huber, 1993; Meyer *et al.*, 1993; Vorhies & Morgan, 2003), could be a potentially fruitful research direction. A latent class analysis (McCutcheon, 1987) or a qualitative comparative analysis (Rihoux & Ragin, 2009) might serve as a tool to identify the underlying different configurational types of firms, which can be subsequently characterized based on company and industry characteristics. While firm size does not seem to affect the effectiveness of a firm's network-oriented behaviors in our study, this may be due to the fact that we did not provide analyses based on specific industries. Therefore, future research should include the effect of firm size on the effectiveness of a firm's network-oriented efforts within an industry since networking is often associated with small and medium size firms (e.g. Chetty & Campbell-Hunt, 2003; Ferris *et al.*, 2007; Semrau & Sigmund, 2010).

Our research focused on understanding actors' activities by the means of their network-oriented behaviors, which are aimed at changing a companies network position, such as changing relational portfolio characteristics. As such, we prejudice our perspective via the 'action affects structure' perspective. However, further research into the relationship between network structure and firm actions (i.e. a 'structure affects actions' perspective) needs to balance this view. Future research should incorporate these two perspectives to study firms' network-oriented behaviors. For instance, by using network measures, e.g. focusing on focal firms holding a position that is characterized with high centrality, coupled with a behavioral perspective of network-oriented behaviors, we can learn a great deal about the interactions between structure and firm actions. This could lead to questions such as: do the configurations of firms' network-oriented behaviors differ under different network conditions, such as the egonet structure of a firm (density, transitivity, etc.)? Does a local cluster within the network foster different configurations of a focal firm's network-oriented behaviors compared to those in a more open structured network? While we have attempted to use the construct 'closeness to end users' to initially tap into an aspect of a firm's network structure in relation to its distance to the relevant end consumer, more precise measures are needed, e.g. by using the geodesic distance (a network measure representing the distance between two nodes with other nodes between them) between a focal firm and a predefined end user of its offerings.

## Appendix A Measurement items and factor loadings

Constructs		Factor loadings
<b>Network-oriented Behaviors</b>		
<i>Information Acquisition</i> ( $\alpha = 0.89$ )		
IA1.	We ask our business partners when we need information regarding any of the following: new business opportunities, competition or technology developments in the market.	0.82
IA2.	Information provided by our business partners is helpful for us to make an informed decision.	0.88
IA3.	By speaking to our business contacts, we are able to obtain the information that is crucial to us.	0.80
IA4.	Information from our business contacts who work in a similar market can be useful for us.	0.77
<i>Opportunity Enabling</i> ( $\alpha = 0.89$ )		
OE1.	We make every effort to go out and network in order to increase our reputation in the market.	0.81
OE2.	We recognize that the value of working well with our business partners adds to the reputation of our products or services.	0.71
OE3.	We invest in building up our reputation in the market by networking with our business partners.	0.88
OE4.	We work towards becoming an effective business partner for other companies in the market (e.g. potential customers or suppliers).	0.88
<i>Strong-tie Resource Mobilization</i> ( $\alpha = 0.89$ )		
SRM1.	Matching our suppliers' capacity to the demands of our customers has been an important practice in our organization.	0.81
SRM2.	Our suppliers' ability is critical for us to satisfy our customers.	0.80
SRM3.	Having good relationships with both suppliers and customers has enabled us to adapt to changes in the market place.	0.83
SRM4.	Our customer-focused approach is communicated to suppliers, so that they are aware of how we serve our customers and can contribute to the success of delivering the offerings.	0.85
<i>Weak-tie Resource Mobilization</i> ( $\alpha = 0.87$ )		
WRM1.	We initiate relationships with new business partners to gain local knowledge in a new market.	0.79
WRM2.	We interact with the customers of our customers.	0.75
WRM3.	We work closely with influential parties who have relationships with our direct customers to stimulate demand.	0.83
WRM4.	Identifying our competitors' major customers helps us to getting to know the needs and requirements of potential customers.	0.81
<b>Market-oriented Behaviors</b>		
<i>Customer-oriented Behaviors</i> ( $\alpha = 0.90$ )		
CUS1.	We closely monitor our level of commitment in serving customers' needs.	0.87
CUS2.	Our business strategies are driven by our goal to create greater value for our customers.	0.89
CUS3.	Our strategy for competitive advantage is based on our understanding of customer needs.	0.85
<i>Competitor-oriented Behaviors</i> ( $\alpha = 0.86$ )		
COM1.	We rapidly respond to competitive actions that threaten us.	0.78
COM2.	Top management regularly discusses competitors' strategies.	0.84

COM3.	We target customers where we have an opportunity for competitive advantage.	0.85
<b>Relationship-oriented Behaviors</b>		
<i>Relationship Coordinating Behaviors (<math>\alpha = 0.92</math>)</i>		
RC1.	We analyze what we would like to achieve with different business partners.	0.85
RC2.	We match the use of resources (e.g. know-how, information, people and assets) to the individual relationship.	0.82
RC3.	We inform ourselves of our business partners' goals, potentials and strategies.	0.88
RC4.	We judge in advance which possible business partners to talk to about building up relationships.	0.88
<b>Firm Performance</b>		
<i>Relationship Portfolio Effectiveness (<math>\alpha = 0.91</math>)</i>		
RPE1.	For the most part, our business relationships are very effective.	0.87
RPE2.	Across the board, our business relationships operate well for us.	0.89
RPE3.	In general, we find our business relationships to be very productive and efficient.	0.88
<i>Firm Profitability (<math>\alpha = 0.92</math>)</i>		
PRO1.	Net profit relative to your major competition	0.91
PRO2.	ROI relative to your major competition	0.92
PRO3.	Financial liquidity position relative to your major competition	0.86
<b>Moderators</b>		
<i>Close to End Users (<math>\alpha = 0.88</math>)</i>		
CEU1.	It is easy for us to interact with the end-users of our offerings.	0.84
CEU2.	We feel very close to the end users of our offerings.	0.94
<i>Technological Turbulence (<math>\alpha = 0.91</math>)</i>		
TT1.	The technology in our industry is changing rapidly.	0.86
TT2.	Technological changes provide big opportunities in our industry.	0.92
TT3.	A large number of new product ideas have been made possible through technological breakthroughs in our industry.	0.86
<b>Control Variables</b>		
<i>Industry Growth</i>		
IG1.	Please evaluate the overall growth of your industry in the UK (poor...excellent).	-
<i>Market Presence</i>		
MP1.	Please specify, approximately, how many years your company has been established in the UK (open using drop down option)?	-
<i>Firm Size</i>		
FS1.	How many employees did your company have last financial year (10 categories)?	-

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