Essential Micro-foundations for Contemporary Business Operations: Top Management Tangible Competencies, Relationship-based Business Networks and Environmental Sustainability

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Although various studies have emphasized linkages between firm competencies, networks and sustainability at organizational level, the links between top management tangible competencies (TMTCs) (e.g. contemporary relevant quantitative-focused education such as big data analytics and data-driven applications linked with the internet of things, relevant experience and analytical business applications), relationship-based business networks (RBNs) and environmental sustainability have not been well established at micro-level, and there is a literature gap in terms of investigating these relationships. This study examines these links based on the unique data collected from 175 top management representatives (chief executive officers and managing directors) working in food import and export firms headquartered in the UK and New Zealand. Our results from structural equation modelling indicate that TMTCs are the key determinants for building RBNs, mediating the correlation between TMTCs and environmental sustainability. Directly, the competencies also play a vital role towards environmental practices. The findings further depict that relationship-oriented firms perform better compared to those which focus less on such networks. Consequently, our findings provide a deeper understanding of the micro-foundations of environmental sustainability based on TMTCs rooted in the resource-based view and RBNs entrenched in social network theory. We discuss the theoretical and practical implications of our findings, and we provide suggestions for future research.

Introduction

Environmental sustainability is an issue that garners significant scholarly attention and a vast academic literature has investigated the drivers of sustainability at the organizational level (e.g. Epstein and Roy, 2001; Giunipero, Hooker and Denslow, 2012; Lozano, 2015), including notable studies published in this journal (Ferlie, McGivern and De Moraes, 2010; González-Benito and González-Benito, 2005; Rueda-Manzanares, Aragón-Correa and Sharma, 2008). However, the literature on environmental sustainability has paid considerably less attention to the drivers of

sustainability at the micro-level. An understanding of micro-foundations is critical due to the growing evidence that cognitive beliefs towards environmental sustainability (Fassin et al., 2015; Frandsen and Johansen, 2011; Kim et al., 2014) and the psychological foundations for corporate social responsibility (CSR) (sometimes used as an alternative term for social or environmental sustainability) (Doh and Quigley, 2014; Hillenbrand, Money and Ghobadian, 2013; Kim et al., 2014, Morgeson et al., 2013) are driving environmental practices. Also, the wider business scholarship increasingly points to the need for a better understanding of the micro-foundations of crucial issues in strategic management such as strategic implementation, firm-level heterogeneity, the contribution of human resources to value co-creation as well as routines and capabilities (Felin et al., 2012; Foss, 2011; Foss and Lindenberg, 2013; Schoenherr, Narasimhan and Bandyopadhyay, 2015), but the scholarship on environmental sustainability has largely neglected to address these micro-foundations. Building on this emerging literature, our study specifically investigates the micro-foundations of sustainability by examining the interactions between top management tangible competencies (TMTCs), relationship-based business networks (RBNs) and environmental sustainability.

Essential micro-foundations such as TMTCs rooted in the resource-based view (RBV) of the firm provide the foundations for organizational practices (Abell, Felin and Foss, 2008; Coff and Kryscynski, 2011; Foss, 2011; Nyberg et al., 2014). However, while scholarship on the micro-foundations of the RBV has dynamically developed in the strategy and human resource management (HRM) literatures (Nyberg et al., 2014; Orlitzky, Siegel and Waldman, 2011), the RBV literature has continued to focus on the influence of organizational-level resources and capabilities on sustainable/responsible practices (Aragon-Correa and Sharma, 2003; Bowen, 2007; Hart, 1995). The scholarship on CSR and environmental sustainability has provided growing evidence that the individual characteristics of senior managers are demonstrably crucial in guiding environmental practices and organizations are highly heterogeneous in terms of such micro-foundations (Chin, Hambrick and Treviño, 2013; Godos-Díez, Fernández-Gago and Martínez-Campillo, 2011; Gond et al., 2017; Renwick, Redman and Maguire, 2013; Robertson and Barling, 2013; Stea, Pedersen and Foss, 2016; Waldman, Siegel and Javidan, 2006), but this scholarship has failed to investigate the role of TMTCs. Our study focuses specifically on the role of modern analytical skills in environmental sustainability. A better understanding of such skills is important because there is growing demand for skilled professionals who have tangible competencies to handle contemporary business operations linked with advanced technology and big data (e.g. big data analytics and the internet of things). It is predicted that, by 2018, the USA alone may require over 150,000 skilled people with deep analytical skills (e.g. advanced statistical analysis and machine learning) while similar demand has been noted in Europe. It is believed that such data-and-IT-savvy management can significantly contribute to the effectiveness of business operations that reduce negative environmental impacts. Firms that ignore such skills may deprive themselves of financial and non-financial benefits (e.g. environmental efficiencies). However, there is a lack of empirical research on the environmental impacts of such skills (Akhtar et al., 2015; Barton and Court, 2012; Brown, Chui and Manyika, 2011).

While TMTCs can explain the impact of *internal* drivers of environmental sustainability within the boundaries of organizations, the sustainability literature also points to the critical influence of *external* drivers in the form of business networks (Collins et al., 2007; Miemczyk, Johnsen and Macquet, 2012; Roome, 2001; Schoenherr, Narasimhan and Bandyopadhyay, 2015; Stea, Pedersen and Foss, 2016). The general business literature suggests that social networks play an important role in different organizational processes, including innovation and organizational change (e.g. Aalbers, Dolfsma and Koppius, 2014; Powell, Koput and Smith-Doerr, 1996; Swan and Scarbrough, 2005; Wincent, Thorgren and Anokhin, 2013), and scholars have noted the enabling role of networks for the transfer of valuable knowledge across firms (e.g. Hansen, 1999; Schoenherr, Narasimhan and Bandyopadhyay, 2015; Tortoriello and Krackhardt, 2010; Tortoriello, Reagans and McEvily, 2012) . Scholarship on environmental sustainability demonstrates that business networks are essential for developing environmental outcomes for collaborative organizations (e.g. Benito-Hernández, Platero-Jaime

and Esteban-Sánchez, 2016; Benn *et al.*, 2006; Simpson and Power, 2005) and studies have specifically employed social network theory to explain how the degree of density in the network, trust and satisfaction in the network or the level of centrality of the organization in the network affect environmental practices at the organizational level (e.g. Brass, Butterfield and Skaggs, 1998; Chen, 2009; Fisher, 2003; Vurro, Russo and Perrini, 2009), but studies have not investigated the role of top management tangible skills and competencies in the formation of trusted and satisfied contemporary business networks. Existing studies in supply chain management that link modern analytical skills with networks mainly examine the links with traditional performance outcomes such as cost, profit and return on investment and do not focus on the relationships with environmental sustainability (Akhtar *et al.*, 2015; Schoenherr, Narasimhan and Bandyopadhyay, 2015; Yu and Nagurney, 2013).

Thereby, given that previous research neglected the role of TMTCs and their links with RBNs and environmental sustainability, the first contribution of this study is to develop a conceptual framework by integrating the micro-foundation view of competencies grounded in the RBV, the RBN theory and environmental sustainability. Given the focus of previous environmental sustainability research on the organizational level of analysis, the second contribution of this study is to employ the RBV and social network theory at the micro-level in order to explain the drivers of environmental sustainability. The final contribution is linked with the complexity of the framework (i.e. multiple dimensions and higher-order constructs) following a comprehensive statistical process, including addressing endogeneity biases that have not been properly addressed by many non-experimental studies (Abdallah, Goergen and O'Sullivan, 2015; Antonakis *et al.*, 2010; Qin, 2015).

Theoretical development and hypotheses

Top management tangible competencies and environmental sustainability

Scholars have long suggested that organizational resources and management competencies can play a considerable role in improving the environmental performance of firms, and this scholarship has linked these resources and competencies to the RBV (Aragon-Correa and Sharma, 2003;

Bowen, 2007; Hart, 1995). The RBV addresses the heterogeneity of firms with regard to their strategic and resource endowments (e.g. Barney, 1991; Kraaijenbrink, Spender and Groen, 2010; Wernerfelt, 1984), and hence allows us conceptually to scrutinize how the development of different types of resources and competencies may contribute towards environmental sustainability. The wider business scholarship has in recent years moved towards investigating the micro-foundations of the RBV (Abell, Felin and Foss, 2008; Coff and Kryscynski, 2011; Foss, 2011; Nyberg *et al.*, 2014), and hence the RBV provides us with an important lens through which we can investigate how the micro-foundations such as TMTCs are linked to environmental sustainability that consists of multiple indicators such as waste reduction, reusable packaging, material efficiency, energy consumption and protecting the natural environment (Hart, 1995; Rao *et al.*, 2006).

The scholarship linking environmental practices and competencies to the RBV has so far largely failed to investigate the micro-foundations of environmental sustainability. Accepting the underlying general premise that firm-specific resources and competencies can lead to a competitive advantage, this scholarship has long explored how specialized resources (e.g. green innovations or an organization's sustainability reputation) and competencies can improve organizational environmental practices (Husted and Allen, 2007; Litz, 1996; Russo and Fouts, 1997; cf. Mellahi *et al.*, 2016), while paying less attention to how resources and competencies of leaders can improve environmental sustainability. Most pertinent to our investigation, this scholarship has largely failed to link the micro-foundations of the RBV with environmental sustainability (Frynas and Yamahaki, 2016), even though such a micro-level RBV approach has already started to develop dynamically within the strategy and HRM literatures (Nyberg *et al.*, 2014).

The CSR and environmental sustainability literature demonstrates that individual chief executive officers (CEOs) and other top management teams are crucial in guiding environmental strategies of firms (Chin, Hambrick and Treviño, 2013; Godos-Díez, Fernández-Gago and Martínez-Campillo, 2011; Robertson and Barling, 2013; Waldman, Siegel and Javidan, 2006). As Waldman and Balven (2014, p. 224) recently noted, responsible leadership is 'not about whether organizations
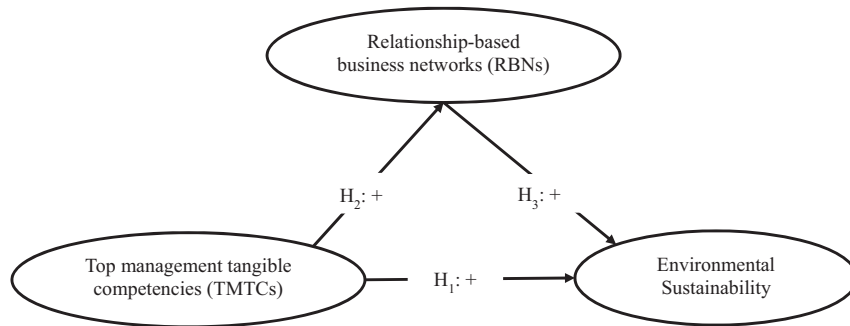
H4: Relationship-based business networks also mediate the relationship between TMTCs and sustainability

Figure 1. Interrelationships between underlying constructs: essential micro-foundations

act responsibly, but about how individuals act and make decisions'. This scholarship suggests that sustainable and environmental practices are actively shaped and diffused across the firms' networks by CEOs and other top management team members, notwithstanding whether such leadership is driven by instrumental/economic motives (Canales, 2013; McWilliams and Siegel, 2011; Siegel, 2009) or by stakeholder pressures (Doh and Quigley, 2014; Maak and Pless, 2006). These studies have investigated how the sustainable practices of firms are shaped *inter alia* by the leaders' workplace pro-environmental behaviours and leadership styles (Robertson and Barling, 2013), the leaders' perceptions of the role of ethics and social responsibility (Godos-Díez, Fernández-Gago and Martínez-Campillo, 2011), the leaders' political ideology (Chin, Hambrick and Treviño, 2013), the CEO intellectual stimulation (Waldman, Siegel and Javidan, 2006) or the leaders' personal trust and commitment (Doh and Quigley, 2014). At the same time, this emerging literature has paid no attention to the leaders' personal tangible competencies (e.g. analytical applications, education and experience in quantifying performance dimensions) that are essential micro-foundations for contemporary business operations inundated with data and analytics (Akhtar *et al.*, 2015; Bennis and O'Toole, 2005; Chen, Chiang and Storey, 2012; Kor and Mahoney, 2005; Waller and Fawcett, 2013).

The wider business scholarship on the microfoundations of the RBV has recently departed from its previous focus on creating resources and competencies at the organizational level towards a focus on the role of individuals in creating and utilizing such resources and competencies (Abell, Felin and Foss, 2008; Barton and Court, 2012; Coff

and Kryscynski, 2011; Felin and Hesterly, 2007) . This recent RBV scholarship suggests that relevant in-depth knowledge and tangible competencies are not possessed by firms as such, but rather by the individuals within the firms. As Coff and Kryscynski (2011, p. 1430) noted, 'valuable capabilities rely on *individuals* with idiosyncratic goals, desires, and preferences who can choose whether to join, stay, or exert effort' (original emphasis). In turn, the tangible micro-foundation competencies of CEOs and other top management team members, as well as their ability to shape the processes behind the creation and utilization of competencies, shape organizational environmental practices based on analytics (Garbuio, King and Lovallo, 2011; Kor and Mesko, 2013; Sheremata, Lee and Medcof, 2010), and we posit that they may also shape environmental sustainability. As Garbuio, King and Lovallo (2011, p. 1459) emphasized: 'managing the resource structuring process lays largely within the control of the top management team'. Extending this line of thinking to environmental sustainability, we hypothesize that (interrelationships are shown in Figure 1):

> *H1*: Top management tangible competencies are positively related to environmental sustainability.

Top management tangible competencies and relationship-based business networks

Top management teams' competencies (educational, experiential and analytical) play a key role in achieving desirable results, including developing RBNs linked with trust and information sharing among business partners (Barton and Court, 2012; Eisenhardt, 1989; Patnayakuni, Rai and

Seth, 2006; Tsai and Ghoshal, 1998). For instance, top management education related competencies such as quantitative skills in processing vital information can lead to the development of intra-firm trust and relationship-oriented networks (Zaheer, McEvily and Perrone, 1998), leading to a sustainable competitive advantage for firms (Barney, 1991; Barney and Hansen, 1994).

By utilizing their education-based competencies as a key resource, top management teams develop relationship-based networks enhancing firms' reputation and the creation of new business opportunities (Lado, Boyd and Wright, 1992). It has been noted that individuals can strengthen their business networks by strengthening unique relationships with customers and suppliers (Von Hippel, 1998). The top management teams educational competencies can also facilitate the development of social ties and business network relationships (Burt, 1992). Top management education-based competencies are the key knowledge assets that firms can use to develop RBNs with other organizations in order to develop a sustainability-based competitive advantage (Uzzi, 1996; Winter, 1987). For example, Hambrick, Cho and Chen (1996) in their study on 32 US airlines found support that diversity in terms of functional background, education and tenure of top management teams contributed positively to the substantial actions and responses they took for their respective firms. Thus, it suggests that top management teams' education competencies are essential for the actions they take for the firms. Extending these arguments over to the RBNs suggests that those top management teams with problem solving and quantitative-based skills can be in a far better position to form intra-firm relationship-based networks. Wiersema and Bantel (1992), for instance, found that those firms that have top management teams with higher education levels and extensive problem solving and quantitative training were in a better position to bring a strategic change. Other studies have also found similar associations, e.g. a positive relationship between top management teams' education levels and firms' innovation (Bantel and Jackson, 1989; Kyrgidou and Spyropoulou, 2013).

Recent research also notes that managerial cognitive capabilities lead to the development of dynamic capabilities, and the heterogeneity of cognitive managerial capabilities affects organizational performance (Helfat and Peteraf, 2015). Gavetti

(2012) also suggested that leaders with superior associative mental skills have greater success in identifying strategic opportunities. The top management teams on the basis of their higher level of educational-based competencies could be in a far better position not only for valuable relationship-based networks but also to identify potential networks that generate relational assets in the form of sustainable practices (Helfat and Peteraf, 2015). Those top management teams with better educational competencies are expected to perform activities in a reliable manner when called in for a particular analytical task (Helfat and Winter, 2011).

RBNs developed on the basis of individuals' characteristics can be enduring, and it has been noted that such valuable resources flow from network ties (Grossman, Yli-Renko and Janakiraman, 2012; Inkpen and Tsang, 2005; Yli-Renko, Autio and Sapienza, 2001). For instance, top management experience-based competencies can also be useful for the development of relationship-based networks. Scholars have noted that top management teams' experience-based competencies influence their orientation and the strategic choices linked with relationship-based networks (Anderson, 2008; Hambrick and Mason, 1984).

Additionally, top management teams' analytically oriented competencies can play an important role for the development of RBNs. For example, McAfee and Brynjolfsson (2012, p. 64) noted that, 'the more companies characterized themselves as data-driven, the better they performed on objective measures of financial and operational results ... companies in the top third of their industry in the use of data-driven decision making were on average, 5% more productive and 6% more profitable than their competitors'. It is also noted that top performing companies are using five times more analytically based competencies than low performing companies, indicating a potential impact of the use of analytical competencies on performance (LaValle *et al.*, 2013). Research notes that top management teams' analytical competencies directly shape the absorptive capacity of managers to build better complex business networks (Helfat and Peteraf, 2015; Kor and Mesko, 2013). As Barton and Court (2012) noted, 'advanced analytics is likely to become a decisive competitive asset in many industries and a core element in companies' efforts to improve performance'. This suggests that top management teams with a

higher level of analytical competencies can be in a better position to develop RBNs compared to those with limited analytical competencies. Given the discussed linkages between tangible characteristics of education, experience and analytical competencies, and RBNs, we hypothesize:

H2: Top management tangible competencies are positively related to relationship-based business networks.

Relationship-based business networks and environmental sustainability

RBNs are typically explained with the help of network theories, and networks have emerged due to the increased complexity of contemporary business operations massively connected through information and data flows among network ties (Schoenherr, Narasimhan and Bandyopadhyay, 2015; Yu and Nagurney, 2013). Such networks are also connected based on trust, satisfaction and joint decision making that contribute to environmental practices (Li *et al.*, 2010; Patnayakuni, Rai and Seth, 2006). Scholars have noted that these networks play a key role in mediating access to valuable resources, thus enabling innovation and an organizational change (e.g. Coleman, 1988; Powell, Koput and Smith-Doerr, 1996; Swan and Scarbrough, 2005) that help to create knowledge linked with environmental sustainability (Schoenherr, Narasimhan and Bandyopadhyay, 2015). This relates closely with a new way of constructing environmental initiatives, for instance green and ethical purchasing, reduction of waste and other environmental initiatives. Thus, RBNs could be particularly important for providing valuable know-how that works together in order to develop and strengthen environmental outcomes.

Despite the importance of social networks, much remains to be learned about the specific ways in which these networks influence sustainability indicators. In particular, the link between the RBNs, how these relationship-based networks share best practices and build mutual trust, and the impact this has on environmental sustainability is currently in its infancy. Thus integration of insights from social network theory into the study of environmental sustainability offers a remarkable potential (Galaskiewicz, 2011; Schoenherr, Narasimhan and Bandyopadhyay, 2015). Due to its vital role, scholars have pointed out the

enabling role of social networks for the transfer of valuable environmental knowledge across firms that prepare them to co-action against unsustainable practices (e.g. Hansen, 1999; Tortoriello and Krackhardt, 2010; Tortoriello, Reagans and McEvily, 2012).

Trust and the length of a relationship have also been indicated as playing an important role for the flow of resources across network partners. For instance, the density and strength of social ties have been suggested to be important components for the development of innovation linked with sustainable outcomes (Borgatti and Cross, 2003; Hansen, 1999; Powell, Koput and Smith-Doerr, 1996). Since RBNs exhibit higher levels of trust and satisfaction, such networks build superior information and data sharing platforms contributing to joint decision making for better environmental outcomes (Batt, 2003; Li *et al.*, 2010; Patnayakuni, Rai and Seth, 2006). Firms also gain key market shares by using trusted and satisfied business networks, which allow them to react to market changes effectively and efficiently. Such connected business partners work together to collect, analyse and integrate data to support their joint decision making (Batt, 2003; Li *et al.*, 2010). This enables them to detect their operational deficiencies and improve logistics affecting environmental components such as waste reduction, material efficiency and overall environmental performance (Li *et al.*, 2010; Patnayakuni, Rai and Seth, 2006; Rao *et al.*, 2006).

Given the business network sharing logic, incremental changes in such businesses (e.g. commitment, trust, joint decision making and satisfaction) would be likely to leave positive impacts on environmental sustainability. Moreover, greater levels of satisfaction and trust in business networks have been shown to be linked with more positive perceptions of environmental concerns (Batt, 2003; Li *et al.*, 2010; Rao *et al.*, 2006).

Schoenherr and Speier-Pero (2015) also noted various benefits of RBNs, including increased visibility, reduced network complexity, cost reductions, better demand planning and other operational developments contributing to environmental sustainability (Rao and Holt, 2005). These scholars also believed that such networks help firms to identify risks and potential customers linked with environmental policies. The existence of enduring relationships and mutual trust in business networks are arguably the key assets that help in responding to changing

environmental regulations and relevant supplier practices affecting the whole business network sustainability (Simpson and Power, 2005).

Relationship-based network partners share insights and analytics that assist them to adapt innovative approaches to deal with complex business networks linked with modern data-and-information-driven operations. Their intensively connected approach based on trust and joint decision making can facilitate them to deal with such contemporary operations effectively, which in turn helps to gain environmental advantages over competitors (Grossman, Yli-Renko and Janakiraman, 2012; Tan *et al.*, 2015). We thus hypothesize the links between RBNs and environmental sustainability:

> *H3*: Relationship-based business networks are positively related to environmental sustainability.

Additionally, given the arguments discussed to build Hypotheses 1−3, we propose a sub-hypothesis linked with these arguments. RBNs are linked with TMTCs as mentioned earlier (e.g. Helfat and Peteraf, 2015; Kor and Mesko, 2013), which are also the key determinants for environmental practices (e.g. Garbuio, King and Lovallo, 2011; Kor and Mesko, 2013; Sheremata, Lee and Medcof, 2010). In addition, while there is a relationship between TMTCs and environmental sustainability (e.g. Coleman, 1988; Powell, Koput and Smith-Doerr, 1996; Swan and Scarbrough, 2005), networks may also mediate the relationship between TMTCs and environmental sustainability. The value of capabilities may depend on the context where they are used, while networks may particularly help to enhance capabilities through achieving synergies between organizations and between individuals. Notably scholarship on technology clusters and innovation networks suggests that such networks are increasingly an important precondition for achieving environmental sustainability (Casper, 2007; Sol, Beers and Wals, 2013).

The mediating role of network components (e.g. trust) studied at the macro-level has shown important links between environmental knowledge that could strengthen network competencies. This also provides learning opportunities for weakly connected network operators. Consequently, involved managers could sharpen their competencies which can also contribute to their environmental practices (Levin and Cross, 2004). Such networks share high-performance work systems that can influence network ties, mental capabilities, organizational citizenship behaviour and human resource practices. This leads them to achieve better environmental sustainability through administrative efficiency and flexibility due to the coordination and macro-level exploitation of relevant knowledge resources, ultimately supporting the internal social structure linked with managers' competencies and their environmental practices (Evans and Davis, 2005).

Social network capital as a mediator also shows strong links between open innovation and firm environmental performance. Research also shows that such innovation strengthens network capabilities and influences sustainable practices among network partners (Godos-Díez, Fernández-Gago and Martínez-Campillo, 2011; Helfat and Peteraf, 2015; Rass *et al.*, 2013). Although such studies dealing with certain social network components as a mediator at the macro-level provide some guidelines, the mediating links between TMTCs and the indicators of environmental sustainability have not been established empirically. We thus propose an additional hypothesis based on the above arguments:

> *H4*: Relationship-based business networks mediate the relationship between top management tangible competencies and environmental sustainability.

Method

Sample and procedure

The sample for this study consisted of 175 CEOs and managing directors working in selected global import and export firms (dairy, meat, vegetables and fruits) headquartered in the UK and New Zealand. The sample characteristics are given in Table 1.

The KOMPASS database was used to reach a total of 850 CEOs and managing directors. After excluding incomplete responses, a total of 175 (20% response rate) usable responses were utilized to conduct structural equation modelling with parcelling (DeShon, 1998; Kline, 2011). When such top management research participants (i.e. CEOs and managing directors) are involved, obtaining high response rates is very challenging (Cycyota and Harrison, 2006). Also, studies show

Table 1. Sample characteristics

	Category	No	%
Job titles	Directors	106	61
	CEOs	69	39
Agri-food networks	Vegetables and fruits	98	56
	Meat	52	30
	Dairy	25	14
Employees	<20	41	23
	20−100	81	46
	101−200	53	30
Turnover ($m)	<15	28	16
	15−60	147	84
Total		175	100

that an average response rate from developed countries such as the UK, the USA and New Zealand is generally not high (Mehta, Dubinsky and Anderson, 2003; Mellahi and Harris, 2016). For example, Draulans, Deman and Volberda (2003) obtained 6%–11% response rates from the UK and other European countries. Similarly, by using a mail survey method, Spriggs, Hobbs and Fearne (2000) received a response rate of 16% from selective UK beef producers. We therefore made extra efforts to improve our response rate, which included sending multiple reminders to complete our survey, making possible in-person visits for deliveries and collections where geographical distance allowed, inclusion of short and concise statements in the questionnaire, providing enough time to fill in the questionnaire, avoiding busy periods of the year (e.g. Christmas and other major events) and offering a summary of our findings. In short, our purposive sampling method helped us to choose those samples who fulfilled the study objectives and to get a suitable sample size to apply appropriate statistical procedures.

The reason behind selecting the particular roles and responsibilities of CEOs and managing directors is their significant connections with contemporary data-and-analytics-driven requirements for modern business operations. Advances in information technology provide opportunities to get new insights from big data (i.e. structured and unstructured data) and make evidence-based decisions. When top management such as CEOs and managing directors are equipped with such skills, they avail themselves of data-hidden-opportunities that may not be explored without having tangible quantitative skills linked with their job description. Also, data-and-analytics-driven senior management may create an evidence-based

and data-driven culture helping to achieve sustainability. Additionally, research on these roles and their effects on environmental sustainability is emerging and studies have called for more research in this domain (Akhtar *et al.*, 2015; Schoenherr, Narasimhan and Bandyopadhyay, 2015; Yu and Nagurney, 2013). Thus, with the choice of particular roles and responsibilities of CEOs and managing directors (details provided in the Appendix) we make an endeavour to bridge the research gap as well as to contribute to exploring the links between the roles and responsibility and their effects on environmental sustainability that need data-and-analytics-driven requirements from top management.

Food import and export firms provided a very interesting and somewhat under-researched context for our investigation (Akhtar *et al.*, 2015; Schoenherr, Narasimhan and Bandyopadhyay, 2015; Yu and Nagurney, 2013). The selected food import and export firms (dairy, meat, vegetables and fruits) headquartered in the UK and New Zealand are globally connected (the USA, Europe, Australia, New Zealand, China, Malaysia, Thailand, Saudi Arabia, UAE, India, Pakistan, Bangladesh and Sri Lanka) and they generate both local and global impacts. Locally, the content explores the selected under-researched domains in New Zealand and the UK. Globally, New Zealand dairy accounts for approximately 35% of global trade and exports 95% of the entire dairy produce (Schewe, 2011). New Zealand also supplies more than 40% of total global lamb exports (Ledgard *et al.*, 2011). Thus, our research content helps to enlighten global−local research impacts.

Measures, reliability and validity

All measurement items utilized in this study were measured on a five-point Likert scale (strongly disagree, 1; strongly agree, 5). The construct details – including the relevant studies, brief item description and codes – are presented in the Appendix. Although the items were taken from past studies, all constructs used in this study were also refined by using exploratory factor analysis (EFA). EFA with varimax rotations, eigenvalues ≥1 and scree plots assisted us to develop the constructs.

Table 2. Reliability and validity of constructs, evaluation of measurement models

Constructs	Items	α	λ	AVE	CR
Top management tangible competencies (TMTCs)					
Education-based competencies	TMTC_Ed	0.74	0.79	0.51	0.76
Experience-based competencies	TMTC_Ex		0.72		
Analytical-based competencies	TMTC_An		0.62		
Relationship-based business networks (RBNs)	RBN1	0.91	0.70	0.60	0.91
	RBN2		0.73		
	RBN3		0.78		
	RBN4		0.80		
	RBN5		0.92		
	RBN6		0.73		
	RBN7		0.73		
Environmental sustainability (ES)	ES1	0.89	0.74	0.61	0.92
	ES2		0.83		
	ES3		0.86		
	ES4		0.77		
	ES5		0.80		

α, item reliability; λ, loading; AVE, average variance explained; CR, construct reliability.

Top management tangible competencies (independent variable)

TMTCs were measured using three different constructs: (1) education-based competencies, (2) experience-based competencies and (3) analytical-based competencies. Education-based and experience-based items were taken from past studies (Bennis and O'Toole, 2005; Kor and Mahoney, 2005). The studies by Chen, Chiang and Storey (2012) and Waller and Fawcett (2013) assisted us in building the construct for assessing analytical-based competencies. A total of 17 items were used in the survey to measure the tangible competencies (see Appendix, Table A1). The reliability and validity results of all underlying constructs are given in Table 2, including item internal consistency (α), loadings (λ), average variance extracted and construct reliability.

The items (see Appendix, Table A1) mainly measured were relevant in-depth knowledge, analytical expertise, quantitative techniques used, quantitative education, understanding data, using analytical insights for better business performance, analytical skills to predict customers' demand and performance improvement, use of analytics for performance measurement and finding new business opportunities, using analytics for quantifying business performance, analytical workforce and analytics being a major business strategy.

Relationship-based business networks (mediator)

A total of seven items measured RBNs (Li *et al.*, 2010; Patnayakuni, Rai and Seth, 2006). The items measured were trusted information exchange for RBNs, sharing best practices for building better RBNs, basing RBNs on mutual trust, satisfied relationships with business partners, long term relationships with strategic partners participatory decision making and avoiding unwanted demands that can hurt RBNs.

Environmental sustainability (dependent variable)

Environmental sustainability measured the decrease in total waste to output ratio, following reusable packaging policy, material efficiency, decreased energy consumption and negative impacts on the natural environment (Hart, 1995; Rao *et al.*, 2006). Discriminant validity of the constructs was measured using two methods. First, the correlation between the constructs did not exceed the value of 0.85 (Kline, 2011), ranging between 0.36 and 0.49. Second, as listed in Table 3, the square of the correlation (ϕ^2) by each pair of constructs was less than the average variance explained (Chiang, Kocabasoglu-Hillmer and Suresh, 2012; Sekaran, 2000).

Chi-squared difference tests did not detect any difference between the respondents and non-respondents; early to late respondents did not depict significant differences either. Additionally, the control variables [types of networks

Table 3. Second method for discriminant validity

| Constructs | Statistics | | | Condition met |
	ϕ	ϕ^2	AVE	$\phi^2 <$ AVE
TMTCs and RBNs	0.36	0.13[a]	0.56[b]	Yes
TMTCs and ES	0.47	0.22	0.56	Yes
RBNs and ES	0.46	0.21	0.61	Yes

ϕ, correlation between factors; AVE, average variance explained.
[a] ϕ^2, $0.36 \times 0.36 = 0.13$.
[b] AVE, $(0.51 + 0.60)/2 = 0.56$ (AVE for TMTCs and RBNs).

(vegetables and fruits, meat, dairy), industry (manufacturing/producers/importers/exporters), size of firms (number of employees and turnover), gender and age] were used and showed no significant differences.

We also addressed endogeneity biases that have been ignored by many non-experimental studies (Abdallah, Goergen and O'Sullivan, 2015; Antonakis *et al.*, 2010; Qin, 2015). Such biases mainly include common-method variance, measurement error and omitted variables (Antonakis *et al.*, 2010; Hamilton and Nickerson, 2003). To address common-method variance theoretically, extant research was used to develop a systematic questionnaire and measures that were also later refined using EFA. The guidelines (avoiding unfamiliar words, double-barrelled questions and technical words) provided by Tourangeau, Rips and Rasinski (2000) were also used. The items were further grouped with different conceptual dimensions. The extensive use of negatively worded items was avoided, as such items could lead to the distrust of the respondents' pattern of responding and can create a source of bias (Podsakoff *et al.*, 2003). The respondents were also informed about the anonymity of the survey. We avoided a single-informant bias and collected data from CEOs and managing directors. Statistically, Harman's one-factor test produced multiple factors explaining greater variance compared to a single-factor solution or combinations. The marker variable technique (the variable was the number of

languages respondents knew) proposed by Lindell and Whitney (2001) provided very small correlations. The latent factor approach also did not show any issues (Malhotra, Kim and Patil, 2006).

To deal with the measurement error, we used structural equation modelling with the maximum likelihood estimate and a multiple indicator approach, which correct for 'the biasing effects of random measurement errors' (Frone, Russell and Cooper, 1994). Omitted biases exist in various forms (for details see Antonakis, Bendahan and Lalive, 2014; Antonakis *et al.*, 2010); the most important guide in this regard is 'theory, theory and more theory' (Antonakis and Dietz, 2011; Antonakis, Bendahan and Lalive, 2014) to develop constructs and multiple constructs can help to address this point. We followed these guidelines and our constructs consisted of multiple items and sub-constructs (e.g. TMTCs consists of three dimensions; RBNs were measured with seven items; and environmental sustainability was assessed with five items). The descriptive statistics and correlation matrix of the underlying constructs are provided in Table 4.

Results

Figure 2 depicts the hypotheses and the relevant standardized results. Hypothesis 1 proposes that TMTCs positively affect environmental sustainability. This hypothesis is supported at $p < 0.01$ with $\beta = 0.46$. Hypotheses 2 (TMTCs positively affect RBNs) and 3 (RBNs positively affect environmental sustainability) are also supported with $\beta = 0.38$ ($p < 0.01$) and $\beta = 0.29$ ($p < 0.01$) respectively. Additionally, the fit indices with a non-significant p value (0.126) and R^2 values ranging from 14% to 40% are given in the caption to Figure 2, showing stronger support to the final model.

Hypothesis 4 (mediating analysis, RBNs mediate the relationship between TMTCs and environmental sustainability) was tested by using three approaches, namely (a) the causal-steps approach

Table 4. Descriptive statistics and correlation matrix of underlying constructs

Constructs	$\bar{x}$	σ	TMTCs	RBNs	ES
Top management tangible competencies (TMTCs)	4.17	0.27	1		
Relationship-based business networks (RBNs)	4.10	0.41	0.36	1	
Environmental sustainability (ES)	4.09	0.48	0.47	0.46	1

$\bar{x}$ mean; σ standard deviation; $n = 175$; all correlations are significant at $p < 0.01$.

$R^2 = 0.14$

Relationship-based
business networks (RBNs)

H_2: 0.38*** H_3: 0.29***

$R^2 = 0.40$

Top management tangible
competencies (TMTCs) H_1: 0.46***   Environmental
Sustainability

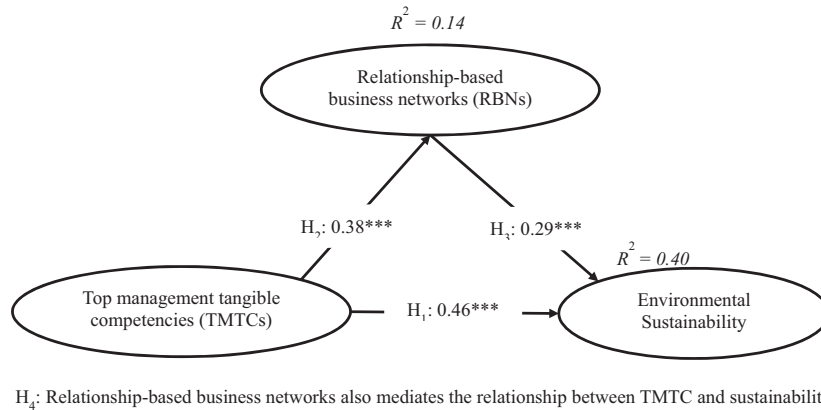H_4: Relationship-based business networks also mediates the relationship between TMTC and sustainability

Figure 2. Structural results for hypothesis testing, R^2 values and fit indices
Notes: n = 175; p = 0.126; χ²/df = 1.181; confirmatory fit index 0.990; Tucker−Lewis index 0.987; incremental fit index 0.990; root mean square error of approximation 0.032.
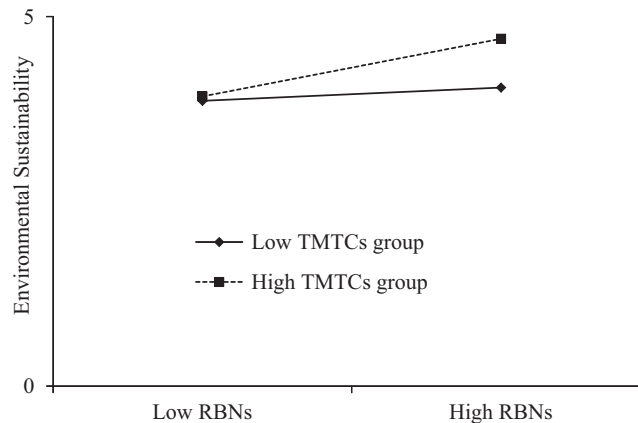***Statistically significant at $p < 0.01$.

Figure 3. Effects of essential micro-foundations

(Baron and Kenny, 1986), (b) Sobel-type tests (Sobel, 1982) and (c) bootstrapping (Preacher and Hayes, 2008). The causal-steps approach showed that the independent variable (TMTCs) significantly affects the dependent variable (environmental sustainability) with $\beta = 0.47$ and $t = 6.98$ at $p < 0.001$. The independent variable also significantly affects the mediating variable (RBNs), as $\beta = 0.35$ and $t = 4.99$ at $p < 0.001$. Further, RBNs (mediator) significantly affect environmental sustainability with $\beta = 0.46$ and $t = 6.86$ at $p < 0.001$. Finally, when the model was controlled for the mediating variable (RBNs), the previous relationship (i.e. between TMTCs and sustainability) was reduced ($\beta = 0.34$ and $t = 5.18$ at $p < 0.001$) but was still significant. The results thus showed partial mediation rather than full mediation as

the previous relationship was still significant. The Sobel test also showed that the indirect effect of the independent variable on the dependent variable via the mediator is significantly different from zero at $p < 0.001$. Additionally, the Aroian and Goodman tests showed the same results. The bootstrapping method with 5000 samples and 95% confidence interval was also utilized (Preacher and Hayes, 2008) with parcelling as the strategy to conduct the required analyses. First, it was found that TMTCs were positively associated with environmental sustainability [$\beta = 0.84$, $t(172 \text{ df}) = 6.98$, $p < 0.001$], total effects. It was also found that TMTCs were positively related to RBNs [$\beta = 0.54$, $t(172 \text{ df}) = 4.99$, $p < 0.001$]. Moreover, the mediator (RBNs) was positively associated with environmental sustainability [$\beta = 0.40$,

$t(172 \text{ df}) = 5.04$, $p < 0.001$]. Additionally, the analysis indicated that the direct effect of TMTCs on environmental sustainability was reduced [$\beta = 0.63$, $t(172 \text{ df}) = 5.18$, $p < 0.001$] when controlled for RBNs and thus partially mediated with confidence intervals ranging from 0.11 to 0.37.

To investigate further the relationship between the intensity of having stronger micro-foundations such as TMTCs and sustainability, surveyed companies were categorized into high or low intensity of TMTCs. The t test results show that the grouping is significantly different at $p < 0.00$ with means ($\bar{x}$) 4.01 and 4.33 for low TMTCs and high TMTCs respectively. Similarly, the groups for RBNs ($\bar{x} = 4.01$; $\bar{x} = 4.20$; $p < 0.01$) and environmental sustainability ($\bar{x} = 4.00$; $\bar{x} = 4.25$; $p < 0.05$) were different. As shown in Figure 3, it concludes that more environmental sustainability or sustainable practices are achieved when firms' top management is equipped with tangible competencies (e.g. quantitative background and analytical skills) with in-depth relevant knowledge. Firms also adapt better sustainable practices when TMTCs are interacted with RBNs ($\beta = 0.15$, $p < 0.05$).

Discussion and conclusion

The aims of this research were to assess the relationships between TMTCs, RBNs and environmental sustainability. We found that TMTCs were positively related to RBNs and environmental sustainability. RBNs were also positively correlated to environmental sustainability. Additionally, RBNs play a partial mediating role between TMTCs and environmental sustainability. These results support our theoretical framework underpinned by our hypothesis development.

Theoretical implications

The findings of this paper provide important insights to organizational theory by demonstrating how the interactions between individual-level competencies and skills and relationship-based networks influence environmental sustainability, drawing on the micro-foundations of the RBV and social network theory linked with trust and information sharing. Emerging sustainability studies at the individual level of analysis have focused more around understanding the role of green leadership and employees' pro-environmental behaviour in

sustainability (e.g. Kim *et al.*, 2014; Renwick, Redman and Maguire, 2013; Robertson and Barling, 2013); however, little research has been conducted in explicating the important role of micro-foundations and top management competencies in environmental sustainability. Thus we bring micro-foundations to the extant literature on environmental sustainability. In contrast to previous sustainability research that focused on the possession of specialist environmental competencies by companies (e.g. pollution prevention competencies, the ability to create green innovations or an organization's sustainability reputation) (e.g. Chen, Lai and Wen, 2006; Hart, 1995; Lourenço *et al.*, 2014), we particularly emphasize contemporary skills possessed by individuals (e.g. modern data-mining and analytical skills with social networking competencies) that are imperative for modern business operations, as these operations are being inundated with structured and unstructured data. We additionally contribute to the existing literature on environmental sustainability by providing specific and deeper insights on the linkages between the micro-foundations such as individuals' skills and competencies and RBNs rooted in social network theory and how these in turn affect environmental sustainability. Essentially, we establish a link between not only the micro-foundations and environmental sustainability, but also the micro-foundations and RBNs that partially mediate the correlation between TMTCs and environmental sustainability (Coleman, 1988; Powell, Koput and Smith-Doerr, 1996; Swan and Scarbrough, 2005).

These findings have important implications for the RBV and network theories. Recent scholarship from the RBV lens has begun to explore the micro-foundations of the RBV (Abell, Felin and Foss, 2008; Coff and Kryscynski, 2011; Foss, 2011; cf. Nyberg *et al.*, 2014), investigating *market factors* within HRM, most notably the unit-level human capital resource (cf. Nyberg *et al.*, 2014) and, within strategic management, the micro-foundations of value appropriation and the micro-foundations of firm-level heterogeneity (Foss, 2011). However, RBV scholarship has failed to explore the micro-foundations of *non-market factors*, most notably environmental sustainability (Frynas and Yamahaki, 2016), which our study helps to explore. We suggest that individual skills and competencies play an important role in enhancing environmental sustainability, in contrast to the previously popular view that resources

required for environmental sustainability 'depend upon large numbers of people or teams engaged in coordinated actions such that few individuals, if any, have sufficient breadth of knowledge to grasp the overall phenomenon' (Hart, 1995, p. 989). Hence we demonstrate that the micro-foundations of the RBV matter as much for environmental sustainability as they matter for HRM or strategic management. Furthermore, the ideas put forward in this paper echo the wider research on dynamic capabilities (e.g. Teece, 2007, 2014) as well, which upholds that an individual's characteristics directly influence sensing and seizing opportunities and firm performance.

These findings also have implications for network theories, as they emphasize the social and relational factors for economic activities (e.g. Burt, 1992; Granovetter, 1985; Schoenherr, Narasimhan and Bandyopadhyay, 2015); however, most of the research focus has been at the organizational level such as organization-wide networks and how these influence learning as well as organizational performance, thus ignoring the role of individuals' skills and competencies in the formation of RBNs. Therefore, we firmly bring micro-foundations into network-based theories and highlight the important role of individual skills and competencies in the formation of relational assets in the form of RBNs that lead to environmental sustainability.

In summary, this study contributes to extant research on environmental sustainability; in particular it identifies the micro-level variables and thus enhances our understanding of how individual skills and competencies may serve as the key foundations for environmental sustainability. It is one of the first attempts to link individuals' skills and competencies to the concept of environmental sustainability and RBNs. Answering the research call by Foss and colleagues (e.g. Felin and Foss, 2005; Felin, Foss and Ployhart, 2015; Foss, 2011) for an integrated view on the interactions between micro- and organizational-level analyses, this paper has identified possible individual-level skills and competencies for environmental sustainability. The interplay of individual skills and competencies and RBN considerations may be leveraged to develop organization-wide environmental practices.

Practical implications

The findings of this study have important implications for managers and policy makers.

Organizations are facing growing pressures from various stakeholders to improve their environmental performance. Understandably, green leadership and green management practices have received much attention. But our findings suggest that green leadership and new management practices should be accompanied by nurturing micro-level top management skills and competencies in order to improve organizations' environmental sustainability. Thus, organizations would benefit from investing and hiring managers and employees who have key skills and competencies relevant for improving environmental sustainability, as organizations navigate through the complex demands of various stakeholders.

In their selection of sustainability professionals, companies understandably tend to focus on sustainability-related skills and competencies (e.g. engineering skills or familiarity with ISO14000 and other management systems) and relational skills and competencies (e.g. publicity skills or the ability to negotiate with civil society and policy makers). But our findings suggest that tangible personal skills such as analytical expertise or knowledge of quantitative techniques play an important role in daily business operations and may improve environmental sustainability by quickly unpacking the knowledge and expertise required in managerial decisions on environmental sustainability. In fact, we think that data-savvy and analytically oriented top management can possibly make better decisions regarding environmental sustainability because they are better able to sift through a constantly growing wealth of data, especially in large, complex multinational companies with far-flung global operations.

The findings further suggest that quantitative education, data mining and analytical insights are important with regard to scanning external demand and pressure for better environmental sustainability. It is thus better to invest in analytical skills in order to predict customer demand for environment-friendly products. It can also help to quantify environmental performance and to identify external market opportunities for new businesses that depend on analytically-oriented workforce. Analytical characteristics also assist to build trusted-information exchange platforms, sharing best practices to build enduring RBNs for mutual benefits. Consequently, through such characteristics and network relationship firms together achieve better environmental

sustainability. The intensity of TMTCs and RBNs both together may provide better environmental sustainability. It is thus worthwhile to take on board that relationship-oriented firms may equip their top management with better tangible skills and relevant knowledge so they might apply analytics to achieve better sustainable practices.

Finally, policy makers should pay greater attention to the importance of the above-mentioned skills. On the one hand, policy makers need to employ more government officials with quantitative education or analytical skills in order to better evaluate corporate environmental performance or the success of existing government regulations. On the other hand, they could encourage the development of such skills through educational policies (e.g. by investing in the relevant educational institutions or rewarding universities that make quantitative skills obligatory in environmental management courses) and they could encourage the development of relevant RBNs (e.g. by removing any legal barriers to collaboration between corporations or by developing public programmes for the exchange of sustainability best practices in small and medium-sized enterprise clusters). In fact, we think that the lack of the required quantitative or analytical skills in government may be an important reason why environmental regulation sometimes fails to be successfully implemented and why regulation fails to improve corporate environmental performance, especially in developing/emerging economies whose governments often lack the relevant skilled professionals.

Limitations and future research

We acknowledge the limitations of our research, but we also recognize several valuable opportunities for further research on this topic, since scholarship examining the specific role of micro-foundations and network-based business relationships in environmental sustainability is still in its infancy. First, while we underpinned the theoretical grounds based on arguments raised by previous research and addressed endogeneity issues, no causal claims can be made as this is a non-experimental study. Future research might conduct in-depth longitudinal case studies to further unpack the interactions between individual competencies, networks and environmental

sustainability. Second, our study is based on one specific industry and future research would benefit from follow-up studies in other industries, given that the underlying constructs can behave differently in different industries. Finally, the role of TMTCs and RBNs may vary *inter alia* between different contexts due to the differences in home country and host country institutional environments, or they may vary between different points in time as contemporary business requirements and analytical techniques change due to technology and new business requirements and their connections with environmental sustainability. Therefore we suggest that future research would benefit by testing our model in different institutional contexts and at different time periods. Studies may also combine different measures, including top management competencies, specific leadership style, top management pro-social behaviour, employees' attitudes, norms and belief systems as well as HRM practices, and examine their impact on environmental sustainability.

In this paper, we focus only on environmental sustainability. We believe, however, that integrating social and financial measures of sustainability can provide important insights. Therefore, future studies can examine two-fold linkages regarding sustainability dimensions. First, sustainability may be tested as a multi-dimensional construct if these constructs do not show competing and contrasting effects, which will require a comprehensive scale development approach. Second, once the scales are developed, research can focus on the links between the dimensions that might reveal *inter alia* interesting results for those firms that believe that environmental sustainability is often achieved at the cost of financial loss.

Future research should also focus on pure technical skills of top management, how these skills can help them to make automated business decisions, to optimize business performance and to quantify micro-level environmental performance measures. As modern business operations are intensively inundated with data and analytics and technology (e.g. big data analytics and internet of things), this trend has thrown many challenges for managers and executives to continuously update their skills to remain part of the game. Researching the links between specific modern skills at micro-level and their impact on environmental performance outcomes at organizational level may provide valuable insights.

Appendix

Table A1. Constructs, brief item description and codes

Constructs	Brief item description	Codes
Top management tangible competencies (TMTCs) (Bennis and O'Toole, 2005; Chen, Chiang and Storey, 2012; Kor and Mahoney, 2005; Waller and Fawcett, 2013)	• I have in-depth business knowledge that helps towards an understanding of our business operations	TMTC_Ed1
	• I use network analytics to understand our business network operations	TMTC_Ed2
Education-based competencies	• I know key quantitative techniques for improving business operations (e.g. optimization techniques)	TMTC_Ed3
	• I have sufficient quantitative educational background to produce insights from big data	TMTC_Ed4
Experience-based competencies	• I have experience to understand complex import and export business operations	TMTC_Ex1
	• My experience in data mining helps our company to improve our business operations	TMTC_Ex2
	• My experience in quantitative analytics is the key determinant for our performance improvement	TMTC_Ex3
	• My experience in analytics helps our company to improve our key business operations	TMTC_Ex4
Analytical-based competencies	• Our analytical dashboard helps to create business opportunities	TMTC_An1
	• We frequently use analytical skills to predict customers' demand (e.g. buying patterns)	TMTC_An2
	• Our analytical skills are the key assets for our performance improvement	TMTC_An3
	• Our dashboard indicates the key analytical insights	TMTC_An4
	• We use analytics to create more external business opportunities (e.g. developing/opening a new branch)	TMTC_An5
	• Our analytics help us to quantify our performance	TMTC_An6
	• We pay special attention for analytical skills when we hire our employees	TMTC_An7
	• Our analytics strongly support our business strategy	TMTC_An8
	• Analytics help us to make automated decision making	TMTC_An9
Relationship-based business networks (RBNs) (Li *et al.*, 2010; Patnayakuni, Rai and Seth, 2006)	• We have created trusted information exchange systems for our RBNs	RBN1
	• We share our best practices for building better RBNs	RBN2
	• Our RBNs are based on mutual trust	RBN3
	• Overall, we have satisfactory relationships with business partners	RBN4
	• We have long term relationships with our strategic partners	RBN5
	• Both sides in the relationship do not make any demands that can hurt the relationship	RBN6
	• Our relationship network mechanisms are based on participatory decision making	RBN7
Sustainability (Hart, 1995; Rao *et al.*, 2006)	• Our total waste to output ratio is reducing	ES1
	• We strongly follow reusable packaging policy	ES2
Environmental sustainability	• Our material efficiency is increasing	ES3
	• Our energy consumption is decreasing	ES4
	• Our negative impacts on the natural environment are reducing	ES5

References

Aalbers, R., W. Dolfsma and O. Koppius (2014). 'Rich ties and innovative knowledge transfer within a firm', *British Journal of Management*, **25**, pp. 833–848.

Abdallah, W., M. Goergen and N. O'Sullivan (2015). 'Endogeneity: how failure to correct for it can cause wrong inferences and some remedies', *British Journal of Management*, **26**, pp. 791–804.

Abell, P., T. Felin and N. Foss (2008). 'Building micro-foundations for the routines, capabilities, and performance links', *Managerial and Decision Economics*, **29**, pp. 489–502.

Akhtar, P., M. Tse, Z. Khan and R. Rao-Nicholson (2015). 'Data-driven and adaptive leadership contributing to sustainability of global agri-food supply chains connected with emerging markets', *International Journal of Production Economics*, **181**, pp. 392–401.

Anderson, M. H. (2008). 'Social networks and the cognitive motivation to realize network opportunities: a study of managers' information gathering behaviors', *Journal of Organizational Behavior*, **29**, pp. 51–78.

Antonakis, J. and J. Dietz (2011). 'More on testing for validity instead of looking for it', *Personality and Individual Differences*, **50**, pp. 418–421.

Antonakis, J., S. Bendahan and R. Lalive (2014). Causality and endogeneity: problems and solutions. In D. V. Day (ed.), *The Oxford Handbook of Leadership and Organizations*, pp. 93–117. New York: Oxford University Press.

Antonakis, J., S. Bendahan, P. Jacquart and R. Lalive (2010). 'On making causal claims: a review and recommendations', *The Leadership Quarterly*, **21**, pp. 1086–1120.

Aragon-Correa, J. A. and S. Sharma (2003). 'A contingent resource-based view of proactive corporate environmental strategy', *Academy of Management Review*, **28**, pp. 71–88.

Bantel, K. A. and S. E. Jackson (1989). 'Top management and innovations in banking: does the composition of the top team make a difference?', *Strategic Management Journal*, **10**, pp. 107–124.

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

Barney, J. B. and M. H. Hansen (1994). 'Trustworthiness as a source of competitive advantage', *Strategic Management Journal*, **15**, pp. 175–190.

Baron, R. M. and D. A. Kenny (1986). 'The moderator–mediator variable distinction in social psychological research: conceptual, strategic, and statistical considerations', *Journal of Personality and Social Psychology*, **51**, pp. 1173–1182.

Barton, D. and D. Court (2012). 'Making advanced analytics work for you', *Harvard Business Review*, **90**, pp. 78–83.

Batt, P. J. (2003). 'Building trust between growers and market agents', *Supply Chain Management: An International Journal*, **8**, pp. 65–78.

Benito-Hernández, S., M. Platero-Jaime and P. Esteban-Sánchez (2016). 'The influence of cooperative relations of small businesses on environmental protection intensity', *Business Ethics: A European Review*, **25**, pp. 416–439.

Benn, L., P. D. Cousins, B. Squire, S. Vachon and R. D. Klassen (2006). 'Extending green practices across the supply chain: the impact of upstream and downstream integration', *International Journal of Operations and Production Management*, **26**, pp. 795–821.

Bennis, W. G. and J. O'Toole (2005). 'How business schools lost their way', *Harvard Business Review*, **83**, pp. 96–104.

Borgatti, S. P. and R. Cross (2003). 'A relational view of information seeking and learning in social networks', *Management Science*, **49**, pp. 432–445.

Bowen, F. (2007). 'Corporate social strategy: competing views from two theories of the firm', *Journal of Business Ethics*, **75**, pp. 97–113.

Brass, D. J., K. D. Butterfield and B. C. Skaggs (1998). 'Relationships and unethical behavior: a social network perspective', *Academy of Management Review*, **23**, pp. 14–31.

Brown, B., M. Chui and J. Manyika (2011). 'Are you ready for the era of "big data"', *McKinsey Quarterly*, **4**, pp. 24–35.

Burt, R. (1992). *Structural Holes: The Social Structure of Competition*. Cambridge, MA: Harvard University Press.

Canales, J. I. (2013). 'Constructing interlocking rationales in top-driven strategic renewal', *British Journal of Management*, **24**, pp. 498–514.

Casper, S. (2007). 'How do technology clusters emerge and become sustainable?: social network formation and inter-firm mobility within the San Diego biotechnology cluster', *Research Policy*, **36**, pp. 438–455.

Chen, S. (2009). 'Corporate responsibilities in internet-enabled social networks', *Journal of Business Ethics*, **90**, pp. 523–536.

Chen, H., R. H. Chiang and V. C. Storey (2012). 'Business intelligence and analytics: from big data to big impact', *MIS Quarterly*, **36**, pp. 1165–1188.

Chen, Y.-S., S.-B. Lai and C.-T. Wen (2006). 'The influence of green innovation performance on corporate advantage in Taiwan'. *Journal of Business Ethics*, **67**, pp. 331–339.

Chiang, C.-Y., C. Kocabasoglu-Hillmer and N. Suresh (2012). 'An empirical investigation of the impact of strategic sourcing and flexibility on firm's supply chain agility', *International Journal of Operations and Production Management*, **32**, pp. 49–78.

Chin, M., D. C. Hambrick and L. K. Treviño (2013). 'Political ideologies of CEOs: the influence of executives' values on corporate social responsibility', *Administrative Science Quarterly*, **58**, pp. 197–232.

Coff, R. and D. Kryscynski (2011). 'Invited editorial: Drilling for micro-foundations of human capital-based competitive advantages', *Journal of Management*, **37**, pp. 1429–1443.

Coleman, J. S. (1988). 'Social capital in the creation of human capital', *American Journal of Sociology*, **94**, pp. 95–120.

Collins, E., S. Lawrence, K. Pavlovich and C. Ryan (2007). 'Business networks and the uptake of sustainability practices: the case of New Zealand', *Journal of Cleaner Production*, **15**, pp. 729–740.

Cycyota, C. S. and D. A. Harrison (2006). 'What (not) to expect when surveying executives: a meta-analysis of top manager response rates and techniques over time', *Organizational Research Methods*, **9**, pp. 133–160.

DeShon, R. P. (1998). 'A cautionary note on measurement error corrections in structural equation models', *Psychological Methods*, **3**, pp. 412–423.

Doh, J. P. and N. R. Quigley (2014). 'Responsible leadership and stakeholder management: influence pathways and organizational outcomes', *Academy of Management Perspectives*, **28**, pp. 255–274.

Draulans, J., A. P. Deman and H. Volberda (2003). 'Building alliance capability: management techniques for superior

alliance performance', *Long Range Planning*, **36**, pp. 151–166.

Eisenhardt, K. M. (1989). 'Agency theory: an assessment and review', *Academy of Management Review*, **14**, pp. 57–74.

Epstein, M. J. and M.-J. Roy (2001). 'Sustainability in action: identifying and measuring the key performance drivers', *Long Range Planning*, **34**, pp. 585–604.

Evans, W. R. and W. D. Davis (2005). 'High-performance work systems and organizational performance: the mediating role of internal social structure', *Journal of Management*, **31**, pp. 758–775.

Fassin, Y., A. Werner, A. Van Rossem, S. Signori, E. Garriga, H. von Weltzien Hoivik and H.-J. Schlierer (2015). 'CSR and related terms in SME owner–managers' mental models in six European countries: national context matters', *Journal of Business Ethics*, **128**, pp. 433–456.

Felin, T. and N. J. Foss (2005). 'Strategic organization: a field in search of micro-foundations', *Strategic Organization*, **3**, p. 441.

Felin, T. and W. S. Hesterly (2007). 'The knowledge-based view, nested heterogeneity, and new value creation: philosophical considerations on the locus of knowledge', *Academy of Management Review*, **32**, pp. 195–218.

Felin, T., N. J. Foss and R. E. Ployhart (2015). 'The microfoundations movement in strategy and organization theory', *Academy of Management Annals*, **9**, pp. 575–632.

Felin, T., N. J. Foss, K. H. Heimeriks and T. L. Madsen (2012). 'Microfoundations of routines and capabilities: individuals, processes, and structure', *Journal of Management Studies*, **49**, pp. 1351–1374.

Ferlie, E., G. McGivern and A. De Moraes (2010). 'Developing a public interest school of management', *British Journal of Management*, **21**, pp. s60–s70.

Fisher, C. D. (2003). 'Why do lay people believe that satisfaction and performance are correlated? Possible sources of a commonsense theory', *Journal of Organizational Behavior*, **24**, pp. 753–777.

Foss, N. J. (2011). 'Why micro-foundations for resource-based theory are needed and what they may look like', *Journal of Management*, **37**, pp. 1413–1428.

Foss, N. J. and S. Lindenberg (2013). 'Microfoundations for strategy: a goal-framing perspective on the drivers of value creation', *Academy of Management Perspectives*, **27**, pp. 85–102.

Frandsen, F. and W. Johansen (2011). 'Rhetoric, climate change, and corporate identity management', *Management Communication Quarterly*, **25**, pp. 511–530.

Frone, M. R., M. Russell and M. L. Cooper (1994). 'Relationship between job and family satisfaction: causal or noncausal covariation?', *Journal of Management*, **20**, pp. 565–579.

Frynas, J. G. and C. Yamahaki (2016). 'Corporate social responsibility: review and roadmap of theoretical perspectives', *Business Ethics: A European Review*, **25**, pp.258–285.

Galaskiewicz, J. (2011). 'Studying supply chains from a social network perspective', *Journal of Supply Chain Management*, **47**, pp. 4–8.

Garbuio, M., A. W. King and D. Lovallo (2011). 'Looking inside psychological influences on structuring a firm's portfolio of resources', *Journal of Management*, **37**, pp. 1444–1463.

Gavetti, G. (2012). 'Toward a behavioral theory of strategy', *Organization Science*, **23**, pp. 267–285.

Giunipero, L. C., R. E. Hooker and D. Denslow (2012). 'Purchasing and supply management sustainability: drivers and barriers', *Journal of Purchasing and Supply Management*, **18**, pp. 258–269.

Godos-Díez, J.-L., R. Fernández-Gago and A. Martínez-Campillo (2011). 'How important are CEOs to CSR practices? An analysis of the mediating effect of the perceived role of ethics and social responsibility', *Journal of Business Ethics*, **98**, pp. 531–548.

Gond, J.-P., A. El Akremi, V. Swaen and N. Babu (2017). 'The psychological microfoundations of corporate social responsibility: a person-centric systematic review', *Journal of Organizational Behavior*, **38**, pp. 225–246.

González-Benito, J. and O. González-Benito (2005). 'An analysis of the relationship between environmental motivations and ISO14001 certification', *British Journal of Management*, **16**, pp. 133–148.

Granovetter, M. (1985). 'Economic action and social structure: the problem of embeddedness', *American Journal of Sociology*, **91**, pp. 481–510.

Grossman, E. B., H. Yli-Renko and R. Janakiraman (2012). 'Resource search, interpersonal similarity, and network tie valuation in nascent entrepreneurs' emerging networks', *Journal of Management*, **38**, pp. 1760–1787.

Hambrick, D. C. and P. A. Mason (1984). 'Upper echelons: the organization as a reflection of its top managers', *Academy of Management Review*, **9**, pp. 193–206.

Hambrick, D. C., T. S. Cho and M.-J. Chen (1996). 'The influence of top management team heterogeneity on firms' competitive moves', *Administrative Science Quarterly*, **41**, pp. 659–684.

Hamilton, B. H. and J. A. Nickerson (2003). 'Correcting for endogeneity in strategic management research', *Strategic Organization*, **1**, pp. 51–78.

Hansen, M. T. (1999). 'The search-transfer problem: the role of weak ties in sharing knowledge across organization subunits', *Administrative Science Quarterly*, **44**, pp. 82–111.

Hart, S. L. (1995). 'A natural-resource-based view of the firm', *Academy of Management Review*, **20**, pp. 986–1014.

Helfat, C. E. and M. A. Peteraf (2015). 'Managerial cognitive capabilities and the microfoundations of dynamic capabilities', *Strategic Management Journal*, **36**, pp. 831–850.

Helfat, C. E. and S. G. Winter (2011). 'Untangling dynamic and operational capabilities: strategy for the (n)ever-changing world', *Strategic Management Journal*, **32**, pp. 1243–1250.

Hillenbrand, C., K. Money and A. Ghobadian (2013). 'Unpacking the mechanism by which corporate responsibility impacts stakeholder relationships', *British Journal of Management*, **24**, pp. 127–146.

Husted, B. W. and D. B. Allen (2007). 'Strategic corporate social responsibility and value creation among large firms: lessons from the Spanish experience', *Long Range Planning*, **40**, pp. 594–610.

Inkpen, A. C. and E. W. K. Tsang (2005). 'Social capital, networks, and knowledge transfer', *Academy of Management Review*, **30**, pp. 146–165.

Kim, A., Y. Kim, K. Han, S. E. Jackson and R. E. Ployhart (2014). 'Multilevel influences on voluntary workplace green behavior individual differences, leader behavior, and coworker advocacy', *Journal of Management*, **43**, pp. 1335–1358.

Kline, R. B. (2011). *Principles and Practice of Structural Equation Modeling*. New York: Guilford Press.

Kor, Y. Y. and J. T. Mahoney (2005). 'How dynamics, management, and governance of resource deployments influence

firm-level performance', *Strategic Management Journal*, **26**, pp. 489–496.

Kor, Y. Y. and A. Mesko (2013). 'Dynamic managerial capabilities: configuration and orchestration of top executives' capabilities and the firm's dominant logic', *Strategic Management Journal*, **34**, pp. 233–244.

Kraaijenbrink, J., J.-C. Spender and A. J. Groen (2010). 'The resource-based view: a review and assessment of its critiques', *Journal of Management*, **36**, pp. 349–372.

Kyrgidou, L. P. and S. Spyropoulou (2013). 'Drivers and performance outcomes of innovativeness: an empirical study', *British Journal of Management*, **24**, pp. 281–298.

Lado, A. A., N. G. Boyd and P. Wright (1992). 'A competency-based model of sustainable competitive advantage: toward a conceptual integration', *Journal of Management*, **18**, pp. 77–91.

LaValle, S., E. Lesser, R. Shockley, M. S. Hopkins and N. Kruschwitz (2013). 'Big data, analytics and the path from insights to value', *MIT Sloan Management Review*, **21**, pp. 20–32.

Ledgard, S. F., M. Lieffering, D. Coup and B. O'Brien (2011). 'Carbon footprinting of New Zealand lamb from the perspective of an exporting nation', *Animal Frontiers*, **1**, pp. 40–45.

Levin, D. Z. and R. Cross (2004). 'The strength of weak ties you can trust: the mediating role of trust in effective knowledge transfer', *Management Science*, **50**, pp. 1477–1490.

Li, Y., E. Xie, H.-H. Teo and M. W. Peng (2010). 'Formal control and social control in domestic and international buyer–supplier relationships', *Journal of Operations Management*, **28**, pp. 333–344.

Lindell, M. K. and D. J. Whitney (2001). 'Accounting for common method variance in cross-sectional research designs', *Journal of Applied Psychology*, **86**, pp. 114–121.

Litz, R. A. (1996). 'A resource-based view of the socially responsible firm: stakeholder interdependence, ethical awareness, and issue responsiveness as strategic assets', *Journal of Business Ethics*, **15**, pp. 1355–1363.

Lourenço, I. C., J. L. Callen, M. C. Branco and J. D. Curto (2014). 'The value relevance of reputation for sustainability leadership'. *Journal of Business Ethics*, **119**, pp. 17–28.

Lozano, R. (2015). 'A holistic perspective on corporate sustainability drivers', *Corporate Social Responsibility and Environmental Management*, **22**, pp. 32–44.

Maak, T. and N. M. Pless (2006). 'Responsible leadership in a stakeholder society – a relational perspective', *Journal of Business Ethics*, **66**, pp. 99–115.

Malhotra, N. K., S. S. Kim and A. Patil (2006). 'Common method variance in IS research: a comparison of alternative approaches and a reanalysis of past research', *Management Science*, **52**, pp. 1865–1883.

McAfee, A. and E. Brynjolfsson (2012). 'Big data: the management revolution', *Harvard Business Review*, **90**, pp. 61–67.

McWilliams, A. and D. S. Siegel (2011). 'Creating and capturing value strategic corporate social responsibility, resource-based theory, and sustainable competitive advantage', *Journal of Management*, **37**, pp. 1480–1495.

Mehta R., J. A. Dubinsky and E. R. Anderson (2003). 'Leadership style, motivation and performance in international marketing channels: an empirical investigation of USA, Finland and Poland', *European Journal of Marketing*, **37**, pp. 50–78.

Mellahi, K. and L. C. Harris (2016). 'Response rates in business and management research: an overview of current practice and suggestions for future direction', *British Journal of Management*, **27**, pp. 426–437.

Mellahi, K., J. G. Frynas, P. Sun and D. Siegel (2016). 'A review of the nonmarket strategy literature: toward a multi-theoretical integration', *Journal of Management*, **42**, pp. 143–173.

Miemczyk, J., T. E. Johnsen and M. Macquet (2012). 'Sustainable purchasing and supply management: a structured literature review of definitions and measures at the dyad, chain and network levels', *Supply Chain Management: An International Journal*, **17**, pp. 478–496.

Morgeson, F. P., H. Aguinis, D. A. Waldman and D. S. Siegel (2013). 'Extending corporate social responsibility research to the human resource management and organizational behavior domains: a look to the future', *Personnel Psychology*, **66**, pp. 805–824.

Nyberg, A. J., T. P. Moliterno, D. Hale and D. P. Lepak (2014). 'Resource-based perspectives on unit-level human capital: a review and integration', *Journal of Management*, **40**, pp. 316–346.

Orlitzky, M., D. S. Siegel and D. A. Waldman (2011). 'Strategic corporate social responsibility and environmental sustainability', *Business and Society*, **50**, pp. 6–27.

Patnayakuni, R., A. Rai and N. Seth (2006). 'Relational antecedents of information flow integration for supply chain coordination', *Journal of Management Information Systems*, **23**, pp. 13–49.

Podsakoff, P. M., S. B. MacKenzie, J.-Y. Lee and N. P. Podsakoff (2003). 'Common method biases in behavioral research: a critical review of the literature and recommended remedies', *Journal of Applied Psychology*, **88**, pp. 879–903.

Powell, W. W., K. W. Koput and L. Smith-Doerr (1996). 'Interorganizational collaboration and the locus of innovation: networks of learning in biotechnology', *Administrative Science Quarterly*, **41**, pp. 116–145.

Preacher, K. J. and A. F. Hayes (2008). 'Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models', *Behavior Research Methods*, **40**, pp. 879–891.

Qin, D. (2015). 'Time to demystify endogeneity bias', SOAS, University of London, UK. Department of Economics Working Paper.

Rao, P. and D. Holt (2005). 'Do green supply chains lead to competitiveness and economic performance?', *International Journal of Operations and Production Management*, **25**, pp. 898–916.

Rao, P., O. La O'Castillo, P. S. Intal Jr and A. Sajid (2006). 'Environmental indicators for small and medium enterprises in the Philippines: an empirical research', *Journal of Cleaner Production*, **14**, pp. 505–515.

Rass, M., M. Dumbach, F. Danzinger, A. C. Bullinger and K. M. Moeslein (2013). 'Open innovation and firm performance: the mediating role of social capital', *Creativity and Innovation Management*, **22**, pp. 177–194.

Renwick, D. W., T. Redman and S. Maguire (2013). 'Green human resource management: a review and research agenda', *International Journal of Management Reviews*, **15**, pp. 1–14.

Robertson, J. L. and J. Barling (2013). 'Greening organizations through leaders' influence on employees' pro-environmental behaviors', *Journal of Organizational Behavior*, **34**, pp. 176–194.

Roome, N. (2001). 'Conceptualizing and studying the contribution of networks in environmental management and sustainable development', *Business Strategy and the Environment*, **10**, pp. 69–76.

Rueda-Manzanares, A., J. A. Aragón-Correa and S. Sharma (2008). 'The influence of stakeholders on the environmental strategy of service firms: the moderating effects of complexity, uncertainty and munificence', *British Journal of Management*, **19**, pp. 185–203.

Russo, M. V. and P. A. Fouts (1997). 'A resource-based perspective on corporate environmental performance and profitability', *Academy of Management Journal*, **40**, pp. 534–559.

Schewe, R. (2011). 'Two wrongs don't make a right: state and private organic certification in New Zealand dairy', *Environment and Planning*, **43**, pp. 1421–1437.

Schoenherr, T. and C. Speier-Pero (2015). 'Data science, predictive analytics, and big data in supply chain management: current state and future potential', *Journal of Business Logistics*, **36**, pp. 120–132.

Schoenherr, T., R. Narasimhan and P. Bandyopadhyay (2015). 'The assurance of food safety in supply chains via relational networking: a social network perspective', *International Journal of Operations and Production Management*, **35**, pp. 1662–1687.

Sekaran, U. (2000). *Research Methods for Business: A Skill-building Approach*. New York: Wiley.

Sheremata, W., P. H. Lee and T. Medcof (2010). '"Any" industry experience, diversity, and systems innovation: the complexities of TMT composition', *Academy of Management Annual Meeting Proceedings*, https://doi.org/10.5465/AMBPP.2010.54503678.

Siegel, D. S. (2009). 'Green management matters only if it yields more green: an economic/strategic perspective', *Academy of Management Perspectives*, **23**, pp. 5–16.

Simpson, D. F. and D. J. Power (2005). 'Use the supply relationship to develop lean and green suppliers', *Supply Chain Management: An International Journal*, **10**, pp. 60–68.

Sobel, M. E. (1982). 'Asymptotic confidence intervals for indirect effects in structural equation models'. In I. S. Leinhardt (ed.), *Sociological Methodology 1982*, pp. 290–312. San Francisco, CA: Jossey-Bass.

Sol, J., P. J. Beers and A. E. Wals (2013). 'Social learning in regional innovation networks: trust, commitment and reframing as emergent properties of interaction', *Journal of Cleaner Production*, **49**, pp. 35–43.

Spriggs, J., J. Hobbs and A. Fearne (2000). 'Beef producer attitudes to coordination and quality assurance in Canada and the UK', *International Food and Agriculture Management Review*, **3**, pp. 95–109.

Stea, D., T. Pedersen and N. J. Foss (2016). 'The relational antecedents of interpersonal helping: "quantity","quality" or both?', *British Journal of Management*, **28**, pp. 197–212.

Swan, J. and H. Scarbrough (2005). 'The politics of networked innovation', *Human Relations*, **58**, pp. 913–943.

Tan, K. H., Y. Zhan, G. Ji, F. Ye and C. Chang (2015). 'Harvesting big data to enhance supply chain innovation capabilities: an analytic infrastructure based on deduction graph', *International Journal of Production Economics*, **165**, pp. 223–233.

Teece, D. J. (2007). 'Explicating dynamic capabilities: the nature and microfoundations of (sustainable) enterprise performance', *Strategic Management Journal*, **28**, pp. 1319–1350.

Teece, D. J. (2014). 'A dynamic capabilities-based entrepreneurial theory of the multinational enterprise', *Journal of International Business Studies*, **45**, pp. 8–37.

Tortoriello, M. and D. Krackhardt (2010). 'Activating cross-boundary knowledge: the role of Simmelian ties in the generation of innovations', *Academy of Management Journal*, **53**, pp. 167–181.

Tortoriello, M., R. Reagans and B. McEvily (2012). 'Bridging the knowledge gap: the influence of strong ties, network cohesion, and network range on the transfer of knowledge between organizational units', *Organization Science*, **23**, pp. 1024–1039.

Tourangeau, R., L. J. Rips and K. Rasinski (2000). *The Psychology of Survey Response*. New York: Cambridge University Press.

Tsai, W. and S. Ghoshal (1998). 'Social capital and value creation: the role of intrafirm networks', *Academy of Management Journal*, **41**, pp. 464–476.

Uzzi, B. (1996). 'The sources and consequences of embeddedness for the economic performance of organizations: the network effect', *American Sociological Review*, **61**, pp. 674–698.

Von Hippel, E. (1998). 'Economics of product development by users: the impact of "sticky" local information', *Management Science*, **44**, pp. 629–644.

Vurro, C., A. Russo and F. Perrini (2009). 'Shaping sustainable value chains: network determinants of supply chain governance models', *Journal of Business Ethics*, **90**, pp. 607–621.

Waldman, D. A. and R. M. Balven (2014). 'Responsible leadership: theoretical issues and research directions', *Academy of Management Perspectives*, **28**, pp. 224–234.

Waldman, D. A., D. S. Siegel and M. Javidan (2006). 'Components of CEO transformational leadership and corporate social responsibility', *Journal of Management Studies*, **43**, pp. 1703–1725.

Waller, M. A. and S. E. Fawcett (2013). 'Data science, predictive analytics, and big data: a revolution that will transform supply chain design and management', *Journal of Business Logistics*, **34**, pp. 77–84.

Wernerfelt, B. (1984). 'A resource-based view of the firm', *Strategic Management Journal*, **5**, pp. 171–180.

Wiersema, M. F. and K. A. Bantel (1992). 'Top management team demography and corporate strategic change', *Academy of Management Journal*, **35**, pp. 91–121.

Wincent, J., S. Thorgren and S. Anokhin (2013). 'Managing maturing government-supported networks: the shift from monitoring to embeddedness controls', *British Journal of Management*, **24**, pp. 480–497.

Winter, G. (1987). 'Knowledge and competence as strategic assets'. In D. J. Teece (ed.), *The Competitive Challenge: Strategies for Industrial Innovation and Renewal*, pp. 159–184. Cambridge, MA: Ballinger.

Yli-Renko, H., E. Autio and H. J. Sapienza (2001). 'Social capital, knowledge acquisition, and knowledge exploitation in young technology-based firms', *Strategic Management Journal*, **22**, pp. 587–613.

Yu, M. and A. Nagurney (2013). 'Competitive food supply chain networks with application to fresh produce', *European Journal of Operational Research*, **224**, pp. 273–282.

Zaheer, A., B. McEvily and V. Perrone (1998). 'Does trust matter? Exploring the effects of interorganizational and interpersonal trust on performance', *Organization Science*, **9**, pp. 141–159.

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