

**SMALL AND MEDIUM ENTERPRISE (SME) RESEARCH IN SCM: THE CASE FOR  
SINGLE-RESPONDENT RESEARCH DESIGNS**

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# **SMALL AND MEDIUM ENTERPRISE (SME) RESEARCH IN SCM: THE CASE FOR SINGLE-RESPONDENT RESEARCH DESIGNS**

## **ABSTRACT**

Deciding on the number of respondents in a data collection instrument is a key design consideration requiring supply chain researchers to balance multiple competing factors. The debate on this respondent design question may unintentionally disregard over 95% of enterprises engaged in supply chains: small and medium enterprises (SMEs). We present arguments for why single-respondent designs can be more appropriate in the SME setting, particularly when considering the various facets of supply chain management and the untapped potential of SCM-SME research. Assuring that SCM theoretical frameworks and research designs allow for SME inclusion will be important in aiding the SCM field to progress forward.

## **INTRODUCTION**

There is currently a debate as to whether single-respondent data collection methods are appropriate for the supply chain management (SCM) discipline. This arises from a concern to align research methods with the characteristics of supply chain phenomena, and a general concern to enhance the quality of SCM research. The more general concern militates the SCM field toward following other disciplines within business and management by greatly reducing the use of single-respondent survey methods. In this article, we focus on these questions as they apply to SCM research involving small and medium enterprises (SMEs), and argue that there are a number of factors in research of this kind that tend to make single-respondent methods appropriate under certain circumstances.

Our initial reason for examining the single-respondent question in relation to SMEs was a suspicion that, especially in small firms, it could be impossible to find more than one respondent sufficiently knowledgeable to provide a well-informed response. As we explain below, SMEs represent the vast majority of firms in most economies: so, if we were to insist on research designs that required multiple respondents per firm, there is a risk that we would not be able to collect data from the majority of supply chain firms – that is, SMEs. However, as we explore more widely the way SMEs have been and could be researched in the context of SCM, other considerations affecting the validity of single-respondent survey methods also become apparent. Some of these arise from the characteristics of SMEs and the divergence of these characteristics from the large-firm assumptions that originally gave rise to fundamental SCM concepts. Others arise from a tendency to use a firm-level unit of analysis to examine phenomena that are more meaningfully understood at the level of the supply chain or network. This particularly affects SMEs because they are often seeking to negotiate a supply chain context strongly shaped by dominant, major firms in the chain. We examine the nature of SMEs, draw on SME and family business research, and try to understand the implications for survey methods in SCM-SME research.

It is useful to set our discussion against relevant definitions of SCM. Two common definitions are as follows:

*The design and management of seamless, value-added processes across organizational boundaries to meet the real needs of the end customer* (Institute for Supply Management)

*Supply chain management encompasses the planning and management of all activities involved in sourcing and procurement, conversion, and all logistics management activities. Importantly, it also includes coordination and collaboration with channel partners, which can be suppliers, intermediaries, third party service providers, and customers* (Council of Supply Chain Management Professionals)

What we see common to both definitions is that SCM entails actively designing, planning, and managing processes and collaborations. While in large firms these activities likely involve numerous people and departments, in SMEs such disparate involvement may not be the case – SCM-SME activities are likely carried on by one or very few organizational members. We also see in these definitions an emphasis on spanning boundaries to meet customer needs: SCM can include both within- and between-firm methods. SCM-SME activities often have an inter-family characteristic not as common in large firms (Luo & Chung 2005). Thus, whether single-firm or multi-firm constructs are of interest, special treatment is required in SCM research that allows for inclusion of SMEs so to represent actual supply chain phenomena.

We present our perspective in the following manner. In the next section, we review SME research in the general management literature to show how inclusion (rather than exclusion) of SME research has benefited that field. We also highlight the implications of differences between SMEs and large firms for SCM theory and research. Next, we describe the state of SME research in SCM, suggesting that our field has an obligation to go further in understanding SCM-SME phenomena and that single-respondent approaches may help. We conclude with suggestions on where our field can go next and what role single-respondent methods have for the progressions of SCM science.

## **SME CHARACTERISTICS AND SUPPLY CHAIN MANAGEMENT**

Although the definition of SME varies across legal and institutional frameworks, public data suggests that SMEs continue to constitute the great majority of business organizations around the world. According to the statistics compiled by the US Small Business Administration (2016), there are 29.6 million businesses that employ fewer than 500 employees, suggesting that

SMEs represent 99.9% of all firms and employ 47.8% of the private sector workforce in the US. The European Commission defines SMEs as firms having fewer than 250 employees, an annual turnover of up to EUR 50 million, or a balance sheet total of no more than EUR 43 million. According to this definition, SMEs represent 99% of all firms in Europe, employing 66.7% of the European workforce and contributing for 58.6 % of value added within the non-financial business economy (Eurostat, 2011). In emerging and transitioning economies, the proportion and economic impact of SMEs is even greater. This numerical dominance of SMEs means that understanding any area of business management requires the inclusion of SME data.

Early management research, however, largely disregarded SMEs and focused most attention on understanding the strategic behaviors and performance of large, complex, and multi-national enterprises. Yet, from the 1970s, researchers started to increasingly appreciate the importance of SMEs, as evidenced by the rise of dedicated journals (e.g., *Entrepreneurship Theory & Practice*, *the Journal of Small Business Management*, *Small Business Economics*, among many others). As well as enhancing knowledge about SMEs, this research revealed to management scholars the potential contribution that studying SMEs could provide to the general management literature: perhaps most notably in relation to understanding how firms address critical challenges such as change, modernization, agglomeration, and growth. Another important contribution of SMEs that attracted substantial attention in management research is the production of a resource that is considered essential for an economy - that is, a continued supply of entrepreneurs (e.g., Boswell, 1973). For these reasons, the last three decades have witnessed an impressive growth in the attention paid to SMEs in management research.

Because of their prevalence, it is perhaps obvious that SMEs play an important role in supply chains around the world. For example, according to the Organization for Economic

Cooperation and Development, SMEs “account for between a quarter and two-fifths of worldwide manufactured exports” (OECD, 2002: 13), suggesting that these firms contribute substantial inputs to global manufacturing processes. In fact, in a globalized and interconnected economy, supply chains are becoming increasingly extended and complex, involving not only direct material suppliers and customers, but also involving a variety of small firms focused on indirect operations such as fabrication, testing, purchasing, transportation, and distribution (Cook and Garver, 2002; Larson and Halldorsson, 2002). This is due, in part, to the development of market-supporting institutions (e.g., standards) and information technology that reduces communications costs (Langlois 2003). Hence, an increasing number of firms are specializing in activities (e.g. logistics) that previously were performed in-house by large, vertically integrated firms. Thus, SMEs are more and more influential in supply chains (Hvolby and Trienekens 2002), and supply chain interconnections among SMEs are becoming increasingly critical factors for competitive advantage (e.g., Christopher and Towill 2002; Bayraktar et al., 2009; Lenny Koh et al., 2007; Sukwadi, Wee, & Yang, 2013).

### **Identifying and Leveraging SME Differences for SCM Research**

Unfortunately, the growing attention given to SMEs in general management research has not been paralleled in SCM literature, and the distinctive opportunities and challenges that SCM entails for SMEs are still little studied and understood. SMEs differ from their larger counterparts in critical dimensions that are likely to influence their approach toward SCM. Research indicates that SMEs have greater scale constraints that limit their ability to invest in productive assets and develop international channels (e.g., Mesquita & Lazzarini, 2008). In addition, SMEs have lower bargaining power and reputation, which in turn create higher transaction costs in inter-firm relationships (e.g., Arend & Wisner, 2005). Building on this

research, we articulate our analysis along three important dimensions: strategic goals, governance structures, and resources. These dimensions not only characterize key differences between SMEs and larger firms, but also entail substantial heterogeneity among SMEs. Hence, we believe the dimensions can provide important and nuanced insights about SCM in the SME context.

First, prior research suggests that SMEs have significantly different as well as more diverse goals than larger firms. The great majority of SMEs is indeed owned and managed by a founder or a founding family (La Porta et al., 1999) who pursues a wide assortment of financial and non-financial goals (Carney, 2005; Chrisman et al., 2012; Kotlar & De Massis, 2013; Kotlar et al., 2017). Thus, the goals of SMEs are generally more heterogeneous than those of larger firms that are likely to be characterized by dispersed ownership, professional management, and, thus, a greater emphasis on financial concerns such as profits and growth (e.g., Shinkle, 2012). In SMEs, non-financial goals focus on the fulfillment of the founder's or the family's social and affective needs through involvement in the firm. This includes a sense of belonging and intimacy, as well as the ability to exercise authority within the firm, to provide benefits to family members and associates, and to perpetuate the firm's founding identity and values through dynastic succession (Berrone, Cruz, & Gomez-Mejia, 2012). These non-financial goals can either align or conflict with the financial goals of the firm (Chrisman & Patel, 2012; Gómez-Mejía et al., 2007; Zellweger & Nason, 2008), and research in general management has recently highlighted important implications of these trade-offs on both firm behaviors and performance (e.g., Gómez-Mejía et al., 2011; Miller, Le Breton-Miller, & Lester, 2013).

Second, SMEs are characterized by concentrated governance structures that isolate managers from the scrutiny of the market for corporate control and provide them with great

discretion to follow idiosyncratic strategies (Carney, 2005). The voting rights deriving from concentrated ownership, combined with overlap between ownership and management (Jensen & Meckling, 1976), grant SMEs' management substantial authority over decision-making and isolate managers from the interference of other stakeholders. This, in turn, provides opportunities for owners and managers to provide benevolent contracts for the members of the controlling family (Cruz, Gómez-Mejía, & Becerra, 2010; Gómez-Mejía, Larraza-Kintana, & Makri, 2003) and less formalized management practices (Carney, 2005). As such, it entails lower procedural rigor, making decisions sometimes less predictable and more capricious but also potentially more responsive and entrepreneurial. This governance setting has important consequences for strategic decisions and outcomes. Some scholars argue that the governance structures of SMEs allow them to take bold decisions (Zahra, 2005), whereas other scholars underscore their potential negative consequences, such as risk-aversion, path-dependency, and inertia (Morck, Stangeland, & Yeung, 1998).

Finally, the differences between SMEs and larger firms also stems from unique resources and liabilities that arise from the close interaction between family and business systems, including financial, human, and social capital (Habbershon & Williams, 1999). For example, informal communication channels contribute to SMEs' social capital in the form of bonding ties within the firm and bridging ties with external stakeholders (Arregle et al., 2007; Pearson, Carr, & Shaw, 2008). Yet, SMEs also suffer limited access to talent that is due, in part, to less attractive human resource policies (Chrisman, Memili, & Misra, 2014). Similarly, SMEs' emphasis on multiple goals sometimes lead to self-control issues and sub-optimal allocation of financial resources (De Massis et al., 2016; Schulze, Lubatkin, & Dino, 2003; Schulze et al., 2001). In sum, SMEs have advantages in accessing some resources such as tacit knowledge,



social capital, and inter-personal bonds, but also disadvantages in accessing other resources such as professional managers, technical assets, and external financing (Gedajlovic & Carney, 2010).

A renewed attention to these major dimensions of differences between small and large firms (among many others) has led to a significant enrichment of general management scholarship. SME research has broadened the range of phenomena studied, enriched existing theoretical perspectives while creating new ones, tested theory in broader and more generalizable contexts, and increased the relevance of management research to reflect the proportion and contribution of SME firms in global economies. Most importantly, this body of research has showed that SMEs are a significantly more heterogeneous group of firms than their larger counterparts. By overlooking SMEs in general, and the abovementioned dimensions of SME heterogeneity in particular, existing theory and research on SCM may have missed important opportunities.

These “missing links” become clearly apparent when considering the SCM research framework developed by Chen and Paulraj (2004). For example, heterogeneity in goals, governance, and resources among SMEs may influence the antecedents of SCM. Goal differences (e.g., the relative emphasis on financial and non-financial goals) may influence how managers perceive environmental uncertainty and how they respond to it (e.g., Gómez-Mejía et al., 2007). The extent to which top managers are willing to provide time and resources toward managing supplier relationships is likely to depend on the availability of slack in terms of financial and administrative resources that can be deployed to such activities (e.g., De Massis et al., 2016; George, 2005). Likewise, considering different governance configurations in terms of firm ownership and management can help explain how owner-managers of SMEs discriminate between different contracting modes (Uzzi, 1997) and establish recurrent contracts with

preferred suppliers (Carney, 2005). Heterogeneity in goals, governance, and resources have also implications for supply network structure, buyer-supplier relationships, and vertical integration that collectively constitute fundamental elements of a supply chain's structure (Chen and Paulraj, 2004). For example, the importance of non-financial goals, such as preserving the founding identity, increases SMEs' concern for corporate reputation (e.g., Zellweger et al., 2013) that may, in turn, explain the size and variety of supply networks in which SMEs are willing to engage. Similarly, trust is a critical resource for SMEs (e.g., Steier, 2001) that may be developed through repeated transactions rather than contractual arrangements and, thus, may critically influence the design of buyer-supplier relationships (Feranita, Kotlar, and De Massis, 2017). Finally, non-financial goals such as preserving the founding family's control may critically influence SMEs' willingness to integrate activities with supply chain partners. For example Gómez-Mejía et al. (2007) show that because of differences in goals, firms prefer remaining independent from cooperative organizations even if doing so implies accepting greater business risk.

Taken together, these examples suggest that heterogeneity in goals, governance, and resources among SMEs have important implications for the antecedents and structure of SCM. However, existing research provides only indirect insights on these links. Arguably then, there is little doubt that integrating insights about SMEs will offer opportunities for extending existing theory in SCM research so to provide more accurate and powerful explanations of SCM performance. Consequently, our field should be cautious of research designs that might exclude the pursuit of this opportunity. An aversion to single-respondent designs could create such an exclusion. In the next section, we discuss SCM-SME opportunities in greater detail and in relationship to respondent designs.

## **OPPORTUNITIES IN SME-SUPPLY CHAIN RESEARCH**

Integration is arguably the ‘big idea’ in SCM, flowing from the insights of Forrester (1958) that it was necessary to understand phenomena of the system, not just the individual entity. Houlihan’s (1984) early conceptualisation of SCM was about internal integration – integrating the differentiated functions within the firm, such as procurement, production, and distribution. SCM’s scope was quickly extended to include inter-firm issues, typically by seeking the benefits of integration beyond the firm without outright ownership (Blois, 1972) – that is, external integration. A great deal of research has examined the effect and interaction of both external and internal integration on firm performance (e.g. Frohlich and Westbrook, 2001; Flynn, Huo and Zhao, 2010; Schoenherr and Swink, 2012). The evidence suggests that various forms of both internal and external integration improve firm performance and that contingencies such as demand uncertainty (van Donk and van der Vaart, 2005) determine the extent to which integration improves performance. Further studies suggest that contingencies such as environmental uncertainty affect the extent to which either internal or external integration improves firm performance on different dimensions of operational performance, such as delivery, cost, quality, and flexibility (Wong, Boon-itt., and Wong, 2011).

The central concern with supply chain integration has implications for the treatment of SMEs in SCM research. The early focus on internal integration suggests that SCM has its origins in large-firm concerns. SME firms – especially those at the ‘small’ end of the SME spectrum – typically do not have the scale to warrant specialised functions and, hence, have less of a need to solve the problem of integrating them. Medium-sized firms might have some concerns, but arguably not to the extent that large firms most certainly experience. Moreover, as discussed above, SMEs that are family-owned and controlled often have a distinctively coherent sense of

purpose and, hence, have less need for deliberate integration programmes or formal SCM practices for increasing integration. This suggests that many of the data-collection instruments that seek to measure internal integration may be inappropriate for SMEs because such instruments seek to measure a meaningless or minor phenomenon in smaller firms.

While all firms have supply chain relationships in that they buy from suppliers and sell to customers, to actively engage in SCM means more than this, especially as understood from recent literature and as characterised in the definitions in the Introduction. The normative implications of SCM integration research are that firms should take action to undertake integration with their counterparts by, for example, sharing information, planning jointly, co-developing products, and using common information systems (e.g. see measurement scales in Flynn et al., 2010; Wong et al, 2011). This view of SCM is rooted in models from the automotive, electronics, and clothing industries, which see large OEMs or brand owners determining and implementing strategies to manage their internal supply chains and external supply bases (Bates and Slack, 1998). Under this view of SCM, information sharing and joint planning may be rather one-sided, with SMEs ‘integrating’ on terms determined by their larger counterparts. Furthermore, major corporate supply chain actors may, as discussed, have very different types of goal to those of SMEs, especially SMEs that are family-owned.

However, the framing of SCM theory and empirical research typically neglects the kind of distinctive features of SMEs that we have identified above. On the rare occasions when SMEs have been explicitly foregrounded in SCM research, it has often been to draw attention to their inadequacies; several studies investigate the difficulties faced by SMEs in adopting SCM technologies such as e-business and CRM (Harland et al., 2007; Rahbek Pedersen, 2009) that are desired by the SMEs’ larger customers. Interestingly, widely-cited papers on supply chain

integration use samples that do include large percentages of firms qualifying as SMEs by virtue of their number of employees or turnover (Flynn et al., 2010; Wong et al, 2011). While it is welcome and important that SMEs are included in these studies, it is perhaps problematic that they are researched using frameworks and concepts that have their origins in large-firm concerns and potentialities. Large firms see contemporary SCM practices as a way to overcome internal integration problems, and this may be irrelevant or trivial to SME firms. And large-firm SCM may be a threat to SME performance. Indeed, large firms have more relative power to promote and propagate contemporary SCM practices that suit their individual strategies, whereas SMEs often take a passive and compliant role, even though they do engage in interactions with upstream and downstream counterparts.

An opportunity, therefore, exists for the SCM field to develop new insights by more systematically and appropriately researching SME firms. We provide a list of potential research questions in Table 1. Yet, if our methodological norms conflict with this direction of development, then an opportunity will be lost. Recently, a SCM, dyadic study by Roh et al (2013) compared results from single, one-sided-responses versus multiple, dual-sided responses to dyadic constructs (e.g., relationship satisfaction). The study, which did not explicitly focus on SMEs, found that “when perceptual agreement exists, single-rater data may be appropriate to use in multi-stakeholder research” (p. 722). Low perceptual agreement, on the other hand, led to erroneous outcomes. Opportunities, therefore, exists with SMEs. First, when SCM is internally focused, not only is perceptual agreement much more likely, SCM is also less of a multi-stakeholder construct. Particularly with family SMEs, their top management teams are typically dominated by family members (e.g., De Massis et al., 2015), which has been shown to reduce information asymmetries, monitoring costs, and control costs (Cruz et al., 2010; Gómez-Mejía,

et al., 2003). While the implication still needs assessment, the literature suggests that in SMEs perceptual agreement will be generally high. Second, when SCM is externally focused, there still appears room for opportunity for single-respondent designs so long as perceptual agreement is established. Evidence shows that boundary-spanning personal are especially adept in characterizing network phenomena (Calloway et al. 1993), the likelihood of which increases particularly when the networks are SME-to-SME. We explore this further in our subsequent section on respondent designs.

< INSERT TABLE 1 >

### **Opportunities Beyond the Focal-Firm View**

Much supply chain research, such as studies of the effect of integration on performance (e.g. Frohlich and Westbrook, 2001), typically take a focal-firm perspective. Such research seeks to determine how the extent and form of integration – both within the firm and between the firm and its counterparts – affects focal-firm performance. Because SCM grew out of a concern to link existing spheres of management, such as logistics and materials management, it is not surprising that SCM emerged as another firm-centric management concept. But, as Carter et al. (2015) point out, in this rush to develop managerial recommendations, the SCM discipline neglected the development of a thorough conceptualisation of the supply chain itself. Taking the supply chain-level view requires researchers to ‘stand outside of the chain’ instead of seeing it from a focal firm perspective.

This has implications for research methods and for the single- vs. multiple-respondent debate. If we wish to collect data about supply chains, then we need to collect data from relevant

entities and organisations across the supply chain, not just active large firms. Of course, this is difficult: whether using a survey instrument or interview-based qualitative method, locating, contacting, and collecting data from multiple organisations in a supply chain is complicated and requires more effort than collecting data from a large focal firm. When using a survey instrument to measure supply network constructs, if we also have reservations about data from SMEs because only one knowledgeable respondent exists, then this militates further still against being able to capture the supply chain holistically: there is a danger that the view of large firms will prevail because of their heightened ability to provide multiple respondents. This requires researchers to weigh any risks of common method variance against risks of systematically neglecting SMEs, the most prevalent organisations in many supply chains. To take this argument further, if we are genuinely concerned to understand the supply network, and our research questions and theoretical frameworks concern relational or supply network phenomena, then our unit of analysis is no longer a focal firm. This would mean that, although we may have a single respondent from any one firm, we have multiple respondents from the unit of analysis (a triad, say). Although it has for obvious reasons dominated, in the end there is nothing sacred about the firm as the unit of observation or the unit of analysis.

A reluctance to collect data from SMEs because of the lack of multiple, well-informed respondents per firm may represent more than a marginal loss in richness of understanding: it can determine what research questions we pursue and what theories we deploy (Van Maanen et al., 2007). For example, if we are interested in relational phenomena such as trust and power, a bias toward large firms as data-sources also means that we typically are collecting data from the same advocates of contemporary SCM practices. Some issues will be almost entirely absent (e.g. large firms are unlikely to be open about using power in relation to SMEs). In researching such

phenomena, data must be collected from both parties. Furthermore, theory is linked to method not only in terms of epistemology and debates about the details of qualitative or quantitative techniques. Theory also determines how we decide what our unit of analysis is. For example, while the well-known concept of absorptive capacity can be conceived as a firm-level phenomenon (Cohen and Levinthal 1990), Lane and Lubatkin (1998) argued that it varies from relationship to relationship – i.e. it is a dyadic phenomenon. Under these circumstances, a reluctance to collect data from SMEs may result in a severely compromised understanding of absorptive capacity in this latter sense.

In sum, there are many opportunities to expand our SCM field by remaining open to SME samples: discovering new SCM phenomena and enriching our supply network understanding. Yet, doing so requires an allowance for single-respondent designs so that we do not miss these opportunities and do not create a large-firm bias in studying SCM.

### **SCM-SME RESEARCH AND RESPONDENT DESIGNS**

This section turns more fully to the question of single-respondent research designs. First, we draw on the small business, entrepreneurship and family business literatures to examine how these fields have dealt with the single-respondent question. We then draw together the implications of the earlier sections for single-respondent SCM research designs as they relate to SMEs.

Insights from general SME research can guide the SCM field. In particular, we focus on the reliance on primary data collected from key informants, and how issues related to the number of respondents are perceived and assessed in SME literature. Primary data is often necessary in studies focusing on SMEs because, compared to larger firms, SMEs have lower obligations to



disclose information about their conduct and performance (e.g., Schulze et al., 2003). To address the increasing demand for evidence and research on SMEs, several national and international programs were launched that relied on surveys. Examples include the U.K. Annual Small Business Survey (Atkinson and Hurstfield, 2003) and the U.S.A. Small Business Development Center (SBDC) survey (Chrisman et al., 2012). Notably, these surveys are based on single respondents. Moreover, research in entrepreneurship has also relied on single key informants. While the risk of common method variance is acknowledged, there are a number of perceived advantages: that the most knowledgeable individual will provide the response; that this will reflect the views of the firm as a whole; and that sample size will increase (Lyon et al., 2000). Sample size, in particular, increases because research effort can be spread across more firms and participation is more likely when only one person has demands made on their time.

While it appears the general SME research field has collectively judged that advantages of single-respondent designs can outweigh the disadvantages for satisfying the needs of their nascent field, related research on the efficacy of single-respondent designs is instructive for the SCM field. For instance, in focal firm research, Terziovski (2010) successfully used a single, key SME informant design that was accompanied by telephone interviews of sampled respondents to assess bias. Holt et al. (2017) studied family businesses to find that single- vs. multiple-respondent scores had different mean value, but similar regression results. Homburg et al. (2012) found some support for smaller organizational size improving single-respondent accuracy, but even stronger support when high authority respondents report on recent, objective, and salient concepts. For inter-organizational research, while Kumar et al. (1993) found evidence for single-informant bias, appropriate single-informants have high correlations (averaging 0.85) with multi-informant scores. This result is similar to Anderson and Narus (1990) who found near perfect

correlations among dual informants in a firm. To judge what single-informants are appropriate, Calloway et al. (1993) find that boundary spanning personnel in particular provide fairly reliable responses to network questions. While this sampling of literature shows that, as with all methods, there are limitations in single-respondent approaches, we can have confidence in SCM-SME single-respondent designs that select appropriate informants for reporting on recent, objective, and salient concepts. Also, as shown by Roh et al (2013), when perceptual agreement can be established (perhaps through pilot studies), choosing boundary-spanners oriented toward the particular external SCM-SME phenomenon may also be warranted.

Given the above literature, there are many approaches to assure validity in single-respondent designs in SCM-SME research. In addition, because a large majority of SMEs are owned and managed by members of a family, selecting owners and managers as respondents is crucial. The members have great power in their organizations and are likely to have high levels of access and understanding of firm-specific SCM information as they are typically involved in all aspects of the firm. Because family members typically become involved in the business early on in life, the age of managers can represent SCM-related knowledge as well. Socialization is also a key mechanism in developing family-firm managers. Because family firms invest heavily in family members so as to prepare them for leadership roles (Verbeke & Kano, 2012), greater socialization, in turn, enables informal information flows that should make family managers well-knowledgeable about many aspects of a firm's supply chain operations. By contrast, non-family managers in SMEs are often considered outsiders and do not benefit from the same socialization processes that apply to family members. This suggests that as firm size increases, the firm is more likely to professionalize by appointing non-family manager.

A strong suggestion, then, is for SCM-SME researchers to target long-tenured family members as their key informant. Yet, as the size of firms increases, it becomes more important to implement techniques to assess the validity of single respondent data. The literature also makes clear that it is very important to specify not only the number of respondents, but also the identity and role of the respondent. If a survey querying firm-level SCM constructs is completed by the upper echelons of the firm (e.g., the firm founder, owner, or top manager) the concern of biases is significantly diminished. However, the risk of biases toward the same firm-level SCM constructs is much greater if the respondents are lower-rank managers (e.g., middle managers in charge of one department). For SCM-SME researchers, the suggestion is clear that an appropriate key informant is operating at a similar organizational hierarchical level as the core SCM constructs in the study.

While the above discussion suggests that different approaches are warranted for SCM-SME research, a final consideration should be made: the cost to the firm for responding. That is, what actual costs and opportunity costs are there for the responding firm? With respect to SMEs versus large firms, multiple-respondent designs arguably incur relatively higher costs to participating SMEs than to large firms. The average opportunity cost, in particular, of a single individual in an SME is much higher than in a large firm. For example, when the one person responsible for suppliers in an SME is busy with a questionnaire, the entire purchasing department is not conducting the business of the enterprise. This is not the case in large firms. Likewise, the supply chain members for an SME may likely be SMEs as well, so if multiple supply chain members are required then the costs to the supply chain increase that much more. Additionally, if the SME purchases from large enterprises, gaining the support of the large enterprise to participate in a SME-related survey is much less likely than the other way around.

If a firm's response cost is inversely related to the size of the enterprise, and if multi-respondent research designs heighten response costs that much more, it follows that to avoid deterring SME involvement, SCM-SME research designs must adapt accordingly. Single, key informants might require more assistance from the academic researchers. Convenience and efficiency in SME data collection should also help. In sum, assuming SCM research designs for large firms are appropriate for SME firms is an assumption to be quite skeptical about.

## **CONCLUSIONS**

Research concerns about the validity of various data collection methods is essential to the progression of a discipline. The Journal of Supply Chain Management is no stranger to this debate (Flynn 2008; Mentzer 2008; van Weele and van Raaij 2014). Yet, constraints set on methodologies without a systems-level view can bias SCM research in detrimental ways. The concern is that our methodologies will drive our research questions, rather than having our research questions drive our methodologies. Restraining designs to multiple respondents may bias SCM research toward large firms that, in turn, may continue to bias the field's view of SCM. The general management field has found substantial use in investigating SMEs as well as large firms. The SCM field should be wary to position itself in such a way that misses the same opportunity.

All data that is collected for theoretical testing contains errors (Neter, Kutner, Nachtsheim and Wasserman 1996). It is ultimately the ever-evolving, collective judgment of a scientific discipline that determines what degree of instrumental error is acceptable (Feibleman

1972). In the SCM field, heterogeneity exists in both the relevant units-of-analysis and the levels-of-analysis (e.g., individuals, teams, facilities, enterprises, dyads, and networks). Single-respondent versus multiple-respondent designs will vary in error magnitude as the object of analysis changes. Depending on the intent, there are even studies where multiple respondents have, in fact, performed worse than single-respondent studies (Teo and King 1997). The key choice is to decide how much error is acceptable.

The empirical operations and SCM field has already institutionalized a measurement error-contingency model on a different dimension – the exploratory-confirmatory continuum – with the need for certainty increasing over time (Meredith et al. 1989; Malhotra & Grover 1998). For instance, conceptual methods are appropriate for ground-breaking research areas, single and multiple case study methods are appropriate for emerging topics, primary and secondary statistical methods are acceptable for established subject where theories exist, and experimental methods are welcomed for highly defined questions. We believe this perspective is useful for the respondent design question as well. The vast area of untapped SCM-SME phenomena will likely uncover new topics. The field would do well to afford these topics the same error-acceptance model. While single-respondent designs can be susceptible to biases and error, such designs in SCM-SME research can also help “cast a wider net” so to capture what is unknown, helping our field move forward.

Further research comparing the degree of error in single versus multiple respondent designs under various conditions is needed and, as with Roh et al. (2013), the SCM field should continue to replicate the types of comparison studies done elsewhere (Calloway et al. 1993; Homburg et al. 2012). Yet, ultimately it is the judgment of the researcher and the SCM field that matters. Further research is needed to facilitate that judgment in discerning what respondent

design methods are warranted and when. We believe it is a start but, as always, the conversation should continue.

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**Table 1. Some research questions at the intersection of supply chain management and SMEs research**

<b>Dimensions of SME heterogeneity</b>	<b>Building blocks of supply chain management</b>		
	<b>Antecedents of supply chain management</b>	<b>Supply chain structure</b>	<b>Outcomes of supply chain management</b>
<b>Goals</b>	<p>How does the heterogeneity in SMEs' goals influence top manager's perceptions of environmental uncertainty associated with supply chain management?</p> <p>How does the heterogeneity in SMEs' goals influence the size and variety of supply networks in which they are willing to engage?</p> <p>How does the heterogeneity in SMEs' goals influence financing decisions within supply chains?</p>	<p>How does the heterogeneity in SMEs' goals influence the size and structure of supply networks in which they engage?</p> <p>How does goal alignment and goal diversity between SMEs influence their choice of contracting modes in supply chains?</p> <p>How does the heterogeneity in SMEs' goals influence their willingness to implement information technology in their supply chains?</p>	<p>How does the heterogeneity in SMEs' goals influence the persistence and resilience of supply chain relationships?</p> <p>How does SCM contribute to the achievement of financial and non-financial goals in SMEs?</p>
<b>Governance</b>	<p>How do different governance configurations in SMEs influence top managers' perceptions of environmental uncertainty associated with supply chain management?</p> <p>How do different governance configurations in SMEs influence the speed and rate of change of supply chain decisions?</p>	<p>How do different governance configurations in SMEs influence the size and structure of supply networks in which they engage?</p> <p>How do different governance configurations in SMEs influence the persistence of their supply chain relationships?</p>	<p>How do different governance configurations in SMEs influence the persistence and resilience of supply chain relationships?</p> <p>How does SCM influence changes in SME governance?</p>
<b>Resources</b>	<p>How does the heterogeneity in SMEs' resources influence the perceptions of environmental uncertainty associated with supply chain management?</p> <p>To what extent and how do SMEs' supply chain decisions depend on their distinctive resource endowments and inherent resource limitations?</p>	<p>How does the heterogeneity in SMEs' resources influence the degree of integration with supply chain partners?</p> <p>How does the heterogeneity in SMEs' resources influence the likelihood of developing frugal SCM innovations?</p>	<p>How does the heterogeneity in SMEs' resources influence the persistence and resilience of supply chain relationships?</p> <p>How does SCM enable SMEs to leverage their distinctive resource endowments and address their inherent resource limitations?</p>