



SME supply chain portfolios: firm satisfaction and organization resources

SME supply
chain portfolios

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Mert Tokman

*Department of Marketing, James Madison University,
Harrisonburg, Virginia, USA*

R. Glenn Richey Jr, Tyler R. Morgan and Louis Marino
*Department of Management and Marketing, The University of Alabama,
Tuscaloosa, Alabama, USA, and*

Pat H. Dickson

*Business and Accountancy, Wake Forest University, Winston Salem,
North Carolina, USA*

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Abstract

Purpose – The purpose of this research is to investigate the combination of relational and organizational resource factors that influence small-to-medium-sized firm satisfaction with their supply chain portfolio performance.

Design/methodology/approach – This research employs two complementary theoretical lenses frequently used in the explanation of relationship performance, resource-based view of the firm and strategic behavior theory. The authors then used an international survey based in three Northern European countries to test their hypotheses with hierarchical linear regression.

Findings – The quantitative analysis supports all three hypotheses indicating that supply chain portfolio flexibility is an important determinant for small-to-medium-sized firm satisfaction with supply chain portfolio performance. Additionally, firm alliance orientation and entrepreneurial orientation both significantly influence the relationship between supply chain flexibility and performance satisfaction.

Research limitations/implications – This research is limited by the categorization of the supply chain portfolio flexibility types as high and low resource linkages by the researchers. Future research may look at additional ways to measure individual agreements and have firms categorize them according to resource requirements. However, the findings of this research provide a theoretical and empirical foundation through the application of resource-based view of the firm and strategic behavior theory for future research in the area of small-to-medium-sized firms and their satisfaction with supply chain portfolios.

Practical implications – Important managerial implications are found for small to medium-sized firms and larger firms that work with them when managing portfolio satisfaction. This research indicates that it makes sense for managers to consider categorizing supply chain relationships similar to the way they categorize their end-user relationships. This allows small-to-medium-sized firms across the portfolio to be segmented into groups where appropriate relationship maintenance can take place and where more suitable satisfaction goals can be defined in terms of operational metrics.

Originality/value – The framework developed in this paper provides insights on small-to-medium-sized firm satisfaction with supply chain portfolio performance. This research stimulates a new research stream towards an integrated theory of supply chain portfolio management.

Keywords Supply chain portfolio, Inter-organizational relationships, Organizational resources, Entrepreneurial orientation, Alliance orientation, Supply chain management, Small to medium-sized enterprises

Paper type Research paper

Introduction

Despite the increasing importance of cooperative supply chain relationships, evidence suggests that organizations find it difficult to realize the benefits they receive from



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their supply chain portfolios (Fabbe-Costes and Jahre, 2008; Kogut, 1989). For example, a trade journal survey found that more than 70 percent of the companies involved in portfolios report that they are unhappy with the performance of their portfolio partners (Birkhahn, 2002). This finding is supported by research demonstrating that firm-level satisfaction with portfolio performance has been less than optimal (Chatterjee, 2004; Park and Russo, 1996; Shamdasani and Seth, 1995). For example, Chatterjee (2004) found that the average satisfaction with portfolio partners to be 3.01 on a five-point scale and Shamdasani and Seth (1995) conclude that average satisfaction with the performance of a portfolio of partners ranges between 2.21 and 5.93 (on a seven-point scale) depending on the partners' commitment, compatibility, and competence levels.

For small-to-medium-sized enterprises (SMEs), this mediocre performance may be especially troubling as SMEs are more likely to need collaborative agreements to leverage their relatively constrained resources (Daugherty *et al.*, 2006; Steensma *et al.*, 2000b). Further, SMEs that proficiently manage their portfolios can develop competencies that level the competitive playing field with larger firms (Hoang and Rothaermel, 2005). These SMEs benefit more from being proactive than their larger counterparts (Sarkar *et al.*, 2001; Wagner and Johnson, 2004). In fact, due to the relatively constrained resources faced by SME's, research shows that firms with fewer than 500 employees (250 in the European Union[1]) are employing supply chain relationships at significantly higher levels than that of their larger counterparts (Suarez-Villa, 1998). Yet, some SMEs are still facing challenges in determining the configuration of their supply chain portfolios that will maximize their competitiveness (Lim *et al.*, 2006).

Therefore, this study focusses on the SME's supply chain portfolio, which is defined as an array of cooperative interfirm relationships maintained and adjusted by firms to gain access to scarce resources across the various phases of a firm's value chain (Cooper *et al.*, 1997; George *et al.*, 2001; Min and Mentzer, 2004; Tokman *et al.*, 2007). This array includes various kinds of interorganizational agreements ranging from informal marketing agreements to licensing agreements to technology-based joint ventures to equity-based contracts. For the following reasons it is important for both the SMEs and the large firms who go into these agreements with SMEs to understand the ways in which SMEs satisfaction with supply chain portfolios may be improved: satisfaction is an important indicator of the perceived effectiveness of the supply chain portfolio (Norman, 2004; Mehta *et al.*, 2006; Van De Ven and Ferry, 1980; Saxton, 1997); a firm's experience with networks of relationships included in its portfolio may impact the firm's overall attitudes and future intentions towards all other relationships (Gulati, 1998; Dickson and Weaver, 1997); and maximization of satisfaction leads to stability of supply chain portfolio relationships which then results in sustained financial benefits (Lohrke *et al.*, 2006; Gill and Butler, 2003; Beamish and Inkpen, 1995; Hamel *et al.*, 1989).

Based on the resource-advantage (R-A) and strategic behavior (SBT) theories, the objective of this study is set to investigate the effects of the SMEs' interconnected resources on their satisfaction with supply chain portfolios. Mainly, two resource interconnections are examined: the interconnection between the flexibility of the supply chain portfolio (a relational resource) and the SME's alliance orientation (AO) (an organizational resource) and the interconnection between the flexibility of the supply chain portfolio (a relational resource) and the SME's entrepreneurial orientation (an organizational resource). The flexibility of the supply chain portfolio is conceptualized by Auster's (1992) typology of high- and low-resource investment

linkages (HRILs and LRILs). Each type of supply chain relationship within a portfolio requires a different level of resource investment and lower levels of resource investments indicate higher levels of portfolio flexibility, i.e. SME's ability to easily add or drop supply chain partners to its portfolio. Moreover, this study investigates the interactions between the relational and organizational resources, because R-A theory suggests that these are two of the most critical resource types that have potential to develop into more sustainable competitive advantages compared to other resource types (Hunt and Morgan, 1995). The reason behind this argument is that the competitor organizations would not be able to easily transfer, imitate, or substitute these two types of resources because of their causal ambiguity and time dependence (Dierickx and Cool, 1989).

In addressing our objective, we will first provide the theoretical underpinnings of supply chain portfolio configuration. Moreover, we present our model that depicts the interaction of relational and organizational resources as the determinants of supply chain portfolio satisfaction. In doing so, we will make at least three contributions to the existing literature. First, this study contributes to the ongoing debate on whether or not certain types of interfirm relationships in a portfolio satisfy SMEs more than others (Tokman *et al.*, 2007; Mehta *et al.*, 2006; Bagchi *et al.*, 2005; Norman, 2004; George *et al.*, 2001; Saxton, 1997). Following the notions rooted in R-A theory, this study suggests that the supply chain portfolios that are structured with mostly flexible (LRILs) relationships lead to higher levels of satisfaction for SMEs because these types of relationships not only provide access to sought after resources but also lessen dependency on other organizations. Second, this study contributes to the supply chain portfolio configuration literature (Wassmer, 2010; Goerzen, 2007) by suggesting that portfolio flexibility by itself is not enough to determine the SMEs' level of satisfaction with their portfolios and that such relational resources should be aligned with the organizations strategic objectives. Therefore based on the SBT, this study identifies such organizational resources as entrepreneurial orientation and AO as complementary resources to relational resources. Finally, this study provides suggestions to both SMEs and large firms that struggle with supplier/buyer relationship management. While the SMEs can develop a better understanding of how to structure their supply chain portfolios based on their strategic objectives, the larger firms can develop a plan for SME partner selection based on their organizational and relational resource combinations.

Previous research on supply chain portfolio configuration

Extant research in strategic management and supply chain management typically focusses on alliance portfolio types (Achrol and Kotler, 1999; Tikkanen *et al.*, 2007), formation (Kogut, 1988; Gulati, 1998; Holden and O'Toole, 2004), performance (Heide and Minor, 1992; Parkhe, 1993; Celuch *et al.*, 2002), value creation (Kale *et al.*, 2001; Möller *et al.*, 2005), and managing instabilities (Das and Teng, 2000; Dubois, 2003). In the past 15 years, scholars started to emphasize the configuration of supply chain relationship portfolios. Research on the configuration of portfolios has focussed on a large variety of supply chain relationships that make up the entire portfolio (Wassmer, 2010). Table I summarizes the past studies on various supply chain configuration methods using different classification schemes.

The earlier configuration methods examined the size of the portfolio (Gulati, 1999; Ahuja, 2000) as well as the age of the supply chain relationships that made up the portfolio (Stuart *et al.*, 1999) as part of their classification schemes. This was followed

Source	Method of portfolio configuration:
Gulati (1999), Ahuja (2000), Lahiri and Narayanan (2013)	Number of supply chain partners in portfolio (portfolios made up of large vs small number of supply chain partners)
Stuart <i>et al.</i> (1999), Gulati and Higgins (2003)	Age of supply chain partner relationships in portfolio (portfolios made up of longer vs shorter term relationships)
Goerzen and Beamish (2005), Lavie and Miller (2008), Duysters and Lokshin (2011)	Internationalization of the portfolio (portfolios made up mostly international vs domestic supply chain partners)
Rowley <i>et al.</i> (2000), Norman (2004)	Strength of relationship between supply chain partners (portfolios made up of higher vs lower levels of trusted relationships)
Parise and Casher (2003), Hoffmann (2007)	Resource redundancy between supply chain partners (portfolios made of highly redundant vs highly synergistic supply chain relationships)
Dickson and Weaver (1997), Chatterjee (2004), Koka and Prescott (2008)	Environmental turbulence surrounding the supply chain relationships (portfolios made up of relationships surrounded by high vs low risk environments)
Lavie and Rosenkopf (2006), Tokman <i>et al.</i> (2007)	Exploitation and exploration orientation of the supply chain portfolio (portfolios made up of process improvement vs market growth focused relationships)
Jiang <i>et al.</i> (2010)	Governance diversity of the supply chain partners (portfolios made up of public vs private vs non-profit organizations)

Table I.
Review of studies
exploring supply chain
portfolio configuration

by three additional research streams. One stream focussed on the resource-based aspects such as resource redundancy, synergy, and complementarity using the resource-based theories (Parise and Casher, 2003; Tokman *et al.*, 2007). A second one focussed on relational aspects such as the level of trust, relational embeddedness, and cultural distance (Rowley *et al.*, 2000; Norman, 2004; Goerzen and Beamish, 2005; Hoffmann, 2007). The third stream emphasized risk and governance based on transaction costs and interorganizational dependencies (Koka and Prescott, 2008; Jiang *et al.*, 2010). In this study, we follow a combination of both resource and relationship based streams and make two main contributions to the supply chain configuration topic: based on the R-A theory, this study utilizes level of flexibility as a relational resource to examine portfolio configurations; and this study combines R-A theory with another theoretical perspective – SBT – to explain how the strategic resource interconnections (between relational and organizational resources) would lead to higher levels of SME satisfaction with supply chain portfolios. The next section describes the development of the study's hypotheses based on the two aforementioned theoretical perspectives.

Theoretical grounding and hypothesis development

The complexity of portfolio relationships can hardly be explained through one theoretical lens. In general, previous studies explained portfolio performance behaviors by supporting transaction cost economics (TCE) from a theoretical duality. For instance, Silverman and Baum (2002) combined TCE with the resource-based view (RBV) of the firm building the basis for alliance-based competitive dynamics.

Furthermore, Gulati (1995) used TCE and sociological theory, and Parkhe (1993) matched TCE with game theory. Alternatively, this study integrates R-A theory with SBT to form a framework stimulating research towards examination of supply chain portfolio configurations. Since no single theory is capable of explaining the wide range of supply chain portfolio motives, forms, and outcomes that exist in the marketplace (Hoskisson *et al.*, 1999), we will begin by discussing how R-A theory offers grounded insight into the advantages of more flexible supply chain portfolios over less flexible ones.

R-A theory and relational resources

The R-A theory of competition defines resources as the “tangible and intangible entities available to the firm that enable it to produce efficiently and/or effectively a market offering that has value for some market segment(s)” (Hunt and Lambe, 2000, p. 33). Furthermore, the R-A theory advances the categorization of resources from the simple tangible/intangible dichotomy to a seven-fold grouping that include physical, financial, human, organizational, relational, informational, and legal resources (Hunt and Morgan, 1999). Hunt and Morgan (1995) suggest that the key to attainment of sustainable competitive advantages is developing unique and/or superior combinations of these seven resource categories in a way that they cannot be imitated or substituted by the competing firms.

R-A theory specifies that firms participate in interorganizational relationships to acquire vital resources in order to manage their relationship dependencies (Lambe *et al.*, 2000, 2002). Participating in numerous relationships (i.e. a portfolio) concurrently with diverse partners reduces a firm’s dependence on a single resource provider by expanding the options the firm has in sustaining critical resource flows (Stearns *et al.*, 1987). This suggests that for firms to seek out market-based opportunities, they must build a supply chain portfolio made up of diverse relationships rather than depending on single providers. Moreover, R-A theory suggests that while firms acknowledge the need to obtain resources from external constituencies, they prefer to do so through cooperative mechanisms such as supply chain relationships that allow them to maintain flexibility and some degree of autonomy as they control critical risk dependencies. Firms that remain flexible in their ability to quickly and efficiently respond to changing customer needs have increased levels of customer satisfaction (Zhang *et al.*, 2005). For example, Sun Microsystems developed a supply chain portfolio including Fujitsu, Toshiba, Oracle, Netscape/AOL, and IBM (Gomes-Casseres, 2000). Some of these relationships survived for a long-time whereas others were short-lived; some were narrowly focussed and others were broader. The implication of this strategy was that Sun developed a capability to manage its supply chain portfolio of diverse and flexible relationships that accounted for their success rather than resources acquired from individual relationships.

Supply chain portfolio flexibility (SCPF) refers to the SME’s ability to change its portfolio structure by adding and/or eliminating relationships – allowing them to adapt to the dynamics of the environment. Each relationship in a SME’s portfolio entails a resource investment level. Some relationship types such as joint ventures require extremely high levels of resource investments such as capital and technology (Lambe and Spekman, 1997) that are bounded by formal contracts. Other types like short-term subcontracting and distribution agreements do not require as much and are much less formal (Lusch and Brown, 1996). Based on Auster’s (1992) typology, firms can structure their relationship portfolios with both HRILs and LRILs. Rajagopal *et al.* (2009) later investigated the idea of scalable partnerships where supply chain members may look to expand the scope of their business in the future. Supply chain portfolios

that are dominated by HRILs typically involve some or all of the following elements: international outsourcing (Yu and Lindsay, 2011), highly intense resource investments, long-term orientation, or high level of cooperation between the firms (Kale *et al.*, 2002; Rindfleisch and Moorman, 2003). They also indicate a formal contractual structure (Lusch and Brown, 1996), which increases the relationship termination costs since the consequences of self-interest-seeking behaviors are somewhat obvious to supply chain portfolio members. On the other hand, supply chain portfolios that are dictated by LRILs imply access to partner resources as well as shared costs and risks. Moreover, LRILs allow more flexibility in terms of relationship termination since the structure of these relationships is much less formal and less likely to be bounded by contracts. Thus, they imply short-term orientation, impending goal conflicts, and ambiguous intentions in terms of the future of the relationship between the firms.

An SME's satisfaction with its supply chain portfolio performance may be enhanced through relationships that reciprocate access to highly valuable resources that cannot be acquired from elsewhere efficiently and/or effectively. These resources can include tacit knowledge, rare technology, and/or access to market segments that have yet to be explored. However, while gaining access to such sought after resources – supply chain firms often prefer to avoid relinquishing flexibility and opt for portfolios with a higher percentage of LRILs. Consistent with the fundamental premise of R-A theory, such a portfolio would allow the SME's to gain access to critical resources while minimizing their dependencies on other firms. Therefore:

- H1. SME SCPF (higher percentage of LRILs in a portfolio) will be positively associated with supply chain portfolio performance satisfaction.

SBT and the interaction of relational and organizational resources

SBT examines the leveraging of resources based on the belief that the environment of a firm is not the dominating force on strategic responses (McGee *et al.*, 1995). The choice of behaviors to cope with the environment is based not so much on an ambition to minimize transaction costs (as in TCE; Williamson, 1975, 1991) or necessarily to compensate for lacking or scarce external resources (as in RBV; Barney, 1991), but rather as a consequence of fitting resources to strategic goals. Thus, SBT provides several inferences regarding supply chain portfolio behavior. First, the choice to participate in cooperative portfolios will depend on goal directed supply chain strategy such as gaining access to new distribution channels. For example, Starbucks Coffee expanded into new countries through a supply chain portfolio with firms such as United Airlines and Marriott (Gomes-Casseres, 2000). Second, the choice of supply chain portfolio structure will be based on the strategies and structures of the participants (Tallman and Shenkar, 1994). For instance, British Telecom and AT&T chose to form a joint venture – a highly structured linked in network node in a supply chain portfolio – based on shared vision of asset integration between the firms (Gomes-Casseres, 2000; Jarillo, 1988). Finally, the choice of cooperative strategies and the cooperative structures will be based on a desire to better the firm's competitive position (McGee *et al.*, 1995). For example, General Mills allied itself with the leading online grocer Webvan to learn how to use the internet channel (Gomes-Casseres, 2000). Therefore, according to SBT, firms may consider collaboration with other organizations as sources of competitive advantages and participate in portfolios as a mechanism towards supply chain strategic goals rather than attempting to internalize their environment and/or resource dependencies.

Based on the notions of SBT, one can conclude that it is not just the ratio of HRILs/LRILs in a supply chain portfolio that drives the satisfaction by itself; rather it is the alignment of the SMEs' strategic/competitive orientations (organizational resources) with the SCPF (relational resources) that determines the satisfaction levels. For instance, firms that are oriented towards building alliances with larger firms in order to continue competing in the marketplace may prefer a higher ratio of joint ventures (HRILs) in their portfolios – thus less flexibility, whereas firms that are oriented towards self-sufficiency may prefer less restricted and more flexible relationships in their portfolios (Chen and Chen, 2002). Therefore, two such organizational resources are examined in the following sections: AO and entrepreneurial orientation.

AO refers to the propensity of SMEs to establish various types of strategic alliances with larger firms in order to survive and continue competing in the marketplace in the future (Steensma *et al.*, 2000b). Huxham (1993) labels high levels of AO as the attainment of collaborative advantage and defines it as “something unusually creative is produced – perhaps an objective is met – that no organization could have produced on its own and when each organization, through the collaboration, is able to achieve its own objectives better than it could alone” (p. 22). Hence, the SME oriented towards alliance building usually has the need for working with their supply chain network partners in order to reap benefits that would not have been gained if the firm had undertaken the initiatives on its own (Daugherty *et al.*, 2006). As SMEs recognize that they are not self-sufficient and it is not enough to be small and entrepreneurial, they will pursue higher levels of AO (Huxham and Vangen, 2000) and develop more extensive supply chain portfolios. SMEs become satisfied with the performance of their supply chain portfolios defined by more flexible or less structured linkages when their AO is low. This is because most of these firms believe in self-sufficiency and they are very protective of their highly valuable resources. Therefore, they would usually deal with other firms on transactional basis and would only build the types of relationships that do not require high levels of valuable resource contributions. However, some SMEs see alliances with larger firms as their survival mechanism and as their access to critical resources increases, flexibility becomes less of an issue and SMEs become more concerned with securing important resources through less flexible, but more formally structured, relationship types such as joint ventures and equity investments (Chen and Chen, 2002). These relationships require long-term orientation and a high level of cooperation. Hence:

H2. SME AO moderates the relationship between SCPF and satisfaction with supply chain portfolio performance; such that the positive relationship between portfolio flexibility and satisfaction will be significantly more pronounced for the firms with less AO.

Entrepreneurial orientation is another organizational resource that complements the SME SCPF. Firms that are oriented towards entrepreneurial activities have been characterized by three major attributes: innovation of new products, high likelihood of risk taking, and a proactive approach in identifying new opportunities for their firms (Barringer and Bluedorn, 1999; Covin and Slevin, 1989). Following the notions of the SBT in regards to strategic alliances, it is clear that all three entrepreneurial-orientation attributes provide SMEs with strong strategic reasons to develop alliances with larger firms. In fact, Powell *et al.* (1996) found that innovative firms have a tendency to establish more R&D type alliances with various levels of cooperation, i.e. contribution

to the relationship. This is because such strategic alliances provide SMEs with access to highly sought-after resources that help them sustain their innovation-oriented competitive approach (Avlonitis and Salavou, 2007; Miller, 1983). As organizations improve their ability to share among supply chain members, their combined resources and knowledge may result in new and innovative capabilities (Defee and Fugate, 2010). On the other hand, firms with less innovative ambitions would focus on improving their ongoing business processes by utilizing their internal resources more effectively and efficiently. Therefore, they would use supply chain alliances much less extensively and when they do, they would prefer to stay more flexible and less bounded by long-term contractual agreements.

Long-term, highly cooperative relationships (like joint ventures) represent a high-risk situation for SMEs due to their demanding nature like sharing highly critical resources and putting limits on continuing relationships with other suppliers or buyers (who are likely competitors of the alliance partner). SMEs that are less entrepreneurially oriented avoid such risky situations by structuring a portfolio of highly flexible supply chain relationships. These firms do not have extensive portfolios to begin with and if they focus exclusively on a single cooperative agreement, failure of this alliance would have an enormous negative impact for the organization (Marino *et al.*, 2002). On the other hand, more entrepreneurially oriented firms form relationships with numerous supply chain partners and lessen the impact of potential failure risk by enlarging the number of suppliers for critical resources. It has been proposed that improvements in supply chain resiliency, the ability to prepare for and respond to disruptions in the supply chain, provide an advantage for the firm over competitors (Ponomarov and Holcomb, 2009).

As a final point, the third attribute of entrepreneurial orientation – proactive approach in identifying opportunities – also plays a role in determining the more satisfactory supply chain portfolio structure. Proactive firms gather information and identify opportunities is by scanning the environment through effective communication with their supply chain partners (Norman, 2004). Supply chain partners gaining different benefits through the sharing of information depending on their position in the supply chain (Lumsden and Mirzabeiki, 2008). Alliances with supply chain partners provide proactive firms with both tacit knowledge, such as utilization of alliance-based technology (Bonner *et al.*, 2005), and explicit knowledge, such as relational norms in distribution channels (Mehta *et al.*, 2006). As a result, proactive SMEs structure larger supply chain portfolios that offer a range of valuable information sources, which are being used to identify new opportunities in the external environment (Aldrich, 1979; Stearns *et al.*, 1987). On the other hand, SMEs that are not proactive usually focus on internal environment and process improvement. This strategic choice results in less extensive yet more flexible supply chain portfolios that help these firms focus on effective and efficient use of internal resources without having to share their secrets in achieving effectiveness and efficiency with others. Therefore:

- H3. SME entrepreneurial orientation moderates the relationship between SCPF and satisfaction with supply chain portfolio performance; such that the positive relationship between portfolio flexibility and satisfaction will be significantly more pronounced for the firms with less entrepreneurial orientation.

Figure 1 details our model.

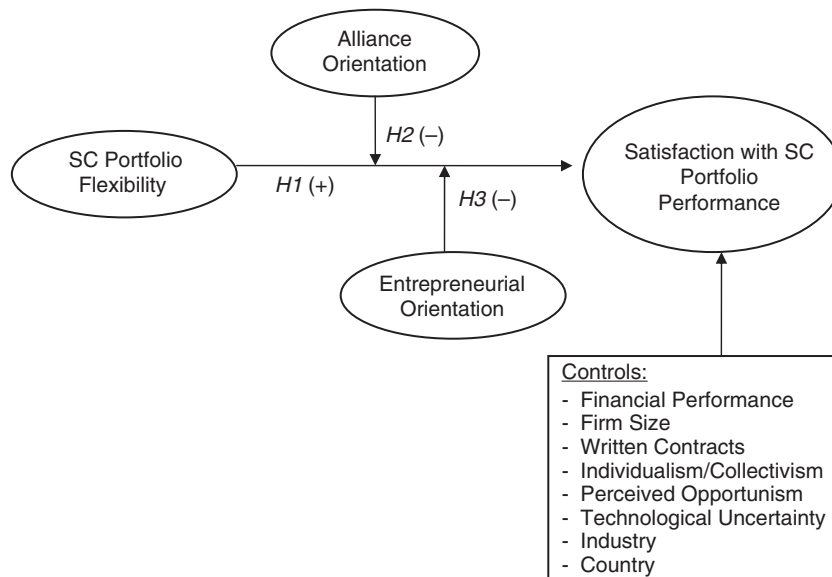


Figure 1.
Hypothesized model

Research methodology

Data collection consisted of an international survey of SME owners and general managers followed by analysis utilizing hierarchical linear regression. The following subsections briefly detail our study methodology.

Sample frame and data collection

Data used in this study were collected in the Strategic Alliance Research Group dataset, which utilized a randomized selection process to survey owners and general managers of SMEs in Finland, Sweden, and Norway. These countries were chosen to test our hypotheses as they represent a relatively homogeneous sample and they afford an acceptable level of control for regional-level economic factors. We realize that Finland, Sweden, and Norway are independent countries with distinct histories and cultures – however, Finland, Norway, and Sweden employ legal systems based on Norwegian Civil Law. Moreover, there are important similarities that we believe allow us to combine the countries for the purposes of this study. First, Finland, Norway, and Sweden are closely grouped in the Project GLOBE (House *et al.*, 1999) study of international culture. Further, each of these three countries ranked low in the 1997 EuroMoney (1998) Country Risk Index (i.e. with 100 being low, Finland was 94.52, Norway was 95.83, and Sweden was 93.39), the GDP per capita reported in US dollars in the United Nations Department of Economic and Social Affairs (UNESCO) Statistical Yearbook (2002) was relatively similar (Finland \$24,842, Norway \$30,869, Sweden \$26,799), and each of the countries provides strong intellectual property protection.

Although the Strategic Alliance Research Group dataset was collected five years ago, we submit that the relationships investigated in this research are not temporally bound. While previous research has investigated individual supply chain relationships, our research addresses the fundamental question of how flexibility influences satisfaction. We believe that regardless of the age of the data, answering this question is of importance to both academics and practitioners. Additionally, according to Robins (2004), the age of

research data is deemed important only if four required conditions are met regarding variable Z , where Z is a variable that is causally related to any X or Y variable from our model. To evaluate the potential impact of a variable Z such as technology, the economy, etc., we consulted with industry experts. According to their assessment of the data, the above four conditions were not met and thus the age of the data does not negatively influence the study.

The survey instrument employed in this study was developed in English and then underwent a “double back-translation” process. The items were first translated into the major language of each non-English speaking country, translated back into English, translated again to the non-English language, and then finally translated back into English again. This translation procedure is consistent with the guidelines established by Brislin (1980) in regards to the equivalence of language translations. Once the translation process was completed, pilot tests were conducted. This was done in order to ensure the clarity and accuracy of the survey translation. The survey method also employed a key marketing decision-maker focus (informant) as theoretical support exists for the proposition that firms of small to medium size are extensions of the individuals in charge (Lumpkin and Dess, 1996). Thus, the questionnaire was addressed to the owner or general manager of each firm surveyed.

Surveys were mailed in a two-wave mailing process to 400 SMEs in Finland, 2,465 in Norway, and 600 in Sweden. Response rates varied among countries (30.3 percent Finland, 17.57 percent Norway, and 30 percent Sweden) but follow-up phone calls with a random sample of non-respondents in each country showed that there were no differences between respondents and non-respondents. Additionally these and all other respondents were subject to a wave analysis using MANOVA. Indications of non-response bias were not found based on the wave analysis (Armstrong and Overton, 1977). Industry bias was also tested at this point without a significant outcome. A large portion of the returned responses were not included in the study for reasons such as unidentified or unqualified responders, large amounts of missing data, firms identified as being large, and firms identified as subsidiaries (non-independent SMEs). The total response rates and usable response rates by country as well as respondent and firm characteristics are reported in Table II.

Common method bias is also of concern when conducting survey-based research. However, it is thought to be most problematic when a question evokes strong sentiments from a respondent (Boyd and Fulk, 1996). We assert that many of the questions included in the survey are objective, such as firm size, industry, country of origin, etc., and thus do not evoke sentiment. Additionally, the remaining questions regarding supply chain portfolio performance, orientation, technological uncertainty, opportunism, and individualism, while not strictly objective, are still unlikely to evoke strong feelings and thus minimize the potential impact of common method bias. Also, we interspersed the dependent and independent variables which helped with minimizing the effects of retrieval cues (Podsakoff *et al.*, 2003).

Moreover, following recommendations provided in Podsakoff *et al.* (2003), common method bias was empirically assessed through Harman's one factor test. The one factor model revealed significantly worse fit ($\chi^2 = 1,203.772$; $df = 219$) than the measurement model ($\chi^2 = 313.514$; $df = 211$), suggesting that CMB is not of serious concern (Podsakoff and Organ, 1986). In addition, some items were reverse coded which should further reduce the effect of common method bias.

Consistent with the questions under consideration in this study, only independently owned market driven firms that were consistent with the European Union's definition

	Finland	Norway	Sweden	Total
<i>Response characteristics</i>				
Sent/contacted	400	2,465	600	3,465
Returned	121	433	180	734
Response rate (%)	30.25	17.57	30.00	21.2
Total usable surveys	42	81	86	209
Usable survey rate (%)	10.5	3.3	14.3	6.0
<i>Respondent characteristics (%)</i>				
Majority owner	85	77	98	87
Manager of the firm	15	23	2	13
<i>Firm characteristics (%)</i>				
Food industry	2.5	6	9	7
Wood industry	7.5	10	9	9
Print industry	5	9	14	10
Rubber industry	0	10	5	6
Chemicals industry	2.5	6	0	3
Transportation industry	5	0	7	4
Machinery industry	15	4	13	10
Electronics industry	12.5	17	2	10
Programming industry	10	32	20	20
Other industries	40	6	21	21
<i>International characteristics (%)</i>				
International and domestic sales	55	55	52	54
Domestic sales only	45	45	48	46

281**Table II.**
Sample statistics

of a SME (<250 employees) were included in the usable sample. Further, to ensure that the respondent was a key decision maker in the firm, the sample was also limited to include only independent firms in which the respondent held an equity stake. More than 86 percent of the respondents were either sole or majority owners of the subject and the other 13 percent were minority (<50 percent) share owners that acted as a high-level manager in the firm. Consistent with the primary questions under consideration in this study, only SMEs that had supply chain portfolios were included in this sample. Finally, firms with incomplete surveys were eliminated.

Measures

The measures included in the survey were derived from those used in related research and adjusted to fit this specific context (e.g. Marino *et al.*, 2002; Covin and Slevin, 1989; Steensma *et al.*, 2000a, b). The measurement model is tested using the two-step procedure advocated by Anderson and Gerbing (1988). This method of measurement and relational testing allows for rigorous testing of measurement reliability and validity before subjecting the structural model to tests of fit. The measurement model is used to arrive at a group of indicators for each construct that shared a common variance with little unexplained error and little relationship to items reflecting other constructs. Both the measurement models and structural models are analyzed with the M-plus statistical analysis soft-ware (Muthen and Muthen, 1998). All of the measures used in this study and their reliability statistics are presented in Table III.

Satisfaction with supply chain portfolio performance refers to the focal firm's general assessment of its experience with its supply chain network members. This measure was operationalized using a three-item five-point scale assessing general

Items	Factor loadings	Error term	Composite reliability	Cronbach's α	AVE
<i>Satisfaction with alliance portfolio performance</i>			0.85	0.82	0.63
In general, your company's experience with cooperative relationships has been (1-extremely poor; 5-extremely good)	0.778	0.182			
In general how would you characterize the financial returns produced by your company's cooperative relationships (1-large loss; 5-very profitable)	0.530	0.173			
In your overall assessment, how has your cooperative relationships performed as compared to your expectations (1-very poorly; 5-very well)	0.560	0.261			
<i>Technological uncertainty</i>			0.74	0.76	0.61
In our industry, the rate of obsolescence is very high	0.469	0.468			
In our industry, the modes of production change often	0.560	0.392			
Our industry is extremely R&D oriented	0.753	0.258			
<i>Opportunism</i>			0.75	0.76	0.44
In general our strategic alliance partners... provide us with a truthful picture of their business (r)	0.371	0.203			
have appeared to alter the facts slightly in order to get what they needed	0.373	0.448			
seem to believe that honesty does not pay when dealing with partners	0.587	0.027			
have sometimes promised to do things without actually doing them late	0.384	0.308			
<i>Alliance orientation</i>			0.73	0.81	0.60
In the future, small companies increasingly will be required to enter into strategic alliance portfolios to achieve success	0.628	0.470			
Small companies must recognize that they are not self-sufficient	0.584	0.531			
It is not enough to be small and entrepreneurial in the future	0.476	0.668			
Small companies will have to increasingly "network", i.e. enter into strategic alliances to achieve success	0.684	0.385			
<i>Entrepreneurial orientation</i>			0.77	0.79	0.55
In general, the top managers in my company favor...					
a strong emphasis on innovations	0.388	0.849			
very many lines of products/services	0.560	0.687			
dramatic changes in product/service lines	0.473	0.776			
initiating actions to which competitors respond	0.551	0.697			
being the first business to introduce new products I services	0.728	0.470			

Table III.
CFA results and reliability statistics

(continued)

Items	Factor loadings	Error term	Composite reliability	Cronbach's α	AVE
adopting a very competitive, "undo-the-competitors" posture	0.492	0.757			
a strong proclivity for high risk projects	0.547	0.701			
bold actions that are necessary to achieve the firm's objectives	0.565	0.681			
<i>Individualism/collectivism</i>			0.62	0.63	0.51
If a group is slowing me down, it is better to leave it and work alone	0.355	0.874			
To be superior, a man must stand alone	0.533	0.716			
One does better work working alone than in a group	0.715	0.489			
I would rather struggle through a personal problem by myself than discuss it with a friend	0.484	0.765			
Problem solving in groups gives better results than problem solving by individuals (r)	0.352	0.876			

Notes: $df = 211$; $\chi^2(p) = 313.514$ (0.000); RMSEA = 0.048; SRMR = 0.061; CFI = 0.924; TLI = 0.904; NFI = 0.901; IFI = 0.914

Table III.

experience with partners, characterization of financial returns produced by the supply chain portfolio, and the overall assessment of the supply chain portfolio's performance compared to expectations. These items were adapted from Marino *et al.* (2002) and combined into a single scale through mean calculation.

SCPF refers to the SME's ability to change its portfolio structure by adding and/or eliminating relationships – allowing them to adapt to the dynamics of the environment. Firms were asked to indicate on a six-point scale (from 0 to 5+) the extent to which they used 11 separate types of cooperative agreements including equity investments, joint ventures, long-term outside contracting, short-term outside contracting, licensing, long-term marketing agreements, long-term distribution agreements, export management and trading company agreements, product R&D alliances, process R&D alliances, or buyer-supplier alliances. A "1" indicated that the firm had used one of these types of agreements while a "5" indicated that the firm had used five or more of these agreements.

To classify the cooperative relationships as requiring high-resource contributions or low-resource contributions, Auster's (1992) typology of HRILs and LRILs was used. The relationship types are categorized as LRIL and HRIL by each of the researchers separately. Then, through discussions researchers agreed on the categorization of relationship types. Based on this classification method, resource contribution extent of a supply chain portfolio was computed using the following formula:

$$SCPF = [LRILs / (HRILs + LRILs)]$$

where LRILs is the total number of LRILs including long-term outside contracting, short-term outside contracting, licensing, long-term marketing agreements, long-term distribution agreements, export management and trading company agreements,

product R&D alliances, process R&D alliances, and buyer-supplier alliances. HRILs the total number of HRILs including joint ventures and equity investments.

The score on this index could range from 0 to 1 with a high score indicating a relatively high flexibility and lower score indicating a relatively low flexibility.

The key decision leader's entrepreneurial orientation is assessed in the study through the use of an eight item five-point scale developed by Covin and Slevin (1989). The items assess the firm managers' tendencies towards risk taking, innovation, and proactiveness towards competitors. This measure was selected because it has been used broadly in the entrepreneurship and strategic management literatures. Following a psychometric analysis of the scale, one item was removed, resulting in an eight-item scale ($\alpha = 0.79$). The deleted item was concerning aggressiveness and the main reason it caused problems in the scale was because it was nearly impossible to distinguish it from the boldness item when translated into other languages. The remaining eight items are averaged to produce a single scale.

AO refers to the SME's propensity to establish alliances with larger firms in order to reap benefits that would not have been gained if the firm has undertaken the collaborative initiatives by itself. To assess the SME AO, firms were asked four questions. These items were originally put together by Steensma *et al.* (2000a) to assess the SMEs attitudes towards the necessity of strategic alliances for firm survival. Each question utilized a five-point Likert scale with an answer of "3" indicating neutrality, "1" indicating strong disagreement with the statement, and "5" indicating strong agreement with the statement. The first question stated "in the future, both large and small companies increasingly will be required to enter into portfolios to achieve success." Second, the companies were asked if they agree with the following statement: "small companies must recognize that they are not self-sufficient." Third statement was "it is not enough to be small and entrepreneurial in the future." Finally, "large and small companies will have to increasingly 'network', i.e. enter into portfolios to achieve success." The questions were combined through a mean calculation.

The primary focus of this proposed model of supply chain portfolio satisfaction is the direct impact of perceptions by key decision makers regarding the competitive environment, firm's positioning, and cultural orientation. Whereas the firm's principal industry and their perceptions of opportunism and technological uncertainty may act as surrogates for the firm's competitive environment (Osborn and Baughn, 1990), other variables like firm size, financial performance, existence of formal contracts provides explanation for the firm's position in the marketplace. Finally, we included country of origin and individualism/collectivism scale to account for cultural orientations. A detailed discussion is included in the Appendix. Descriptive statistics for the sample are presented in Table IV.

In order to improve reliability and validity of the measurement scales and to reduce bias and error, several statistical analyses were performed before testing the hypotheses. Two major forms of validity – including construct validity and internal validity – are reviewed (Shadish *et al.*, 2002).

Construct validity refers to the degree to which a construct corresponds to what its scale items are intended to measure (Cronbach and Meehl, 1955; Schwab, 1999). Thus, a confirmatory factor analysis (CFA) was used to test for convergent validity where the goal is to confirm that all scale items are set to load on their intended measurement scale (Gerbing and Anderson, 1987). The CFA included all of the multiple item measures in the study. Table III presents the results of the CFA. Overall measurement model fit is favorable with an RMSEA of 0.048, CFI of 0.924, NFI of 0.901, and TLI of

	Mean	SD	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)
Country of origin - Sweden (1)	0.41	0.49	1.00																						
Country of origin - Norway (2)	0.39	0.49	-0.67**	1.00																					
Country of origin - Finland (3)	0.20	0.40	-0.42**	-0.40**	1.00																				
Industry - food (4)	0.07	0.25	0.09	-0.02	-0.09	1.00																			
Industry - wood (5)	0.09	0.29	0.01	0.02	-0.03	-0.08	1.00																		
Industry - print (6)	0.10	0.30	0.11	-0.04	-0.09	-0.09	-0.11	1.00																	
Industry - rubber (7)	0.06	0.23	-0.04	0.14*	-0.12	-0.07	-0.08	-0.08	1.00																
Industry - chemical (8)	0.03	0.17	-0.14*	0.16*	-0.01	-0.05	-0.05	-0.06	-0.04	1.00															
Industry-transportation (9)	0.04	0.19	0.14*	-0.16*	0.02	-0.05	-0.06	-0.07	-0.05	-0.03	1.00														
Industry - machinery (10)	0.10	0.29	0.09	-0.16*	0.08	-0.09	-0.10	-0.11	-0.08	-0.06	-0.06	1.00													
Industry - electronics (11)	0.10	0.30	-0.21**	0.19**	0.03	-0.09	-0.11	-0.11	-0.08	-0.06	-0.07	-0.11	1.00												
Industry - programming (12)	0.22	0.41	-0.08	0.20**	-0.15*	-0.14*	-0.16*	-0.18*	-0.13	-0.09	-0.10	-0.17*	-0.18*	1.00											
Industry - other (13)	0.21	0.41	0.06	-0.28**	0.28**	-0.14*	-0.16*	-0.17	-0.13	-0.09	-0.10	-0.17*	-0.17*	-0.27**	1.00										
Financial performance (14)	83.19	27.88	-0.28**	0.19**	0.11	-0.04	0.01	-0.05	0.09	0.08	-0.07	-0.07	0.02	0.13	-0.09	1.00									
Firm size (15)	33.66	43.76	0.03	-0.01	-0.02	0.01	0.03	0.03	0.06	0.04	-0.04	0.07	-0.06	-0.02	-0.06	0.12	1.00								
Technological uncertainty (16)	3.12	0.99	-0.06	0.11	-0.05	-0.10	-0.24**	0.08	-0.11	-0.06	-0.10	0.03	0.05	0.49**	-0.24**	0.05	0.05	1.00							
Individualism (17)	2.98	0.47	0.09	-0.12	0.03	-0.04	0.07	0.03	-0.01	-0.15	.02	0.04	0.01	-0.07	0.05	0.06	-0.07	-0.09	1.00						
Opportunism (18)	3.08	0.52	0.11	0.18**	-0.35**	0.01	-0.06	0.05	0.04	0.01	0.00	-0.05	0.02	0.15*	-0.16*	-0.03	-0.05	0.12	0.14*	1.00					
Alliance orientation (19)	3.50	0.78	-0.26**	0.15*	0.13	0.01	-0.04	-0.26**	0.13	0.05	-0.06	0.07	0.05	0.12	-0.07	0.03	0.01	0.11	-0.21**	-0.02	1.00				
Written contract (20)	1.48	0.50	0.07	-0.20**	0.26**	-0.14*	0.06	0.19**	-0.15*	-0.05	-0.04	0.08	0.00	-0.18*	0.15*	-0.13*	-0.03	-0.09	0.06	-0.15*	-0.03	1.00			
Entrepreneurial orientation (21)	3.17	0.69	-0.02	-0.05	0.09	0.05	-0.21**	-0.12	-0.04	0.03	0.07	0.05	-0.04	0.14*	0.03	0.20**	0.22**	0.42**	0.00	0.06	0.08	-0.09	1.00		
SC portfolio flexibility (22)	0.90	0.17	0.23**	-0.33**	0.13	-0.07	0.01	0.17*	-0.02	0.07	0.11	0.08	0.01	-0.25**	0.03	-0.15*	-0.06	0.00	0.01	0.04	-0.07	0.03	0.04	1.00	
Satisfaction with SC portfolio (23)	2.51	0.62	-0.04	-0.03	0.08	0.14*	0.00	-0.12	0.16*	0.13	0.04	-0.06	0.03	-0.14*	0.00	0.20**	0.11	-0.12	-0.13	-0.25**	0.17*	-0.03	-0.03	0.08	1.00

Notes: Listwise $n = 209$. **Correlation is significant at the 0.05 and 0.01 level (2-tailed)

Table IV. Mean standard deviation and correlations

0.904 – all above the threshold provided by Hu and Bentler (1999). Following the guidelines of Hair *et al.* (1995), all of the scale items loaded significantly (above 0.35) on their expected constructs and did not load on any other construct, thus providing convergent validity for the constructs included in the measurement model. Additionally, discriminant validity was assessed using the approach recommended by Fornell and Larcker (1981) where the correlations between variables were compared to the square root of the AVE of each construct (see Table III). We found the square root of AVE to be higher in every instance, supporting discriminant validity for the constructs.

Schwab (1999) associates internal validity to reliability of measures or the degree to which measurement scores are free of random errors. Two reliability statistics are shown in Table II; composite reliability and Cronbach's α . Cronbach's α (Cronbach and Meehl, 1955) provides an estimate of the correlation coefficient that is expected between a summary score of a measure and another hypothetical measure of the same construct using the same number of repetitions. Similarly, composite reliability refers to the similarity of item scores obtained on a measure that has multiple items and is calculated as a proportion of explained true variance in total variance which includes both true variance and residual variance. In either case, the reliability statistics exceed the 0.70 guideline (ranging between 0.73 and 0.85) suggested by Nunnally and Bernstein (1994) except for the individualism/collectivism measure.

Results

To test the hypotheses, hierarchical linear regression was utilized. Hierarchical regression is especially appropriate for this study because it allows for the evaluation of incremental changes in R^2 as new variables are entered while controlling for the effects of other variables of interest. To capture the interaction between SCPF and AO, these variables were multiplied to create an interaction variable. The same procedure was also used to capture the interaction between SCPF and entrepreneurial orientation. These interaction terms, along with the main effects, were entered on the final step of the regression. The results of the three-step regression analysis are reported in Table V.

The first step included the control variables only and the model is significant ($F = 2.71$, $p < 0.01$) with an adjusted R^2 of 0.12. Aside from the effects from opportunism, financial performance and food and rubber industries, the control variables proved to be non-factors as sources of satisfaction with supply chain portfolio performance for SMEs. Naturally, firm's that reached their financial goals were satisfied with their supply chain portfolio and those perceived high levels of opportunism in their environment were less satisfied. In the second step, the main effects of portfolio flexibility, AO, and entrepreneurial orientation factors were introduced and the model is significant ($F = 2.89$, $p < 0.01$) with an adjusted R^2 of 0.15. The change in R^2 from Model 1 to Model 2 is also significant ($\Delta F = 3.35$, $p < 0.05$), implying that the main effects significantly improved the predictive ability of the model. In the third and final step, the full model with the interactions effects was tested. Once again, the full model is significant ($F = 3.37$, $p < 0.01$) with an adjusted R^2 of 0.20. Moreover, Model 3 demonstrates a significant improvement over the first two models as measured by the change in R^2 ($\Delta F = 6.13$, $p < 0.01$).

The results of Model 2 provide support for *H1* at the $p < 0.1$ level of significance but not at $p < 0.05$. *H1* suggests that more flexible supply chain portfolios lead to higher likelihood of satisfaction with supply chain portfolio performance. Since a larger proportion of LRILs in a supply chain portfolio indicates more flexibility, the positive sign ($b = 0.14$) between SCPF and satisfaction indicates support for *H1* at the $p < 0.1$ level. To improve on the explanatory power of our initial hypothesis, two interaction effects are introduced to the

Dependent variable – satisfaction with supply chain portfolio performance	Model 3		
	Model 1	Model 2	Model 3
<i>Controls</i>			
Finland	0.03	-0.02	-0.01
Norway	0.08	0.07	0.07
Food industry	0.14*	0.14*	0.10
Wood industry	-0.00	-0.04	-0.03
Print industry	-0.08	-0.10	-0.14*
Rubber industry	0.15**	0.11	0.09
Chemicals industry	0.12	0.10	0.10
Transportation industry	0.05	0.05	0.04
Machinery industry	-0.04	-0.07	-0.09
Electronics industry	0.06	0.03	0.03
Programming industry	-0.06	-0.08	-0.09
Financial performance	0.20***	0.24***	0.25***
Firm size (no. of employees)	0.06	0.09	0.09
Presence of formal contract	0.01	0.02	0.03
Individualism	-0.10	-0.06	-0.07
Opportunism	-0.21***	-0.23***	-0.23***
Technological uncertainty	-0.03	0.00	0.02
<i>Main effects</i>			
SC portfolio flexibility		0.14*	0.11
Alliance orientation		0.16**	0.15**
Entrepreneurial orientation		-0.12	-0.10
<i>Interactions</i>			
SC portfolio flexibility × alliance orientation			-0.20***
SC portfolio flexibility × entrepreneurial orientation			-0.14**
<i>Model fit</i>			
R^2	0.20	0.24	0.28
Adjusted R^2	0.12	0.15	0.20
F	2.71***	2.89***	3.37***
ΔF		3.35**	6.13***
ΔR^2		0.04**	0.05***

Notes: Listwise $n = 209$. * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$

Table V.
Hierarchical regression models for satisfaction with supply chain portfolio performance

model. It is also important to note that one of the interaction variables (AO) has a significant impact ($b = 0.16$, $p < 0.05$) on satisfaction with portfolio performance. This is only natural as the more alliance oriented SMEs would be expected to structure their supply chain portfolios in a more proactive and planned manner.

Two-way interaction terms are calculated by multiplying the mean-centered variables to avoid collinearity (Jaccard *et al.*, 1990). The results of Model 3 provide support for $H2$ and $H3$. $H2$ is supported as the interaction term (flexibility × AO) is significant in the expected direction ($b = -0.20$, $p < 0.01$). This means when the AO is low, the relationship between portfolio flexibility and satisfaction is much stronger than the case when the AO is high. Finally, $H3$ suggests that at low levels of entrepreneurial orientation, the positive relationship between SCPF and satisfaction with supply chain portfolio performance becomes stronger. The interaction term (flexibility × satisfaction) is significant in the expected direction ($b = -0.14$, $p < 0.05$)

implying that entrepreneurial orientation is an important determinant of satisfaction with supply chain portfolio performance. Hence, *H3* is supported.

For better understanding, the interaction effects are plotted to demonstrate the cell means for the dependent variable – satisfaction with supply chain portfolio performance – as shown in Figures 2 and 3. To form the cells, we identified means as the cutoff points for each independent variable and recoded the variables as high (2) and low (1) (see Cohen and Cohen, 1983). For example, in Figure 1 where the interaction between SCPF and AO plotted, we created four cells (two by two) where cell-1 is high-SCPF/low-AO, cell-2 is low-SCPF/low-AO, cell-3 is low-SCPF/high-AO, and cell-4 is high-SCPF/high-AO. We then calculated and plotted mean satisfaction scores for each cell and compared them against one another.

Figure 2 demonstrates that for SMEs with low AO, the more flexible their supply chain portfolio the higher their satisfaction with portfolio performance. Alternately, for SMEs with high AO, the flexibility of supply chain portfolio has virtually no impact on portfolio satisfaction as these firms establish a large variety of alliances with various resource investment levels.

In Figure 3, it would appear that for both SMEs with low and high entrepreneurial orientation, the greater the level of portfolio flexibility the greater the level of satisfaction. However, this relationship is more pronounced for SMEs with low entrepreneurial orientation.

Discussion

Theoretical implications

Guided by the two complementary theoretical lenses that contribute to the explanation of supply chain portfolio performance, this study identifies relational and

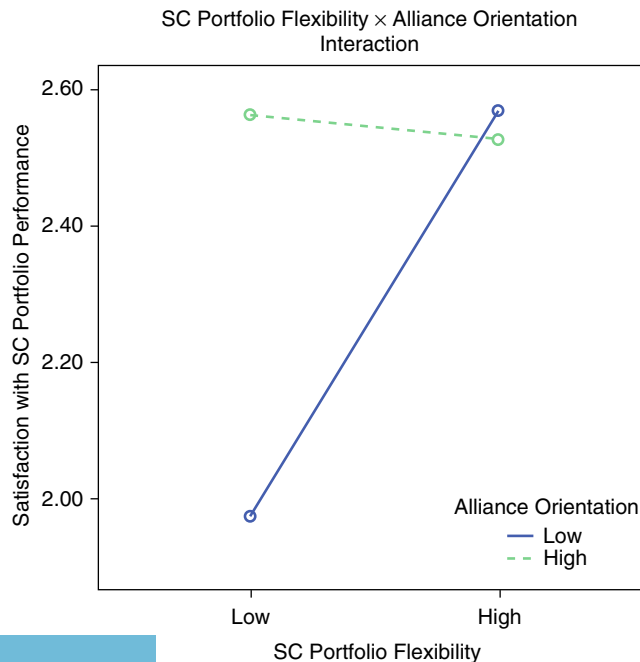


Figure 2.
Moderating effects of
alliance orientation

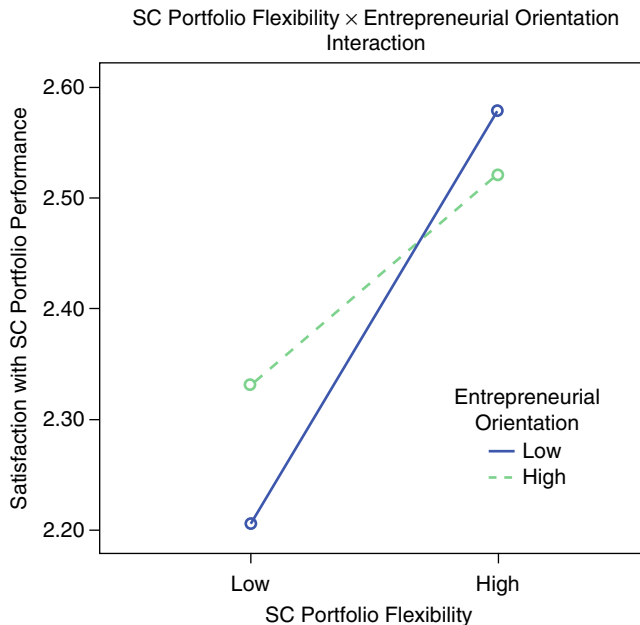


Figure 3.
Moderating effects
of entrepreneurial
orientation

organizational resource factors that drive SME satisfaction with supply chain portfolio performance. In support of R-A theory, the findings of this study indicate that portfolio flexibility is a fairly important determinant for SMEs when they make decisions related to supply chain alliances. SMEs are more likely to be satisfied with the performance of their supply chain portfolios that entail flexible linkages when their AO is low. However, as their desire and/or need to access to important resources of larger firms increase, flexibility becomes less of an issue and SMEs become more concerned with securing critical resources through portfolios structured with all different types of relationships including short-term contracts as well as joint ventures. Whereas the importance of flexibility in supply chain relationships is concurrent with the resource-based theories, the fact that it loses importance when an SME is not deemed to be self-sufficient challenges the premises of these theories and agrees more with the complementary view of R-A theory and SBT. That is, SMEs tend to be more satisfied with their supply chain portfolios when the structure of their portfolio is aligned with their strategic choices/orientations.

Our findings in regards to the moderating role of entrepreneurial orientation also support a complementary view of R-A theory and SBT. The SMEs that are less entrepreneurially oriented put significantly more emphasis on SCPF. This is because their strategic choice is to focus on internal process improvement rather than growth through innovation or aggressive exploitation of external growth opportunities. By focussing on internal processes, the idea is to improve on what they do best, become self-sufficient, and keep the internal resources that make them successful within the organization. Because of this internally focussed strategic orientation, these firms avoid the very long term, highly contractual, relationships like joint ventures that present such risks as having to share highly valuable resources, being bounded by a single partner, and being distracted from “what we do best.” However, this is not to say

more entrepreneurially oriented SMEs all favor HRILs like joint ventures and equity investments. Entrepreneurially oriented firms also prefer a certain level of flexibility in their interfirm relationships to hedge their resource access risk. Yet, flexibility does not seem to be as critical to them as it is to less entrepreneurially oriented firms – mostly due to their strategic choice to grow through innovation and seek new markets that require access to larger firms' resources which diminish the significance of flexibility.

Looking over the control variables, it is evident in this study that opportunism in supply chain portfolio relationships, as conceptualized by TCE (Williamson, 1991), exists and decreases SME satisfaction with supply chain portfolio performance. However, the results of this study also show that SMEs are not deterred by opportunism when they need to form supply chain portfolios to attain their strategic objectives. Our findings show that firms in a marketing context are willing to tolerate the dissatisfaction caused by opportunism when they are in dire need of critical resources such as technology, information, or organizational processes or procedures (Rindfleisch and Moorman, 2003). This case is especially true for the SMEs, since they usually do not have the option to acquire such critical resources through vertical integration due to lack of financial resources compared to larger firms. This finding challenges the TCE view that firms should seek to control the monitoring costs resulting from perceived opportunism through vertical integration rather than through some form of supply chain portfolios and concurs with the SBT where firms base their supply chain portfolio performance decisions on their strategic needs.

Managerial implications

This study also develops important managerial implications for SMEs and larger firms that work with SMEs when managing portfolio satisfaction. When it comes to metrics, supply chain partners must assess the strategic orientation of SMEs before comparing satisfaction ratings across firms. An uncomplicated approach, where all supply chain partners are viewed homogeneously and expected to exceed a standardized metric threshold, discounts individual firm needs across the portfolio. For instance, SMEs that believe in self-sufficiency will most likely report lower satisfaction ratings than firms are more oriented towards alliances and entrepreneurial activities when resource investment requirements in relationships are high. Hence, attempts to raise satisfactions across all firms and all alliance types may be ineffective for some firms and inefficient for others. Therefore, it makes sense for managers to consider categorizing supply chain relationships similar to the way they categorize their end-user relationships. This way SMEs across the portfolio can be segmented into groups where appropriate relationship maintenance can take place and where more suitable satisfaction goals can be defined in terms of operational metrics.

At the core of these findings, managers need to understand that opportunism exists in all relationships. That being said, all relationships will encompass different levels of satisfaction, resource commitment, and temporal focus. They will also include different – sometimes conflicted – strategic orientations. Managers are thus encouraged set different expectations for each relationship. Metrics for relational and organizational expectations should be set based on the specific relationship. Moreover, smaller firms may need to endure some levels of dissatisfaction in exchange for valuable resources. Not all relationships should be long term and as with more transactional relationships, satisfaction may be less important. As with many strategic issues in supply chain logistics, a tradeoff exists between level of satisfaction and limited access to resources. Building flexibility into the organization should help balance these relationships.

Limitations and future research

In this study, we developed a framework that sheds light on SME satisfaction with supply chain portfolio performance. Based on complementary views from R-A theory and SBT, we form integrated stances to explain the satisfaction phenomenon through relational and organizational resource factors. The implications of this research were not only meant to provide the managers of SMEs with a direction to assess what causes satisfaction with supply chain portfolio performance, but also to stimulate a new research stream towards an integrated theory of supply chain portfolio management.

Two main limitations are identified in this study. First, the measure of SCPF and the categorization of the relationship types into LRILs and HRILs are certainly subjective and based on the judgments of the researchers. For example, whereas one firm may view R&D agreements as a LRIL, another firm may rely solely on a R&D agreement and the resulting innovation to survive in the marketplace and thus view agreement as an HRIL involving a major commitment. Therefore, a more rigorous measure of SCPF that allows firms to individually categorize agreements as LRILs and HRILs would be useful in a marketing context. Second, whereas the study combines complementary views from two theories that contribute to the explanation of satisfaction with supply chain portfolio performance, there remains other theories that may add more explanatory power to the model such as relational exchange theories (Morgan and Hunt, 1994), organizational learning theory (Grant, 1996), options theory (Kogut, 1991), and service dominant logic (Vargo and Lusch, 2008; Yazdanparast *et al.*, 2010).

With regards to directions for future research beyond sorting out the issues related to the study's limitations, a more comprehensive set of outcomes related to supply chain portfolio management should be examined. These may include stability of the supply chain portfolio, specific benefits attained through portfolio management, and maybe even the size of the portfolio. These could indicate – to firms – the effectiveness and efficiency of their supply chain portfolio management capabilities.

Additionally, while existing research theories each explain important aspects of supply chain portfolio dynamics, an integrated supply chain portfolio theory that encapsulates and/or draws on multiple theories can provide a richer perspective into supply chain portfolio management. Also, since the sample used in this study is limited to SMEs operating in three northern European countries, future research should confirm these results by applying the proposed framework to additional industries and countries. Finally, a longitudinal approach to examining the supply chain portfolio management phenomena may explain trends in portfolio management and may assist firms in positioning themselves in accordance with the predicted trend.

Note

1. http://ec.europa.eu/enterprise/policies/sme/files/sme_definition/sme_user_guide_en.pdf

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Further reading

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Appendix: Discussion of Control Variables

Industry

A firm's industry has commonly been used as an objective measure of a firm's environment in the past studies of supply chain portfolio formation (Osborn and Baughn, 1990). Additionally, it is possible that the average dissatisfaction with supply chain portfolio performance will vary by industry. Therefore, since the purpose of this study is to examine dissatisfaction at the firm level, dummy variables were created for each of the nine industries represented in the sample.

Firm size

Relative firm size was measured based on the SME's total number of employees. While a number of other variables might be used to determine size, it was assumed that small and often closely held firms would be more willing to provide more accurate information regarding employment than other indicators of size such as assets or gross income.

Financial performance

Financial benefits are the ultimate goal of supply chain portfolio initiatives regardless of the original motivation such as access to new technology or new markets (Birkhahn, 2002). To account for this, perceived financial performance was operationalized by combining two scales developed by Covin *et al.* (1994). The first scale used a seven-item five-point scale that asked respondents to assess the importance (1 = little, 3 = moderate, 5 = extremely) of the following: sales level, sales growth rate, cash flow, gross profit margin, net profit, firm operations, return on investment, and ability to fund firm growth from profits. The second seven-item five-point scale asked respondents to assess how satisfied the organizations top managers were with each of seven types of financial performance. These items were then combined by multiplying the importance of each type of performance by satisfaction for that type of performance. The seven scores produced by this process were then averaged to produce a single scale ($\alpha = 0.82$).

Formal contract

The use or non-use of a formal contract for the supply chain portfolio relationships is predicted to impact the potential outcomes. Both Lazerson (1995) and Larson (1992) found that while most SMEs have formal contracts for their portfolio relationships, some do not since they believe that written contracts relay a message of distrust. Therefore, the respondents were asked to report (a yes/no question) whether there were contracts for the majority of their supply chain portfolios relationships.

Individualism/collectivism

Steensma *et al.* (2000b) found high levels of individualistic orientation leads to avoidance of technology portfolios involving equity ties, whereas firms that reside in more collectivist environments are more likely to use supply chain portfolios to gain competitive advantage. Hence, individualistic vs collectivistic orientation of the firm included in the study as a control variable. The cultural orientation of the SMEs was assessed via ten items developed by Erez and Earley (1987). Earley (1989) claimed that past cross-cultural research had shown that these value anchored were psychometrically valid. An exploratory factor analysis of data resulted in a solution in which six of the ten items were retained. Four of the original items either cross-loaded or had factor loadings below 0.35 and were dropped from consideration. An additional factor analysis on the remaining six items resulted in a uni-dimensional factor solution in which all items loaded above 0.35 with a factor eigenvalue of 2.11. The mean of these six items was used in this study ($\alpha = 0.63$).

Country of origin

While the sample of the countries that were included in this study (Sweden, Norway, and Finland) was relatively homogeneous, dichotomous dummy variables were created to control for country effects.

Technological uncertainty

Technological uncertainty is characterized by rapid pace technological development, quick replacement of previous technologies, and obsolescence (Harrigan, 1985). Technological uncertainty was operationalized using a three-item five-point scale assessing perceptions regarding product obsolescence, rate of technological change, and extent of R&D in the industry. These items were derived from environmental perception scales developed by Covin and Slevin (1989) and Schultz *et al.* (1995). The three items were averaged to produce a single scale.

Perceived opportunism

Perceived opportunism refers the focal firm's perceptions of other firm's competitive or self-interest seeking behaviors as opposed to cooperative or mutually beneficial behaviors in an interfirm relationship (Parkhe, 1993). Perceived opportunism was operationalized using a seven-item five-point scale assessing perceptions regarding truthfulness, factuality, honesty, noncompliance with promises, complaints, and expected reciprocity. These items were derived from perceived opportunism scales developed by John (1984), Parkhe (1993), and Provan and Skinner (1989). The items were combined into a single scale by a mean calculation.

About the authors

Mert Tokman (PhD, The University of Alabama) is an Associate Professor of Marketing in the College of Business at James Madison University. His research interests include distribution channel management and supply chain networks. He has published about 20 refereed articles in marketing and supply chain management journals like *Journal of Business Logistics*, *International Journal of Logistics Management*, *International Journal of Physical Distribution and Logistics Management*, *Industrial Marketing Management*, *Journal of the Academy of Marketing Science*, and *Journal of Retailing*. Mert Tokman is the corresponding author and can be contacted at: mtokman@cba.ua.edu

R. Glenn Richey Jr (PhD, University of Oklahoma) is an Associate Professor of International Marketing and Supply Chain Management and the Morrow Faculty Excellence Fellow at The University of Alabama's Culverhouse College of Commerce and Business. His current international and domestic research interests include relationship governance; green and reverse logistics; manufacturer–distributor–retailer resource decision making; and supply chain risk preparedness and recovery. Dr Richey has published over 60 articles in peer-reviewed SCML, marketing, management, international business, and operations management scholarly journals. Dr Richey is Co-Editor of *International Journal of Physical Distribution and Logistics Management* and on seven editorial review boards. Prior to entering academe, Dr Richey worked for ten years in industry.

Tyler R. Morgan (MBA, University of Alabama) is a doctoral student at the University of Alabama, specializing in the field of supply chain management and strategy. He earned a Bachelor's degree in Finance from the University of Alabama in 2003. Prior to returning to academe, Mr Morgan worked in the insurance industry for six years. His research has been published in the *International Journal of Physical Distribution and Logistics Management*.

Louis Marino (PhD, Indiana University) is a Professor of Entrepreneurship and Strategic Management at The University of Alabama. Professor Marino's research focuses on how entrepreneurial firms respond to environmental uncertainty and how a firm's entrepreneurial orientation impacts the nature and efficacy of their response. His research has been published in outlets such as the *Academy of Management Journal*, *The Journal of International Business Studies*, *The Journal of Business Venturing* and *Entrepreneurship Theory and Practice*.

Pat H. Dickson is a Professor of Management at Wake Forest University. His research focuses on the formation, structure and performance of strategic alliances of entrepreneur-oriented firms. Dr Pat H. Dickson, who joined Wake Forest University in 2006, is an Associate Professor and Director of the Business and Enterprise Management degree program in the Schools of Business. He has also served as a Professor of Strategy and Entrepreneurship on the faculties of Georgia Tech and the University of Louisville. Prior to earning his PhD in 1997 from the University of Alabama, Dickson spent 15 years as an entrepreneur, co-founding companies in the automotive parts and service industry and as a corporate executive serving as Director of Franchising for a super-regional retail and manufacturing company in the same industry. His research has appeared in top journals in the management and entrepreneurship fields and has been awarded a Certificate of Distinction for Outstanding Research by the Academy of Management and the National Federation of Independent Business.

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