How do Supply Chain Management and Information Systems Practices Influence Operational Performance? Evidence from Emerging Country SMEs

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How do Supply Chain Management and Information Systems Practices Influence Operational Performance? Evidence from Emerging Country SMEs

Abstract

This study first provides a comparative analysis of the impact of supply chain management (SCM) and information systems (IS) practices on operational performance of small and medium-sized enterprises (SMEs) operating in two neighboring emerging country markets of Turkey and Bulgaria. Then, we investigate moderating effects of both SCM-IS linked enablers and inhibitors on the links between SCM and IS practices and operational performance of SMEs. To this end, we first empirically identify the underlying dimensions of SCM and IS practices, and SCM-IS related enabling and inhibiting factors. Second, a series of regression analyses is undertaken to estimate the impact of the study's constructs on operational performance of SMEs. The results are discussed comparatively within the contexts of both Turkish and Bulgarian SMEs and beyond. The study makes a significant contribution to the extant literature through obtaining and analyzing cross-national survey data of SCM and IS practices in emerging country markets.

Keywords: Supply chain management; information systems; operational performance; SMEs; Turkey; Bulgaria

1. Introduction

Given intensifying global competition as well as structural and contextual disadvantages against developed economies (Buckley, 2009), small and medium-sized enterprises from emerging countries (EC SMEs) face the challenge of gaining sustained competitive advantage. Yet, business success and survival in dynamic and fast changing markets depend heavily on being part of an effectively managed supply chain (Bayraktar et al., 2007), and adopting innovative means of doing business in supply chain domain (Wunder et al., 2012). Thus, EC SMEs live in a reality of larger supply chain(s) that they are embedded in and can leverage for sustained performance (Koh et al., 2007). In turn, information systems and related enabling technologies facilitate building unified supply networks linking suppliers to customers by integrating business processes for quick and effective management of information. Therefore, supply chain management (SCM) and information systems (IS) play vital roles in long-term success and survival of EC SMEs.

SMEs have a substantial share in total world output and employment and play a pivotal role in economic and technological development, supply chain functioning, and performance (Koh et al., 2007). They differ from large companies in terms of competitive dynamics, resource endowments, and their approach to SCM and IS practices. Different realities concerning SCM and IS practices for EC SMEs emphasize the need for contextualized and in-depth understanding of such practices and their likely effects on business success. Moreover, idiosyncrasies of emerging countries entail novel exploration of the relevant enabling and inhibiting factors that could help explaining the effects of the SCM and IS practices on operational performance of EC SMEs.

However, there is a paucity of research on SCM and IS practices, and their effects on EC SMEs' performance (Bayraktar et al., 2009). Moreover, enabling and inhibiting factors that constitute boundary conditions to the link between SCM and IS practices and EC SMEs' performance is still largely unknown in many emerging country settings. Without gaining insights into such external factors, the relationships among SCM, IS practices and performance cannot be fully understood. Besides, our knowledge on SMEs' behavior as pivotal players in emerging countries still lags behind actual practices (Größler et al., 2013).

Chow et al. (2008) posit that SCM and IS practices are both structurally and contextually bounded, i.e., varying perceptions concerning implementing and managing SCM and IS practices can exist across different countries. Every country has its own unique characteristics that should be judiciously evaluated for an effective implementation of SCM and IS practices. At this point, Turkey and Bulgaria can be interesting and relevant research settings to examine SMEs from these two neighboring emerging countries of Southeast Europe. Given their proximity to larger markets, Turkey and Bulgaria are essential contexts for setting up production bases with potential market expansion opportunities into the nearby countries (Bloomen and Petrov, 1994; Ulengin and Uray, 1999). Thus, exploring SCM and IS practices in these two key emerging country settings with both similarities and differences can offer some unique insights into SCM and IS practices and their role in EC SME performance.

The principal goal of this study is to investigate the interactive effects of SCM and IS practices and SCM-IS enablers and inhibitors on EC SMEs' operational performance. To this end, this study first identifies the underlying dimensions of SCM and IS practices, and SCM-IS related enabling and inhibiting factors. Second, a set of hypotheses is developed and tested, and their results are discussed comparatively within the contexts of SMEs from Turkey and Bulgaria. Relying on data obtained from SMEs' executives, this study offers a timely examination of the role of SCM and IS practices together with SCM-IS enablers and inhibitors in EC SMEs' operational performance. This contribution also addresses the scant research on SCM and IS practices in a relevant context comparatively. As put by Ketikidis et al. (2008), the bulk of the current research on Southeast Europe focuses on single country (e.g., Bloomen and Petrov, 1994; Ulengin and Uray, 1999).

The remainder of this paper is organized as follows. The next section reviews relevant literature and sets out the study's hypotheses. Research method is presented in the following section. Then, results and discussion are provided followed by conclusion and implications.

2. Background and hypotheses

A conceptual framework, as shown in Figure 1, is proposed to explore to what extent the application of SCM and IS practices in SMEs – in tandem with SCM-IS related enablers and

inhibitors – will influence operational performance of SMEs in emerging country markets. A detailed explanation of SCM and IS practices together with SCM-IS related enablers and inhibitors is provided in the ensuing subsections.

[Insert Figure 1 here]

2.1. SCM practices

SCM comprises particular approaches and practices in order to effectively integrate suppliers, manufacturers, distributors and customers to improve the sustained performance of individual firms and supply chain altogether in a cohesive business model (Chopra and Meindl, 2001). While SCM primarily targets inefficiencies along supply chain, it also involves effective customer demand anticipation, optimal resources positioning corresponding with this demand and its effective fulfillment through healthier materials, information, and financial management.

The literature is replete with SCM practices dimensions from a variety of perspectives (e.g., Chin and Tat, 2015), but lacks consensus on relevant constructs (Burgess et al., 2006). Li et al. (2005) developed a measurement instrument for SCM practices. Their measurement instrument contains six validated dimensions, which encompasses strategic supplier partnership, customer relationship, information sharing, information quality, internal lean practices and postponement. Burgess et al. (2006) consolidated the constructs suggested previously by the scholars such as Chen and Paulraj (2004) and offered the following dimensions to categorize the extant studies: business results and outcomes, improvement orientation, intra/inter-organizational relationships, leadership, logistics and process information systems. In their search of underlying dimensions of SCM practices contributing to Turkish manufacturing SMEs' performance, Koh et al. (2007) clustered 12 individual SCM practices in two empirically tested and validated factors: outsourcing and multi-suppliers, and strategic collaboration and lean practices. This study identifies the following set of SCM practices which is briefly outlined below.

The first two SCM practices, *close partnership with suppliers* and *customers* refer to long term, collaborative, and deeply involved relationship management with suppliers and

buyers (Li et al., 2006). *Benchmarking* of supply chain performance enables comparison between supply chain members and other supply chains through relationships. These three practices together constitute the first leg of SCM practices that are pertinent to interorganizational cooperation. Interorganizational cooperation and collaboration is the epicenter of SCM, because the contemporary definition of SCM in relation to other domains highlights the notion that SCM is the management of business activities and relationships across organizational boundaries (Mentzer et al., 2008).

Furthermore, *just-in-time* (JIT) *supply* entails suppliers producing and delivering to manufacturers right quantity at right time with continuous and consistent conformance to performance specifications (Mistry, 2005). JIT has become pivotal for survival and success in turbulent business environments (Tang et al., 2005) that describes majority of business landscape today (Cavusgil and Cavusgil, 2012). *Electronic procurement* (e-procurement) refers to a virtual purchasing application that helps firms reducing their purchasing cost (Rahman, 2004). *Outsourcing* entails farming out some non-core activities, which in turn enables freeing firm resources in order for the firm to focus on key activities and lower costs to gain competitive advantage (Jaafar and Rafiq, 2005). Using *third-party logistics* (3PL) is becoming an increasingly popular SCM practice (Perçin and Min, 2013), which involves outsourcing all logistics operations to an external party (Sink and Langley, 1997). *Strategic planning* concentrates on deploying strategies in different functional areas to offer superior customer value at lower costs through effective sourcing policies, efficient supply chain networks, improved quality and reduced total cycle time, better post-sale service and higher responsiveness to customer needs (Carter et al., 1997). *Multiple sourcing* (measured as many suppliers) is a strategy of using several suppliers concurrently for one input where several suppliers compete against each other, which enable buying firm to obtain lower prices. *Selective sourcing* (measured as few suppliers) is a strategy of using few (often one) suppliers for one input (Chen and Paulraj, 2004), where a buyer wants to secure a long-term business relationship and collaboration with one or few dedicated suppliers in return for lower transaction and production costs. *Holding safety stock*, which could be viewed as a part of business continuity planning, is a practice of maintaining buffer against supply and demand

volatilities to tackle uncertainties (Koh and Tan, 2006), despite its potentially negative cost implications in an increasingly complex and dynamic business environment (Tang, 2006). The underlying glue that holds these practices together is that they all pertain, at varying degrees, to supply operations as an integral component of SCM.

The relevant literature provides evidence that the abovementioned SCM practices will lead to increased operational performance. This argument can also be applied to EC SMEs. For instance, partnership with suppliers, including work-flow unification, information sharing, and joint planning that are conducive to the just-in-time (JIT) system, could result in lead-time decrease in production and effective response to customer demands (Perry and Sohal, 2001) that tend to be volatile in emerging countries. Furthermore, partnership with suppliers is generally found to be an essential factor for SMEs to understand their strategic suppliers and obtain necessary inputs (Bordonaba-Juste and Cambra-Fierro, 2009). Customer relationships, covering the activities such as complaint handling and customer satisfaction (Li et al., 2006), often result in better demand forecasting, and hence improve firm's resource planning and efficiency. Likewise, JIT often reduces lead-time in production, stock levels, and holding costs which are directly linked to EC SMEs' operational performance (Mistry, 2005). Furthermore, previous research suggests several advantages of logistics outsourcing that include operating cost reduction, service level enhancement, core competence prioritizing, and capital cost lessening (Liu and Lyons, 2011). Particularly, EC SMEs can utilize logistics outsourcing to leverage economies-of-scale and knowhow that cannot be obtained singlehandedly, given their small scales and insufficient resources to run effective logistics systems. Likewise, benchmarking stimulates continuous improvement of EC SMEs through comparative analyses (Moser et al., 2011) and hence allows key performance indicators to be re-positioned and re-valued over time subject to market forces and dynamics. In short, there is confirming evidence for each relevant dimension of SCM practices to suggest that SCM practices can contribute to operational performance of EC SMEs through various means, which leads to the following hypothesis.

H1: SCM practices are positively associated with operational performance of EC SMEs.

2.2. IS practices

Managing SCM operations includes various undertakings extending from material sourcing to production scheduling, logistics, and distribution network optimization within and across organizations. Thus, effective information flows within and across organizations are essential to manage supply chains, and such SCM operations cannot be possible without information systems management. In contrast, ineffective information systems are a major barrier to effective SCM (Fawcett et al., 2008). Hence, information flow is essential to supply chains, and information management capability is critical to developing competitive advantage. Information system is a major driving factor influencing supply chain performance (Bayraktar et al., 2009). Most manufacturing firms, including EC SMEs, deploy numerous IS practices to enhance their operational performance, which include *material requirements planning* (MRP), *manufacturing resource planning* (MRPII), *enterprise resource planning* (ERP), *supplier relationships management* (SRM), and *customer relationships management* (CRM) (Tang et al., 2005). This study highlights the following set of IS practices with each having its own specific goals and advantages.

 MRP and *MRPII* are both manufacturing planning and control systems that are used to coordinate firm's order fulfillment processes by matching materials and resources availability to market demand. *ERP* system, a major extension of MRP and MRPII, is an integrated application designed to address information fragmentation across firms' business, integrate intra- and inter-organizational information (Sharif et al., 2005), and offer a unified platform for a firm-wide information management system. *SRM* is the systematic, enterprise-wide evaluation of suppliers' assets and capabilities in line with overall business strategy. *CRM* builds relationships with customers while customizing prospective marketing strategy to enhance value. These practices are all primarily employed and utilized within the domain of single firm, although they all assist SCM.

 Furthermore, there are several IS practices that pertain primarily to interorganizational domain, i.e., facilitating business activities across organizational boundaries. These IS practices entail interorganizational coordination among boundary-spanning employees and also synchronize IS technologies with business processes to work effectively. First, *e-business*

refers to the use of internet-based applications to manage intra- and interorganizational business processes (Lin and Lin, 2008). Second, *radio frequency identification* (RFID) refers to using transponders or tags affiliated with objects for identifying and tracking them by means of radio waves (Hu et al., 2011). Third, *electronic data interchange* (EDI) is computer-to-computer real-time exchange of data and documents (Tapscott, 1997) and is used to streamline information exchange between firms. Finally, *bar coding* is the placement of computer readable codes on items (Kachru, 2009), and it enables efficient track and storage of information about products.

All these tagging and electronic transfer technologies could improve operational performance when deployed and utilized effectively in customer relationships, information and order processing, and product security. For example, RFID tags allow precise subject counting and locating in real-time, and thus, improve efficiency (Ustundag and Tanyas, 2009). EDI's benefits to SMEs include increased information quality, reduced transaction cost, reduced inventory level, improved forecasting, improved cash-flow, and finally improved operational efficiency and customer service (Iacovou et al., 1995). Despite potential barriers stemming from their complexities and organizational readiness (Iacovou et al., 1995), EDI and similar IS technologies offer cutting edge opportunities to EC SMEs to attain high level of operational performance.

In a similar vein, an effective utilization of MRP, MRPII and ERP can reduce lead-time in manufacturing and stock levels and also improve resource planning and efficiency. In particular, ERP allows generating timely and accurate information within firms and collaboratively sharing this information between firms through an integrated database to have better communication with other firms (Loh and Koh, 2004). Likewise, e-business emerges as an important factor shaping business today (Wagner et al., 2003). It enables marketing of EC SMEs' products/services online and allows online transaction and payment systems, while incorporating this system into supply chains. In fact, e-business is a vital tool to foster visibility of SMEs in the global marketplace, alleviate risks and uncertainties of foreign markets, and overcome size constraints (Piscitello and Sgobbi, 2004). In turn, SCM, SRM, and CRM systems are softer practices with social skill requirements on top of IT skills, and

they enable supplier and customer knowledge management, partnership building, performance assessment, and effective procurement strategy design. Thus, they improve customer services, organizational buying effectiveness (Miocevic and Crnjak-Karanovic, 2012), and resource planning and operational efficiency of EC SMEs. In line with technology acceptance framework that suggests a positive link between technology implementation and performance (Nair et al., 2013), implementation of IS practices is likely to improve operational performance of EC SMEs.

H2: IS practices are positively associated with operational performance of EC SMEs.

2.3. SCM–IS enablers and inhibitors

Although it may be intuitive to posit that the abovementioned SCM and IS practices are positively associated with operational performance of EC SMEs, the strength and direction of these relationships are unlikely to be universal across the population of firms focal to this research. Thus, examining the nexus of relationships between SCM-IS practices and operational performance of EC SMEs entail accounting for contingencies and boundary conditions of these relationships. In particular, explanation of the effects of SCM and IS practices on SMEs' operational performance is not complete without proper attention to explore SCM and IS related enablers and inhibitors.

SCM-IS enablers consist of factors that facilitate performance achievement through SCM and IS practices. In this study, following SCM-IS enablers are identified ex-ante particularly with regard to institutional and socioeconomic landscape of emerging countries. Common wisdom suggests that education and financial support are essential for a fruitful employment and utilization of IS practices. Information systems are highly technical systems, which demand appropriate training provision and skills to function effectively. Because SMEs may lack required resources and know-how to attain this, it is necessary to recognize that empowering circumstances could be provided through alternative methods such as government funding, academic sourcing and research center know-how. Likewise, SMEs do not typically have a convenient access to vocational education (Goss and Jones, 1992). This

notion underlines the fact that the EC SMEs' labor force may not be fully capable to perform specific tasks (Goss and Jones, 1992). Such capability shortcoming could be handled through an effective delivery of vocational training to SMEs, e.g., provision of training sessions so that SMEs' performance could be enhanced by effective utilization of SCM and IS practices. Thus, relevant factors grouped under the label of SCM-IS enablers are likely to be instrumental in shaping the link between SCM-IS practices and operational performance of EC SMEs.

Particularly EC SMEs often do not have access to adequate information system to enhance their operating performance. Also, numerous SMEs cannot afford to participate in industrial exhibitions and fairs and hence may not have up-to-date information about the latest IS practices. However, enhanced information delivery to SMEs enables them to realize operational advancement via effective utilization of SCM and IS practices (Bayraktar et al., 2009).

The link between SCM-IS practices and EC SMEs' operational performance can also be enhanced by cross-country regional agreements which may typically allow better supply chain integration and management (Rugman et al., 2009). In fact, supply contract promotes cross-border business collaborations and thus could foster effectiveness of sourcing supplies from other countries. Better infrastructure establishment is also a key enabler for supply chain operations. Most EC SMEs suffer from the lack of sufficient physical, financial and judicial infrastructure (Isobe et al., 2000). Thus, a better infrastructure is envisaged to strengthen SCM and IS practices' influence on operational performance. Increased regional cooperation between institutions (Rugman et al., 2009) and close cooperation between companies and governments can encourage different interorganizational collaboration formations such as new product and technology development, and licensing agreements. These SCM-IS related enablers can expand business opportunities for EC SMEs and thus may improve their operational performance through more effective adoption of SCM-IS practices. Based on these arguments, it is expected that:

H3: SCM-IS enablers positively moderate the relationships between SCM and IS practices and operational performance of EC SMEs.

Nevertheless, due consideration should also be given to explore the potential impact of SCM and IS related inhibitors from a reverse perspective. SCM-IS inhibitors include elements that hinder operational performance attainment through SCM and IS practices, casting the focal links weaker. In this study, the following SCM and IS inhibitors are explored further.

During adaptation or implementation stage, resistance to change by the workforce is a central factor preventing firm to fully leverage SCM and IS practices (Fawcett et al., 2008). For example, deploying an ERP system within a firm necessitates reengineering of business processes which requires employees to alter their daily activities to implement ERP practices. It is often difficult to accomplish this without changing employees' attitudes and work values, which may otherwise inhibit effectiveness of SCM-IS practices. Likewise, deploying any SCM or IS practice requires appropriate supplier/vendor support in which the lack of this support is likely to decrease operational performance of IS users and also adoption of JIT practices by buyers (Matson and Matson, 2007).

When implementing IS practices, it is important to consider integration issues within a firm. Mismatch between the systems that are used by suppliers and customers, inability or unwillingness to share information, lack of trust among supply chain members, and non-aligned strategies and operating philosophies (Fawcett et al., 2008) prevent full integration and inhibit information sharing, which reduces operational efficiency in supply chains. Finally, SMEs typically have limited skills and resources (Bordonaba-Juste and Cambra-Fierro, 2009; Piscitello and Sgobbi, 2004; Wagner et al., 2003), hindering abilities to deploy SCM and IS practices as intended, which in turn reduces their operational performance.

This discussion proposes that the SCM-IS inhibitors negatively affect the link between SCM-IS practices and EC SMEs' operational performance, given their adverse effects on the effectiveness of SCM-IS practices. Although specifics of this relationship as discussed here have not been empirically scrutinized in prior research, it is likely that these inhibitors can

comprise important factors precluding EC SMEs to increase their operational performance. These arguments lead to the following hypothesis.

H4: SCM-IS inhibitors negatively moderate the relationships between SCM and IS practices and operational performance of EC SMEs.

3. Research methodology

Since the primary objective of this study is to provide a comparative analysis of the interactive influences of SCM, IS practices, SCM-IS enablers and inhibitors on operational performance of SMEs within two emerging country settings (i.e. Turkey and Bulgaria), we have adopted a descriptive research design to test our research framework. To this end, a set of hypotheses is formulated and tested based on an empirical study involving relatively large samples of SMEs from these two neighboring Southeast European countries, which is novel in this stream of research. Given the nature of our hypotheses and variables used in the study, we undertake multiple regression analysis which provides a means of objectively evaluating the degree and character of the relationship between dependent and independent variables and then assessing the magnitude, sign and statistical coefficient for each independent variable (Hair et al., 1998). The following subsections explain in detail the procedures for sampling and data collection, and also measurement of variables used in the study.

3.1. Sample and data collection

Data for this study were collected from a self-administered survey that was circulated in Turkey and Bulgaria concurrently. A survey instrument was developed to explore the impact of SCM and IS practices in interaction with SCM-IS related enablers and inhibitors on EC SMEs' operational performance. The questionnaire was pre-tested several times to ensure that wording, format and sequencing of questions were appropriate.

In line with a typical SME research, we have adopted the number of employees as the base for the definition and operationalization of SME. An SME is identified as organization that employs fewer than 250 employees. The minimum of 10 employees was also used as a

threshold criterion to exclude micro firms that do not fit to the purpose of this research. This range is consistent with an SME definition adopted by both Turkish and Bulgarian authorities and by EU.

Two samples of SMEs operating in food products and beverages (NACE code 15) in both countries were selected randomly from Small Business Administrations' database in Turkey and Bulgaria. These neighboring countries constitute two important Southeast European countries, revealing both similarities and remarkable differences with regard to their cultures and business realities. Until 1989, the Bulgaria followed a centrally planned economic structure. Since then, the country's economic structure has been transforming to a market-oriented one. Nonetheless, Turkey has had a comparatively lengthier practice and experience as a market economy than Bulgaria. Recently, numerous Turkish firms have been moving to Southeast European countries to enhance their competitive edge via obtaining better input prices, easier access to European countries, and presence in relatively untapped markets. Thus, such linkage, similarities, and differences between the two countries offer proper settings for a comparative investigation of SCM-IS practices and operational performance of SMEs in Turkey and Bulgaria. Accordingly, adopting Turkey and Bulgaria as survey settings serves two main purposes: 1) establishing a plausible base for generalization of findings to other emerging country SMEs, and 2) revealing differences and similarities between SCM and IS practices, SCM-IS enablers and inhibitors, and operational performance of SMEs located in two neighboring countries in Southeast Europe.

It was requested that questionnaires be completed by a senior officer/executive in charge of both SCM and IS activities. Of the 500 questionnaires posted, 172 questionnaires were returned in Turkey after one follow-up. Sixteen surveys were eliminated due to large missing values. Thus, the overall response rate was about 31.2% (156/500) among Turkish SMEs, which was considered acceptable for following analysis. From 500 questionnaires posted, 107 questionnaires were returned in Bulgaria. Twelve questionnaires were dropped as they were largely incomplete. With a total of 95 questionnaires, the overall response rate was thus 19% among Bulgarian SMEs.

A comparison of key demographical characteristics of firms such as the annual revenue, employee count, and sub-industry difference revealed no significant differences between responding and non-responding firms (p>0.1). Following Armstrong and Overton (1977), another non-response bias check was carried out by comparing early respondents with late respondents. Analysis of variance tests with regard to the respondent types showed no significant differences (p>0.1) in the mean responses on any of the study's constructs. Thus, it is highly likely that the responses adequately represented the total sample group.

3.2. Measurement of variables

Based on the extant literature, a total of eleven SCM practices applicable to SME context were identified. Research participants were asked to specify to what extent these SCM practices were deployed in their firms. In a similar vein, a set of ten IS practices was identified and measured. Respondents were asked to identify to what extent these IS practices were applied in their firms. A set of eight enabling factors for SCM and IS practices was also identified. Participants were asked to specify their perceptions of the relative importance of these factors for the implementation of SCM and IS practices. In addition to SCM-IS enablers, a set of seven factors that is likely to inhibit SCM and IS practices effectiveness in SMEs were defined and measured. Respondents were also requested to indicate how often they came across problems when implementing SCM and IS practices in their firms.

Although the extant literature provides various dimensions of operational performance which may also be applicable to SME context, it is generally acknowledged that it is difficult to select a single measure of firm performance. Thus, seven operational performance (OPER) criteria related to the use of SCM and IS practices were identified. Respondents were asked to indicate how their firms had performed over the last 3 years with respect to their key competitors on each operational performance criterion.

Table 1 provides the measurement of the study's constructs along with the exact wording of the items constituting SCM practices, IS practices, SCM-IS related enablers and inhibitors, and operational performance.

[Insert Table 1 here]

4. Results and discussion

The data analysis to test the proposed hypotheses was executed at four phases. First, a number of univariate analyses were undertaken to identify mean differences between Turkish and Bulgarian SMEs in terms of implementation levels of SCM and IS practices, perceptions toward the relative importance of SCM-IS enablers and SCM-IS inhibitors, and the level of operational performance. Next, a series of exploratory factor analyses (EFA) with varimax rotation was executed to identify the underlying dimensions of SCM practices, IS practices, SCM-IS related enablers and inhibitors in order to test for discriminant validity (Mentzer and Flint, 1997). In the third phase, measurement models were tested for each construct using confirmatory factor analysis (CFA) to verify if extracted dimensions in stage 2 are in fact unidimensional and provided a good fit to data. Finally, based on hierarchical regression analysis, the impact of the study's constructs on operational performance of SMEs for each country sample (i.e. Turkish and Bulgarian) was estimated. These phases are explained in the following subsections.

4.1. Univariate analysis

Table 1 shows the means and standard deviations of the items constituting SCM practices, IS practices, SCM-IS related enablers and inhibitors, operational performance, and the t-test statistics for comparing differences in mean scores for both Turkish and Bulgarian SMEs. There are some significant differences noted between each group of SMEs with respect to implementation levels of SCM and IS practices.

Compared to Bulgarian SMEs, Turkish SMEs have higher levels of deployment for the following set of SCM practices including "just-in-time supply" (p<0.01), "e-procurement" (p<0.01), "3PL" (p<0.01), "strategic planning" (p<0.01) and "holding safety stock" (p<0.01). These findings might be explained by high capital cost in Turkey. Turkish SMEs prefer to establish instant replenishments with their suppliers and tend to practice newer procurement applications such as e-procurement, JIT, and 3PL. Another SCM practice that Turkish firms

use more heavily, i.e. strategic planning, helps firms create a strategic fit with their business environment when dealing with global competition. Since Bulgaria has still undergoing a major transition from state-run to a more market-driven economy (Ketikidis et al., 2008), the value and importance of strategic planning and holding safety stock might not be well understood by Bulgarian SMEs.

Furthermore, implementation level of forming close partnership with suppliers is slightly higher than that of forming close partnership with customers in both country samples. This finding tends to confirm Ketikidis et al. (2008), who noted that Southeast European companies focus more on dealing with suppliers other than customers, mainly because many of such companies are production/SCM oriented, given their institutional and economic realities (Buckley, 2009).

Likewise, Turkish SMEs overwhelmingly outperform their Bulgarian counterparts in terms of applying following IS practices: "MRPII" ($p<0.01$), "ERP" ($p<0.01$), "SCM" ($p<0.01$), "CRM" ($p<0.01$), "SRM" ($p<0.01$) and "EDI" ($p<0.01$). In contrast, as compared to Turkish SMEs, "MRP" ($p<0.01$) and "RFID" ($p<0.01$) are relatively more practiced by Bulgarian SMEs. This finding gives an intuition that Turkish SMEs with the exception of RFID are more prone to use more technologically advanced tools than their Bulgarian counterparts.

Concerning the relative importance of SCM-IS related enabling factors, Turkish SMEs perceive the following factors relatively more important than Bulgarian SMEs: "more education" ($p<0.01$), "easier access to vocational training" ($p<0.01$), "more funding and financial support" ($p<0.01$) and "better infrastructure" ($p<0.01$). The only exception to this is the level of importance placed on the enabling factor of "improved information provision" ($p<0.01$) where the mean value of this factor is significantly higher for Bulgarian SMEs than for Turkish SMEs ($p<0.01$). In terms of the relative frequency of SCM-IS related inhibitors, no significant differences, however, are noted between Turkish and Bulgarian SMEs.

There are also significant differences ($p<0.001$) between Turkish and Bulgarian SMEs in terms of operational performance. On each of the seven performance criteria, Turkish SMEs were found to have better performance levels than Bulgarian SMEs. The finding that

the Turkish SMEs fare relatively much better than their Bulgarian counterparts in terms of SCM and IS related operational performance is not particularly surprising. Given Turkey's long experience with market economy and its increasing integration to the world economy, Turkish SMEs have long been exposed to intensifying global competition and thus have been seeking effective ways to improve their operational efficiency.

4.2. Exploratory factor analysis (EFA)

Spearman correlation coefficients among the constituent items of the relevant constructs uncovered from several low to moderate inter-correlations. Hence, an effort was undertaken to produce a parsimonious set of distinctive variables from all items underlying each construct to account for possible conceptual and statistical overlap. EFA with varimax rotation was performed separately on each construct to extract its underlying dimensions for the full sample of Turkish and Bulgarian SMEs. Table 2 shows the results of EFA.

The purification process resulted in eliminating three SCM practices (i.e. multiple sourcing, outsourcing, and holding safety stock) with low and/or inappropriate loadings. EFA on remaining 8 SCM practices yielded 2 factors with eigenvalues greater than 1. Based on the item loadings, these two factors were respectively labeled as *supply practices* (SCM1) and *collaboration* (SCM2). Cronbach alpha values for the underlying factors are 0.67 and 0.61, respectively, implying an acceptable level of construct reliability (Nunnally, 1978).

[Insert Table 2 here]

Similarly, an EFA was carried out to explore potentially distinctive dimensions of IS practices. After eliminating one IS practice with low and/or inappropriate loading (MRP), the factor analysis produced 2 factors that explained 56.8 per cent of observed variance. Cronbach alphas for the underlying factors are 0.81 and 0.69, respectively. These factors were labeled as *intrafirm IS practices* (IS1) and *interfirm IS practices* (IS2). A similar EFA for SCM–IS enablers yielded a total of 2 factors explaining 63.7 per cent of observed variance. These factors were respectively labeled as: *Cooperation building* (ENAB1) and *infrastructure*

building (ENAB2). The Cronbach alpha values for ENAB1 and ENAB2 are 0.79 and 0.76, respectively, exhibiting a satisfactory level of construct reliability. Nevertheless, all 7 SCM-IS inhibitors were loaded into a single factor, *SCM-IS inhibitors*, explaining 62.7 per cent of the observed variance. Table 2 shows that Cronbach alpha value for *SCM-IS inhibitors* is 0.90. Similarly, all 7 operational performance measures were also loaded into a single factor, *operational performance*, which explained 61.7 per cent of observed variance. Cronbach alpha value for *operational performance* is 0.88, signifying adequate construct reliability.

4.3. Confirmatory factor analysis (CFA)

In this stage, the relevant constructs were tested using the first order confirmatory factor model to evaluate construct validity by means of maximum likelihood method. The following results consistently supported the factor structure for all five constructs as noted earlier in the EFA stage. The CFA is based on comparing sample and model variance-covariance matrices. The measurement model results at the aggregate level for relevant constructs are presented in Table 2.

Figures in Table 2 exhibit standardized regression weight between each item and its corresponding latent variable where all weights in CFA are found significant ($p<0.001$). The goodness-of-fit indices for these variables are demonstrated in Table 3. These indices conform to commonly accepted standards. The value of $\chi2$ ranges from 42.11 through 141.25, with the values of $\chi2/df$ ratio varying between 1.37 and 3.24. This ratio should be within the range of 0-5 where lower values indicating a better fit. The results show that the models fit in with this criterion. In addition, GFI, AGFI and CFI for the relevant constructs are highly acceptable, since they are quite close to a value of 1.0, which represents a perfect fit. The results attest construct validity for the measurement models of all five constructs.

[Insert Table 3 here]

4.4. Regression analysis and hypotheses testing

Table 4 presents the descriptive statistics and correlations among the study's variables. The pairwise correlations do not seem to present serious multicollinearity problem for the regression analysis, as none of the coefficients are above 0.50.

[Insert Table 4 here]

Hierarchical regression analysis was used for each group of SMEs (i.e. Turkish and Bulgarian) to test our hypotheses. Independent variables were the constructs derived from factors analyses. Main effects were entered at the first stage and the interaction effects including enablers and inhibitors at the second and third stages, respectively. Regression results were presented in Table 5. For each regression model, tolerance values and variance inflation factors (VIF) were also examined to account for multicollinearity. All tolerance values were more than 0.41, and all VIF scores were above 2.85, indicating that multicollinearity is not a serious problem (Hair et al., 1998). Models 1 to 3 show the regression results for Turkish SMEs, while Models 4 and 6 show the regression results for Bulgarian SMEs. Models 1 and 4 indicate the effects of main indicator variables for both Turkish and Bulgarian samples, respectively, while Models 2 and 5 incorporate the interactive effects of SCM and IS practices, and SCM-IS related enabling factors on operational performance of both samples. Similarly, Models 3 and 6 consider the interactive effects of SCM and IS practices, and SCM-IS related inhibiting factors on operational performance of Turkish and Bulgarian samples, respectively. F-statistics indicate that all six models are significant (p<0.01), indicating a good linear fit with data sets. The adjusted R-square values of Models 1 to 6 ranged between 0.32 and 0.72, exhibiting a satisfactory explanatory power.

[Insert Table 5 here]

Model 1 indicates that from a total of seven indicator variables, the following four are found to have significant effects on operational performance of Turkish SMEs: *supply*

practices (p<0.01), *intrafirm IS practices* (p<0.05), *infrastructure building* (p<0.01) and *SCM-IS inhibitors* (p<0.01). Similarly, for Bulgarian SMEs Model 4 reveals that four of the seven indicator variables have significant effects on operational performance: *supply practices* (p<0.05), *intrafirm IS practices* (p<0.01), *interfirm IS practices* (p<0.01) and *infrastructure building* (p<0.1). The significant positive signs on *supply practices* in Models 1 and 4 provide some partial support for H1 in both Turkish and Bulgarian contexts. Regarding the effects of IS practices on operational performance of SMEs, Bulgarian sample provides strong support for H2, as evident in Models 1 and 4 of Table 5 where both *intrafirm IS practices* and *interfirm IS practices* are found significant (p<0.01). However, the degree of support for H2 has been relatively less for Turkish sample with only *intrafirm IS practices* been found significant (p<0.05). The finding that all two constructs constituting IS practices had more significant effects on operational performance of Bulgarian SMEs as compared to Turkish SMEs, is not particularly surprising. As noted earlier in Bloomen and Petrov (1994) and Ketikidis et al. (2008), there has been an increasing interest in logistics applications and related technologies in Southeast European countries including Bulgaria. Compared to the relatively mature infrastructure of Turkey, early stage IS implementations in Bulgaria may lead to a more favorable impact on SMEs' operational performance given the absence of proper SCM practices.

As can be seen in Model 2, only two of the interaction effects for SCM-IS enablers were found to be significant and positive (p<0.05) for Turkish SMEs. These involve the interaction effect of *supply practices* and *infrastructure building* and that of *intrafirm IS practices* and *infrastructure building*, providing some partial support for H3 in Turkish context. This finding suggests that the impacts of *supply practices* and *intrafirm IS practices* on operational performance of Turkish SMEs are stronger at higher levels of *infrastructure building* than at its lower levels. As for the interaction effects in Bulgarian context, Model 5 shows that the following four interaction effects are significant and positive, which include *supply practices* and *infrastructure building* (p<0.01), *collaboration* and *infrastructure building* (p<0.01), *intrafirm IS practices* and *infrastructure building* (p<0.05), and *interfirm IS practices* and *infrastructure building* (p<0.01). This finding renders a good deal of support for H3

suggesting that the positive moderation of *infrastructure building* is stronger in Bulgaria than in Turkey, as increased *infrastructure building* strengthens the impact of SCM and IS practices on operational performance of Bulgarian SMEs. This finding is particularly interesting, as it implies that Bulgarian SMEs place more emphasis on attempts to build SCM-IS related infrastructure for a better implementation of SCM and IS practices than Turkish SMEs, which will in turn have stronger positive effect on operational performance of SMEs.

As shown in Model 3, H4 is partially supported for the Turkish context in that two of the four interaction terms, *supply practices* and *SCM-IS inhibitors* ($p<0.01$) and *interfirm IS practices* and *SCM-IS inhibitors* ($p<0.05$), are significant. This finding suggests that the effects of *supply practices* and *interfirm IS practices* on Turkish SMEs' operational performance are weaker when *SCM-IS inhibitors* are faced more frequently by Turkish SMEs. In a similar vein, as seen in Model 6, H4 continues to be moderately supported for Bulgarian SMEs but only for SCM practices. Interaction terms for *supply practices* and *SCM-IS inhibitors* ($p<0.05$) and *collaboration* and *SCM-IS inhibitors* ($p<0.01$) are significant. This finding confirms the view that it is only SCM practices that are negatively moderated by *SCM-IS inhibitors* i.e., their impact on Bulgarian SMEs' operational performance is weaker when *SCM-IS inhibitors* are confronted more frequently by this group of SMEs. However, the influence of IS practices of Bulgarian SMEs on their operational performance appears to be not moderated significantly by higher frequency of *SCM-IS inhibitors*.

5. Conclusion and implications

Relying on perceptual data from executives, this study has sought to explore the effects of SCM and IS practices and also those of SCM-IS related enablers and inhibitors on SMEs' operational performance within two emerging countries in Southeast Europe. The study's findings revealed that Turkish SMEs had higher application levels of SCM and IS practices than Bulgarian SMEs. Regarding the relative importance of SCM-IS related enabling factors, Turkish SMEs again were found to place more emphasis than Bulgarian SMEs on most of the enabling factors. No remarkable differences, however, were observed between Turkish and Bulgarian SMEs in terms of the relative frequency of SCM-IS related inhibiting factors.

Regarding the level of operational performance, Turkish SMEs were found to have notably better performance levels than Bulgarian SMEs. Both exploratory and confirmatory factor analyses were deployed to identify empirically validated dimensions of the study's constructs.

For both samples, regression analyses indicated that SCM and IS practices as well as SCM-IS related enabling factors positively influenced SMEs' operational performance. Nevertheless, deployment level of IS practices had a much stronger impact on SMEs' operational performance for Bulgarian SMEs than for Turkish SMEs. Besides, the effects of SCM-IS related inhibitors on SMEs' operational performance were not perceived as significant by Bulgarian SMEs, which tended to contradict with the perceptions of Turkish SMEs. Finally, Bulgarian SMEs' operational performance was found to be more influenced by the interaction effects of predictor variables than that of Turkish SMEs.

5.1. Theoretical and managerial implications

This study makes a number of theoretical contributions to SCM-IS research. Essentially, the study shows that the effects of SCM and IS practices on operational performance vary across cross-national contexts and external factors. Therefore, the key theoretical implication arising from this study is that there are no universal SCM or IS practices that would unconditionally improve operational performance. Instead, it appears that country of origin and various enabling and inhibiting factors have clear and instrumental impact on the relationship between SCM-IS practices and operational performance. Second, the study provides a novel account of the nexus of relationships between SCM-IS practices, relevant factors, and operational performance in the particular context of EC SMEs. Especially, the inclusion of two neighboring but diverse emerging countries in the study enables both greater generalizability through broader contextual inclusiveness and better potential insights into the differences between cross-national contexts within emerging countries. Third, factor analyses exhibit that it is possible to cluster various SCM and IS practices drawing on underlying common themes among them, despite their uniqueness and differences. In fact, the results of the factor analyses may contribute to empirically validated dimensions of discrete SCM-IS practices to enable better conceptualization and operationalization of phenomenon.

The study's findings also provide several managerial implications for SMEs in Turkey and Bulgaria as well as those in other emerging countries. First, Bulgarian and other ex-socialist country SMEs should place more emphasis on attempts to build relevant infrastructure for effective implementation of SCM-IS practices. Managers of these SMEs should also be cognizant that application of IS practices is highly critical to increase their firms' operational efficiency and performance. Second, as for Turkish SMEs, SCM practices are slightly more influential on achieving superior operational performance than for Bulgarian SMEs. Turkish managers are then advised to place greater emphasis on removing SCM-IS related barriers which might have detrimental effects on SMEs' operational performance. For instance, they should be heavily concerned with tackling management development issues, implementing effective human resource management practices, and building necessary integrative mechanisms to coordinate suppliers and customers within their existing system.

Furthermore, particularly managers from Bulgaria and other Southeast European countries are recommended to be well aware of the external factors that can jeopardize interorganizational collaboration, which would more negatively influence Bulgarian SMEs than their Turkish counterparts. In contrast, given the finding that the effectiveness of Turkish SMEs' interfirm IS practices are more vulnerable to inhibiting factors, Turkish managers are advised to pay increased attention to attenuate these factors in order to achieve and maintain effectively executed and coordinated interfirm IS practices. Finally, despite their great care and attention on establishing close partnerships with suppliers and customers, both Turkish and Bulgarian SMEs fail to reap the expected benefits in terms of creating superior operational performance.

This study offers some managerial implications for other EC SMEs as well. First and foremost, the study highlights that SCM and IS practices are inextricably intertwined. Thus, managers of EC SMEs may be advised to adopt an integrative approach to application and management of SCM and IS practices, rather than viewing them as separate entities. Likewise, when it comes to enabling and inhibiting factors, it seems obvious that some enabling factors such as *infrastructure building* elements benefit SCM and IS practices in other EC SMEs as well. So, managers of EC SMEs should be recommended to place a

particular emphasis on *infrastructure building* in terms of providing easier access to vocational training, better education and infrastructure in their own countries. Finally, in addition to Turkish and Bulgarian SMEs, other EC SMEs are likely to pay more attention to the use of IS applications e.g., CRM and SRM) as a formal way of forming close partnerships with suppliers and customers to improve their operational performance.

5.2. Limitations and future research

Nonetheless, the results of this research should be interpreted cautiously. Perhaps a serious limitation of this study was its focus on a single industry, thus precluding the generalization of findings to other industries including services and public sectors. The data were gathered from single respondents, which might result in possible response bias. Future research should strive to gather data from firms across whole supply chains. Another shortcoming of this study is the lack of adequate sample size which hindered us to apply more rigorous statistical tests such as structural equation models. The study should be regarded as an exploratory study and be used as a basis for further deepened research with relatively large data sets. Therefore, future research may examine the proposed associations by incorporating contextual variables into the framework including industry type, supply chain structure, ownership type and intra-regional variations to further probe into contingencies and boundary conditions of relationships examined in this study. Finally, there is a need for further conceptualization and verification of the factors used in this study, following two rigorous factor analyses. If these factors with same practices hold in other research settings, it could be possible to proceed with further conceptualization and theorization around the identified factors and test new hypotheses empirically.

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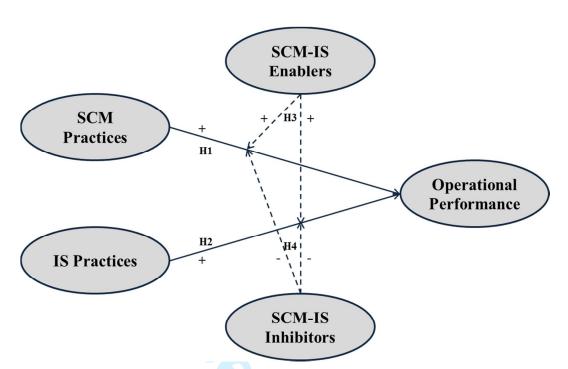
Figure 1. Conceptual model

Table 1. Variables and measures

SCM practices (1= 'not at all implemented' to 5= 'fully implemented')	Turkish Firms		Bulgarian Firms		t-value
	Mean	SD	Mean	SD	
Close partnership with suppliers	3.86	1.19	3.89	1.12	-0.24
Close partnership with customers	3.75	1.21	3.58	1.06	1.14
Just in time supply	3.60	1.28	2.09	1.35	8.84*
E-procurement	2.52	1.20	1.97	1.19	3.54*
Outsourcing	2.85	1.35	2.93	1.17	-0.47
3PL	2.54	1.37	1.65	0.95	5.45*
Strategic planning	3.14	1.25	1.69	0.95	9.69*
Supply chain benchmarking	2.78	1.28	3.06	0.89	-1.88
Few suppliers	3.11	1.41	2.83	1.21	1.59
Many suppliers	3.07	1.49	3.22	1.64	-0.75
Holding safety stock	3.17	1.34	2.49	1.44	3.79*
IS practices (1= 'not at all implemented' to 5= 'fully implemented')					
Material requirements planning (MRP)	2.84	1.25	3.87	1.49	-5.88*
Manufacturing resources planning (MRPII)	2.51	1.16	2.03	1.45	2.84*
ERP	2.38	0.97	1.98	1.37	2.66*
SCM	2.43	0.98	1.42	1.12	7.43*
CRM	2.65	1.25	1.25	0.88	9.87*
SRM	2.39	1.03	1.74	1.17	4.58*
E-business	2.00	0.95	1.74	1.12	1.93
RFID	1.77	0.79	2.24	1.65	-3.05*
Electronic data interchange (EDI)	1.97	0.91	1.08	0.57	8.46*
Bar coding	2.24	1.07	2.52	1.37	-1.79
SCM–IS enablers 1 (= 'of no importance') to 5 (= 'of major importance')					
More education (e.g. formal qualification)	3.90	1.02	2.04	1.11	13.51*
Easier access to vocational training	3.66	1.01	3.24	1.00	3.18*
More funding and financial support	3.80	1.05	2.85	1.07	6.89*
More inter-country regional agreements	3.38	1.26	3.38	1.17	0.04
Better infrastructure (e.g. telecommunications, road, etc.)	3.63	1.14	2.96	1.07	4.66*
Improved information provision	3.61	1.08	4.38	0.85	-5.91*
Increased regional cooperation between institutions	3.47	1.17	3.48	0.98	-0.11
Closer cooperation between companies and governments	3.53	1.18	3.38	1.02	0.99
SCM–IS inhibitors (1= 'not at all' to 5= 'very frequently')					
Resistance to change from employees	3.05	1.01	2.85	0.96	1.53
Resources shortages	3.12	1.12	2.95	1.43	1.07
Skills shortages	3.10	1.25	2.94	1.52	0.93
Insufficient vendor support	3.02	1.19	2.98	1.38	0.81
Integration within existing system	3.04	1.21	2.95	1.64	0.54
Integration with supplier's system	3.23	1.21	3.06	1.53	0.96
Integration with customer's system	3.08	1.22	2.97	1.66	0.63
Operational performance criteria (1= 'definitely worse' to 5= 'definitely better')					
Reduced lead time	3.94	0.99	2.41	1.86	7.36*
Cost saving	4.01	1.08	2.60	0.84	11.56*
Forecasting	3.60	0.97	2.78	0.88	6.87*
Resource planning	3.79	0.90	3.12	0.93	6.29*
Better operational efficiency	3.62	0.84	3.08	0.96	4.53*
Reduced inventory level	3.48	0.98	2.64	0.86	7.07*
More accurate costing	4.06	0.91	2.76	0.90	10.99*

Notes:
SD= Standard deviation
*p<0.01

Table 2. Factor analyses

	EFA					CFA
SCM Practices (K-M-O Measure of Sampling Adequacy= 0.707; Bartlett Test of Sphericity= 389.49; p<0.001)	*Factor loads*	*Eigen-value*	*% Variance explained*	*Cum. per cent*	*Cronbach alpha*	*Regression weight*
Factor 1: Supply practices (SCM1)		2.64	29.29	29.29	0.67	
JIT supply	0.74					0.74*
Strategic planning	0.72					0.70*
E-procurement	0.65					0.41*
3 PL	0.62					0.26*
Few suppliers	0.45					0.51*
Factor 2: Collaboration (SCM2)		1.60	17.77	47.06	0.61	
Close partnership with suppliers	0.78					0.72*
Close partnership with customers	0.76					0.72*
Supply chain benchmarking	0.57					0.35*
IS practices (K-M-O Measure of Sampling Adequacy= 0.757; Bartlett Test of Sphericity= 717.39; *p*<0.001)						
Factor 1: Intrafirm IS practices (IS1)		3.45	38.31	38.31	0.81	
SCM	0.83					0.65*
CRM	0.81					0.78*
MRP II	0.72					0.61*
SRM	0.67					0.75*
ERP	0.63					0.79*
Factor 2: Interfirm IS practices (IS2)		1.66	18.46	56.77	0.69	
RFID	0.82					0.42*
Bar coding	0.77					0.52*
E-business	0.72					0.90*
EDI	0.44					0.46*
SCM–IS enablers (K-M-O Measure of Sampling Adequacy= 0.782; Bartlett Test of Sphericity= 752.51; p<0.001)						
Factor 1: Cooperation building (ENAB1)		3.63	45.41	45.41	0.79	
Increased regional cooperation between institutions	0.84					0.72*
Improved information provision	0.78					0.53*
Closer cooperation between companies and governments	0.73					0.87*
More inter-country regional agreements	0.67					0.75*
Factor 2: Infrastructure building (ENAB2)		1.47	18.33	63.74	0.76	
More education	0.85					0.34*
More funding and financial support	0.76					0.77*
Easier access to vocational training	0.75					0.74*
Better infrastructure	0.51					0.99*
SCM–IS inhibitors (K-M-O Measure of Sampling Adequacy= 0.867; Bartlett Test of Sphericity= 1166.83; p<0.001)						
Factor 1: SCM-IS inhibitors (INH)		4.39	62.73	62.73	0.90	
Resistance to change from employees	0.88					0.24*
Resources shortages	0.87					0.78*
Skills shortages	0.87					0.71*
Insufficient vendor support	0.84					0.68*
Integration with existing system	0.83					0.84*
Integration with supplier's system	0.78					0.85*
Integration with customer's system	0.44					0.85*
Operational performance (K-M-O Measure of Sampling Adequacy= 0.898; Bartlett Test of Sphericity= 935.94; p<0.001)						
Factor 1: Operational performance (OPER)		4.32	61.74	61.74	0.88	
Reduced lead time	0.85					0.58*
Cost saving	0.85					0.75*
Forecasting	0.81					0.73*
Resource planning	0.80					0.84*
Better operational efficiency	0.79					0.80*
Reduced inventory level	0.74					0.70*
More accurate costing	0.66					0.80*

*p<0.001

Table 3. Goodness of fit statistics

Model/Construct	$\chi 2$	$\chi 2$/df	RMR	GFI	AGFI	CFI
SCM practices	21.66	1.35	0.07	0.97	0.95	0.98
IS practices	91.35	4.56	0.10	0.93	0.83	0.90
SCM–IS enablers	57.93	4.82	0.07	0.95	0.84	0.93
SCM–IS inhibitors	8.62	1.08	0.03	0.99	0.97	0.99
OPER	16.38	1.64	0.04	0.98	0.95	0.99

Table 4. Descriptive statistics

Variables	Mean	S.D.	1	2	3	4	5	6	7	8
1. SCM1	2.62	0.87	1							
2. SCM2	3.33	0.81	0.00	1						
3. IS1	2.17	0.90	0.45**	0.14*	1					
4. IS2	1.96	0.78	0.13*	0.05	0.00	1				
5. ENAB1	3.55	0.88	0.08	0.15*	0.08	0.08	1			
6. ENAB2	3.38	0.90	0.36**	0.11	0.26**	0.18**	0.00	1		
7. INH	3.04	1.01	-0.10	-0.18**	-0.23**	-0.24**	-0.03	-0.15*	1	
8. OPER	3.38	0.87	0.48**	0.16*	0.53**	0.21**	0.05	0.44**	-0.23**	1

Notes:
S.D. = Standard deviation
*$p < 0.05$; **$p < 0.01$
N = 251

Table 5. Regression results on operational performance of Turkish and Bulgarian SMEs

Variables	Turkish SMEs			Bulgarian SMEs		
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Supply practices (SCM1)	0.23**	0.36**	0.60**	0.15*	0.38**	0.11
Collaboration (SCM2)	0.09	0.12	0.06	0.04	0.08	0.14
Intrafirm IS practices (IS1)	0.16*	0.16*	0.27*	0.37**	0.45**	0.34*
Interfirm IS practices (IS2)	0.06	0.03	0.40*	0.30**	0.28**	0.15
Cooperation building (ENAB1)	0.04	0.03	0.03	0.14	0.14	0.19*
Infrastructure building (ENAB2)	0.29**	0.28**	0.13*	0.40**	0.52**	0.31**
SCM-IS inhibitors (INH)	-0.31**	-0.37**	-1.90**	-0.14	-0.12	-1.43**
SCM1*ENAB1		0.11			0.02	
SCM1*ENAB2		0.21*			0.28**	
SCM2*ENAB1		0.01			0.12	
SCM2*ENAB2		0.10			0.33**	
IS1*ENAB1		0.13			0.03	
IS1*ENAB2		0.20*			0.16*	
IS2*ENAB1		0.04			0.10	
IS2*ENAB2		0.13			0.23**	
SCM1*INH			-1.04**			-0.45*
SCM2*INH			-0.18			-1.05**
IS1*INH			-0.43			-0.08
IS2*INH			-0.53*			-0.12
F statistics	12.9**	7.77**	7.57**	28.3**	17.3**	7.67**
R-square	0.38	0.45	0.37	0.69	0.76	0.50
Adjusted R-square	0.35	0.40	0.32	0.67	0.72	0.44
N	*156*			*95*		

*p<0.05; **p<0.01