

THE SUPPLY CHAIN MANAGEMENT AND INFORMATION SHARING AS ANTECEDENTS OF OPERATIONAL PERFORMANCE: A CASE OF SMEs

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Abstract

Purpose: The basic purpose of this research is to analyze the interactive impact of IS and SCM practices factors which enable and inhibit SCM-IS on the OPER of SMEs in EC.

Methodology: The key dimensions of IS and SCM practices are attempted to be identified by this research study along with the inhibiting and enabling factors related to SCM-IS. Moreover, the study is based on a set of research hypothesis, which are tested and the findings are comparatively discussed specifically to the SMEs working in Indonesia.

Results: The role of practices related to IS and SCM as well as inhibitors and enablers of SCM-IS in OPER of SMEs in Emerging Countries has been examined timely relying on data obtained from executives of SMEs. The research contributes to the identified research gap on IS and SCM practices in a comparative aspect. Therefore, the study is among the pioneering studies on the issues. So, the current study has used SEM-PLS as a statistical tool to answer the research questions raised in this study and research objectives envisaged in the current study.

Keywords: *Supplier relation, TQM, Environmental, Institutional pressure, Performance*

INTRODUCTION

From the emerging developed countries, challenges are being faced by small and medium sized companies because of increased competition across the world and disadvantages related to contextual and structural aspects for the developed countries in attaining competitive advantage (Avgerou and Walsham, 2017; Chang, 2017; Cavico *et al.*, 2018; Çelik *et al.*, 2018). The success of a business these days is based on effective management of its supply chain in this rapidly changing business markets. According to (Ross, 2002), businesses effectively managing their supply chain are able to sustain in the markets. Adoption of innovative approaches in businesses is required for management of supply chain in an effective way (Tatoglu *et al.*, 2016). The SMEs belonging to the emerging economies are facing the fact that sustainable business performance can be attained through larger supply chains they are surrounded with (Ho *et al.*, 2016). A unified supply chain network accompanied with an integrated information management system (IS), which links the customers and suppliers, can maintain information effectively. Such a system supports in integration of business activities. The survival of SMEs belonging to emerging economies and the long-term success is based on the effective supply chain management (SCM) and use of an integrated IS.

There is limited research conducted on IS and SCM practices and their impact on the operational performance of SMEs with particular reference to emerging countries (Gandhi *et al.*, 2017). With reference to several emerging countries, the inhibiting and enabling factors that construct the margin conditions for establishing relation between Information Systems and SCM practices and performance of SMEs in EC are not known largely. A deep insight into these external factors is required to explore the relation between IS, SCM practices and performance of SMEs. Without a clear understanding, the relation cannot be understood. The lack of information related to the behavior of SMEs being key players is far behind the real practices in emerging countries (Größler *et al.*, 2013).

According to (Prajogo *et al.*, 2016) there are several limitations linked with IS and SCM practices in terms of context and structure. There are different perceptions related to the management and implementation of these practices with reference to different countries. Countries differ because of their characteristics for IS and SCM practices and their effective implementation. For studying SMEs of two emerging countries, Indonesia can be very interesting considering the neighbourhood point of view of Southeast Europe.

For establishing a foundation for production with the opportunities for market expansion capability in the other countries, Indonesia are important contexts (Yilmaz *et al.*, 2015) distinct insights can be given by the exploration of IS and SCM practices as well as SME performance in Indonesia considering their differences as well as similarities.

The basic purpose of this research is to analyze the interactive impact of IS and SCM practices factors which enable and inhibit SCM-IS on the OPER of SMEs in EC. The key dimensions of IS and SCM practices are attempted to be identified by this research study along with the inhibiting and enabling factors related to SCM-IS. Moreover, the study is based on a set of research hypotheses, which are tested and the findings are comparatively discussed specifically to SMEs working in Indonesia. The role of practices related to IS and SCM as well as inhibitors and enablers of SCM-IS in OPER of SMEs in Emerging Countries has been examined timely relying on data obtained from executives of SMEs. The research

contributes to the identified research gap on IS and SCM practices in a comparative aspect. According to (Qrunfleh and Tarafdar, 2014) the existing research in literature is based on the Southeast Europe focusing on a single country

In the next part of research, literature has been reviewed and hypotheses have been formulated. After formulating hypothesis, research method has been presented. Results and discussion is made in the next sector followed with research conclusion and future implications.

LITERATURE REVIEW

SCM practices

Specific techniques and practices are involved in Supply Chain Management for integration of manufacturers, suppliers, distributors and customers in an effective manner. These practices are supportive in the improved performance of the firm as well as the entire supply chain (Qrunfleh and Tarafdar, 2015). The inefficiencies are targeted by the Supply Chain Management, which involves the anticipation of customer demand, use of resources in an optimal way, effective management of information, materials and finance. In literature, different aspects of SCM practices are involved (Chin et al., 2015). However, there is a lack of research on relevant constructs. A measurement tool was developed by for practices related to SCM. There were six specific dimensions in the measurement tool, which include information quality, lean practices, customer relationship, and partnership with suppliers, sharing of information and postponement.

The constructs, which were suggested by previous scholars, were consolidated by (Chardine-Baumann and Botta-Genoulaz, 2014). They added that outcomes of business, orientation improvement, and logistics, and Information Systems process, relations within and across the organizations could be added to categories the extant studies. (Golicic and Smith, 2013) used 12 practices of SCM in two valid factors, which were empirically tested. The study was based on the SCM practices and their impact on the performance of SMEs in Turkey. The included factors were lean practices, strategic collaboration, multi-suppliers and outsourcing.

In this research, the identified set of practices related to SCM has been briefly described as below:

The establishment of collaborative and deep relationship with the buyers and suppliers is involved in the first two practices of SCM i.e. *close partnership with customers and suppliers* (Saenz et al., 2014). Comparison of supply chain members and with other supply chains is involved in *Benchmarking* of supply chain performance.

The first pillar of SCM practices is constituted by these three practices. These are relevant with the cooperation of inter-organization. Supply chain management is the management of relationships and practices within and across the boundaries of organization. The center of supply chain management is the collaboration and cooperation of inter-organization.

The *Just in Time (JIT)* Approach refers to the completion of production activities within time and delivering of right quantity at the right time. For the success and survival of an organization within a competitive business environment, JIT has become crucial. Most of the business landscape are working of JIT (JavadianKootanaee et al., 2013).

The purchasing cost can be reduced by the use of Electronic procurement (e-procurement). This is related to the virtual purchasing application, which supports the companies in lowering their cost of purchasing. *Outsourcing* refers to the practice of using outside resources, which refers to lowering of cost through focus on other key activities for sustaining competitive advantage. Another important practice in SCM is *third-party logistics* (3PL). This refers to the outsourcing of all the operations from some external partly (Perçin and Min, 2013). Use of strategies in different functional areas for providing customers with high quality at low cost is involved in *Strategic planning*. This is done through the use of sourcing policies, use of efficient supply chain networks, low time cycle, improved quality and improved services after sale along with better responsiveness to the needs of customers (Sharma and Kumar, 2015).

Use of different suppliers for a single input is involved in *multiple sourcing*. This leads to an increased level of competition among the suppliers leading to low price. This can be done as a strategy to get low cost inputs. Using few suppliers for outsourcing one input is referred to as *Selective sourcing* (Golicic and Smith, 2013). Through this strategy, long-term collaboration and relationship is established by the buyer resulting low production as well as transaction cost. *Holding safety stock* refers to the maintenance of a sufficient level of stock to manage the volatility of supply and demand and deal with such uncertainties (Koh and Tan, 2006) There are some negative influences of this practice on the cost implications. These practices are combined because of the fact that they all are important factors of SCM even at some varying degrees.

The literature offers some evidence for the previously described practices of Supply Chain Management, which result in improved OPER. This fact is equally applicable to the SMEs in the EC. Production time can be decreased and better response to customers through strong partnership relations with the suppliers, sharing of information, unification of workflow and joint planning (Fernandes et al., 2017). These factors are not stable in the emerging countries. SMEs need to understand that partnership with suppliers is an important factor for getting required inputs.

Demand can be forecasted in a better way through the activities of customer relationships, which involve handling of complaints and satisfying customers (Ho et al., 2016). Resultantly, the efficiency and resource planning of firm is improved. The lead-time is reduced through Just in Time approach, which is related to the OPER of SMEs in EC (Qrunfleh and Tarafdar, 2014). It has been suggested by the previous research that there are various advantages of outsourcing

logistics. These include prioritizing of core competence, reduction of operational cost, and reduction of capital cost and improvement of service level (Sharma and Kumar, 2015). SMEs in the emerging countries can implement the practice of outsourcing logistics for achieving economies of scale keeping in view their insufficient resources and small scales. In the similar way, comparative analysis can result in improvement of SMEs in EC as well (Fawcett *et al.*, 2015) the re-positioning and re-value of the key performance indicators is allowed. Evidence exists that the practices related to Supply Chain Management are contributive for OPER of SMEs in the emerging economies. However, the contribution can be through different means. The following hypothesis has been constructed:

H1: There is a positive association between the SCM practices and OPER of EC SMEs.

Practices of Information System (IS)

Supply Chain Management activities consist of a number of stages i.e. from sourcing of input material to production, operational activities, and distribution of products, logistics and optimization processes within the organization and across the organization. Flow of information is required to be done effectively for managing the SCM activities and operations in an optimized manner. Without the implementation and management of IS, SCM activities can be managed effectively. Lack of effective IS system can be a barrier to sustaining of competitive advantage (Akman and Mishra, 2015) Flow of information is crucial in supply chain for the achievement of competitive advantage. The performance of supply chain can be influenced through the major factor of information system (Danese and Romano, 2011). Several practices related to Information System are implemented by most of the manufacturing firms including SMEs in the Emerging Countries. These practices include the Manufacturing Resource Planning (MRPII), Material Resource Planning (MRP), Supplier Relationships Management (SRM) and Enterprise Resource Planning (ERP) and Customer Relationships Management (CRM) (Yu *et al.*, 2013).

The current research study sheds light on the below mentioned IS practices. Every practice has its specific advantages and purposes. The systems used for planning and controlling the manufacturing processes are MRP and MRPII. These systems are adopted by the firms for matching the resources and materials to the demand in the market and coordination of order fulfillment processes. ERP system is an integrated application, which is developed for resolving the address information across the business firms. It integrates the information within and across the organizations. It is the extension of systems (MRP and MRPII) (Fawcett *et al.*, 2015), the system provides a way for the management of firm wide information. The evaluation of capabilities and assets of suppliers across the enterprise, which is in line with the strategy of business, is referred to as SRM. In CRM, relations are established with the customers and customer value is improved through effective use of marketing strategy. All of these practices support Supply Chain Management. Moreover, these are implemented within area of a single firm.

Several practices of Information Systems are related to the area of inter-organizational. These practices support the activities, which are conducted across the boundaries of an organization. Moreover, IS technologies are synchronized with the business processes for effective working of the organization. The use of applications based on internet is referred as *e-business*. This is related to the management of inter and intra-organizational activities. The use of transponders for the identification and tracking through radio waves is involved in *radio frequency identification* (RFID). This may involve the use of tags with the products. The real time information exchange in the form of documents and data is involved in *electronic data interchange* (EDI). This is used for aligning the flow of information among the organizations. Now days, bar coding is used for tracking of products and information management. In this process, products are given readable codes (Danese and Romano, 2011). This supports the firm in efficient storage of information and tracking of products with ease. OPER can be improved through the use of these technologies, which facilitate the transfer of information electronically. This results in improved customer relationship management, processing of information and product safety. Use of RFID tags can help in stock calculation and locating products with less time (Yu *et al.*, 2013). The advantage of EDI is increased quality of information with low cost of transaction. Moreover, it results in low inventories, better forecasting and financial improves with enhanced level of customer satisfaction (Kasemsap, 2018). SMEs in the EC are provided with highly productive opportunities through the use of IS and EDI technologies, irrespective of their issues and complexities (Wu *et al.*, 2015).

Firms can reduce their lead-time in the process of manufacturing and maintaining stock through use of ERP, MRP and MRPII. Flow of information can be accurate and timely with the use of ERP. Better communication is resulted, which could be a source of bringing efficiencies (Danese and Romano, 2011). Today, the use of e-business has become a key component for shaping organizations (Heinrich *et al.*, 2017). Through e-business technology, products can be sold online. It can be a crucial tool for SMEs working across the globe to avoid the uncertain situations in the foreign markets through online sale and payment systems. The softer practices are CRM, SRM and SCM, which are related to the requirements of social skills. Management of customer as well as supplier knowledge is enabled by these practices. Moreover, building partnership, assessment of performance, designing of procurement strategy is also facilitated.

The result of these practices is the improvement of customer service management and buying effectiveness of organization (Miocevic and Crnjak-Karanovic, 2012). Moreover, operational efficiency of SMEs in Emerging Economies with improved resource planning is attained. A positive relation between implementation of technology and its performance is

suggested by the framework of technology acceptance (Nair *et al.*, 2013). Moreover, the IS practices and their implementation enhance the OPER of SMEs in Emerging Countries.

H2: There is a positive association between IS practices and operational performance of SMEs.

Inhibitors and Enablers to SCM-IS

It is sensitive yet sensitive to make a concluding mark about the impact of IS and SCM practices mentioned previously on OPER of SMEs in Emerging Countries. However, the direction exhibited by these practices cannot be similar across the universe, which can be a focus of this research. There is need for examining the boundary conditions and contingencies of the relation SCM-IS and OPER of SMEs in Emerging Countries. There is no complete information available on the impact of IS and SCM related practices on OPER of SMEs without the exploration of the inhibitors and enablers of these factors (Wong *et al.*, 2012).

Using IS and SCM practices, performance achievement are supported through the enablers of SCM-IS. This research study identifies the following enablers of SCM-IS with reference to socio-economic and institutional circumstances of the emerging countries. It has been suggested by the common wisdom that the use of IS practices and acquiring fruitful employment require financial and educational support. Suitable skills and capabilities are required for the effective use and functioning of Information Systems (Basheer *et al.*, 2019). The information systems are very technical. Most of the SMEs may not be aware of the process or resources required for IS systems. Therefore, it is required to attain appropriate knowledge and skills for this.

Alternative methods such as use of research center, government funds and academic sourcing can be employed by SMEs. Vocational education cannot be assessed easily by SMEs (Nurizman and Singla, 2017). The workers of SMEs in the Emerging Countries are not capable of performing specific activities. For this, employees working in SMEs can be given vocational training to improve their performance. For instance, use of IS and SCM practices can improve the performance of SMEs. The enablers of SCM-IS can structure the relation of SCM-IS practices and OPER of SMEs in Emerging Countries.

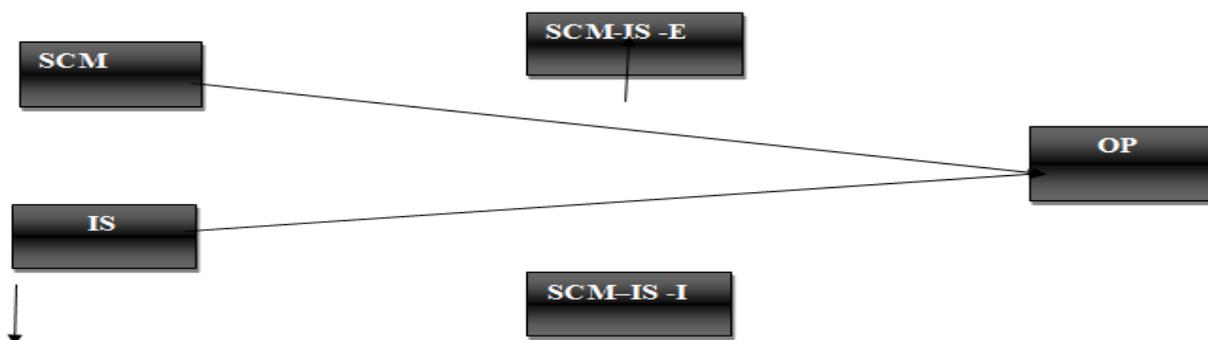
SMEs in Emerging Countries have not proper access to sufficient information system for improving the operational performance. Funding issues also arise for SMEs, which hinder their access to such systems. Participation in the industrial exhibition cannot be afforded by several SMEs. They may not have the latest information and knowledge related to the practices of IS. Providing SMEs with improved information makes them, able to advance the operations through effective utilization of IS and SCM practices (Miocevic and Crnjak-Karanovic, 2012).

Agreements among different countries can improve the OPER of SMEs in Emerging Countries through the relation of SCM-IS practices. These agreements can improve the integration of supply chain and its management (Wong *et al.*, 2012). Collaboration of businesses across the border can be promoted through supply contracts, which can enhance the supply of input sources from nearby countries as well. Another key enabler for the operations of supply chain is improved infrastructure.

There is a lack of judicial infrastructure, financial and physical resources in the SMEs of Emerging Countries (Nair *et al.*, 2013) Supply Chain Management is strengthened through better infrastructure. Therefore, the IS and SCM practices create an effect on the OPER of SMEs. Collaboration is resulted through regional cooperation among the institutions including license agreements, development of products and technology (Basheer *et al.*, 2019) Opportunities for businesses can be enhanced through the enabling factors of SCM-IS, which can improve the OPER of SMEs through employment of practices related to SCM-IS. The following research hypothesis has been developed based on the above arguments.

H3: The relationship between IS and OP is moderated by SCM-IS enablers

H4: The relationship between SCM and OP is moderated by SCM-IS enablers



METHODOLOGY

This research has made use of cluster sampling as a sampling technique. According to the technique suggested by (Wu *et al.*, 2015) the sample size has been determined. The first step is the population identification or total number of firms to be studied. Second step is to determine the sample size of population. For determining the sample size, the table given by (Fawcett *et al.*, 2015) has been used. One of the important techniques of statistics is SEM, which has the power of testing a number of relations simultaneously (Hair Jr *et al.*, 2016). The previous research studies have focused on the approaches based on covariance such as AMOS (Hair Jr *et al.*, 2016). PLS-SEM has become a unique alternative for the widely used CB-SEM approach

RESULTS

There are several reasons behind the popularity of PLS-SEM. Several arguments have been given (Hair Jr *et al.*, 2016) about the adoption of PLS by most of the scholars. When the basic purpose of structural modelling is to make prediction and construct exploration, PLS is very useful approach (Hair Jr *et al.*, 2016). Keeping in consideration these facts, this research has made use of PLS-SEM. This approach is flexible in natural and can deal with complex structural models with minimal sample size demand. Moreover, this research study is based on formative and reflective constructs model. One of the purposes of this research is to make prediction. (Hair Jr *et al.*, 2016) supported the use of PLS (Partial Least Square) for the analysis of data. There are two steps involved in SEM-PLS. The first is the assessment of measurement model and the second step is the structural model assessment. When the model measurement is done, all the items are changed. The high correlation among the indicators shows that they together form the construct. The validity of the measurement model is done through CFA (Confirmatory Factor analysis) through studying the relation among the indicators and construct. The first and second order constructs are evaluated in CFA. Based on the quality aspect, individual evaluation of the model is done such as formative measurement, structural and reflective measurement.

Table 1. Reliability

| | CR | AVE | Cronbach Alpha |
|----------|-------|-------|----------------|
| SCM | 0.975 | 0.872 | 0.885 |
| IS | 0.702 | 0.737 | 0.924 |
| OP | 0.960 | 0.871 | 0.893 |
| SCM-IS-E | 0.802 | 0.832 | 0.916 |
| SCM-IS-I | 0.891 | 0.801 | 0.993 |

The interrelationship between the reflective variable and its indicators is measured in the discriminate validity measurement. The operationalization is estimated for the set of variables that are linked or not with the case.

Fornell-Larcker introduced a measure that is used widely. It is the discriminant validity measure. This has been used as a base value for the determination of discriminant validity. The reliability index term should be greater than .70. The values of cross-loadings were similar with the outer loadings. The correlation is compared through cross loadings. The table 2 shows the assessment values for discriminate value for this research study.

Table 2. Discriminant Validity

| | 1 | 2 | 3 | 4 | 5 |
|----------|--------------|--------------|--------------|--------------|--------------|
| SCM | 0.709 | | | | |
| IS | 0.680 | 0.727 | | | |
| OP | 0.657 | 0.676 | 0.712 | | |
| SCM-IS-E | 0.642 | 0.654 | 0.682 | 0.832 | |
| SCM-IS-I | 0.627 | 0.641 | 0.653 | 0.732 | 0.872 |

The next step is to assess the structural relation of the variables after assessing the reliability. SEM-PLS is effective in the sense that is analyzed the relationships simultaneously. However, other techniques do not assess it properly. The direct and indirect effects are analyzed in the structural equation model.

Table 3. Direct Effect

| | (β) | SD | T-value | P-Values |
|----|-------|-------|---------|----------|
| H1 | 0.211 | 0.135 | 3.211 | 0.000 |
| H2 | 0.357 | 0.152 | 3.678 | 0.000 |

For analyzing the indirect effect, the mediation level is assessed. At 1000 observations, the bootstrapping process has been used. The p-value has been used in this research. The level of significance has been set at 0.05 for p-value (Hafeez *et al.*, 2018). It has been analyzed that all the research hypotheses except H2 have p-value less than 0.05. The mediating effect SCM-IS enablers and SCM-IS inhibitors have been highlighted in Table 4. The t-value comes out to be above 1.96 for the moderation hypothesis and the p-value is less than 0.05. This makes us accept H3, H4, H5 and H6.

Table 4. Indirect Effect

| | (β) | SD | T-value | P-Values |
|-----------|-------------|-------|---------|----------|
| H3 | 0.211 | 0.135 | 3.211 | 0.000 |
| H4 | 0.357 | 0.152 | 3.678 | 0.000 |
| H5 | 0.453 | 0.187 | 3.768 | 0.000 |
| H6 | 0.408 | 0.132 | 3.968 | 0.000 |

Through R2 value, the predictive power can be analyzed for the endogenous variables. The variables near to 0 are considered non-significant. High predictive accuracy is reflected by the value of R2 in the range of 0-1. The values of R2 such as 0.75, 0.50 and 0.25 are considered considerable, fair and weak respectively. In this research study, the value of R2 comes out to be 0.190, which reflects that almost 19 percent variation in SP is defined, by the environmental uncertainties and integration of green supply chain.

Table 5. Expected Variance

| | R ² |
|-----------|----------------|
| OP | 19.0 % |

CONCLUSION

In the total world employment and output, a considerable share is allocated by SMEs. For this reason, SMEs play a crucial role in the supply chain activities and performance along with the growth of technology and economy (Ho *et al.*, 2016; Deacon and Van Rensburg, 2018). In terms of changing competition, there is difference in the large companies and SMEs. They differ in their SCM approaches and practices related to Information systems. Moreover, difference prevails in resource utilization. There is a need for an in-depth understanding of practices related to SCM and IS for SMEs working in emerging economies to experience the joy of success and sustainability. A narrative explanation of the impact of IS and SCM related practices on the (OPER) operational performance of SMEs in EC is given by the idiosyncrasies of emerging countries. The main objective of the current study is exploring the nexus between supply chain management, information sharing and operational performance. In addition to that the current study is also interested in examining the moderating role of SCM-IS enablers and ECM-IS inhibitors in the relationship between supply chain management and operational performance and between information sharing and operational performance. Therefore, the study is among the pioneering studies on the issues. So, the current study has used SEM-PLS as a statistical tool to answer the research questions raised in this study and research objectives envisaged in the current study. The findings of the current study have shown agreement with proposed findings. The result of these practices is improvement of customer service management and buying effectiveness of organization (Miocevic and Crnjak-Karanovic, 2012). Moreover, operational efficiency of SMEs in Emerging Economies with improved resource planning is attained. A positive relation between implementation of technology and its performance is suggested by the framework of technology acceptance (Nair *et al.*, 2013; Chi, 2018; Chima and Kasim, 2018; Cockerill *et al.*, 2018). Moreover, the IS practices and their implementation enhance the OPER of SMEs in Emerging Countries.

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