

Supplier Development Activities and Buying Firm's Performance: An Empirical Investigation of Iranian SMEs

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Abstract

This study attempts to investigate the major antecedent factors that influence manufacturing SMEs intentions toward the implementation of supplier development activities in Iranian SMEs. In order to achieve this objective, the research constructs were developed. The conceptual framework underlying this study was based on the theories of supplier development activities and social capital. These theories were merged and developed by adding some main variables after analyzing various key antecedents that were thought to be the influential factors that determined the intention of the manufacturing firms to adopt supplier development activities. A cross sectional method was used to gather data collected from 280 Iranian manufacturing SMEs. The measures and hypotheses were analyzed with the help of the Structural Equation Modeling (SEM). The research supported the idea that information sharing within firms, communication methods, top management support and trust between trading partners have positive influence on information sharing between firms. Furthermore, the research showed the positive effects of information sharing between firms on inventory management and product quality on buying firms.

Keywords

Supplier development activity, Inventory management, Product quality improvement, Financial performance.

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Introduction

The intensity of global competition has forced firms to focus on their supply chain management by improving the quality of their goods, enhancing delivery and adapting to any unforeseen shortcomings. An efficient supply chain requires the formation of a coordinated stream of information and material from dealers to customers. Therefore, it is important for suppliers to be aware of their buyers' needs for product quality, customer satisfaction, and on-time delivery and enhance flexibility (Nazari-Shirkouhi et al., 2015; Routroy & Pradhan, 2014).

In this respect, Krause et al. (2007) defined supplier development as a set of efforts made by buying firms with supplier toward improving the performance and enhancing the suppliers' capabilities. Implementing suppliers development activities is one of the effectual methods that buying companies will be able to meet; yet this challenge provides way to improve suppliers' abilities (Sillanpaa et al., 2015).

Firms in a supply chain need to communicate with business partners due to the competitive business atmosphere. Companies in the supply chain have to establish relationship with other suppliers and customers, which are supported by their supply chain management activities (Alfred, Felix and Pu, 2018; Hosseini et al., 2017).

In this respect, influence strategies as well as supplier development efforts have been implemented to affect supplier behavior and improve supplier performance, which are focused on the communication of a firm with chain members that finally influence the behavior or decision-making process (Astrid, 2007; Li et al., 2012). However, performance of supplier in this regard is the most important function of supplier development programs in terms of reducing incoming imperfection, augmenting the percent of age on-time delivery, increasing the percentage of orders established completely and decreasing cycle times (Joshi et al., 2017).

In particular, supplier development program benefits both buyers and suppliers in this modern and complicated environment, as many tasks cannot be performed without strong relationship between buyer and supplier (Dalvi and Kant, 2018). In Iran, however, studies on supplier's development activities are lacking. Thus, with the collaboration of the Iranian Small Industries and Industrial Parks Organization (Tehran Industrial Estates Company), this study explores further supplier development activities by answering the following questions:

1. What are the SDAs that will affect information sharing between Iranian manufacturing SMEs?
2. How does information sharing between firms affect product quality and financial performance of Iranian manufacturing SMEs?

Literature review

During the last two decades, many of researchers have considered supplier development to a large extent (Krause et al., 2000; Humphreys et al., 2004; Li et al., 2007; Rogers et al., 2007; Ghijsen et al., 2010; Bai and Sarkis, 2011; Mahapatra et al., 2012; Nagati & Rebolledo, 2013; Blome, Hollos, and Paulraj, 2014; Dalve and Kant, 2015; Dalve and Kant, 2018). In this respect, supplier development can have a wide range extending from confined engagement including supplier qualification and performance evaluation to more serious practices including supplier's personnel training and new product designing (Krause, 1997). It is good to note that a successful implementation of supplier development would lead to higher performance by buying firms.

In short-term, it is concluded that SDAs are mainly concentrated on improving performance of suppliers' products and services but as noted by Watts and Hahn (1993), in long-term, it seeks to enhance suppliers' capabilities. In this regard, for example, Krause et al. (1998) investigated the different approaches toward SDAs on supplier performance and found that those firms that are active in supplier development strategically would benefit more in long-term. In the same vein, Krause et al. (2000) argued that direct engagement in SDAs including site visiting and personnel training would have a significant effect on suppliers' performance.

Supplier development practices have significant contribution to improve financial performance of the buying firms (Carr & Kaynak, 2007; Bai and Sarkis, 2011; Nagati & Rebolledo, 2013). Li et al. (2007) found that there are other factors such as cooperation and trust, which are critical components of supplier development for improving buyers' performance.

Furthermore, it is also discovered that commitment in SDAs would move buying firms into enhanced performance (Dalve and Kant 2015). They also asserted that such enhancements in supplier performance are likely to achieve if only these firms keep themselves committed for long-term relationships with suppliers, especially key suppliers. Similar findings by Abu Bakar (2002) on the Malaysian buying firm argued that

the focus of their supplier development programs was on short-term impacts on product quality, price and delivery. Further to Arumugam. V.C. et al., (2011), this study employed its conceptual model to explain how SDAs may improve the buying performance of Iranian manufacturing firms.

Information sharing within firm: (ISW)

It is obvious that information sharing within a department in an organization can positively affect a firm's performance if done mutually between the organization and its important supplier and if the supplier development is supported by the firm. There is little work that establishes direct effect of information sharing with a company to information sharing between organizations, thus many literatures related to the supply chain coordination suggested that companies ought to strengthen their domestic relationship before trying to coordinate themselves with customers and suppliers. Therefore, the primary responsibility of the supplier development support is to support the relationship of information sharing within departments by leading and sharing information between organizations (Narasimhan and Kim, 2001). Sharing information inside the firms is essential for serving the organization members to recognize serious concerns concerning their suppliers (Crocitto and Youssef, 2003). Moreover, it is a general activity using practical teams comprising elements from marketing sector, purchasing sector, engineering and production in order to resolve the quality problem of suppliers (Kaynak, 2002; Blome et al., 2014) resulting in a significant effect on information sharing between firms (Nazari-Shirkouhi et al., 2015; Carr and Kaynak, 2007).

Information sharing within firm encourages coordination and collaboration. Thus, it is important to support suppliers efficiently (Dewitt and Jones, 2001). So the following hypotheses have been suggested.

[H1]: Information sharing within firms positively correlates with information sharing between firms.

Communication methods (CM)

A firm's performance is affected indirectly and positively by communication. Advancement in today's communications via digital devices enables buying firms to get connected to suppliers for information and business cooperation (Chavhan et al., 2012).

In the literature of communication, it appears to be that firm's

performance is affected indirectly and positively by employment of communication (Dewitt and Jones, 2001; Sriram and Stump, 2004). Some communication methods between buyer and supplier such as face-to-face communication are measured by an imperative average for exchanging information (Dyer, 1997). Wognum et al. (2002) proposed that the new technological communication methods do not put back traditional methods such as face-to-face connection. Communication methods literature recommended that the use of EDI, ERP, Email, and computer to computer links as more modern and advanced communication methods helps to gather more abundant information regarding business transactions and involve users in a diversity of information network (Dewett and Jones, 2001). Carr and Smeltzer (2002) believed that information technology increases interrelation between buyers and suppliers and makes communication easy, both traditional and advanced communication methods. Consequently the above explanation creates this hypothesis.

[H2]: Communication methods positively correlate with information sharing between buyers and suppliers.

Top management support (TMS)

For implementing any process throughout the organization, top management support is crucial (Joshi et al., 2016; Keramati et al., 2013; Muhammad et al., 2018). The projects have to be brought into line with the calculated business objectives. As the main stimulator, top management should welcome new ideas by admitting that learning can happen at any stage (Rao, 2000). It is an internal factor that has been recognized by previous research. Since it provides necessary information and capability and makes available the investments and efforts, it is regarded as a main organizational resource (Kleinschmidt et al., 2007). Successful information sharing seems possible only in the presence of top management support, because adequate changes and investment in organizations takes place (Moberg et al., 2002). Madlberger (2009) showed the compulsory effect of top management support on information sharing between firms. Therefore, the following hypothesis has been suggested:

[H3]: Top management's support from buying firms positively correlates with information sharing between buyers and suppliers.

Trust between Trading (TBT)

In the SC, firms often withhold sharing their sensitive data in general

and their strategically important information (Bagchi et al., 2005) as they feel unsafe if competitors through their SC partners receive secret valuable information. This valuable information can include plans for developing new products, demand forecasts, and adaptation to new technology. Seamless SC processes and collaborative buyer-supplier relationships are required to share sensitive information. Trust, as a requirement for sharing such information through the SC (Fawcett et al., 2007) between the individual managers can help to more frequent contacts and less reluctance for sharing the information. Managers can invest time and efforts for sharing their sensitive information if there exists a long-term trustful relationship between them (Joshi et al., 2016).

Therefore, in evolution of this literature, the following hypothesis has been suggested:

[H4]: Trust between trading partners positively is related to Information sharing between firms.

Information sharing between firms related to inventory management and product quality improvement of buying firms

Information sharing in inter-organizational set-up can cause a further competent stream of goods and services (Dyer and Nobeoka, 2000; Anand and Mendelson, 1997), the reduced level of inventory and lower costs (Yu et al., 2001), which will assist the whole system (Yu et al., 2001). Information sharing decreases shipping costs of inventory, makes the responding process rapid and easy for inventory substitution and lets suppliers to have improved production programs and reduced lead times (Yu et al., 2002).

Lee et al. (1997) discovered that upstream demand distortion will be considerably decreased by sharing inventory level of information. This makes low inventory ranks and fewer stock-outs for both retailer and manufacturer. The manufacturers are able to better react and cater to retailer order pattern and better predict future demand. In theory, this outcome reduces costs. Therefore, sharing replenishment-related information ought to decrease retailer stock-outs, decrease manufacturer stock-outs and, thus, directly boost profit margin. Yu et al. (2002) investigated the levels of inventory and cost position in three conditions of customer demand information. No information sharing and center control were found at the two pole supply chains and they particularly specified that information sharing could decrease cost related to inventory.

A model for investigating the effects of information sharing on inventory levels below permanent service levels was expanded (Waller

et al., 1999). They demonstrated that reducing inventory levels for the entire supply chain is the result of sharing inventory information. Closs et al. (1998) examined the effects of information sharing on inventory and service levels and showed that information sharing reduces inventory. Therefore, the following hypothesis has been suggested:

[H5a]: Information sharing between firms positively is related to buying firm's inventory management.

It is obvious that sharing information with most important suppliers increases the quality of buying firms (Krause et al., 2000; Sriram and Stump, 2004). Product quality of buying firms relies on good relationship with the suppliers by enhancing the suppliers' involvement in the buying companies' services and products design (Tan, 2001; Forza and Flippini, 1998; Shin et al., 2000). If buying firms work with product development teams, suppliers can support buyers to choose raw material of products and elements that can be produced most professionally (Tan, 2001). If the buying firms are involved from the beginning, suppliers are able to offer proposals concerning product oversimplification (Forza and Flippini, 1998). Empirical investigation by Carr and Kaynak (2007) on US manufacturers showed significant effects of information sharing between firms with buying firms' product quality improvement. Thus, the following hypothesis has been suggested:

[H5b]: Information sharing between firms positively is related to buying firm's product quality improvement.

Inventory Management (IM)

Empirical proof related to inventory management relationship has formed various results. Specifically, researchers like Milgrom and Roberts (1988) and Dudley and Lasserre (1989) showed that appropriate and useful customer demand information leads to enhanced firms' performance through decreased inventory. A number of researchers indicated inventory performance standpoint as a powerful measurement scale for company's performance. So, enhancements in inventory performance will lead to outright benefits of cheap capital necessities (Corbey and Jansen, 1993) and indirect advantages of this process—decreases in setup or categorization of costs; so the outcomes of these activities lead to reduced inventory necessities (Lieberman and Demmeester, 1999). According to researchers such as Milgram and Robert (1988), important changes related to inventory might be simply a remix of source usage; firm's capacities are different in using inventory with small or no performance outcomes. Claycomb et al.

(1999) made a model to find the cause and effect between inventory and financial performance. However, researchers usually have the same opinion that surplus inventories at the firm level point to demand-supply do not match and are commonly related to reduced, operational performance (Singhal, 2005). Inventory-related costs including shipping, obsolescence, material handling and insurance weaken earnings margins and lessen stock price for complete conversation on different inventory driven costs (Singhal, 2005). Thus, improved inventory performance is commonly related to enhanced financial performance at the firm's level. Dimitrios et al. (2008) revealed the relationship between inventory management and firm's financial performance. They discovered positive correlation of inventory management performance on a steady measure of financial performance. The research hypotheses made according to the above literature are presented in the following:

[H6]: Inventory management positively is related to buying firms' financial performance.

Product Quality Improvement (PQI)

Products with high quality have positively affected buying firm's financial performance; a lot of researchers described this effect. Elasticity of demand decreases with high standing quality of products and services; therefore, it is able to make easy for a company to charge premium price as a result of enhancing profits (Shetty, 1998). Profitability is boosted by better product quality for the reason that squander decreases and better effectiveness enhances the profits on assets (Handfield et al., 1998). Prices for products and services can be decreased with no damage; if a firm decides to decrease the costs of the products and services due to the lower cost of structures caused by minor rework, reduced waste and enhanced output, it will make no damage and all of them will improve sales and market share (Maani et al., 1994; Salimian and Mirzaei, 2018). Loyalty of satisfied customers is depending on improved products and service quality, which is converted into amplified sales and enhanced competitive advantage (Handfield et al., 1998; Ahire and Dreyfus, 2000; Nazari-Shirkouhi and Keramati, 2017). Carr and Kaynak (2007) explained the connection between quality of product and firms' financial performance and they found significant effects of products quality in purchasing firms' financial performance. Due to the above explanation, the following hypothesis has been formulated:

[H7]: Product quality improvement positively is related to buying firm's financial performance.

Based on the discussions from H1 to H7, the research framework is presented in Figure 1. The SDAs assessed for buying manufacturing firms are ISW, CM, ISB, TMS and TBP.

Research Framework

The research framework is presented in the following Figure 1. The model not only explains interrelationships within supplier development activities but also illustrates the influences of these activities on firms' performance dimensions.

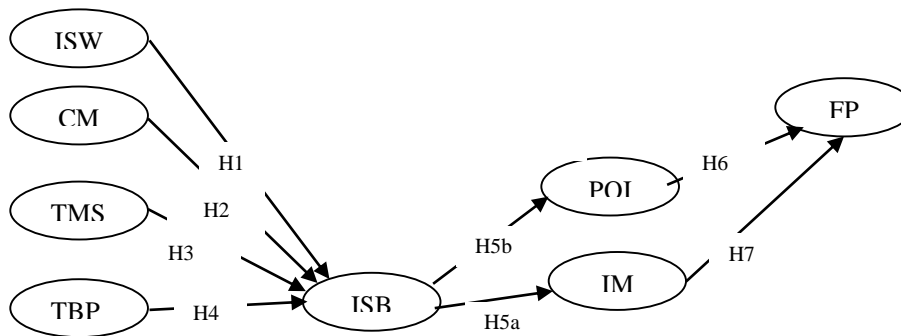


Figure 1. SDAs leading to Financial Performance

Note:

ISW denotes Information sharing within firm
 CM denotes Communication methods
 TMS denotes Top management support
 TBP denotes Trust between trading partners
 ISB denotes Information sharing between firms
 IM denotes Inventory management
 PQI denotes Product quality improvement
 FP denotes financial performance

Research methodology

Data are collected by employing a self-administered survey, measuring the latent constructs in Figure 1. A total of 39 questions were asked based on past literatures reviewed.

A seven point Likert-type scale option of strongly disagree, for option 1, to strongly agree, for option 7, was used according to type of variables.

The Iranian Ministry of Industry defined SMEs as firms with more than 9 and less than 100 employees. There were 14,007 manufacturing SMEs in Iran based on the Statistical Year Book of Iran, 2015-16. All of 14007 industrial SMEs are characterized into nine groups based on the international standard industrial classification. Details are provided in Table 1.

Table 1. Nine Categories of Sampling Structure

No.	Group of industries	unit	%	Sample
1	Producer of food, beverages and tobacco	2389	17%	64
2	Textile, wearing apparel and leather industries	1707	12%	45
3	Wood and furniture	542	4%	15
4	Paper producer and paper publishing	547	4%	15
5	Producer of chemicals, cool rubber and plastic	1743	13%	49
6	Producer of none-metallic mineral products	3335	24%	91
7	Basic metal industries	439	3%	11
8	Producer of fabric metal products, machinery and equipment	2078	14%	53
9	Other industries	1227	9%	34
	Total	14007	100%	377

Source: Statistical Yearbook of Iran, 2015-16

In this study, the manager, quality manager and financial manager of each Iranian industrial SME were requested to complete the questionnaire. Data collected were tested for convergent validity and reliability requirement. To confirm achieving the best possible fitness and test the correlation between the constructs and variables, the structural equation model is used. SEM should be used because it includes multiple regression analysis, factor analysis and also multivariate in a research model (Hair et al., 2010; Noruzy et al., 2013), So, SEM analyses the models simultaneously, and provides multiple fit indices to test the correctness of the hypothesized models.

Findings

With the collaboration from the Ministry, totally, 280 Iranian manufacturing SMEs completed the questionnaires with a response rate of 74%. The total fitness of the structural model is showed from obtained values. See Table 2.

Table 2. Model Fit indices

Model Fit tests	Fit indices
CMIN/DF	1.717
RMSEA	0.051
GFI	0.821
TLI	0.897
IFI	0.906
CFI	0.905

The measurement and structural model were tested as well. The result of the structural model gives a model with a perfect fit to data where CMIN/DF = 1.717, CFI= 0.905, IFI= 0.906, TLI= 0.897, GFI = 0.821, and RMSEA = 0.051. Table 3 contains the results of hypotheses tested. The model explains the factors of supplier development activities that influence buying firms' product quality improvement, inventory management and financial performance.

Table 3. Result of hypothesis testing

Path	Standardized Estimate	Standard Error	Critical Ratio
ISW → ISB	0.152	0.063	2.403**
CM → ISB	0.228	0.080	2.854***
TMS → ISB	0.357	0.075	4.266***
TBT → ISB	0.220	0.075	2.955***
ISB → IM	0.375	0.076	4.367***
ISB → PQI	0.275	0.095	2.904***
IM → FP	0.313	0.072	4.367***
PQI → FP	0.102	0.046	2.223*

The result of hypothesis 1 demonstrates, based on the data given in Table 3, that information sharing within firms positively affects information sharing between firms ($\beta = 0.063$, $Z=2.403$, $P= 0.016$). There are some proofs in empirical studies such as Narasimhan and Kin(2001), Dewitt and Jones (2001) Crocitto and Youssef (2003) Kaynak (2002) and Carr and Kaynak (2007). A positive correlation exists between communication methods and information sharing between firms: the result from hypothesis 2 demonstrates, based on the data given in Table 3, that communication methods have a positive impact on information sharing between firms ($\beta = 0.197$, $Z= 2.854$, $P= 0.04$). The finding of this study confirms that information sharing between firms is related to communication method used by firms. This is in line with previous research by Sriram and Stump (2004), Carr and Smeltzer (2002), and Carr and Kaynak (2007) that firm's performance

is affected positively by the employment of communication methods. The result of this study provides evidence (see Table 3) to support the hypothesis 3 in which top management support has a significant effect on information sharing between firms ($\beta = 0.357$, $Z = 4.266$, $P = 0.000^{***}$). Furthermore, there are some evidences in empirical studies such as Jarvenpaa and Ives (1991), Rao (2000), Kleinschmidt et al. (2007), Moberg et al. (2002) and Madlberger (2009). The result from hypothesis 4 shows, based on the data given in Table 3, that trust between trading partners has a significant effect on information sharing between firms ($\beta = 0.220$, $Z = 2.955$, $P = 0.003$). Several researchers have questioned and examined the relationship between trust and information sharing (Levin and Cross, 2004; Madlberger, 2009, Wang et al., 2009, Chen, H. et al., 2010; Chen et al., 2011). The result of hypothesis 5a demonstrates, based on the data given in Table 3, that information sharing between firms affects buying firms' inventory management significantly ($\beta = 0.378$, $Z = 4.986$, $P = 0.000^{***}$). The finding of this study confirms that inventory management of buying firms is related to information sharing between firms. This is consistent with past studies from Lee et al. (1997), Dyer and Nobeoka (2000), Anand and Mendelson (1997) and Yu et al. (2001). The result of this study provides evidence (see Table 3) to support the hypothesis 5b in which information sharing between firms has a significant effect on product quality improvement ($\beta = 0.275$, $Z = 2.904$, $P = 0.000^{***}$). The finding of this study confirms that product quality of buying firms is related to information sharing between firms. This is consistent with past studies from Krause et al. (2000), Sriram and Stump (2004) and Carr and Kaynak (2007). A positive correlation exists between inventory management and financial performance. The result of the hypothesis 6 shows, based on the data given in Table 3, that inventory management of buying firms positively correlates with buying firm's financial performance ($\beta = 0.313$, $Z = 4.367$, $P = 0.000^{***}$). This is constant with the previous researches from Milgrom and Roberts (1988), Dudley and Lasserre (1989), Sakakibara et al. (1997), Lieberman and Demmeester (1999), Singhal (2005) and Dimitrios et al. (2008). The result of this study provides evidence (see Table 3) to support the hypothesis H7 in which product quality of buying firms significantly effects the buying firms' financial performance ($\beta = 0.102$, $Z = 2.223$, $P = 0.026$). This is constant with the previous researches by Shetty (1998), Handfield et al. (1998), Maani et al. (1994) and Carr and Kaynak (2007).

Discussion and conclusion

SMEs in Iran are short of supplier development activities to excel in their line of business. So, the main motivation of this study is to develop a framework that explains supplier development implementation in favor of Iranian SMEs. Since most of the current studies in this area are rooted in western and industrialized countries, this study approached the concept of supplier development activities (SDAs) modeled from Iranian SMEs. One of the distinguishing benefits of this paper to other published studies is using inventory management as buying firms performance. Therefore, this study revealed that SDAs significantly affect inventory management, product quality improvement and financial performance of manufacturing firms in Iran. One drawback of this study is that the structure of SMEs understudy is dissimilar from large-scale firms. Future research may adapt this model to test the impact of large-scale industries' SDAs.

The finding of this study recommends Iranian manufacturing SMEs to seriously consider the implementation of SDAs to enhance their inventory management and product quality improvement which will eventually be translated into better financial performance. For instance, enhanced two-way communication with their key suppliers through digital devices could help them better manage their physical and financial resources. SMEs with strong relationship with their key suppliers could also get better connection with multiple key suppliers for better negotiation of product quality and pricing.

This study informs researchers and practitioners to observe the associations among supplier development variables, inventory management, product quality improvement and financial performance. While interpretations are made regarding the results obtained, the limiting factors which could have affected the findings should be considered as well.

Another limitation of this study is related to collected data. Data from this study collected and analyzed from subset of employees working in the Iranian manufacturing SMEs. Therefore, it is necessary to be cautious in generalizing the results to different countries. The impact of supplier development activities may be dissimilar in different cultures. To verify the generalizability of the model of study, more empirical studies in different geographical spots and cultural contexts are necessary to set up whether the constructs of research differ across different countries and cultures. To put it another way, testing model

with updated data set across different countries is required before the generalization of the results can be accepted.

International studies will improve the generalization of the relationships tested and a replication of this study would further reconfirm the relationship among supplier development factors, inventory management, product quality and financial performance of buying firms in other geographical regions and cultural contexts. Moreover, the results of diverse international studies could further provide empirical support for the present results. The evidence of the generalizability of results from other countries could give academics and industrial practitioners a sturdier basis of the proposed model in their research or business applications.

Another limitation of the present study has been the limited selection of the observed indicators, variables and constructs just based on the various resources mentioned in literature and researchers' observations. Neglecting other critical factors and constructs deprived the researchers of achieving further insights of critical success factors of supplier development activities implementation in context of SMEs. Therefore, not only should the comprehensive model of this research be developed, tested and studied to determine the effects of changes in any of the nine dimensions of the model, but also future study is recommended to consider other alternative variables. Furthermore, future studies may use different indicators for measuring the construct.

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