Best Supply Chain Management Practices and High-Performance Firms: The Case of Gulf Manufacturing Firms

Abstract

Purpose – The study aims to investigate the best supply chain management practices that are implemented in medium and large-sized Gulf manufacturing firms.

Design/methodology/approach – This study has explored seven supply chain management practices, i.e. supplier collaboration, flexibility with partners, usage of Internet, customer focus, lean production, Internal integration, and quality management. It assumes that the best performing firms must be the ones implementing the best practices. T-test and multiple linear regression analyses were used to establish the best practices, implemented by medium and large-sized Gulf manufacturing firms.

Findings – The results showed that quality management, customer focus, and supplier collaboration are considered as best supply chain management practices in Gulf manufacturing firms. Usage of internet may have been the best practice previously, but not anymore. Lean production cannot yet be qualified as, but may develop into the best supply chain management practice.

Practical Implications – The study provides a useful contribution to the field of best supply chain management practices as it provides better decision-making insights and a benchmarking base to top managers, policy makers, and academics. It is likely to result in increased overall performance of their firms.

Originality/value – The study provides an understanding of the distinctive characteristics of the best supply chain management practices, implemented by Gulf manufacturing firms. It has broader implications for all manufacturing firms, particularly in developing economies where the growth of manufacturing and effective management of their supply chains is a key element for the economic development.

Keywords: Supply Chain Management, Best Practices, Medium to Large-sized Firms, Manufacturing, Gulf Countries.

1. Introduction

Globalisation, stringent quality requirements, and intense competition have forced most Manufacturing Firms (MFs) to improve their performance by re-examining how they get products into their customer's hands, and how they can quickly respond to customer's needs in a constantly changing environment. Therefore, a prerequisite for manufacturers enhances profitability and remains competitive in the current global dynamic market to understand and practice Supply Chain Management (SCM) (Cook *et al.*, 2011). It has contributed for SCM and recognised it as an important field that has generated extensive interests among industrialists and scholars, literally invading world's businesses (Ou *et al.*, 2010; Li *et al.*, 2006).

SCM is considered as a multidisciplinary field that has been explored from many different perspectives (Papakiriakopoulos and Pramatari, 2010). The practices of SCM are proposed to be a multi-dimensional concept, including downstream and upstream sides of the supply chain. The concept of SCM has been considered from two alternative perspectives that include; purchasing and supply management. These perspectives emphasize purchasing and materials management as a basic strategic business processes, rather than a narrow-specialized supporting function (Narasimhan *et al*., 2004); transportation and logistics management. It mainly focuses on integrated logistics systems (e.g. inventory management, vendor relationships, transportation, distribution, warehousing and delivery services) that lead to inventory reduction both within and across firms in the supply chain (Cook *et al.*, 2011).

The best supply chain management practices (SCMPs) have become an essential factor for low-performing firms to remain competitive in the global race (Okongwu *et al*., 2015). The nature of SCMPs will be able to explain the dual purpose of SCM as it improves the performance of an individual firm as well as the performance of the whole supply chain. This could be achieved through the effective adoption and construction of the best SCM practices (Kim, 2006). Apart from some of the firms, many of them still do not exactly know what best practices to implement, due to a lack of understanding of what constitutes a comprehensive set of SCM practices (Li *et al*., 2005; 2006). The best supply chain management practices can positively impact on performance (Tan, 2002). The degree of attention paid to SCM has increased in developing countries since the last two decades; however, the Gulf countries in particular are still behind. Many national entrepreneurs and managers of industrial conglomerates in Gulf countries generally ignore the concept of SCM (Abu-Alrejal, 2007). This phenomenon has halted the manufacturing industry of these countries from adopting and developing practices that enable the effective management of their supply chains

SCMPs are implemented to achieve and enhance performance by enabling an internal cross-functional integration within the firm, and external integration with suppliers and customers (Kannnan and Tan, 2010; Kim, 2006). The seven SCMPs considered in this study (i.e. supplier collaboration, flexibility with partners, usage of internet, customer focus, lean production, internal integration, and quality management) were developed, tested and validated in the literature by researchers such as Li et al. (2006), Green Jr et al., (2008), Tan (2002) and Cook et al. (2011). These practices are considered crucial, and they cover both upstream and downstream sides of the SC. The study has addressed an importance theoretical gap addressing the lack of empirical studies investigating and/or examining the best SCMPs of high-performing Gulf manufacturing firms' and its impact on performance.

There is limited knowledge available on the impact of which best practices of high-performing firms affect their performance; although, current literature gives a clear understanding of the link between SCM practices and performance. There is a lack of empirical evidence on the relationship between high-performers and best SCMPs, and which SCMPs enhance firms' performance. Managers and practitioners in the Gulf region are still seeking to identify the best SCMPs, in which they should focus more to enhance firm performance. The insights would provide an opportunity for Gulf managers to effectively utilize the other practices (current non-best practices) to enhance manufacturing firm's performance. This study has attempted to focus on the best SCMPs of high-performing Gulf manufacturing firms. Thus, the study aims to investigate the current SCMPs that are commonly implemented by high-performing medium and large-sized Gulf Manufacturing Firms (GMFs), and determine the best practices that have the most significant effects on the performance of these firms. Following research question has been developed on the basis of aim:

1. *Which best SCM practices are implemented by high-performing GMFs (both medium and large-sized firms)?*

The rest of the paper is organized as follows: Section 2 presents the literature review. Theoretical research framework, including the definitions and theory underlying each dimension of the SCMPs, best SCM practices and manufacturing firms' performance constructs are discussed in Section 3. Section 4 presents the research methodology. The results of the study are then presented in Section 5. Section 6 includes the discussion of measurements model. Finally, Section 7 provides the main conclusions of the research, identifies the main limitations, and outlines the future research directions derived from this work.

2. Literature Review

Manufacturing firms have been the backbone of economic growth of many nations by driving industrial development. They play an important role in national economies by providing job opportunities and supporting larger industries (Anuar and Yusuff, 2011). To sustain these contributions, manufacturing firms must not only become increasingly advanced in their technologies and manufacturing processes, but also, they should adopt world-class SCMPs. Sandhu et al. (2013) stated that SCM practices are regarded as operational functions and main activities in the firm, which determines the effectiveness and efficiency of its supply chain. The main goal of SCM concept is to enhance the long-term competitive firms' performance and their supply chains by integrating their functions, processes, and operations internally and externally with other partners. These partners mainly include the suppliers, manufacturers, distributers, and customers (Kim, 2006). SCM encompasses various activities such as planning and management, procurement, coordination, collaboration, outsourcing and all other logistics management activities with other channel partners (Soosay *et al.*, 2008). Majority of the studies have emphasized that the ultimate goal of SCM is to enhance and improve the performance of firms (Li *et al.*, 2005, 2006; Chen and Paulraj, 2004; Min and Mentzer, 2004).

Donlon (1996) identified several components and elements of SCM practices, which include supplier partnering, process flow, outsourcing, and information sharing. These main elements are considered as the evolution of SCM practices in the manufacturing firms in the last decade. The empirical work of Sundram et al. (2016) classified seven important SCM practices, namely, supplier strategic partnership, customer relationship, information sharing, information quality, postponement, agreed vision and goals, and risk and rewards sharing. Developing strategic partnerships in the supply chain was also emphasized by Christopher and Jüttner (2000). Whereas, Alvarado and Kotzab (2001) selected customization and information technology through postponement activities as an important factor of SCM practices. Tan (2001) ensured that information sharing among trading partners in supply chain such as customization and postponement are crucial SCM practices that emphasize a well-integrated supply chain. Tan et al. (2002) included six dimensions in their study, namely, supply chain integration, just-in-time capability, customer service management, geographical proximity, and information sharing. Whereas, the study of Chen and Paulraj (2004) included several other dimensions such as communication, supplier involvement, supplier base reduction, cross-functional teams, and long-term relationships to measure SCM practices.

The current commercial and competitive situation of GMFs and the lack of specific studies on best SCM practices in this region justify the opportunity of studying this phenomenon in its own right. Seven SCM practices for this study were selected developed, tested, and validated by many researchers in the SCM literature such as Cook et al. (2011), Green Jr et al. (2008), Li et al. (2006), and Tan (2002). These selected practices by authors are considered crucial and covers both upstream and downstream through the SC. SCM practices are considered as a perfect recipe for the success of several firms from various industries (Gorane and Kant, 2015). The medium and large-sized manufacturing firms are now under increasing pressure due to various international trading and commercial agreements, which have forced them to improve their competitiveness. Majority of the Gulf Manufacturing Firms (GMFs) that used to compete based on price and quality, have now been forced to redirect their operations to compete based on supply chain-oriented factors, i.e. flexibility, serviceability, and responsiveness (Gunasekaran, 2003).

The Gulf manufacturing firms will be able to improve their performance, expand their assets, provide work opportunities, and contribute to the economic growth of the Gulf region

by identifying and developing best SCM practices. Intensified competition, fast technological development, shortening product life cycle, increasingly customised products and volatility in input prices have created a dynamic environment, where manufacturers should be more flexible, adaptive and responsive to fulfil their customer orders (Arlbjørn and Mikkelsen 2014; Anuar and Yusuff, 2011). The identification, adoption, and continuous development of "best practices" are likely to result in a superior business capability, which will ultimately lead to increased competitiveness (Laugen *et al.*, 2005). Table 1 has summarized certain studies that have focused on studying different types of best practices and their effect on various dimensions of performance.

Insert Table 1 in here

3. Theoretical Research Framework

Gulf manufacturing firms have been classified into two categories on the basis of their performance, low and high-performing firms. This study is based on the assumption that best-performing Gulf manufacturing firms are those that possess the best practices. Figure 1 has illustrated the theoretical research framework, developed from the review of literature to understand the antecedents and consequences brought by the casual relationship between SCMPs and the performance of Gulf Manufacturing Firms. SCMPs is conceptualised through seven-dimension construct; whereas, Gulf manufacturing firms' performance is conceived through two dimensions (Figure 1).

Insert Figure 1 in here

3.1 Supply Chain Management Practices (SCMPs)

The seven dimensions of SCMPs cover upstream (supplier collaboration (SCMP/SC)) and downstream (customer focus (SCMP/CF)) sides of a supply chain, information flow within and across a supply chain (usage of internet (SCMP/UoI)), and internal supply chain process (flexibility with partners (SCMP/FwP), lean production (SCMP/LP), internal integration (SCMP/II) and quality management (SCMP/QM)) (Figure 1). Although the seven dimensions capture the major aspects of SCM practices, the conceptualisation cannot be considered an "all-inclusive list" as there may be some other factors (geographical proximity, logistics integration, cross-functional teams, etc.) that also play a significant role in the management and improvement of supply chains. A number of researchers have converged on the fact that the ultimate goal of SCMPs is to improve the performance of firms, although these have been denoted differently and from a multidisciplinary perspective (Cook *et al.*, 2011; Collins *et al*, 2010; Ou *et al.*, 2010; Reyes and Giachetti, 2010; Koh *et al.*, 2007; Li *et al.*, 2006). SCM practices have been defined as the approaches and activities adopted by firms to effectively and efficiently manage the coordination of their supply, demand, and their relationships to meet their customers' expectations (Li *et al.*, 2005). Table 2 has listed these dimensions of SCMPs along with supporting literature.

3.1.1 Supplier Collaboration (SC)

SC is a phenomenon that depicts strong and close relationship between a firm and its suppliers (Li *et al.*, 2006). It is a practice that focuses on their direct and long-term association, mutual planning, and problem-solving efforts (Dirks and Verdaasdonk, 2009). The firms are able to share benefits, information, and participation in one or more key areas (vendor-managed inventory, continuous replenishment, improve product quality, and lead time) through strong SC (Cook *et al.*, 2011). The main aim of SC is to improve overall firm performance, reduce cost, increase profit, and improve forecast accuracy (Grudinschi *et al.*, 2014). Dotti *et al*. (2012) determined SC as a best practice and highlighted its importance for the effective and successful management and improvement of supply chains.

3.1.2 Flexibility with Partners (FwP)

Flexibility is the degree to which a firm is able to adjust the time in which it can ship or receive goods (Tang and Tomlin, 2008). According to Koh *et al*. (2007), it is defined as "the firm's ability to adapt to changes in its environment". There is a general consensus about the fact that supply chains which are flexible, contribute to the competitiveness of firms, despite of the contradicting views, in terms of supply chain (Stevenson and Spring, 2007; Gunasekaran *et al.*, 2013). Therefore, supply chain flexibility, and more specifically flexibility with partners, is regarded as a crucial SCM practices. These practices give the firm an opportunity to increase flexibility by generating alternative sourcing for procurement, and reducing supply chain risks (Iddris *et al*., 2016). The enhancement in manufacturing flexibility does not improve performance but in some situations, it could actually lead to negative results (Chang *et al.*, 2003). In contrast, another research stream has determined and confirmed the positive effect of flexibility on the performance of firms (Tannous, 1996).

3.1.3 Usage of the Internet (UoI)

Rapid technological developments have enabled firms to link the operations of their departments both internally with those of other departments and externally with those of their partners. In particular, the internet has served as one of the main technological developments supporting increased coordination and collaboration among supply chain partners (Cook *et al.*, 2011). Gimenez and Lourenco (2008) found in their study that the effect of internet on SCM has been recognised as an important topic of research through e-procurement, information flows, and e-fulfilment being the fundamental areas of the research. The use of internet, its growth in recent years, and the importance of this factor in supply chain research has been covered in both supply and customer sides integration practices using web technology, and web-based marketing–oriented applications (Gimenez and Lourenco, 2008). It is important to analyse this factor, its significance, and its unique role as a supply chain practice in affecting a firm's performance. Therefore, majority of the MFs have continued to adopt internet-based collaboration to let them be able to take effective decisions in regards to inventory, forecasts, and customers' orders.

3.1.4 Customer Focus (CF)

The purpose of CF is to fulfil customer's expectations, develop customer's loyalty to the company products and services, manage customer complaints, follow up sales after delivery, improve customer satisfaction, and build long-term relationships with the customers (Reyes and Giachetti, 2010). CF is concerned with planning, implementing, and evaluating successful services and relationships between providers and recipients in both upstream and downstream of SCM. It deals with the ability to communicate delivery of the right products and services to customers locally and globally at the right time, right place, and right quantity with correct invoices (Li *et al.*, 2006; Kim *et al.*, 2006). The studies conducted by Ou *et al.*

(2010), Collins *et al.* (2010), and Reyes and Giachetti (2010) have emphasized on the importance of CF practices in supply chain operations.

3.1.5 Lean Production (LP)

Lean production is defined as manufacturing without waste, which tries to remove out the unnecessary costs, time, and other wastes from the entire supply chain (Taj, 2008; Boyle and Rathje, 2009). Lean production mainly focusses on the identification and elimination of waste throughout the product's entire value stream. It not only extends within the organisation, but also along its entire supply chain network. It results in improved output and quality levels, and achieves this using fewer resources, such as raw materials and employee effort (Belekoukias et al., 2014; Boyle and Rathje, 2009). The lean supply chains and application of lean thinking tends to improve the logistic operations (Garza-Reyes *et al.*, 2016; Villarreal *et al.*, 2016).

3.1.6 Internal Integration (II)

Integration is now widely considered a core practice that enables the success of firms, because it allows the integration of processes across different departments that includes sourcing, manufacturing, and distribution (Ellegaard and Koch, 2012). Internal Integration is defined as the extent to which separate parties work together in a cooperative manner to arrive at mutually acceptable outcomes (O'Leary-Kelly and Flores, 2002). According to Narasimhan and Jayaram (1998), internal integration involves the coordination, cooperation, and collaboration between all internal functions within the firm from raw material management through production, shipping, and sales. Ellegaard and Koch (2012) have recognized the positive impact of internal integration and considered it as an important practice for the effective management of supply chains and the successful overall performance of organizations (Ellegaard and Koch, 2012).

3.1.7 Quality Management (QM)

The literature shows that many manufacturing firms consider quality of products as the main factor to drive their competitiveness as it refers to the ability of a product or service to consistently meet the customer expectations (Anuar and Yusuff, 2011; Reyes and Giachetti, 2010). QM has been recognised as a competitive advantage and one of the most important ways to respond rapidly, correctly, and profitably to market demands in the digital world (Ou *et al.*, 2010). Various previous empirical studies defend the significant and positive relationship between QM and firms' performance (Das *et al.*, 2008; Sila *et al.*, 2006).

3.2 Manufacturing Firms' Performance (MFP)

It is essential to align operations, such as those of supply chains, to financial metrics. The performance of manufacturing firm refers to how well a manufacturing firm achieves its market and financial-oriented goals. The market share performance and financial performance have been selected in this study as the dimensions to measure the performance of Gulf manufacturing firms as part of the manufacturing firm performance construct. Li *et al.* (2006), suggested that the short-term objectives of SCM are more operational related, e.g. reduce cycle time and inventory while increasing productivity. Moreover, its long-term objectives are more financially oriented, e.g., increase market share and profits. In addition, measuring manufacturing firm performance based on market share and financial performance is also in line with the work of Zhang (2002), which also considered the market share performance of companies, besides the financial performance.

3.3 Relationship between supply chain management practices and manufacturing firms' performance

Wu *et al.* (2006) stated that higher levels of supply chain management capabilities (i.e. responsiveness, coordination and inter firm activity integration, etc.) can potentially improve a firm's market and financial performance. Li *et al.* (2006) argued that the customer service management practice has a greater direct impact on competitive advantage than on firm performance. According to Li *et al.* (2006), the performance of firm refers to how well a firm achieves its market-oriented as well as financial goals. On the other hand, Al-Shboul's (2012) found that this practice has a greater impact on firm performance (market share and financial). Furthermore, the results of Kim's (2006) study showed that the customer service practice has a positive and significant impact on operational performance, but it does not have a direct significant impact on firm performance. The outcome of Kannan and Tan's (2010) study suggested that there is an overlap to some degree in the domains and practices of supply and quality management. This outcome contradicted Al-Shboul's (2012) study, which found that the total quality management practice was practiced and implemented at a high level and there was no overlap between them. The findings of Ting's (2004) study argued that internal lean production is not practiced in his study since labour cost is low, and has no significant impact on total cost.

3.4 Relationship between high-performing manufacturing firms and best supply chain management practices

Significant research effort has been paid to identify the best supply chain management practices to support firms and achieve a high level of performance. However, most of these efforts have failed to investigate the effect of these practices on firms' performance. Therefore, the concept of best practices refers to a technique, method, process or activity that is more effective at delivering a particular outcome than any other technique, method, process or activity. The best supply chain management practices are those that lead to improvement in performance, that is, they help low performing firms to become a medium performer, medium performer become a high performing firm, and high performer firms maintain their success (Koh *et al.*, 2007; Davies and Kochhar, 2002; Ungan, 2004).

4. Research Methodology

4.1 Questionnaire design

A web-survey was developed based on the SCM literature and consisted of three main parts. The first part comprised of respondent's profile, SCM practices, and GMFP. The second part asked the respondents to rank the degree of using important twenty-three SCMPs grouped in seven categories (SC, FwP, UoI, CF, LP, II, and QM) (Table 3). In particular, the supply chain management practices were ranked (i.e. measured) using a five-point Likert scale as follows: 1=not used, 2=slightly used, 3=no change, 4=highly used, 5= strongly used. The use of these practices was considered between the period 2013-2015. However, in the third part, the respondents were asked to rank their firms' performance based on seven market share and financial performance items (GMFP/MSP1, GMFP/MSP3, GMFP/MSP4, GMFP/FP2, and GMFP/FP5-FP7) previously established as important (Table 3). These were ranked using a five-point Likert scale as follows: 1=performance has strongly deteriorated, 2=performance has slightly deteriorated, 3=no change, 4=performance has slightly improved, 5=performance has strongly improved.

The survey was deployed in English to measure SCMPs elements, which included supplier collaboration, flexibility with partners, usage of internet, customer focus, lean production, internal integration, and quality management as the main dimensional construct of SCMPs. This measurement considers SCM practices within supply chain that included downstream, upstream, and internal processes across the supply chain. Questions related to GMFs performance construct measures were adopted and developed based on the instrument main items previously used by Qrunfleh and Tarafdar (2013) and Li et al. (2005, 2006).

These constructs were further tested and validated from previous studies using data collected from manufacturing firms. All items were measured based on a five-point Likert scale as a unit of measurement with response option ranging from 1 (strongly disagree) to 5 (strongly agree). The survey was pre-tested by four professionals. Independent t-tests were carried out and Levene's test for equality of varanives were also applied to decide whether the data are equal or unequal variances version of the tests. Based on the results, an equal varinces verison of the tests have been used in the analysis.

4.2 Data collection, population and sampling

A quantitative data collection procedure was followed to facilitate the analysis and increase the validity and reliability of outcomes. A questionnaire survey has been designed due to its suitability to collect a large amount of data from a large number of respondents. The sampling frame of this study consisted of all medium and large-sized manufacturing firms as listed in the ministry of industry and trade of each of the six Gulf countries considered for this study (i.e. Saudi Arabia, United Arab Emirates, Kuwait, Oman, Bahrain, and Qatar). Due to different factors such as large amounts of trading agreements among these countries, similar level of maturity of their manufacturing sectors, similar working cultures, similar levels of economic development, and geographical proximity, it was assumed that their SCM practices were very similar. This allowed the study of these practices to be concluded within a regional context as opposed to an individual national context. The data from these countries also helped us to gain a broader insight into the SCM practices adopted by Gulf manufacturing firms. A total of 1421 surveys were distributed via electronic and post mails, which represent whole population of medium and large-sized Gulf manufacturing firms. From these, 144 complete and usable responses were obtained, giving an overall response rate of 10.1 percent. Demographic data shown in Table 2 depicted that the majority of the firms' respondents are from textile, plastic/rubber, and chemical firms, which constitute 57.05 percent of the total firm sample. In terms of job title, the majority of respondents were senior managers, which represents 53.47 percent. Majority of firms have 3-5 product lines, which represents 61.80 percent of the total firm sample. The total numbers of employees in the sample were between 251 and 500 or greater and majority of firms were large-sized which represents (54.86 percent). Almost all the manufacturing firms in this study have 10-30 years of operational experience. In terms of annual sales, the majority of firms have sales between 6-50 million dollars, which represents 69.44 percent from the total firm sample.

Insert Table 2 in here

The data from these countries also helped us to gain a broader insight into the SCM practices adopted by Gulf manufacturing firms. The linkages between medium and large-sized manufacturing firms and low and high-performing firms are important in the context of best SCM practices as they play a crucial role in an economy. Furthermore, various researchers emphasized that both large and medium firms are interested and have more concerns than smaller firms in implementing SCMPs to enhance their performance. This indicates that best practices will come from both medium and large-sized high-performing manufacturing firms (Sundram, *et al.*, 2016; Ungan, 2007). In particular, each medium and large-sized firms in the sample met the following criteria: 1) must have been in operation for at least 10 years; and 2) must have had 51 employees or more. In relation to the targeted respondents, the study included middle and high-level managers (e.g. CEO's, presidents, purchasing managers, supplying managers, planning managers, logistics managers, IT managers, manufacturing managers, distribution/transportation/sales managers and operations managers). Similar to the studies of Al-Shboul et al. (2017), Andreadis et al., (2017) and Belekoukias et al., (2014), respondents in these functional positions were

considered to have an adequate knowledge on SCM practices and their effect on the performance of their firms. The respondents came from eight manufacturing sectors, namely: Food Processing, 179; Furniture, 156; Pharmaceutical, 135; Textile, 135; Chemical, 263; Tobacco and Cigarettes, 67; Paper and Packaging, 73; and Plastic/Rubber, 268.

Gulf countries were selected as a desired sample as it is one of the fastest-growing regions in the world that has benefited from rising oil prices over the past two decades and introduced many facilitations to encourage foreign investors to invest in the Gulf region. It has attracted many international firms and most of them already have branches and offices in the Gulf countries and operate globally. The region is easy to access and more approachable for data collection process and there is lack of empirical studies in the SCM field. Gulf and Western countries arguably share the biggest gap concerning their cultural business and acceptance to SCMPs, regional, and global supply chains. Recognizing this fact, many American and Western firms now have a sustainability and strategic partnerships with Gulf firms who help to create the "new supply chain".

4.3 Measure refinement and validation

4.3.1 Assessment of reliability

Cronbach's alpha was used for each unidirectional scale along with the corrected item-to-total correlation (CITC) to assess the reliability of each construct, and their items, of the theoretical research framework proposed (Figure 1). An alpha score higher than 0.7 was considered acceptable for all constructs of this study (Nunnally, 1978), whereas the cut-off values for α and CITC were between 0.60 and 0.89. Table 3 has displayed the reliability measures; for instance, the SCMP/SC construct initially included five-items. An initial α indicated that SCMP/SC3 item had $\alpha \leq 0.50$. After removing this item from any further analysis, all remaining items were analysed and strongly loaded into their respective α with loadings ≥ 0.68 as shown in Table 3. Similarly, the SCMP/FwP dimension was initially represented by five-items. An initial α indicated that SCMP/FwP4 item had $\alpha \leq 0.50$. After removing this item, the remaining items were analysed and strongly loaded into their respective α with loadings ≥ 0.71. The SCMP/UoI dimension was initially represented by four-items. An initial α indicated that SCMP/UoI4 item had $\alpha \leq 0.50$. After removing this item, all remaining items were factor analysed and the results are shown in Table 3. It can be seen that all items loaded on their respective α with most of loadings ≥ 0.73. The same purification process was applied to the rest of the dimensions and their items. Table 3 denotes with a '*' all the items that were eliminated through this process.

To achieve a significant level of instrument validity, a five-point Likert scale was used in the questionnaire. The questionnaire instrument was reviewed and re-evaluated by five academics and six expert practitioners, who were asked to provide feedback in relation to the appropriateness of the instrument, meaningfulness, and usefulness for the targeted respondents.

Insert Table 3 in here

4.3.2 Assessment of validity

Factor analysis was performed on the remaining items from the reliability analysis to verify the dimensionality and reliability of each construct to ensure convergent validity (Nunually, 1978). Factor analysis was used to examine the multidimensionality of both SCM practices and GMFP. The multidimensionality between the produced factors was checked, which is a measure of sampling adequacy, was found to be 0.783. This value is greater than

0.5, so, it can be considered that the factor analysis test has proceeded correctly and that the sample was used adequately. This shows that the factor processes were correct and suitable for testing multidimensionality. The final analysis was performed after removing all items that have scored below 0.7. Therefore, the result found that all items were strongly loaded (loading > 0.50) on their associated factors, which suggested that there was a convergent validity. Discriminant validity was confirmed when the load of item was stronger on its associated factor than on others. Factor analysis was run to assess the discriminant validity. All items loaded as theorized and seven factors together explained 73.53% of the total variance. As a consequence, KMO of sampling adequacy (0.689) indicated that the data were adequate for factor analysis (Hatcher, 1994), the results shown in Table 4.

Insert Table 4 in here

4.4 Data Analysis

A total 144 complete and usable responses were obtained from the whole population of 1421 medium and large-sized GMFs. The survey asked the respondents to rank their firm's performance improvements within the last three years on the basis of seven performance indicators (Tables 3 and 5). The sample was divided into two groups, high-performers and low performers, to show how much level medium and large-sized GMFs adopt and use SCM practices (Table5, 6, and 8). The analysis was performed in three steps. First, the GMFs were divided into two groups, namely: low and high-performing GMFs. High-performing firms were those that achieved an average score ≥ 4 on all three market share performance items (i.e. GMFP/MSP1, GMFP/MSP3, and GMFP/MSP4) and four financial performance items (i.e. GMFP/FP2, GMFP/FP5, GMFP/FP6, and GMFP/FP7). All these seven items represent the improvements in the combination of market share and financial performance items (GMFP/(MSP-FP)). On the other hand, the low-performing firms were considered those that achieved an average score $x < 4$ on all previous performance indicators, showing either a deterioration in their performance or at best maintaining an status quo, where x represents to firm's performance. This means that manufacturing firms that have an average score $1 \leq x < 3$ represent that their performance has strongly or slightly deteriorated, while firms that have an average score $3 \leq x < 4$ represent that there is no change in their performance. Therefore, merging the last two scales used in this study considers firms as low-performing GMFs, and those who already adopted SCM practices did not have any significant impact on their performance in the last three years. While, high-performing firms were considered those that achieved an average score $x \geq 4$ on all performance indicators, showing either slight or strong improvement in their performance.

Table 5 has indicated that a total of seventy-five Gulf manufacturing firms' performance have strongly improved their market share performance during the last three years; while, sixty-nine firms indicated that their market share performance has stayed the same with no change, or even deteriorated in the last three years. Eighy firms have strongly improved their financial performance over the last three years. A total of seventy-nine Gulf manufacturing firms have strongly improved in combination of market share and financial performance during the last three years, hence was categorized as high-performers. Sixty-five firms indicated that the combination of market share and financial performance have stayed the same with no change, or even deteriorated in the last three years, hence was categorized as low-performers (Table 5). The t-test analysis was performed to determine the differences in the implementation of SCM practices between high and low performer groups for each of the (in total) three categories (GMFP/MSP, GMFP/FP, and the combination of GMFP/(MSP-FP)) (Table 6). Lastly, a multiple linear regression analysis was conducted to determine SAM practices that had significant influence on firm's performance (Table 7).

Insert Table 5 in here

5. Results of the study

5.1 Adoption of supply chain management practices in medium and large-sized Gulf manufacturing firms

T-test analysis has shown that there are many significant differences in the degree of implementation of SCM practices between low and high-performing GMFs (Table 6). This indicates that most of the SCM practices have been implemented differently among low and high-performers. The results show that flexibility with partners, usage of internet, lean production, and internal integration are the least implemented and used SCM practices (mean<4) among the respondents in all categories of performance (GMFP/MSP, GMFP/FP, and in the combination of GMFP/(MSP-FP)). On the other hand, supplier collaboration, customer focus and quality management are the highest SCM practices implemented and used among the respondents (mean≥4) in all performance categories of Gulf manufacturing firm's performance.

The differences between low and high-performing GMFs is not significant in any of the performance categories. High performers in all categories implement SCM practices related to supplier collaboration, customer focus, and quality management to a significantly ($p \leq 0.05$) higher degree than low performers. This suggests that unlike low performers, high performers adopt, apply and gain more from these SCM practices. Additionally, Gulf manufacturing firms which are high performers seem to be more consistent with the use of the practices over time. The exception to this is the difference in the use of supplier collaboration (for MSP-FP), which was found not to be significant ($p>0.05$). The rest four SCM practices are also used more by high performers in the single performance categories; although the significance is lower than $p \leq 0.05$.

The Pearson Correlation Coefficient (r) was used to measure the magnitude and direction of the relationship between GMFP/MSP and GMFP/FP. The results as shown in Table 7 indicate that the correlation coefficient (r) between GMFP/MSP, and GMFP/FP is 0.716 and has a strong positive correlation ($r(144) = 0.003$, $p = 0.05$, 2-tailed). The researcher considers these ranges of correlations (r) for hypotheses analyses in this study as follows: if $r > 0.7$, correlation is considered strong; if $0.3 \leq r \leq 0.7$, correlation is considered moderate; and if $r < 0.3$, correlation is considered weak. Also, the same ranges apply to negative values.

5.2 The Performance effects of supply chain management practices

A multiple linear regression analysis was performed to reveal the performance impact of the different SCM practices and the results have been illustrated in Table 8.

5.2.1 Market Share Performance of Gulf manufacturing firms

The SCMPs such as supplier collaboration, usage of internet, customer focus, and quality management practices are positively related to better market share performance in high-performing GMFs. These practices have statistically significant differences ($p \leq 0.05$) with GMFP/MSP dimension. The proportion of variance explains 78.8% ($R^2 = 0.788$), whereas the F-value is 2.98. This means that there is a significant positive impact and strong ($r>0.7$) relationship between these practices and GMFP/MSP (Cronk, 2004). On the other hand, flexibility with partners, lean production, and internal integration did not show a significant effect ($p > 0.05$) on the market share performance of high-performing GMFs. Whereas, it's found that only usage of internet practice has positive and significant ($p \leq 0.05$) effect on the market share performance of low-performing GMFs. The proportion of variance explains

35.8% (R^2= 0.358), whereas the F-value is 18.68. This means that there is a positive impact and an existence moderate ($0.3 \leq r \leq 0.7$) relation between this practice and GMFP/MSP dimension.

The supplier collaboration practice contributes to rely on few high-quality suppliers and provides assistance in sharing information in inventory levels to improve the quality of suppliers' products with reliable and speed of delivery. Usage of internet has a significant influence on market share as it facilities the exchange of information between the firm and its suppliers and customers and well. If the exchanged information is timely, accurate, complete, adequate and reliable, it will contribute to increase the market share of Gulf manufacturing firm performers. The customer focus practice contributes in increasing the follow-up and monitoring the customers' quality/service feedback, evaluating customers' satisfaction, and providing assistance for their customers. This will build a good reputation for Gulf manufacturing firms as well as increase their sales in local, regional, and global markets. The quality management practice appears to have a positive influence on enhancing market share.

5.2.2 *Financial Performance of Gulf manufacturing firms*

The implementation of supplier collaboration, customer focus, lean production, and quality management practices contribute to better financial performance in high-performing GMFs. This suggests a positive significant ($p \leq 0.05$) relationship between these practices and financial performance except lean practice, which has a negative effect. The proportion of variance explained is 60.1% (R^2= 0.601), whereas the F-value is 26.7. This means that there is a significant impact and an existence of moderate relationship between these practices and GMFP/MSP dimension. The lean production practice showed a significant negative effect on the financial performance of high-performing GMFs. This surprising result may be due to the difference in targeted respondents. Moreover, the majority of targeted respondents generally ignored the concept of lean practice. Even when it is applied, it is done partially and lacks a true spirit and totality, which is supported by the study conducted by Abu-Alrejal (2007).

The flexibility with partners, usage of internet, and internal integration did not show any effect on this measure ($p > 0.05$). Lean production and internal integration practices have significant ($p \leq 0.05$) positive effect on financial performance in low-performing GMFs. The proportion of variance explains 36.8% (R^2= 0.368), whereas the F-value is 92.3. This means that there is a significant positive impact and an existence of moderate relationship between these practices and GMFP/FP dimension. While, all other practices do not have an effect on financial performance in low-performers.

Insert Table 6 in here
Insert Table 7 in here
Insert Table 8 in here

The supplier collaboration practice has positive effect on financial performance. Additionally, customer focus has a positive relationship and influence on financial performance, which plays an important role to increase customers' satisfaction, follow-up, and monitor firm's services and customers' claims. On the other hand, vast empirical and theoretical evidence has shown the positive effect of lean production on various performance dimensions of organizations (Belekoukias *et al*., 2014), including financial. However, the results obtained from this study contradict this previous evidence. Belekoukias et al. (2014) indicated that the incorrect application of some lean tools, e.g. value stream mapping (VSM), may result in negative effects on the performance of firms. The quality management practice has a positive relationship and significantly contributes to better financial performance of high-performing GMFs through encouraging employees to be more involved in quality management and improvement activities.

5.2.3 Combination of Market Share and Financial Performance

The results as shown in Table 8 have indicated that the Pearson coefficient (r) is 0.616 for GMFP/MSP and GMFP/FP, while the correlation has probability (p) 0.003 for two-tailed test. Hence, a moderate positive and statistically significant correlation was found. The proportion of variance explains 61.3% (R^2 =0.613). A multiple linear regression analysis indicated that there is a significant ($p \leq 0.05$) positive relationship between the adoption and implementing of supplier collaboration, customer focus, quality management, and improvement of high-performing GMFs. These practices have statistically significant differences ($p \leq 0.05$) with a combination of GMFP/(MSP-FP) dimension; whereas, all other practices did not have any significant effect. This means that there is a significant positive impact and an existence of strong ($r>0.7$) relationship between these practices and GMFP/(MSP-FP) dimension (Cronk, 2004).

On the other hand, the analysis revealed that the internal integration practice lead to improved market share and financial performance in low-performing GMFs. The proportion of variance explains only 31.9% (R^2= 0.319), whereas the F-value is 78.4. This means that there is a significant positive impact and an existence of moderate relationship ($0.3 \leq r \leq 0.7$) between this practice and a combination of GMFP/(MSP-FP) dimension in low performers. This means that there is a significant positive impact and an existence of moderate relationship between this practice and this dimension; while, all other practices did not have any significant effect. Apparently, a high degree of improvement on the two categories of performance (market share and financial performance) is associated with the implementation of SCM practices at quality management, customer focus and supplier collaboration respectively. Therefore, these practices are considered the best SCM practices for both medium and large-sized firms of high-performing GMFs.

SCM practices directed towards improving supplier collaboration, customer focus and quality management have a significant positive effect on all performance combinations involving high-performing GMFs. Whereas, flexibility with partners, usage of internet, lean production, and internal integration practices have no effect on improving performance combination GMFP/(MSP-FP) in both medium and large-sized firms in low and high-performing GMFs. Figure 2 has illustrated the best SCM practices in Gulf manufacturing firms.

Insert Figure 2 in here

6. Discussion

6.1 Quality management, customer focus and supplier collaboration practices

There are positive significant relationships ($p \leq 0.05$) between the implementation of quality management, customer focus, and supplier collaboration. These practices lead to significant improvements in the combination of market share and financial performances (GMFP/(MSP-FP)). In contrast, these practices do not show any significant synergetic effect in low-performing GMFs. These findings suggest that quality management, customer focus, and supplier collaboration practices should be qualified as best practices, that is, they support high-performing GMFs achieve significant improvements in most performance areas and combinations. Furthermore, these practices seem to reinforce and complement each other. The role of quality management as a best practice in the sense of contributing to performance improvement in high-performing GMFs.

None of the other SCM practices investigated in this study appears to produce any significant impact on high-performing GMFs. These practices include; flexibility with partners, usage of internet, and internal integration. It has been found that lean production

practice has a negative significant effect on financial performance in high-performing GMFs; while, it has positive significant effect in low-performing GMFs. There are no significant effects (p>0.05) of quality management, customer focus, and supplier collaboration practices on market share, financial, and combination of market share and financial performances in low-performing GMFs.

6.2 Flexibility with partners, usage of internet, internal integration and lean production practices

Flexibility with partners practice does not have a significant impact (p>0.05) on improvements of market share, financial, and combination of market share and financial performances in both low and high-performing GMFs. Usage of internet practice has positive significant ($p \leq 0.05$) impact on improvement of market share performance in both low and high-performing GMFs. While, it does not have any significant (p>0.05) effect on any of the other performance areas. Lean production practice has mixed effects on GMFs performance and has negative significant ($p \leq 0.05$) effect on improvement of market share performance in high-performing GMFs. While, it has positive significant ($p \leq 0.05$) effect on improvement of financial performance in low-performing GMFs. Internal integration practice has only one positive significant ($p \leq 0.05$) effect on financial performance in low-performing GMFs; whereas does not have any significant (p>0.05) effect on any other performance areas. Therefore, the conclusion is that these practices does not appear as best practices from manufacturing firms' performance perspective.

According to Al-Najem et al. (2013), the term "lean" is still a relatively unknown concept in Arab countries. This lower level of lean production awareness among Gulf countries when compared, for example, to Western countries may have contributed for this SCM practice to have lower level of implementation than other SCM practices. Although, the use of internet is widely spread among manufacturing firms, there is still a gap in the use of this technology between developed countries, with developed nations showing a much higher rate (Zaied *et al*., 2007). This low use of internet may also impede a more effective internal integration among the departments of the Gulf firms and the improvements of their flexibility with partners. This pattern indicates that high-performing GMFs have problems gaining benefit of practices directed towards flexibility with partners, usage of internet, internal integration, and lean practices. This may be due to the fact that the concepts are not activated and/or rather new, especially in the manufacturing industry.

The differences in implementing and adopting SCMPs as addressed in this study and exploring the best practices between low and high-performing GMFs in both medium and large-sized firms may be due to;

- Majority of the targeted respondents were from large-sized firms (251 employees or greater)
- Large-sized firms play a crucial role in economy and many research emphasizes that large firms are interested and have more concerns in implementing a proper SCMPs for enhancing their performance than other sizes (Sundram, *et al.*, 2016)
- Many large firms have growing number of franchises, trading agreements for the long-run, mergers, alliances and strategic partnerships with other international foreign investors to invest in the Gulf countries and operate globally
- The influence of multinational firms in large-sized firms than other sizes; so, many local firms have also engaged and involved in implementing and creating such best SCMPs in this study
- Recognizing the fact that many American and Western firms now have a sustainability strategy that involves partnering with Gulf's firms who help to create the new supply chain and best SCMPs.

The results have been analysed in Table 9, which clarifies that supplier collaboration, customer focus, and quality management have a variety of performance effects and reinforce each other. Therefore, these four SCMPs investigated seem to represent best practices in high-performing GMFs.

Insert Table 9 in here

The status of usage of internet, which *may* had been best practice in the past, has lost its status. Usage of internet appears to have a positive significant impact on market share performance in both low and high-performing GMFs; whereas, it has no significant effect on financial and the combination of market share and financial performances. The status of lean production is less straightforward, which produced mixed results. Furthermore, lean production has negative impact on improvement of financial performance in high-performing GMFs. While, it has no significant impact on market share and the combination of market share and financial performances. The improvement in lean production as operationalized in this study is not a best practice, but may develop into best SCMPs. The direct effect of this practice on GMFs performance indicators was limited; while, conversely, a firms' quality management, supplier collaboration and customer focus practices will greatly depend on its manufacturing performance.

Therefore, the study concluded that usage of internet and lean production practices are not currently, but may be developed into, best practices in future. The other two practices (flexibility with partners and internal integration) do not have any significant effect in high-performing GMFs and should therefore not be considered as best practices. The study has focused on a limited set of industrial sectors (eight), representing a variety of GMFs in terms of size, process, and type as it affects the SCMPs and the performance of Gulf manufacturing firm.

7. Conclusion

The study aimed to investigate the current SCMPs that are commonly implemented by high-performing GMFs in both medium and large-sized firms. The study has also determined the best practices, which are having the most significant effects on the performance of these firms in a sample of 144 manufacturing firms. It is found that high and low Gulf manufacturing firm performers differ in terms of usage and implementation "width" and "depth" of supply chain management practices. The study has presented an improvement in best practice research in terms of its starting point that is the high-performing GMFs are the ones that (must) have the best SCMPs. The results in this study seem valid for the seven SCMPs investigated in high-performing GMFs. The results have shown that supplier collaboration, customer focus, and quality management are very strong configuration and currently represent best practices. Usage of internet is an emerging practice, but may develop significant positive effects on market share performance in the overall Gulf manufacturing firms' performance. Lean production practice, also did not currently seem best practice too; in contrast, it has a significant negative effect on financial performance; whereas, no significant effects at all in the other performance combinations. Surprisingly many SCMPs, notably flexibility with partners and internal integration, do not have a significant impact on Gulf manufacturing firms' performance, either negatively and/or positively. Therefore, these practices currently are not considered best supply chain management practices in Gulf manufacturing firms'.

7.1 Research limitations, implications, and further research

The analysis suffers from three weaknesses, each reducing the validity of the results. First, the study cannot exclude the possibility that there are additional best practices that are

also used by high-performing GMFs in medium and large-sized firms. Second, this study does not allow for an estimation of the potential of emerging some SCMPs. Finally, it is not clear whether or to what extent the results also hold for Gulf non-manufacturing firms (i.e. service sector). Nevertheless, since the results of this study contradict the experience and results of other researches, a suggestion to perform further studies in relation to this aspect is recommended as part of a future research agenda.

Majority of the Gulf manufacturing firms recognized and emphasized on the importance of using and implementing SCMPs, but unfortunately, some of them still do not know exactly which practices should be implemented effectively. Therefore, the researcher tested a list of pre-defined SCM practices but cannot exclude the possibility that there are additional practices explaining the best Gulf manufacturing firms' performance. Moreover, the interviews could have provided further insights on the best SCM practices used by GMFs. Therefore, future research studies should follow a mixed methods approach (questionnaire survey and interviews) for data collection.

Third, the use of single respondent from each organisation may not be enough to generate accurate data about the SCMPs in Gulf manufacturing firms' and may lead to some measurement and/or results inaccuracy. Therefore, the future research studies should involve more respondents from each sample/targeted firm for data collection. In addition, there are some limitations linked to the sample size. A larger sample size will give a clearer picture and more accurate data for generalization of the results about SCMPs that are already adopted by low and high-performing GMFs and the best practices that were identified by high-performing GMFs. From practical implication viewpoint the managers and practitioners should focus on some areas that need to be improved to overcome the weaknesses of SCMPs such as flexibility with partners, usage of Internet, lean production, and internal integration to enhance the firms' performance.

Future research can expand the domain of SCMPs by considering additional dimensions such as geographical proximity, JIT, outsourcing, external integration, product innovation, E-procurement, order planning, bullwhip, cycle time, inventory management, production level, power/dependence, lead-time management and others, which have not been discussed in this study. In addition, future research can also focus on splitting the population of the study into sub-sectors based on industry type (metal, food processing, electrical, etc.) and size (medium and large) of the GMFs. It can then examine the best SCMPs in each sub-sector alone and conduct a comparative study between sub-sectors their effects on manufacturing performance.

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List of Tables

Table1. Summary of scholarly research on best practices

Best Practice (BPs)	Effect on	Author(s)
Continuous Improvement (CI), Just-in-Time (JIT), Total Quality Management (TQM)	World Class Manufacturing (WCM) and Competitive performance	Flynn *et al.* (1999)
Cross-functional, co-operation	Better performing manufacturing managers such as team building and support.	Kathuria and Partovi (1999)
Customer focus, employee focus, community focus, productivity focus	Customer retention and time to market	Fazli (2011)
Supplier involvement, facility control, vendor and material management	SCM performance	Sridharan *et al*., (2005); Stevenson (2005)
Agreed metrics, good/integrated IT support for data capturing and reporting	Achieving adequate and accurate data for reporting and take decision	Papakiriakopoulos and Pramatari (2010); Forslund and Jonsson (2010)
Customer focus, Customer service management	Time delivery and customer satisfaction	Fawcett (2007), Jasri (2003), Tan (2002)
Benchmarking, CI	Organisational performance, factors affecting the adoption of manufacturing best practices	Garver (2003)
TQM, JIT, WCM, contingency	Competitive advantage	Ketokivi and Schroeder (2004)
Product operations, production process	Production process flexibility, elimination of waste and response time	Grando and Belvedere (2005)
Marketing strategy	Product and distribution strategies	Gooze and Harms (2006)
Supplier and customer relationship	Quality of relationships	Stevenson (2005)
Information sharing, strategic supplier partnership	Sharing, share forecasts with customers, and performance	Hsu *et al*. (2008)
Quality of information, level of information	Quality control, quality cost, best practices, performance	Ou *et al.*, 2010, Li *et al.* (2006)

Collaboration	Developing a collaborative culture	Dotti *et al.*, 2012; Ferreira *et al.*, 2012
Shared goals and specific targets	Achieving the setting targets and goals	Ferreira *et al.*, 2012

Table 2. Description of the respondent firms

Job title	**n**	**%**	**Annual sales ($)**	**n**	**%**
Senior managers (i.e.			Less than one million	-	-
purchasing/supplying/logistic	77	53.4	1-5 million	9	6.25
s, etc.)	58	7	6-10 million	41	28.4
Directors	9	40.2	11-50 million	59	7
CEOs/presidents/vice		7	51-100 million	21	40.9
presidents		6.25	More than 100 million	14	7
					14.5
					8
					9.72
Industry type	**n**	**%**	**Operating experience**	**n**	**%**
Food processing	179	12.5	Less than 10 years	-	-
Furniture	156	9	10-15 years	14	9.72
Pharmaceutical	135	10.9	16-20 years	23	15.9
Textile	280	7	21-25 years	37	7
Chemical	263	9.50	26-30 years	58	25.6
Tobacco and cigarettes	67	19.7	More than 30 years	12	9
Paper and packing	73	0			40.2
Plastic/rubber	268	18.5			7
		0			8.33
		4.71			
		5.13			
		18.8			
		5			
Number of product lines	**n**	**%**	**Firm's size (number of**	**n**	**%**
Under 3	21	14.5	**employees)**	-	-
3-5	89	8	Fewer than 51 (small)	26	18.0
6-8	34	61.8	51-100 (medium)	39	5
No response	-	0	101-250 (medium)	59	27.0
		23.6	251-500 (large)	20	8
		1	501 or greater (large)		40.9
		-			7
					13.8
					8

Table 3. Item purification for SCM practices and Gulf manufacturing firm performance constructs and dimensions

Item	Initial CITC	Final CITC	Initial α	Final α
(a) Supplier Collaboration (SC) construct			0.73	0.85
SCMP/SC1 Our firm share information on inventory levels with our suppliers.	0.63	0.74		
SCMP/SC2 Our suppliers provide any assistance to improve the quality of our firm's products.	0.55	0.71		
SCMP/SC3* Our firm has continuous improvements programs that include our key suppliers.	0.39			
SCMP/SC4 Our suppliers have high level of flexibility and delivery speed.	0.61	0.68		
SCMP/SC5 Our suppliers share forecasts of customer demand with our firm.	0.66	0.72		
(b)Flexibility with Partners (FwP) construct			0.71	0.87
SCMP/FwP1 Our firm is able to deal with different nonstandard orders.	0.74	0.80		
SCMP/FwP2 Our firm is able to produce different features of products such as: options, sizes, and colours.	0.64	0.71		
SCMP/FwP3 Our firm is able to offer special customer specifications.	0.61	0.72		
SCMP/FwP4* Our firm is able to offer/introduce new products for customers.	0.41			
SCMP/FwP5 Our firm is able to adjust capacity (accelerate/decelerate) in production regarding to rapidly customer demand changes.	0.68	0.76		
Usage of Internet (UoI) construct			0.74	0.80
SCMP/UoI1 Exchange of information with our supply chain partners is done via internet.	0.61	0.76		
SCMP/UoI2 In our firm, most of purchasing processes (materials, components, items, etc.) and services are done via internet.	0.66	0.73		
SCMP/UoI3 To high extent of selling of products and services in our firm is done via internet.	0.66	0.75		
SCMP/UoI4* Promotion and marketing in our firm relies to high extent on internet.	0.29			
(c) Customer Focus (CF) construct			0.75	0.84
SCMP/CF1 Our firm is requently follow-up and monitor our customers for quality/service feedback.	0.72	0.77		
SCMP/CF2* Our firm is frequently tries to determine our future customer expectations.	0.23			
SCMP/CF3 Our firm is frequently measures and evaluates our customer satisfaction.	0.67	0.78		
SCMP/CF4 Our firm provides and facilitates any assistance for our customer.	0.68	0.74		
(d) Lean Production (LP) construct			0.72	0.76
SCMP/LP1* Suppliers' warehouses are located very close to our firm.	0.37			
SCMP/LP2 Time has been reduced for inspection of incoming materials/items/components.	0.73	0.81		
SCMP/LP3 Our firm encourages suppliers for shorter lead-times.	0.61	0.78		
SCMP/LP4 Our firm's policy is looking for reduction in set-up times.	0.66	0.89		
(e) Internal Integration (II) construct			0.79	0.89
SCMP/II1 There is high level of coordination between different departments in our firm.	0.73	0.79		
SCMP/II2* Ability to handle unexpected challenges within different departments in our firm.	0.25			
SCMP/II3* There is an internal integration between logistics, production and marketing departments in our firm.	0.33			
SCMP/II4 Our firm formulates quality circles and cross-functional teams for solving problems and/or developing processes, products, and services.	0.74	0.86		
(f) Quality Management (QM) construct			0.82	0.85
SCMP/QM1 Our firm has a salary promotion and incentives for encouraging employees' participation in quality improvement.	0.70	0.75		
SCMP/QM2 The defect rates of the primary products in our firm are decreasing.	0.66	0.87		
SCMP/QM3 Our firm has quality circles and cross-functional teams.	0.76	0.85		
SCMP/QM4 Top management in our firm encourages and offers all resources required for employee education and training.	0.64	0.86		
SCMP/QM5* Our firm implements various inspections effectively and frequently.	0.37			
SCMP/QM6* Our firm treats customer complaints based on quality criteria with top priority.	0.42			
(g) Market Share Performance (MSP)			0.71	0.77
GMFP/MSP1 Market share.	0.57	0.60		
GMFP/MSP3 The growth of market share.	0.63	0.74		
GMFP/MSP4 The growth of sales.	0.67	0.71		

Financial Performance (FP)				0.76	0.79
GMFP/FP2	Return on investment.	0.67	0.75		
GMFP/FP5	Growth in return on investment.	0.70	0.79		
GMFP/FP6	Profit margin on sales.	0.73	083		
GMFP/FP7	Overall competitive position.	0.70	0.72		

*Denote items were deleted.

Table 4. Results of factor analysis for discriminant validity

	Kaiser-Meyer-Olkin measure of sampling adequacy:0.689; factor loadings of 0.4 and above are shown						
Item	SCMP/SC	SCMP/FwP	SCMP/UoI	SCMP/CF	SCMP/LP	SCMP/II	SCMP/QM
SCMP/SC1	0.78						
	0.83						
SCMP/SC2	0.77						
	0.86						
SCMP/SC4		0.71					
		0.88					
SCMP/SC5		0.59					
		0.75					
SCMP/FP1			0.77				
SCMP/FwP2			0.64				
			0.84				
SCMP/FwP3				0.55			
				0.86			
SCMP/FwP5				0.78			
					0.79		
SCMP/UoI1					0.68		
					0.82		
SCMP/UoI2						0.76	
						0.67	
SCMP/UoI3							0.89
							0.75
SCMP/CF1							0.88
							0.79
SCMP/CF3	3.74	3.45	2.89	2.86	2.78	2.67	2.45
SCMP/CF4	14.88	13.64	12.85	11.85	11.29	10.74	9.78
SCMP/LP2	14.88	28.45	40.34	51.56	64.22	56.74	73.53
SCMP/LP3							
SCMP/LP4							
SCMP/II1							
SCMP/II4							
SCMP/QM1							
SCMP/QM2							
SCMP/QM3							
SCMP/QM4							
Eigen value							
Variance (percent)							
Cumulative variance							

(percent)							

Table 5. Average values for the Gulf manufacturing firms' performance criteria in the two groups of low and high-performing firms

Coding	Improvements in GMFs Performance during the last three years	Mean	SD	High-Performers Firms				Low-Performers Firms				Number of high performers	Number of low performers	Total N
				Skewness		Kurtosis		Skewness		Kurtosis				
				Statistic	Std. Er.	Statistic	Std. Err.	Statistic	Std. Err.	Statistic	Std. Err.			
GMFP/MSP1 GMFP/MSP3 GMFP/MSP4	***Market Share Performance (MSP)*** Market share. Growth of market share. Growth of sales.	3.36 3.30 3.42 3.40	0.62 0.73 0.54 0.81	0.109	0.247	-0.091	0.401	0.379	0.368	0.578	0.718	75	69	144
GMFP/FP2 GMFP/FP5 GMFP/FP6 GMFP/FP7	***Financial Performance (FP)*** Return on investment. Growth in return on investment. Profit margin on sales. Overall competitive position	3.05 3.60 2.70 3.00 2.90	0.73 0.54 0.62 0.44 0.81	0.245	0.233	0.273	0.341	-0.212	0.454	-0.381	0.511	80	64	144
GMFP/(MSP-FP)	***Combination of:*** Market Share and Financial Performance (MSP-FP)	3.20	0.42	0.440	0.409	0.454	0.401	0.166	0.247	0.322	0.452	79	65	144
GMFP/MSP	**High-Low Performing GMFs**			**Skewness/Kurtosis**				**Skewness/Kurtosis**						

	High-performing GMFs Low-performing GMFs	4.13 2.36	0.36 0.23	0.43/ -1.05	0.83/ 1.16	75 -	- 69	144
GMFP/FP	High-performing GMFs Low-performing GMFs	4.03 2.08	0.37 0.18	1.12 /0.87	0.46/ -0.67	80 -	- 64	144
GMFP/(MSP-FP)	High-performing GMFs Low-performing GMFs	4.39 2.05	0.27 0.16	1.07/ 1.16	0.64/ 0.72	7 9 -	- 65	144

Table 6. Differences in Mean Values between High and Low-Performing Gulf manufacturing firms; using t-test for the investigated SCM practices (1=no use, 5=high use)

Improvements in Gulf Manufacturing Firms' Performance in the last three years (2013-2015)	Low/High-Performing GMFs	Sample size (n)	Supply Chain Management Practices in the Last Three Years (2013-2015)																			
			SCMP/SC			SCMP/QM			SCMP/FwP			SCMP/UoI			SCMP/CF			SCMP/LP			SCMP/II		
			Mean	t	Skewness /Kurtosis	Mean	t	Skewness /Kurtosis	Mean	t	Skewness /Kurtosis	Mean	t	Skewness /Kurtosis	Mean	t	Skewness /Kurtosis	Mean	t	Skewness /Kurtosis	Mean	t	Skewness /Kurtosis
GMFP/MSP	High-performing GMFs	75	4.401	8.21*	0.08/	4.871	10.33*	0.51/	3.091	0.98	1.13/	2.771	1.41	0.99/	4.230	6.11*	0.72/	2.701	1.87	0.98/	2.173	1.09	1.03/
	Low-performing GMFs	69	2.310		0.98	2.291		0.09	2.623		0.02	2.541		0.28	2.391		1.53	2.521		0.56	2.401		0.26
GMFP/FP	High-performing GMFs	80	4.337	6.41*	0.05/	4.291	7.74*	0.32/	3.715	3.45*	0.94/	3.101	2.86*	0.82/	4.221	9.67*	0.45/	3.311	1.71	0.74/	3.711	2.98*	0.54/
	Low-performing GMFs	64	2.401		0.61	2.315		0.04	2.571		0.03	2.352		0.15	2.561		0.94	2.601		0.24	2.591		0.31
GMFP/(MSP-FP)	High-performing GMFs	79	4.361	6.22*	0.06/	4.512	8.64*	0.24/	3.401	5.42*	0.77/	3.118	4.81*	0.81/	4.433	7.57*	0.33/	3.051	4.11*	0.65/	2.861	1.66	0.83/
	Low-performing GMFs	65	2.311		0.73	2.314		0.02	2.591		0.09	2.201		0.02	2.310		0.63	2.521		0.43	2.601		0.45

Notes: * Coefficients are statistically Significant (2-tailed) at $p \leq 0.05$.

Table 7. Pearson correlation analysis for GMFP/MSP and GMFP/FP items relationship

Coding	GMFP/MSP items	GMFP/FP items
GMFP/MSP items		
Pearson Correlation	1	
Sig. (2-tailed)		
N	144	
GMFP/FP items		
Pearson Correlation	0.716*	1
Sig. (2-tailed)	0.003	
N	144	144

* Correlation is statistically significant at 0.05 level.

Table 8. Multiple Linear Regression Analysis: Standardized Coefficients (Beta)

Improvements in Gulf Manufacturing Firms' Performance in the last three years (2013-2015).	Sample size (n)	(Unstandrdized Coefficents)/ Standrdized Coefficents*; t, Sig.*	Supply Chain Management Practices in the Last Three Years (2013-2015)						
$R^2 = 0.513$		(B/Std.Error)/ Beta; *t, Sig.*	SCMP/SC	SCMP/QM	SCMP/FwP	SCMP/UoI	SCMP/CF	SCMP/LP	SCMP/II

High-performing GMFs/MSP	75	(B	0.310	0.106	0.100	0.231	0.286	-0.092	0.102
R^2 = 0.787; F-value = 298.1		Std. Error)	0.107	0.051	0.073	0.084	0.097	0.831	0.073
Adjusted R^2 = 0.697, P = 0.021		Beta	0.162	0.561	0.271	0.188	0.321	0.301	0.187
		t	2.902*	2.084*	1.368	2.234*	2.654*	-1.118	1.368
		Sig.	0.003	0.017	0.119	0.015	0.008	0.291	0.137
Low-performing GMFs/MSP	69	(B	0.147	0.043	0.121	0.035	0.015	0.018	0.068
R^2 = 0.358; F-value = 18.68		Std. Error)	0.148	0.025	0.237	0.016	0.022	0.048	0.061
Adjusted R^2 = 0.286, P = 0.043		Beta	0.890	0.183	0.336	0.193	0.115	0.262	0.184
		t	0.996	1.706	0.761	2.316*	0.681	0.365	1.114
		Sig.	0.382	0.083	0.998	0.024	0.473	0.734	0.326
High-performing GMFs/FP	80	(B	0.065	0.075	0.048	0.106	0.156	0.086	0.068
R^2 = 0.601; F-value = 26.7		Std. Error)	0.016	0.025	0.039	0.071	0.038	0.035	0.061
Adjusted R^2 = 0.512, P = 0.016		Beta	0.121	0.115	-0.316	0.611	0.171	-0.101	0.217
		t	2.251*	2.365*	1.235	1.448	4.156*	2.471*	1.114
		Sig.	0.031	0.028	0.213	0.154	0.011	0.021	0.241
Low-performing GMFs/FP	64	(B	0.015	0.087	0.005	0.018	0.021	0.057	0.064
R^2 = 0.368; F-value = 92.3		Std. Error)	0.022	0.067	0.042	0.048	0.034	0.026	0.034
Adjusted R^2 = 0.291, P = 0.033		Beta	0.082	0.157	0.011	0.025	0.031	0.163	0.030
		t	0.681	1.563	0.113	0.365	0.628	2.149*	1.902*
		Sig.	0.828	0.078	0.928	0.890	0.844	0.026	0.031
High-performing GMFs/(MSP-FP)	79	(B	0.144	0.091	0.069	0.037	0.144	-0.023	0.015
R^2 = 0.769; F-value = 278.9		Std. Error)	0.077	0.112	0.093	0.063	0.077	0.054	0.087
Adjusted R^2 = 0.689, P = 0.042		Beta	0.112	0.301	0.032	0.354	0.271	-0.156	0.275
		t	1.867*	0.811*	0.748	0.587	1.867*	0.438	0.174
		Sig.	0.021	0.031	0.151	0.132	0.021	0.181	0.337
Low-performing GMFs/(MSP-FP)									
R^2 = 0.319; F-value = 78.4	65	(B	-0.034	0.107	-0.011	0.048	-0.018	-0.147	0.075
Adjusted R^2 = 0.257, P = 0.029		Std. Error)	0.089	0.076	0.112	0.119	0.093	0.148	0.120
		Beta	-0.071	0.137	-0.008	0.152	-0.069	-0.108	0.277
		t	-0.376	1.408	-0.096	0.400	0.199	0.996	0.620
		Sig.	0.490	0.129	0.949	0.396	0.665	0.248	0.264

Note: * Coefficients are statistically significant at $p \leq 0.05$.

Table 9. SCM practices (7 categories) and best practices (3)

Supply Chain Management Practices (SCMPs)	**Best practice**	**Remarks**
Supplier Collaboration (SC)	Yes	Strong manufacturing performance effects
Flexibility With Partners (FwP)	No	No manufacturing performance effects
Usage of Internet (UoI)	No longer	Has strongly positive significant effect on market share performance; no significant effects from other performance combinations.
Customer Focus (CF)	Yes	Strong manufacturing performance effects
Lean Production (LP)	Possibly	Has strongly negative significant effect on financial performance; no significant effects from other performance combinations.
Internal Integration (II)	No	No manufacturing performance effects
Quality Management (QM)	Yes	Strong manufacturing performance effects

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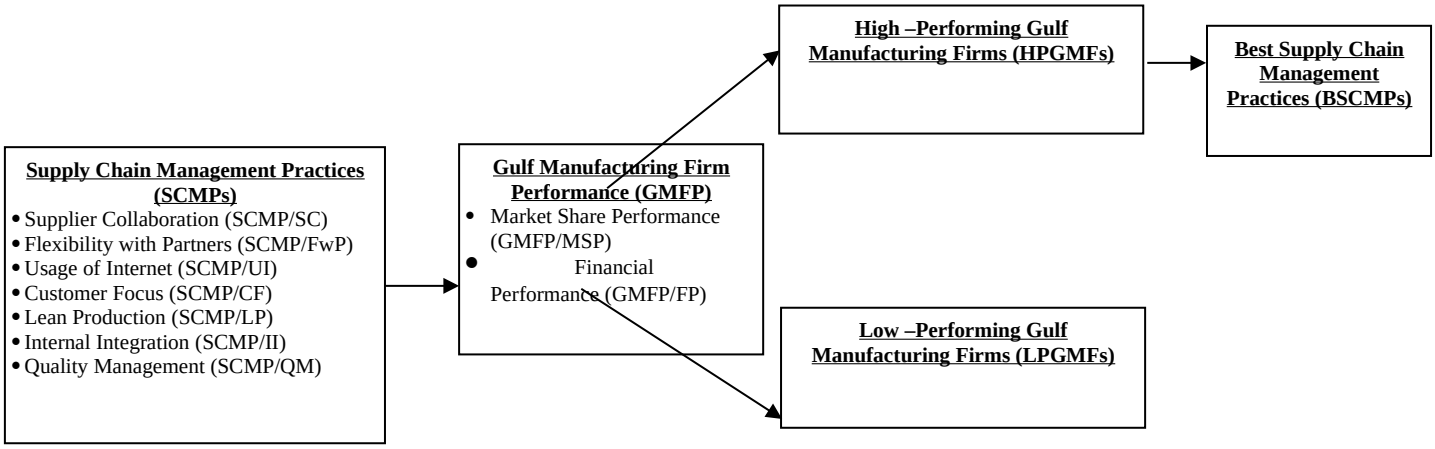

Figure 1. Theoretical Research Framework

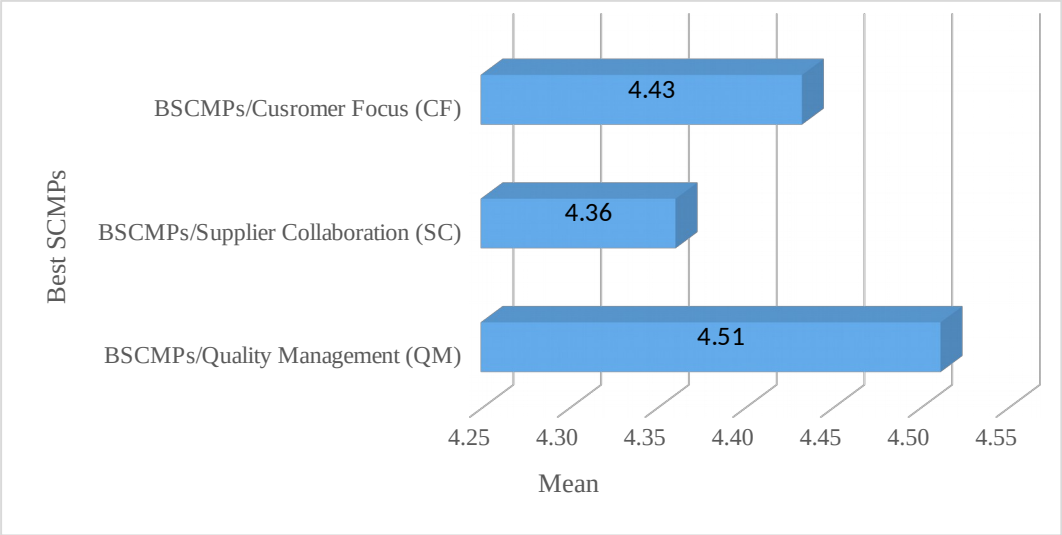

Figure 2. Best SCM practices in High-Performing Gulf Manufacturing Firms.