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Business excellence through total supply chain quality management

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Abstract

Purpose – The purpose of this paper is to show how the quality practices such as leadership and strategic quality planning, supplier relationship management, customer focus, quality data and reporting, process management and human resource management are as relevant to supply chains as they are to an individual firm.

Design/methodology/approach – Based on the review of relevant literature, propositions have been framed to stimulate future research. In order to evaluate the quality management (QM) practices in Pakistani supply chains, three cases have been presented. These cases provide information about QM practices of the case companies with respect to the supply chains they represent. Based on the case comparisons, common themes regarding the state of QM in Pakistani supply chains have been identified.

Findings – The current study shows that the state of QM in the supply chain context is at a primitive level in Pakistan. Most organizations have instituted quality departments and devised quality policy and planning inspired by ISO 9000 standards. However, quality culture that promotes bottom-up improvement throughout the organization is nonexistent. Compared with the proposed framework of total supply chain quality management (TSCQM), Pakistani organizations have a long way to go before any significant integration can be achieved in the quality functions at the supply chain level.

Originality/value – Building upon the current literature in the field of supply chain and QM, the current study proposes a new, more comprehensive framework TSCQM.

Keywords Pakistan, Developing countries, Supply chain management, Quality management, Supply chain quality

Paper type Research paper

1. Introduction

Quality has been a big influence all over the world since 1980s (Casadesús and de Castro, 2005). It has been one of the major research areas in the operations management literature (Nair, 2006). Over the years it has evolved to incorporate new practices (e.g. supply chain management (SCM)) and methodologies (e.g. Six Sigma). Quality gurus argued that quality improvement can increase the profitability by improving the marketability of the product through improved performance and driving down costs that result from defects and field failures (Deming, 1986; Garvin, 1984; Juran *et al.*, 1999). Considerable amount of empirical evidence does suggest that quality management (QM) is positively related to improvement in; product quality, customer satisfaction, market share, and competitive advantage (see Awan *et al.*, 2009; Flynn *et al.*, 1995; Fotopoulos and Psomas, 2010; Kaynak, 2003; Mohrman *et al.*, 1995; Nair, 2006; Powell, 1995; Prajogo and Sohal, 2006; Samson and Terziovski, 1999).

A SC is composed of all the organizations taking part in fulfilling a customer's order (Chopra *et al.*, 2006). This chain of organizations may be extended from suppliers' supplier to the customers' customer and beyond. SCM enables organizations to manage the value addition in goods and services throughout the SC as a single process with a common goal of customer satisfaction. This is contrary to the traditional practice of

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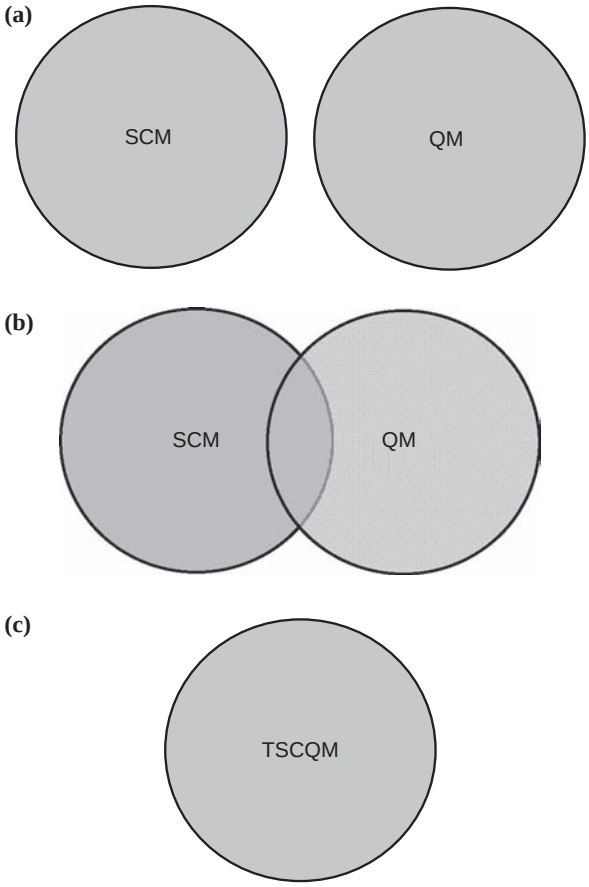
entering into arms-length relationships with the SC partners (customers/suppliers) where dealing with them is a zero sum game. Studies have shown that SCM is an effective tool for firms seeking increased competitiveness, business stability, and growth (Chin *et al.*, 2010; Li *et al.*, 2006). Goal in SCM is to achieve higher level of synchronization between the SC partners (Zhang *et al.*, 2011). Prado-Prado (2009) argued that managing different components of the SC jointly is a source of competitive advantage in the current dynamic business environment.

Researchers have shown increased interest in the study of QM from SC perspective in the recent years (e.g. Flynn and Flynn, 2005; Foster, 2008; Kannan and Tan, 2007; Kaynak and Hartley, 2008; Kuei *et al.*, 2010; Lin *et al.*, 2005; Ramos *et al.*, 2007; Sila *et al.*, 2006; Zhang *et al.*, 2011). This area has been formally termed as "supply chain quality management." Foster and Ogden (2008) suggested that SCM and QM efforts improve each others' performance and integration between the two functions can be beneficial for an organization in many ways. Houshmand and Rakotobe-Joel (2000) argued that SCM as a paradigm is geared toward adjusting the system at the SC level so as to achieve harmony in all the processes whereas quality improvement efforts target higher level of performance continuously at the organizational level. Organizations, however, are usually involved in these two activities simultaneously and hence require SC integration and quality improvement at the same time. It is also important to integrate SCM and QM because both are interrelated, i.e. better quality cannot be achieved without SC integration and efforts to improve quality on continual basis usually result in higher level of integration between all the SC partners. While research in the area of QM in SCs has not been scarce during the last decade, there is still a need to develop a framework for managing quality throughout the SCs. Previous research on QM has been more focussed on aspects related to operational excellence, while SC QM research mostly focussed on identifying the common themes between SCM and QM (Foster, 2008; Robinson and Malhotra, 2005) and studying relationships between SC-related quality practices (i.e. supplier QM and customer integration) on various aspects of organizational performance (Kannan and Tan, 2007; Kaynak and Hartley, 2008; Levy *et al.*, 1995; Sila *et al.*, 2006). Current study argues that in order to realize the full benefits of QM and SCM efforts, it is imperative that QM practices throughout the SC are aligned with a common focus. It is propounded that this alignment can lead to joint quality policy making and strategy execution, a phenomenon which can be called "total supply chain quality management" (TSCQM). Levy *et al.* (1995) suggested that such relationship between the SC partners can result in higher level of confidence in supplier's quality; reduction in the level of inspection; higher delivery speed; and suppliers taking responsibility for the quality. In developing the theory regarding TSCQM we have discussed the various quality practices with the SC perspective from the literature and framed our propositions to stimulate future research. Figure 1 demonstrates the different ways in which organization may align its quality and SC functions.

This study is divided into six sections. In the following section proposed framework has been presented with the support of existing literature in the field. Third section presents research methods employed in the study. Section 4 presents' three cases from Pakistani industry that evaluate the level of quality practices in the Pakistani SC's. The study ends with Section 5 presenting a brief discussion of the findings and Section 6 concluding the study with limitations and prospects for future research.



Notes: (a) QM and SCM: traditional view; (b) supply chain management; (c) total supply chain quality management

Figure 1.
QM in supply chains

2. TSCQM

Many studies have focussed on defining the relationship between QM and SCM activities in an organization. Various perspectives have emerged from these studies regarding this relationship. Some researchers have argued that there is no clear difference between the roles of the two functions (e.g. Chin *et al.*, 2010). Others have pointed out that SCM is a quality initiative that involves the SC partners (Kanji and Wong, 1999; Yeung, 2008). Vanichchinchai and Igel (2009) argued that the ultimate goal of both QM and SCM is customer satisfaction which can only be achieved through fulfillment of customer requirements related to quality, cost, (delivery) time, and flexibility. The two disciplines differ, however, on the degree of emphasis laid upon these different aspects of customer requirements. This latter point of view leads to the need of a synergistic view of the two areas that can result in fulfillment of all the customer requirements. Empirical evidence does suggest that synergy between QM and SCM results in better; product quality, customer service (Kannan and Tan, 2007; Sila and Ebrahimpour, 2002), organizational performance (Kaynak and Hartley, 2008;

Lin *et al.*, 2005; Ou *et al.*, 2010), and SC performance (Flynn and Flynn, 2005; Vanichchinchai and Igel, 2010).

Traditionally, company centric issues like price, product quality, and delivery time, etc., were considered important by the organizations where as in SC view of QM; supplier/customer relationships, combined effort on production of quality products, etc., become the central issues (Lin *et al.*, 2005). QM in SCs is important as each company is a part of at least one SC (Ramos *et al.*, 2007) while most companies belong to many SCs at the same time and are dependent upon their SC partners for the success of quality and SC initiatives. Indeed the foundation for the success of SCs is laid upon the ability of the SC partners to excel on different aspects of SC quality (Kuei *et al.*, 2010). In order to improve SC results in the areas of costs, lead time, transportation time, and improved customer service levels, quality and technology driven capabilities have to be maintained (Kuei *et al.*, 2002).

It can be concluded from the above discussion that QM and SCM activities support each others' performance and that of the whole organization. Should this result in both functions merging in order to create a higher level of synergy? Should they continue performing their respective roles as separate organizational functions independent of each other? These are the questions that require further debate. Current study advocates the point of view that roles of QM and SCM cannot be separated if an organization has to achieve excellence in business processes and product/service quality. In order to achieve excellence, the scope of QM has to be broadened from "total QM" to "TSCQM." This means that all activities related to fulfillment of customer requirements are jointly planned and executed by the SC partners. Quality council in this case is composed of top management representatives of all the SC partners and quality plans and goals are made at the SC level and not at the organizational level.

In the following section we discuss how the different quality practices can be applied at SC level in order to achieve business excellence leading to higher level of customer satisfaction, profitability, and market share. While there is slight difference among the different frameworks for identifying what constitutes QM, there is a fair amount of agreement on key quality practices (Sousa and Voss, 2002). QM practices used to demonstrate the proposed framework in this study are leadership and strategic quality planning, supplier relationship management, product design, customer focus, quality data and reporting, process management, and human resource management.

2.1 Leadership and strategic quality planning

Leadership of an organization has an important role to play in supporting change initiatives through quality planning, employee motivation, and provision of training and resources to support these initiatives (Das *et al.*, 2008). It is the responsibility of the management to communicate the vision and quality policy, to develop and deploy quality goals, and take improvement initiatives continuously. Various studies have emphasized the importance of the role, top management plays in effectiveness of quality initiatives throughout the SCs (e.g. Gunasekaran and McGaughey, 2003; Kanji and Wong, 1999; Kaynak and Hartley, 2008; Ou *et al.*, 2010; Robinson and Malhotra, 2005). In order to manage quality initiatives throughout the SC, top management is responsible for fostering quality measurement and performance among all the entities in the SC along with guiding the internal organizational efforts. In this regard leadership means that top management shapes the relationships

with the partners in the same SC (Robinson and Malhotra, 2005). Top management has a role to play in SC integration to support product improvement efforts (Ou *et al.*, 2010) and nurturing a culture that facilitates continuous improvement, open communication, and cooperation without barriers with the SC partners (Kaynak and Hartley, 2008). This discussion leads us to our first proposition:

P1. Ability of the top managements to foster relationships with SC partners is directly related to SC integration. This integration is directly related to success in planning and execution of joint quality initiatives.

2.2 Supplier relationship management

In order to ensure the quality of the final product, it is essential that all the entities in the SC have the same definition of quality (Lai *et al.*, 2005). Quality coming from the supplier is important because it is inherited by the end product (Chow and Lui, 2003). Supplier partnerships are a source of competitive advantage over the rivals (Mangiameli and Roethlein, 2001). Continuous raw material supplies with desired quality characteristics help in keeping down the quality-related costs (Das *et al.*, 2008). Better relationships with suppliers encourage their early involvement in design efforts that can result in simpler designs (Kaynak and Hartley, 2008). Suppliers in stable relationship with the organization show higher level of commitment to quality (Lai *et al.*, 2005). Among other factors, Stewart (1995) identified limited number of suppliers, working with the suppliers on quality, delivery- and service-related issues, ability of the suppliers to implement just in time system, and alignment of demand and manufacturing system in real time as factors critical to achieving the competitive advantage. Liker and Choi (2004) compared the Japanese and US auto-manufacturing companies in terms of their supplier management activities. Their studied showed a strong relationship between Japanese firms (Honda and Toyota) and their suppliers and arms-length relationship between US firms and their suppliers. Authors attributed the success of Japanese companies in supplier management to six activities, i.e. conducting joint improvement activities, sharing information intensively but selectively, developing suppliers' technical capabilities, supervising suppliers, turning supplier rivalry into opportunity, and understanding the working of the suppliers. This leads us to the formulation of our second proposition:

P2. The willingness of suppliers to invest time and effort on developing quality systems suited to the client companies is dependent upon the stability of their relationship with the client companies.

2.3 Product design

Most of the problems with the products occur due to poor design of either products or the production process (Evans and Lindsay, 2005). The production process starts at the point of inception of the raw material. Hence the focal firm is not the only entity in control of the quality parameters of the product delivered to the end customer. End product delivered to the end customer is the product of efforts made by all SC partners. Communication early in the design phase between all the stake holders like customers, suppliers, engineers, and design team, etc., can reduce the subsequent design changes (Besterfield *et al.*, 2003) and improve the success rate for the new products (Heizer *et al.*, 2009). Deming (1986) emphasized the importance of consumer research for the design of the product in order to develop understanding about the issues related to product.

Design quality can be enhanced by creating better understanding of customer requirements and coordinating with suppliers on design issues (Ou *et al.*, 2010). Simpler SCs can result from simpler product designs (Yeung, 2008). Taking customer and supplier input in the design process can result in simpler process with reduced variation (Kaynak and Hartley, 2008). We forward our third proposition as:

P3. Collaboration between manufacturers, suppliers, and the customers in product design phase leads to a product which is more suited to customer requirement and that can be produced through more effective production process.

2.4 Customer focus

Customer satisfaction is the goal of every business. It costs less to keep the existing customer than to attract a new one since the cost of offensive marketing is higher than that of defensive marketing (Reiner, 2005). Obtaining customer focus requires effort both at the organizational level as well as at the SC level. End customer is the only source of revenue for the whole SC (Chopra *et al.*, 2006). It is, therefore, important for all the SC partners to have a clear understanding about the customer requirements. Quality systems on both the supplier's and manufacturer's end are contributing factors toward the quality of product or service delivered to the customer (Romano, 2002). All SC partners need to have common goals like "customer satisfaction throughout the SC" (Gunasekaran *et al.*, 2004). Such common goals can lead to the joint efforts in achieving customer satisfaction. Achieving customer satisfaction can lead to repeat purchases and post purchase advocacy by the customer that can lead to higher market share and profitability:

P4. Quality of the product delivered to the end customers is positively influenced by higher level of understanding about the customer requirements among all the SC partners and their joint efforts to meet them from product design to the delivery phase.

2.5 Quality data and reporting

Timely collection and reporting of quality-related data like customer satisfaction, quality costs, error rates, rework, defects, and scrap, etc., is the basis for quality improvement efforts. Organizations not only need to gather and process information about their own processes but also about the other members of the SC so that problems can be identified at any step of the SC (Chang, 2009). Timely collection, availability, and use of quality data are important in supplier QM, design improvement, and the improvement of team performance (Kaynak and Hartley, 2008). Srivastava (2008) showed that measuring cost of quality is as relevant and beneficial for the whole SC as it is for an individual organization. Quality throughout the SC is not achievable without sharing of the necessary information (Xu, 2011):

P5. Product and process improvement throughout the SC is dependent upon timely collection, sharing, and use of accurate quality data.

2.6 Process management

A process is any unique combination of people, materials, equipment, methods, measurements, and the environment (Besterfield *et al.*, 2003). In order to reduce errors, organizations need to review and improve the processes continuously (Chow and Lui,

2003). In the SC context, process integration is a very important aspect and is defined as the linking of internal and external activities (Robinson and Malhotra, 2005). Process control is critical to SC success and can be achieved through SC performance measurement (Gunasekaran *et al.*, 2004). Statistical process control provides the means to monitor the processes and provides information that helps in problem solving. Kanji and Wong (1999) argued that the processes normally covered in SCM should not be logistical processes only instead; design, production, and distribution processes ought to be considered as well. Flynn and Flynn (2005) suggested that aim of quality improvement efforts is to reduce process variance which helps in the reduction of safety stocks and cycle inventories. QM practices help in reduction of setup time, allow smaller lot sizes. Quicker flow helps the cycle time which helps in reducing pipeline inventory:

P6. Higher level of process integration in the SC is associated with improvement in SC performance.

2.7 Human resource management

QM philosophy emphasizes continuous process improvement through involvement of people. Means like suggestions schemes, and different types of teams should be used at all the organizational levels in order to sustain the quality improvement effort (Dale *et al.*, 2009). In order to improve the outgoing quality, employees are empowered to take necessary decisions and actions. Kanji and Wong (1999) argued that different SC partners act as the internal customers and suppliers and in order to meet the need of the external (end) customers, need of internal customers need to be met. It is crucial for the success of SCM activities that employees recognize their dependence upon other SC partners (Ou *et al.*, 2010).

Training is the primary means for implementation and strengthening of QM practices. Employees cannot be expected to produce quality if they are not equipped with the necessary skills and knowledge base (Chow and Lui, 2003). Training related to the work performed, statistical tools for quality improvement, and problem-solving techniques are must for every employee if he or she has to play a part in quality improvement efforts. Trained employees are better able to understand customer problems and communicate with the customers (Kaynak and Hartley, 2008):

P7. Training and empowerment motivate employees to achieve higher levels of performance with regards to customer satisfaction and process improvement.

3. Research methods

This paper uses multi-case approach to investigate frameworks for QM in the Pakistani SCs. The main idea behind using cases is to use them as the basis for theory formation using inductive logic (Eisenhardt and Graebner, 2007). Siggelkow (2007) argued that cases usually lead toward the research questions and engagement in the rich case data provides inspiration for new ideas. Cases also improve the existing theories by pointing out and filling the gaps in them. Case method is appropriate as it evaluates the events in the real-life circumstances without the events and variables being subjected to manipulation (Soltani and Wilkinson, 2010). Multiple cases provide a benefit of comparison between the cases as opposed to within unit analysis and this type of research has a potential for making major scientific discoveries (Jensen and Rodgers, 2001). Soltani *et al.* (2011) pointed out that qualitative investigations in

the field of SC quality have been rare and the survey-based studies are poorly suited to measure the multiple perspectives of members at the different tiers of the SC. They further argued that use of qualitative methods in the non-western environment can reveal the contextual factors impacting supplier-manufacturer relationships.

In the current study three case studies have been used to evaluate the QM practices in Pakistani SCs. The data for the cases was gathered through in-depth interviews from quality and the SC managers of the case companies. Among the three companies chosen for the study one is multinational handling its operations in Pakistan directly. The other two case companies are Pakistan based and are best in class in their respective industries. This sample of companies does not only provide a basic understanding about the QM in Pakistani SCs but also an insight into the impact of different leadership styles on QM implementation in SCs.

4. Case analyses

4.1 Case 1: a paper and board manufacturer

First case company is a paper and board manufacturer operating in Lahore. Company deals with 17 products and number of raw material suppliers exceeds 150. Most dealings are with business-to-business customers. Company is ISO 9001-2000 and ISO 14001-2004 certified. Top management plays an effective role in the quality planning, and quality issues are an important agenda in the top management meetings. Awareness of the SC concept is low but it is gradually improving and leadership of the organization is starting to play a role in developing SC wide quality initiatives. In dealings with both the customers and suppliers, quality issues are considered important. Customer demands usually dictate most operational decisions in SC relationships. Product designs are extensively reviewed with the inputs from both the customers and suppliers. Inspection at different levels of the SC is fairly high. Company managers suggest that this is due to the nature of raw material (waste paper). In case of materials sourced from large multinationals, lesser amount of inspection is required. Low SC understanding usually results in a typical SC member considering only its own interests. The knowledge of the end customers is low among the upstream members. On the supply side company deals with two different types of suppliers. One type is small suppliers with usually uneducated workforce and management and the large multinationals with much more developed quality practices. In making the decision about supplier selection even though price is considered important, central importance is given to the quality. Rating system for suppliers is also in place. Company usually has two to three suppliers for each type of raw material. However, in case of waste paper supplies many suppliers are used. Suppliers give valuable input in the product design phase. During the last two years company has run major training programs for educating its suppliers. Data related to defect rates, scraps, error rates, etc., is available and displayed but is not widely used. Statistical process control is also only used by the quality department. Workers are not trained in basic statistical and problem-solving techniques to use this type of information. Quality data are not used to evaluate the supervisory and managerial performance. Employee involvement programs within the company are in an infancy stage and there is no real participation of non-supervisory employees in the decision making. There are no real barriers for communication of employees within the company and within the SC. However, within the company both formal and informal communication mechanisms are used whereas while communicating with the suppliers only formal mechanisms are employed.

4.2 Case 2: a multinational wholesaler

Second case company is a large multinational wholesaler. Currently company is operating stores in different cities of Pakistan. For an assortment of over 20,000 products company is dependent upon over 500 suppliers. Top management of the company takes quality issues seriously and is appraised on the basis of quality performance. Quality is an important issue in the top management meetings within the company as well as with the top managers of the SC partners. Quality is also an important part of the strategic plans of the company. When designing new products or services, company extensively consults its suppliers and customers. Company management has strong customer focus and this focus is communicated to all relevant personnel involved through training. Customer demand is matched with the company's capability by an extensive process where cross-functional teams check the feasibility of all the new products and services. After the finalization of the initial processes all such plans require the input from the quality assurance department, which ensures the sustainability of the process before granting its approval. Company continually gathers information in order to gauge customer satisfaction levels and anticipate future needs. Regular communication with suppliers ensures that there is similar understanding about the customer needs in the upstream members of the SC. Customer service procedures are in place and employees are expected to follow these procedures in terms of customer complaints and unusual requirements. In the process of supplier selection, quality is not the most important factor. In dealing with suppliers, company uses a supplier scorecard, which is used to monitor the performance of suppliers against the key performance indicators like lead time and fill rate. Company spends heavily in terms of time and effort on developing its suppliers and believes in keeping fewer suppliers as opposed to many. In case of any consistent discrepancy between the incoming quality from the supplier and the customer requirement, supplier training initiatives are undertaken. Companies in the SC, while do consider their partners in the major decisions, maturity of the SC concept has not reached the level where companies are willing to share their internal cost information and decide about the overall SC profitability in a collaborative manner. The process of flow of goods from suppliers to the customers is highly inspection oriented. SC manager of the company understands the waste that occurs due to inspection and is working on reducing the inspection points throughout the SC of the products where inspection points could be substantially reduced. Data on key quality parameters is regularly gathered and compiled in the monthly reports. Statistical process control is not used in the company and is not considered when selecting the suppliers. However, company is working on developing such systems. In order to improve the processes that involve the whole SC, improvement teams are also made with representatives from the suppliers. There is a training department that takes care of all the training needs of the employees.

4.3 Case 3: a dairy products manufacturer

Third case company is a large dairy products manufacturer in Pakistan. Company manages over 25 different product variants and works with over 200 suppliers. Company is also HACCP, ISO 9002 and ISO 14000 certified. Top management of the company takes quality issues seriously. However, dealing with the quality issues is the responsibility of quality department only. Quality planning is not explicitly a part of the strategic plans of the company. SC profitability is not considered when making strategic decisions and each company in the SC looks out for its own profitability. Like

the other two case companies there are two types of suppliers; large ones with world class manufacturing and management systems; and the others that are small suppliers with less developed systems and management practices. The relationship with the first kind of suppliers is that of a partnership where partners confer with each other in all major product decisions and share internal information regarding the product progress. Relationship with the second kind of suppliers is arms-length relationship where both parties take care of their own interests. Supplier development systems are in place and company believes in working with the suppliers in long term. Company invests in supplier education about the product quality. In recent times company has started the evaluation of suppliers' suppliers due to certain regulatory issues. Conception of the new products is the responsibility of the marketing department, quality in the design phase is the responsibility of the R&D department, after the design phase is complete and the product is launched then quality becomes the responsibility of quality department. Elaborate mechanisms are in place to gather timely information about the consumer response to company's products. Each department gathers data about its own quality parameters and company uses statistical process control to monitor the processes in its manufacturing facilities. Inspection is an important part of quality control and there is emphasis on greater inspection in order to improve the quality. Interdepartmental communication takes place only through formal mechanisms. Company retains full-time trainers and necessary training is provided to every worker, however, there are no formal mechanisms for involvement of non-supervisory employees in the decision-making process.

5. Discussion and conclusion

As discussed above the ultimate objective of both the SC and the QM is customer satisfaction. This is a significant reason to synergize the good practices of both the areas (Ramos *et al.*, 2007). This paper proposes a framework for TSCQM and explored the current blend of SCM and QM activities in Pakistan using the example of three organizations. Summary of the results has been provided in Table I. Table shows the cross-case comparison regarding how the three case companies are doing on various aspects of QM. Even though the sample size is small, few common themes are identifiable from this study:

- Field of SCM is highly underdeveloped in Pakistan and organizations usually mean the internal SC or the value chain of the company when asked about the overall SC. Organizations usually only consider their own customer and their own suppliers in their decision making. In the strategic planning process this results in companies considering only their own competitive position and profitability rather than that of the whole SC.
- In all three companies there were two categories of suppliers, i.e. large suppliers with well-developed processes and infrastructure and small suppliers with undeveloped infrastructure and management practices. A common theme was that the level of integration between the focal firm and the larger suppliers is much higher than the smaller ones. The main reason cited for that by the managers of the three companies was education. Companies are more willing to share their internal information with the educated suppliers because they feel that this information would be put to good use for the overall benefit of both companies and not be shared with the competitors.

QM practices	Company A	Company B	Company C
Leadership and strategic quality planning	High involvement of top management in quality issues at organizational level but not at the SC level. No quality planning at the strategic level	High involvement of top management at SC level. However, no concept of formal joint quality planning	Low involvement of top management at the company as well as the supply chain level in issues related to quality. No quality planning at the strategic level
Supplier relationship management	Supplier selection is based on quality. Fewer suppliers are kept for most products. Information sharing with selected suppliers only	Quality and price both are important in supplier selection and retention. Fewer suppliers exist. Information shared with selected suppliers only. Evaluation of suppliers' suppliers has been introduced	Supplier selection is based on quality. Many suppliers are required. Information sharing with selected suppliers only
Product design	Involves both the suppliers and customers in design phase	High involvement of suppliers and customers in design phase of new product and service offerings	Low customer and supplier involvement
Customer focus	SC partners clear about customer requirements of their own customers only as opposed to the end customers	Rigorous methods for gathering and disseminating knowledge about customer requirements throughout the SC	Continuous information gathering regarding the product performance in the market. However, information is used for service recovery only and not for design improvement
Quality data and reporting	Mechanisms for information collection exist. Little use of quality information at organization or SC level	Quality-related information is collected and shared only within the organization	Information regarding quality issues is gathered in timely manner, however, it is only used at organizational level
Process management	Process management is weak at the SC level. The amount of inspection is a function of the supplier as opposed to the process. Low consideration for process optimization at SC level	Managers do not view process as consisting of the whole SC. Very high inspection orientation throughout the SC. Low consideration for process optimization at SC level	Consideration for internal organizational processes only. Highly inspection oriented process. Low consideration for process optimization at SC level
Human resources management	Employee involvement and training initiatives are not adequate to allow SC wide involvement of the employees, which can lead to better SC integration	Necessary training is provided. Formal mechanisms for employee involvement within the company are present. Teams involving members from SC partners are also present	Job-related training is available. Employee involvement is non-existent

Table I.
Cross-case analysis

- Overall use of quality data and reporting is low inside the companies and almost non-existent in the SCs. Because most of the departments inside the company are at loggerheads with each other for the acquisition of resources in order to achieve the departmental objectives, no one wants to share information about the quality problems specific to the departments and it is only the quality of the end product that can be detected by control mechanisms.
- Even though companies seek to improve their processes continuously, no formal mechanisms are present for doing so within the organizations or the SCs. Employees are not rewarded for bringing any novel ideas for the product/process improvement and like the "Taylor management system" the job of worker is to produce while that of quality inspector is to keep a check on quality. While companies today are more open for improvement than those in the past, it might take a long time before elaborate mechanisms for continuous quality improvement become visible in Pakistani organizations. As the job of employees is just to produce so most of the training is directly related to their jobs and workers are not equipped with the tools necessary to make significant contributions to the overall process improvement.

Current study shows that the state of QM in the SC context is at a primitive level in Pakistan. Most organizations have instituted quality departments and devised quality policy and planning inspired by ISO 9000 standards. However, quality culture that promotes bottom up improvement throughout the organization is non-existent. Compared with the proposed framework of TSCQM, Pakistani organizations have a long way to go before any significant integration can be achieved in the quality functions at the SC level. Weakest area in the organizations is that of employee involvement. While most other quality practices are moving in the right direction, there is a lack of realization regarding the importance of employee role in quality improvement in order to achieve business excellence.

6. Limitations and future research

Current study was an exploratory study limited by the small sample size. It also only considered large enterprises as the focal firms. Some themes have been identified regarding the quality practices in the SCs of Pakistani companies. In order for these themes to be generalizable, large-scale empirical studies need to be conducted in Pakistan. It would also be interesting to explore the existence of quality practices in SCs consisting of small and medium enterprise.

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