ABSTRACT
The dynamic market environment in the global supply chain has increased the pressure and challenges among the manufacturing companies in Malaysia to be innovative, to improve quality and to reduce cost. In the present competitive environment quality management is critical as products must meet expectation of global customers in terms of quality, design and price expectations. Furthermore, as the supply chain is stretched, fragmented and complex worldwide, the issue of managing quality in a global supply chain has become more important. The development of strategic relationships with suppliers can contribute to quality performance. In addition, relationship with customers enable firms to focus on the meeting their needs. Emphasis on supply chain quality orientation among supply chain partners is crucial to improve relationships with their suppliers as well as customers. The main purpose of this study is to investigate the effect of supply chain quality orientation on supplier relationship and customer relationship. 550 questionnaires were distributed to managers in the manufacturing companies in Malaysia and 151 questionnaires were analyzed. The results revealed that supply chain quality orientation leads to higher level of supplier relationships and customer relationships.

KEYWORDS
Supply Chain Quality Orientation, Supplier Relationship, Customer Relationship, Manufacturing, Malaysia

1. Introduction
The impact of global competition has placed new challenges on manufacturing organizations. These includes increase in competitive pressure, changes in customer behaviors, shift in technology and increasing market globalization. In Malaysia, supply chain management (SCM) has emerged as essential strategy for manufacturing companies to improve performance and competitiveness. SCM involves transforming a company’s supply chain into an efficient chain to meet customers’ requirements and satisfaction. The effectiveness of the entire supply chain could have a profound performance effectiveness compared to the effectiveness of just one individual organization. In line with the increased recognition of the importance on managing the firm’s supply chain, quality management has also been transformed from a company wide perspective into a supply chain perspective. This shift is essential as the main objective of the supply chain is emphasized on meeting customer requirement and satisfaction.

Quality management which is company focused does not necessarily guarantee that potential problems such as defects, late delivery and failure to fulfill customer demand in the supply chain would not occur. Once the supply chain is interrupted due to product defects, it is difficult to bring the supply chain in order. Managing quality across the supply chain is therefore crucial in ensuring efficiency in supply chain in terms of reduced defects, reduced inventory and cost. Recognizing that interdependencies exist not only within the firm but across the firms in the supply chain, supply chain quality orientation (SCQO) among the supply chain partners is deemed pertinent. In addition, striving to improve the quality of supplies and processes seems to be the basis of supply chain relationships. Therefore this paper examines the effect of SCQO in Malaysian manufacturing companies on supplier relationship and customer relationship.

The paper begins with clarifying the concept of supply chain management quality orientation. In section 2.1, the paper presents literature reviews of supply chain quality
orientation. In the section 2.2 and 2.3, the discussions on supply chain performance as related to customer relationship and supplier relationship are discussed. Section 2.4 proposes the theoretical framework for the study. In Section 3.0 the research methodology is presented. The final section presents the discussions of the results, conclusions and insights from the study.

2. Literature Review

2.1 Supply Chain Quality Orientation

Quality management has become increasingly important in the firm strategic planning [1]. It has been recognized as an important component of supply chain strategy and top management priority in achieving supply chain objectives. It is viewed as a critical focus in supply chain management [2] and has become a top strategic target in enhancing customer satisfaction [3]. As the overall performance of a company is dependent on the performance of all entities in the supply chain, the supply chain performance can be optimized by managing the supply network in the supply chain [4], [5].

In support of this, a survey conducted among firms in Turkey firms concur that strategies supporting quality have fundamental requirement to sustain in the existing competitive market [6]. Quality orientation is considered an important requirement for continued survival in the market place [7]. Nevertheless, supply chain quality is more than just managing the supply network, it involves sharing of quality responsibility, joint customer and supplier quality, joint decision making and two way communication in meeting customer requirements [8]. They also claimed that supply chain optimization can be achieved through managing quality in the supply chain. Consequently all companies need to band together with respect to quality issues in a supply chain environment [9], [10].

A case study revealed that collaboration of quality issues between customer and supplier resulted in well coordinated operations [10], [11]. Improving supply chain quality demands a more collaborative approach to the issue, in fact it requires closer communication and process integration whereby supply chain partners become part of the solution [12]. However, the complexity of today’s supply chain has resulted in difficulty to communicate effectively with internal stakeholders and external partners on quality related events. Effective supply chain quality should enables firms to identify source of quality related risks and unwanted events and identify trends, subsequently to allow firms to respond accordingly.

In addition, supply chain members must complement and mutually support overall shared supply chain objectives. It requires firms to be coordinated in a strategic orientation [13]. Supply chain orientation requires commitment of multiple firms to implement company strategic objectives. Besides commitment among supply chain partners, inter-firm coordination is the mechanism for the companies to achieve their supply chain strategy. Besides, it is also imperative for supply chain partners to develop compatible or similar goals [14]. On top of that, involvement of supply chain partners in establishing strategic supply chain quality planning would enable organizations to minimize quality-related problems at production start-up. Strategic supply chain quality and documentation of quality requirements must be done in parallel with other supply chain planning activities. Customer needs must be first documented in planning for quality in supply chain. Quality requirement for each part must be predetermined and sourced from selected suppliers that met the quality criteria in ensuring product quality in supply chain [15]. In managing quality in supply chain, all supply chain members should be responsible for quality. Every member in the supply chain should be involved in ensuring end customer satisfaction. To achieve this, commitment and cooperation among supply chain members are required to coordinate process and activities from the source of materials to the manufacturing and products delivery. In this study supply chain quality orientation (SCQO) describes the organization emphasis on inter-organizational quality efforts in supply chain involving supply chain partners.

2.2 Supplier Relationship

Manufacturing companies establish collaboration and cooperative relationship with suppliers to improve quality and reduce lead time [16], [17]. Establishment of cooperative relationship with suppliers enables manufacturers to discuss quality issues open-mindedly. There are evidences indicating that establishing strategic relationship with suppliers could be attributed to improving quality in supply chain. Establishing strategic relationship with suppliers enable the manufacturing companies to capitalize on the suppliers market knowledge, technical capability, and facilitate information sharing and suppliers participation in new product design [16], [18], [19], [20], [21], [22] [23].

Relationship with suppliers include activities such as solving problems jointly with suppliers, helping suppliers to improve their product quality, involving suppliers in the organization’s continuous improvement program, certify supplier for quality and involve suppliers in new product development [22], [23]. Therefore, in the long run, strategic supplier partnership with suppliers can bring
mutual benefits to supply chain partners besides contributing to the company’s performance. Long term relationship, suppliers involvement in product development process, selecting suppliers based on quality, using certified suppliers and maintaining close communication with suppliers about quality matters and design changes should also be emphasized [24]. Supplier relationship should also involves providing technological assistance to suppliers, sharing of cost information, establishing long-term contracts with suppliers and joint investment with suppliers [25]. Hence, the following hypothesis is postulated.

H1: Supply chain quality orientation is significantly related to supplier relationship.

2.3 Customer Relationship

In today’s dynamic environment, firms are pressed to build long-term relationships not only with suppliers but with their customers as well [26], [27]. Shorter product life cycle and constant changes in customer demand has forced the companies to channel their efforts to meet these needs by being customer focused. This involves knowing the real requirements of the customers and meeting these requirements at the lowest possible cost [28]. Establishing relationship with customers enable the manufacturers to be more focused on their customers’ needs. As a result, firms are more capable to provide a service specific to individual customers [29].

Focusing on customers’ involves aligning and focusing on the needs of the customers before, during and after the business transactions. It is necessary for companies to pay close attention to track customers’ demands in products and services due to dynamic customers’ expectations and demands [27]. By tracking customer complaints, an organization can determine the causes of customer dissatisfaction. In fact firm performance could be adversely affected due to failure to focus on customer needs [30]. Therefore, in measuring customer relationship; interaction, measuring customer satisfaction, determining customer future expectations, follow-up on customer complaints and fair play with customers should be emphasized [30]. Many firms are increasingly realizing the imperativeness to start a relationship with customers very early in the product life cycle. Customers’ inputs at the design stage are solicited to avoid potential downstream problems which lead to better customer acceptance of product and services [31]. Traditionally, firms tend to involve suppliers in product development, however, a research on 149 European firms indicated that more than 50% of the respondents of the participating firms involve customers for close collaboration or joint decision making with respect to business processes issues such as research and development decisions [31]. The research indicated that customer collaboration is considered important in customer relationship management and distribution. Information sharing and collaboration are also important factors in customer relationship and in enhancing performance. Improved performance in design process is also attributed to firm interactions with its customers [9]. Thus the following hypothesis is proposed.

H2: Supply chain quality orientation is significantly related to customer relationship.

2.4 Research Framework

Based on the above hypothesis, the framework for this study is as follows.

3. Research Methodology

Manufacturers (FMM) Directory 2005 was used to select the respondents for this study. The unit of analysis for this study is organization. The responding organizations were selected based on a proportionate stratified random sampling. The manufacturing company is stratified into six different industries which comprised mainly large organizations or multinational corporations (MNCs). The companies are randomly selected and questionnaire is the instrument used for this study. The questionnaires were sent by post and email to the selected organizations. The respondents were given six weeks to answer the questions, after which reminders by post and emails were sent to respondents to request for their participation in the survey. The respondents comprised General manger, Senior Managers, Head of Department, purchasing managers, quality managers who were knowledgeable and experienced in the area of quality management and supply chain management.
A total of 550 questionnaires were sent to the respondents of which 158 questionnaires were returned. However only 151 questionnaires were completed and considered usable for analysis whereas the other 7 questionnaires were not usable as certain sections were not answered by the respondents. The measurement for SCQO is developed for this study based on the reviews of literature and discussion with the practitioners. Past studies on supply chain quality were primarily based on case studies of a single or few companies. However, prior to the main survey, the pilot study were conducted on eight manufacturing companies to determine the suitability of the questionnaires developed. This ensures that the target respondents equally understand the questions developed for this study. After the pilot study, the questionnaires where certain questions were worded and refined before embarking on the actual study which was done in early October 2006. The respondents were asked to evaluate the emphasis on supply chain quality orientation with their supply chain partners based on 1 = ‘none’ to 5 = ‘very substantial’. The respondents were asked to evaluate their supplier and customer relationship practices based on 1 = Never or does not exist, 2 = sometimes, 3 = frequently, 4 = mostly and 5 = always or definitely exist.

A total of ten items were used to evaluate the supply chain quality orientation. The items for this variable were developed based on extensive literature review e.g. [8], [11], [32], [33]. The sample items used are ‘joint establishment of short term and long term quality planning’ and multi-directional quality awareness’. Six items were used to assess the supplier relationship practices’. The sample items used are ‘we participate in the quality effort of our suppliers’, and we regularly solve problems with suppliers’. The items for supplier relationship practices were adapted from previous studies [22], [24]. Five items were used to measure customer relationship practices. The sample items for customer relationship practices include; ‘we interact with customers to set reliability, responsiveness and other standards for us’ and ‘we measure and evaluate customer satisfaction’ [22].

4. Analysis

Factor analysis was conducted via principal component analysis on all the ten items for supply chain quality orientation. The KMO result is 0.943 and Bartlett’s test which is significant at 0.000. The measure for sampling adequacy is above 0.50 which ranges from 0.926 to 0.966. The total variance explained is 68.7% which is considered sufficient to explain the variance in the dependent variable. KMO for both supplier relationship and customer relationship is 0.826 with Bartlett’s test is also significant at 0.000. The total variance explained for supplier relationship and customer relationship is 65.7%. The items in the factorial group were also tested for reliability and the coefficient alpha (Cronbach’s) is 0.95. Alpha values equal to or greater than 0.70 are deemed sufficient to measure reliability of items used in a construct [34]. The cronbach’s alpha for supply chain quality orientation is 0.949, while the cronbach’s alpha for supplier relationship and customer relationship is 0.833 and 0.864 respectively.

Results

Table 1: Characteristics of Responding Organizations

<table>
<thead>
<tr>
<th>Variable</th>
<th>Companies’ profile</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Industry type</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Food products and Beverages</td>
<td>14</td>
<td>9.3</td>
<td></td>
</tr>
<tr>
<td>Rubber and plastic products</td>
<td>25</td>
<td>16.6</td>
<td></td>
</tr>
<tr>
<td>Chemical and chemical products</td>
<td>10</td>
<td>6.6</td>
<td></td>
</tr>
<tr>
<td>Electrical and electronics</td>
<td>29</td>
<td>19.2</td>
<td></td>
</tr>
<tr>
<td>Fabricated metals, Basic</td>
<td>21</td>
<td>13.9</td>
<td></td>
</tr>
<tr>
<td>Metals &amp; other non-metallic</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>product</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other manufacturing activities</td>
<td>52</td>
<td>34.4</td>
<td></td>
</tr>
<tr>
<td>Company ownership</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Malaysian (100%)</td>
<td>54</td>
<td>36.0</td>
<td></td>
</tr>
<tr>
<td>Malaysia- owned (&gt; 50%)</td>
<td>21</td>
<td>14.0</td>
<td></td>
</tr>
<tr>
<td>Non-Malaysia owned (&gt; 50%)</td>
<td>37</td>
<td>24.7</td>
<td></td>
</tr>
<tr>
<td>Non-Malaysian (100%)</td>
<td>38</td>
<td>25.2</td>
<td></td>
</tr>
<tr>
<td>Years in operations</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>less than or equal to 5 years</td>
<td>1</td>
<td>.7</td>
<td></td>
</tr>
<tr>
<td>6 - 10 years</td>
<td>11</td>
<td>7.3</td>
<td></td>
</tr>
<tr>
<td>11- 15 years</td>
<td>18</td>
<td>11.9</td>
<td></td>
</tr>
<tr>
<td>more than 15 years</td>
<td>121</td>
<td>80.1</td>
<td></td>
</tr>
<tr>
<td>Average annual sales (millions of Ringgit Malaysia)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30-100</td>
<td>44</td>
<td>29.1</td>
<td></td>
</tr>
<tr>
<td>101-200</td>
<td>14</td>
<td>9.3</td>
<td></td>
</tr>
<tr>
<td>201-300</td>
<td>11</td>
<td>7.3</td>
<td></td>
</tr>
<tr>
<td>301-400</td>
<td>5</td>
<td>3.3</td>
<td></td>
</tr>
</tbody>
</table>
A total of 151 companies responded to the survey. Table 1 reveals that the manufacturing companies involved in this study comprised food products and beverages (9.3%), rubber and plastics products (16.6%), chemical products (6.6%), electrical and electronics (19.2%), fabricated, and other non-metallic product (13.9%), and other manufacturing activities (34.4%). Other manufacturing industries includes industries such apparel, furniture, and automobile. These responding companies are generally involved in supply chain management. Evidently, other manufacturing industries account for the largest percentage of companies that responded to this study. This is followed by electrical and electronics companies, rubber and plastics, fabricated metals, and food and beverage companies. The companies that responded to this survey provide an indication of their interest in supply chain quality management.

In terms of company ownership, most of the responding companies were fully Malaysian owned (36%). It was found that 25.2% were non Malaysian owned, 24.7% were majority non Malaysia owned (Non-Malaysian hold more than 50% ownership), and 14% are majority Malaysia owned companies (Malaysian hold more than 50% ownership). Non-Malaysian companies are foreign companies from countries such as Japan, America, Germany, Taiwan, and Korea. Most of the companies had been operating more than 15 years (80.1%), with 19% had been around between 6-15 years (19%). Only one company (0.7%) had been operating for a period less than 5 years. Majority of the respondents 63.1% of the respondents market their products out both domestic and international levels, 24.2% fully export their products overseas, and only 12.8% sells their products locally. Higher proportion of companies sold their products in a global market indicates the need to manage quality in the context of supply chain management.

Majority of the responding companies (64%) sources their raw materials or supplies from domestic, regional and global. It is notable that these companies could have purchased the materials from more than one source. Nature of product manufactured is related to the type of production processes adopted by the manufacturing companies. Organizations that produced standardized product tend to utilize line or continuous process rather than those organizations that produce customized products. In relation to supply chain position, majority of the respondents are the final product manufacturer (51%), 1st tier suppliers is 33% and 2nd tiers suppliers is 15.2%. This shows that slightly more than half of the responding companies are in the downstream level of the supply chain rather than the upstream level of the supply chain. This survey focuses on the effect of supply chain quality orientation on supply chain relationships. With respect to relationship with suppliers, more than 90% of the respondents have more than 5 years relationship with theirs suppliers and customers. This also provides some indication of the emphasis that the company placed in supply chain quality practices.
The descriptive statistics which comprised mean and standard deviation values for each variables considered in this study is shown in Table 2. The mean scores ranges from lowest score of 2.81 (supplier relationship) to the highest mean score of 3.88 (customer relationship). Overall, variables that registered mean score above 3.00 is supply chain quality (3.36) and customer relationship (3.88). On the other hand supplier relationship has a mean score which is below 3.00 that is 2.81. The standard deviation ranges from 0.79 for customer relationship to 0.81 for supplier relationship and 0.84 to supply chain quality orientation. The mean score of 2.81 for supplier relationship provides evidence that the supplier relationship practices between the manufacturing companies and its suppliers are in the ‘sometimes’ category. However, customer relationship practice (3.88) indicates that relationship between manufacturing companies and its customers are mostly in the ‘frequently’ category. On the other hand for supply chain quality, the emphasis of supply chain quality among the supply chain members is between ‘moderately substantial to substantial’.

Table 3: Regression Analysis for Supplier Relationship and Customer Relationship

<table>
<thead>
<tr>
<th>Variable</th>
<th>Dependent variable</th>
<th>Supplier relationship</th>
<th>Customer relationship</th>
</tr>
</thead>
<tbody>
<tr>
<td>Independent Variable</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supply chain quality orientation</td>
<td>0.510**</td>
<td>0.440**</td>
<td></td>
</tr>
<tr>
<td>R²</td>
<td>0.260</td>
<td>0.194</td>
<td></td>
</tr>
<tr>
<td>Adjusted R²</td>
<td>0.255</td>
<td>0.188</td>
<td></td>
</tr>
<tr>
<td>F Value</td>
<td>53.292**</td>
<td>35.360**</td>
<td></td>
</tr>
</tbody>
</table>

** p<0.01

Regressions analysis is first conducted to determine the effect of supply chain quality orientation on supplier relationship (Table 3). The regression analysis results show that supply chain quality orientation has positive direct influence on supplier relationship at $\beta = 0.510$, $p<0.01$. The $R^2$ is 0.26 which indicate that 26% of the variation in supplier relationship is explained by supply chain quality orientation. The effect of supply chain quality orientation has a F -value of 53.291 which is significant at $p<0.01$. Therefore $H_1$ is supported.

Next regression analysis is conducted to examine the effect of supply chain quality orientation on customer relationship. The result also shows that supply chain quality orientation has an impact on customer relationship at $\beta = 0.440$, $p<0.01$. The $R^2$ of 0.194 indicate that 19.4% of the variation in customer relationship is attributed to supply chain quality orientation. The F- value is 35.360 is also significant at $p<0.01$. Subsequently, $H_2$ is also supported.

5. Discussion of Findings

This study attempted to investigate the effect of supply chain quality orientation on supplier relationship and customer relationship practices in the context of manufacturing industry in Malaysia. The manufacturing industry involved in this study encompasses Food and beverage, Rubber and Plastics, Chemical, Electrical &and electronics, Fabricated metals and other manufacturing activities such as apparel and Furniture industry. Supply chain quality orientation is dependent to the extent of joint quality planning with supply chain partners, sharing of quality responsibility, joint decision making, compatible quality goals, and establishment of joint quality performance with their suppliers and customers. Apparently, the level of supply chain quality orientation in Malaysia is considerably substantial (3.36). This gives evidence that the manufacturing companies in Malaysia are inclined towards quality management with a supply chain perspective rather than confining it to a company level. Quality management must be implemented across the supply chain, as this leads to improved relationship with supply chain members.

The result of this study revealed that the level of supply chain quality orientation in Malaysian manufacturing companies is quite substantial even though not completely comprehensive looking from the mean score of 3.36. The effect of this supply chain quality orientation is improved supplier and supplier relationship practices. This is supported by the results of this study which indicate that supply chain quality orientation has positive significant impact on both supplier relationship practices and customer relationship practices. The impact of supply chain quality orientation on supplier relationship and customer relationship is both significant at $p<0.01$. The reason for this being that supply chain quality is not only focused on the upstream members (suppliers) of the supply chain but also include the downstream members of the supply chain that is the customers. Majority of the responding companies (55.3%) have between 2-5 suppliers. This is in agreement with literature [35] which established that to meet the needs of the end customers, companies strived to develop strategic partnership with few suppliers. The inefficiency in the supply chain is
affected if there are defects in products [36]. As such, strategic relationship with few suppliers would lead to improved business performance [37], [38]. Only 2.1% relies on single suppliers. In addition relationship with few suppliers can facilitate volume purchase, and reduce disturbances with regard to supplies replenishment [39]. However, relying on single supplier could pose risk to the manufacturers in case of supplier fail to meet the expected quality requirement or on time delivery. However research indicates that firms that sourced from a single supplier tend to be more successful in implementing quality management programs (40).

More than 80% of the responding companies had been operating in Malaysia or in business for more than 15 years. In addition, 91% of the respondents have established long term relationship with their suppliers and customers. This helps to strengthen the trust between the manufacturing companies and their suppliers [41]. Long term relationship with suppliers enabled the manufacturers to capitalize on the capability of suppliers and pursue joint investment with supplier [25]. In addition suppliers are provided with technological assistance to help them improve quality of their product (22). In the long run supplier is committed towards quality improvement [42], [44]. It was found that ensuring quality of products is an important attribute in company relationship with its suppliers [45].

The mean score of 3.88 for customer relationship is higher than the mean score for supplier relationship which is 2.88. This implied that customer relationship is important. The underlying reason for this is that more than 87.3% of the responding companies market their product overseas. Therefore meeting customer expectations and requirement must be emphasized on a continuous basis in view of intense global competition. This give indications for the need to manage the global supply chain as most of their customers are located in the foreign countries. Furthermore the main emphasis of supply chain quality is customer satisfaction which can be realized by being responsive to customer needs. Consequently, there is a tendency not only to establish strategic relationship with suppliers but also to enhance customer relationship. This study revealed that this can be achieved through supply chain quality orientation.

The level of supply chain quality orientation amongst the supply chain partners range from moderately substantial to substantial. This study surveyed the manufacturing companies’ relationship with their strategic suppliers and customers with respect to supply chain quality orientation. This study is focused primarily on evaluating the company quality orientation in supply chain with their supply chain partners and its effect on company relationship with their suppliers and customers. The results indicate that quality management with supply chain partners is being emphasized by the manufacturing companies. The study proved that supply chain quality orientation influenced the supplier relationship practices and customer relationship practices between the manufacturing companies and the external organizations in the supply chain. Consequently, H1 and H2 are fully supported. This shows that the companies recognized that supply chain quality orientation can lead to better relationship with their customers and suppliers.

The implementation of supply chain quality according to the results is considered quite substantial. It is essential for organizations to enhance its supply chain quality orientation in order to improve the relationship with both suppliers and customers. Apparently, the results point out that the stability of supply chain relationship practices are being influenced by the supply chain members’ emphasis on ensuring the quality in the supply chain. As such supply chain quality orientation provides the foundation for further development of supplier and customer relationship practices. It is essential for supply chain members to have similar understanding or interpretation of quality goals and objectives amongst different levels in the supply chain. This will ensure that concerted efforts are geared towards meeting customers’ requirement.

The impact of supply chain quality orientation on supplier relationship is slightly higher than the impact on customer relationship despite lower mean score of 2.88 which implies the important role of suppliers in supply chain quality. Nevertheless the effect on supply chain quality orientation on both supplier relationship and customer relationship is significant. The study is important as it provides insight that supply chain relationships can be enhanced if firms believed in sharing quality responsibility with their supply chain partners. Supply chain members can benefit from quality improvement along the supply chain which could enable firms to sustain competitive pressure. Future studies should investigate the effect on supply chain quality orientation on internal operations. Future studies can also investigate factors that could enhance supply chain quality orientation. In addition future studies could also examine the implementation of quality programs such as ISO 9001, TQM and Six Sigma on supply chain quality orientation.

References


