A Framework for Evaluating the Supply Chain Performance of Apparel Manufacturing Organizations

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Abstract

The abrogation of Multifiber Arrangement in the year 2005 pushed many developing nations into tough competition. Within the textile industry, despite having many advantages apparel manufacturing and exporting organizations (AMEOs) in developing nations are experiencing decline in their supply chain supply chain performance. Developing a comprehensive model to explore and classify factors, which affect the supply chain performance, is extremely significant. Owing to limited research in this area, an exploratory qualitative study involving a variety of organizations in apparel supply chain was carried out, in combination with a literature review, to determine the causes behind that decline. The outcome of preliminary exploratory study and literature review aided in the proposal of a conceptual framework. Employing that framework, a questionnaire survey was designed and piloted to support a quantitative study, which was conducted in the Karachi region in Pakistan. Collected data were analyzed by employing structural equation modeling. Results indicate that a number of factors have a strong influence on the supply chain performance of AMEOs. Apart from contributing to the literature, this study can also be of interest to managers and practitioners from the textile industry, as it clearly indicates areas on which AMEOs need to focus in order to improve their performance.

Keywords: Supply Chain; Performance; Apparel; Developing Nations; Manufacturing; Exporting**.**

1. Introduction

Apparel and textile trade has always been an important segment of the global marketplace. The value of global apparel trade has touched $443 billion, whereas other textile products have reached $284 billion (WTO, 2018). According to WTO (2017) the EU and the U.S.A remain the largest importer of garments in the world. EU duty-waiver policies opened opportunities to emerging economies, and their apparel manufacturing and exporting organizations (McCartney, 2014). Nevertheless, apparel manufacturing organizations could not benefit from such opportunities due to performance-related issues. There are multiple reasons behind poor performance but due to a lack of research on the performance of apparel organizations in developing nations, very little is known in this area. Referring to the same phenomenon, Wang (2013) noted that research in export performance of Asian apparel and textile organizations has been quite limited over the past decade. Therefore, it is imperative to identify and signify the factors affecting the supply chain performance of Apparel Manufacturing and Exporting Organizations (AMEOs). The competitive performance of any organization is dependent upon its competence in distinguishing itself from competitors (Satish and Vivek, 2014). Supply chain management is regarded as an essential approach in building such competitive positioning by meeting the demands of ever evaluating customers (Estampe, Lamouri, Paris, and Brahim-Djelloul, 2013). Thus, it is important to develop a model which could identify and classify factors affecting the supply chain performance of AMEOs. On the one hand, this approach willhelp in gaining the confidence of apparel buyers and better placement in the European and the U.S. apparel markets with resultant economic benefits to the producer.

On the other hand, it will help in contributing to the scarce literature related to the topic. Linh, Kumar, Ruan, Loonam, & Thu (2016) in the same vein, note that more knowledge for effectively managing supply chain is required in developing nations. Bruce, Daly, and Towers (2004) along the same lines, also stated that apparel supply chain issues are still under researched. Moreover, Hamid, Nabi, and Zafar (2014), Noor, Saeed, and Lodhi (2013), Babar and Bilal (2012), Chaudhry and Hodge (2012) observe that the apparel industry needs to improve its supply chain performance. The question arises why organizations in the presence of conventional supply chain performance indicators such as cost, quality, lead time and flexibility, fail to improve their performance? However, it seems that either these indicators have not been fully explored, or there exist some other factors, which also influence the supply chain performance of organizations in terms of their relationship and significance. Thus, this research aims to identify and classify all possible factors affecting the supply chain performance of apparel manufacturing and exporting organizations in a case study in Pakistan. Although this research will mainly identify and classify the internal factors associated with the Pakistani AMEOs, external factors influenced by the role of the government of Pakistan will also be considered. Our study found that planning and resource management is the most important criterion followed by delivery lead time, and quality.

The rest of the paper is structured as follows. Section 2 reviews the literature to find the relevant factors. Section 3 describes the research methodology. Section 4 presents the exploratory study. Section 5 is devoted to our conceptual model. Section 6 presents the questionnaire. Section 7 discusses the results, and finally section 8 concludes the paper.

2. Literature Review
2.1 Apparel Supply Chain
The global apparel industry has experienced a multi-fold growth over the last couple of decades (Kozlowski et al., 2015). However, global apparel supply chains have been operating in a context of market fragmentation and volatile demand. Long lead-times, limited product life cycles, large variety, high competition, and environmental distress are some fundamental characteristics of apparel business (Routroy & Shankar, 2014). Particularly, in the aftermath of Multi-Fibre Agreement, a large number of new entrants has joined the market, challenging existing players (McCartney, 2014). Within this context, Ngai, Peng, Alexander, & Moon (2014) suggest that in the wake of increasing globalization and competition, organizations seeking a leadership position in the apparel and textile market need to develop resilient supply chains. From the same apparel supply chain perspective, several factors define improved performance of an organization, such as export trends, higher profitability (Herath, 2014), increased competitiveness (Herath, 2014; Dyer, & Ha-Brookshire, 2008) and developing a competitive advantage (Kauric, Mikulic, & Omazic, 2016; Dyer, & Ha-Brookshire, 2008). Though ever-changing consumer demand and trends keep apparel retailers continuously under pressure (Kader & Akter, 2014), such pressure is generally transferred to more dependent, low-tech, and less capital-intensive apparel manufacturers (Monsur & Yoshi, 2012).

The literature underlines that apparel supply chain is multifaceted and inherits internal and external complexities. The supply chain performance of AMEOs, therefore, cannot be improved without addressing both internal and external factors. Coulter (2008) on the same note, state that the identification of the internal and external factors helps organizations in developing their strategies. Whereas, Keane and Velde (2008), on the competitive role of both kinds of factors, claim that developing nations cannot move up the industrialization ladder, especially into the apparel and textile value-addition without rational policies and supporting institutions.

2.2 Internal Factors
2.2.1 Cost Management
Berg & Hedrich, (2014) and Neu, et al, (2014) believe that tough price competition is one of the most important factors affecting the apparel business and that this will remain an important factor in the future. Teng and Jaramillo (2005) indicate that the performance of global apparel and textile suppliers is assessed based on their selling price, and internal costs.

2.2.2 Delivery lead time
Babar & Bilal (2012), and Teng & Jaramillo (2005) assert the importance of delivery lead time as an important factor in the selection of a supplier in the apparel and textile supply chain. Neu, et al, (2014) also confirm the significance of the delivery leadtime factor and believe that the apparel market is branded as having short leadtime. Marshall, et al. (2016) believe that the reason behind the success of fashion apparel giants Zara and H&M is the ability to manage fashionable garments within the shortest span of time.

2.2.3 Quality

Babar and Bilal (2012) assert that improving the quality of products could improve the permanence of apparel manufacturing organizations. They further claimed that better quality is dependent upon the availability of defect-free raw material, worker's compensation, product design and inspection. Similarly, Siddique, Shaheen, Akbar, & Malik, (2011) believe that to compete successfully, the textile sector needs intense overhauling of its quality control efforts. In the same regard, Iqbal, Shaikh, Mahmood, & Shafiq, (2010) state that although a large number of apparel and textile organizations have adopted quality control systems, the fabric processing and printing defects level sometimes reach as high as 10%. This indicates that such adoption of quality standards is spiritless and merely adopted to attract foreign buyers. Hasan (2013) also reports similar findings following a case study in relation to a large-size and prominent AMEO in Pakistan that, though both quality control and quality assurance departments with a clear policy and quality manuals are present, yet the operational reality is totally different from the documentation. Makino (2012) on the same note, share that the majority of operators in sewing departments of AMEOs work on a piece rate system, which causes challenges in maintaining quality due to an excessive quantity of units assigned to each operator.

2.2.4 Flexibility

Sardar et al. (2016) stress that for withstanding uncertainty and sustainability issues, organizations need to develop capacity flexibility. Furthermore, organizations can become flexible when they are vertically integrated. Cao et al. (2008) state that a vertical integration accelerates information flow and helps in avoiding inter-organizational conflicts, which mainly arise due to working under the same organization. The development of such kinds of organizational structure results in cost and time efficiency. Morevoer, stressing the importance of a vertical integration, Monsur and Yoshi, (2012) find that the vertical integration helps organizations in attaining competitive advantage. In contrast, increasing flexibility by frequently producing smaller batches with large variety can result in higher costs of production and additional set-up time.

Monsur and Yoshi (2012) while explaining the advantages of such integration state that a vertical integration not only provides control over processes and material, this approach also offers organizations with cost, lead time, quality and differentiation advantages. However, an inefficient use of capacity and a lack of proficiency may result in heavy losses. Along the same lines, Chaudhry and Faran (2015) illustrate that in a vertically integrated setup, quality inspectors are forced to accept the low-quality material developed in-house, which eventually results in the rejection of garments at the completion stage, triggering the higher damages.

2.2.5 Planning and Resource Management

Islam and Adnan (2016), in relation to the role of top management in planning, assert that inefficient management is a major cause of the presence of outdated processes, which have resulted in poor capacity utilization and limited value-addition in AMEOs.
Rehman, (2012) and Siddique et al., (2011) on the same note identify that owing to poor administration, obsolete methods, outdated technology, and poorly trained workforce, the textile sector's capability is quite low.

2.2.6 Workplace and Social Compliance

Berg and Hedrich (2014) report that, besides cost and capacity, workplace and social compliance has become an important criterion when sourcing the apparel products. Portraying the plight of socially and economically exploited workforce of apparel factories in developing nations, Taplin (2014) notes that, to survive in the cost-sensitive global apparel market, technologically unsophisticated, low-capital and labor-intensive apparel factories employ semi-skilled staff to work on a piece rate, in a rather manipulative and pressing environment. Describing it further, Siddique et al. (2011) note that workforce in textile units is mostly dejected due to poor compensation and unhealthy working environments. In relation to an absence of environmental concerns, Siddique et al. (2011) opine that a number of textile and apparel units run on fossil fuels. This not only causes additional cost burden on these units but also heavily pollute the quality of air.

On the contrary, apparel and textile units, which are devoted heavily to improving working conditions and labor standards, are now facing increasing global pressure to become more cost competitive. Ma et al. (2016) on remaining cost competitive find that the global brand and retail leaders mainly award contracts to suppliers quoting the lowest possible prices. Keane and Velde (2008) add that in turn it provokes such apparel and textile organizations to pull out from their workplace and social compliance commitments.

2.2.7 Research and Development

Yang (2012) in his study also recognizes a significant relationship between the innovation capability and the supply chain performance. Siddique et al. (2011) and Iqbal et al. (2010) assert that the textile sector lacks in research and development. Whereas, realizing the absence of research and development, Afzal (2017) mentions that, one of the major reasons behind the declining textile export is a lack of investment in research and development.

2.2.8 Collaboration

Given the size of organizations like Zara and H&M, suppliers feel fortunate to work with these global giants. The size of these big retailers and brand names also give the unparalleled bargaining power to these big organizations over their suppliers in the chain (Goransson, Jonsson, & Persson, 2007). Describing the role of power in managing the apparel and textile producers, big brands and retailers influence the cost structure, quality, delivery and the working conditions of their suppliers (Hussain, Figueiredo, Tereso, & Ferreira, 2012). Morsy (2017) also believe that the role of power between organizations influence the behavior of the organizations. The power is the ability of a member of a channel to influence the behaviour and decisions of other members (Cox, 2001). The information power, reward power, coercive power of large-sized apparel buyers including Walmart, Zara, Nike play important role when dealing with AMEOs in developing nations. Yeung, Selen, Zhang, & Boafeng (2009) find that coercive power influences the supplier integration positively. Though, Abushaikha (2014) from apparel supply chain perspective observe that, AMEOs and the buying organizations generally have close integration, this in return improves the internal operations (i.e. presumably the inventory and warehouse management) of the AMEOs.

However, it can be inferred that some AMEOs face challenges in developing a collaborative relationship with their employees and large sized fabric suppliers. Abushaikha (2014) in relation to AMEOs and their lack of integration with their fabric suppliers i.e. fabric manufacturers state that, since majority of the fabric suppliers are nominated by the buyers, both AMEOs and their suppliers do not feel economic attraction in developing long-term collaboration with each other.

2.2.9 Sourcing

Kader & Akter (2014) and Babar & Bilal (2012) hold that raw material and greige sourcing in apparel industry has a strong impact on supply chain performance of organizations. Similarly, describing the results of poor sourcing, Hishan, et al. (2016) warn that the poor sourcing severely affects the lead time management

On improving the sourcing practices by AMEOs, Chen and Fung (2013) suggest that the high product variety in the garment sector, demands large and variable supply base. However, Chen, et al, (2004) recommend that having a long-term orientation, few suppliers, and better communication, result in greater responsiveness and the financial benefits to the bottom line.

2.2.10 Training and Development

Training should not be limited to assembly line workers, it must be extended to all departments and levels of management. Similarly, in the given political condition of developing nations, employees should be trained to fill for others. Describing the benefits of this notion, Tang and Tomlin, (2008) identify that providing training to develop a cross-trained workforce helps enhance organizational flexibility.

2.2.11 Technology

Hamid et al. (2014) in relation to the apparel and textile value chains of a developing nation, share that besides using information technology to improve production planning and order tracking mechanism, some organizations are using information technology for allowing international buyers to monitor their factory operations via a video link for assuring social compliance on a real-time basis. Describing the importance of technology, Sukwadi, Wee, & Yang (2013) in relation to the apparel industry find that the use of technology improves the responsiveness and flexibility of the organizations. However, the efficient use of technology is scarce in AMEO. One of the reasons behind such behavior can be observed from the findings of Chaudhry and Faran (2015), who maintain that when it comes to embracing a new technology, the piece-rate system causes workers to prevent this adoption. As during the learning period of that technology, their productivity goes down which results in lesser wages. Chaudhry and Faran (2015) recommend that the management of such AMEOs need to adopt a different approach to pay employees, and streamline the acceptance of technology during the learning phase.

2.3 External Factors

Lindner (2009) shares that external factors have barely been studied to assess the performance of a supply chain. Describing the significance of these factors in achieving competitive advantage in global apparel supply chain, Watchravesringkan, Karpova, Hodges & Copeland (2010) stress that governments can play both positive and negative roles for organizations striving to develop a competitive advantage.

2.3.1 Government Policy

With reference to a developing nation, Saeed, (2015) claim that, due to maladministration of national resources , only a few large-scale apparel producers are surviving, in contrast to a higher number in the year 2001. Areas of influence of government policy which are relevant to organizations in the sector include: Water and Power; Law and Order; Social Compliance; Trade Policies; Financial Policies.

The shortage of electricity results in poor resource utilization and lost opportunity. The gravity of this issue can be assessed from the fact that Pakistan's electricity shortage has reached to 6,000-7000 Mega Watts (Khan, 2016; Kiani, 2017). Inam (2017), the chairman of All Pakistan Textile Mills Association (APTMA) South Zone, complains that one of the reasons which caused crises in the textile sector of Pakistan is the unreasonably higher prices of gas and electricity. Nevertheless, the poor enforcement of law and order has also created menace for all aspects of society. Hamid, et al. (2014) assess that poor security situation caused a sharp decline in the apparel and textile export. Further, Rahim, (2017) recommends that to respond to increasing global political pressure for social and environmental protection, the role of government in developing nations is very imperative in warranting that social obligations in AMEOs are being respected. Another important area which needs the government attention is its trade and financial policies. Iqbal et al. (2010) observe that high tariffs rates, duties, unfriendly rebate policy, and poor access to capital are some other reasons for declining competitiveness. Chaudhry and Faran (2015) report that when in need of capital, apparel manufacturers avoid getting finances from the bank, instead they normally depend on the advance payments from the buyers, the credit from the suppliers, or the self-financing. Further, Hamid, et al. (2014) blame that the government of Pakistan has adopted unfriendly import policy only to protect the decades old, ineffective, and technology-deficient local synthetic fiber industry. As a result of this, Hamid, et al. (2014) add that AMEOs restrict themselves to a limited and less-valuable product range by preferably accepting international orders where import of such materials is generally not required.

2.3.2 Physical Infrastructure

Kiani (2013) and Iqbal et al. (2010) note that the infrastructure to support export competitiveness in Pakistan is very outdated and lacks capacity. Whereas, McCartney, (2014) in relation to Pakistan, observes that the problem in Pakistan is not a shortage of such capacity but the management of capacity.

2.3.3 Academic and Industry Alliance

McCartney (2014), Rehman, (2012) and Siddique et al., (2011) note that Pakistan's poor education policies, little R&D, low investment in technology and a learning, shortage of skilled human capital in the textile sector are causing significant harm to national export performance. One of the major reason behind this according to Iqbal et al. (2010) is a low level of academic-industry collaboration and little scientific research. John, Gregor, and Sun (2016) state that governments around the world are playing their roles in advancing such alliances, and Silicon Valley is an example of such a successful coalition and resultant innovation. Dooley and Kirk (2007) support that both academia and industry can gain immense benefits from such an alliance and subsequent knowledge sharing.

2.3.4 Clusters and sub-sectors

Developing industrial clusters not only help in achieving consistency in quality but also decrease the lead time consumed in widespread sourcing. Though, the government of Pakistan in its textile policy realized the importance of the textile parks, it has failed to develop such parks. Yulin and Qazi, (2010) report that Pakistan severely lacks organized textile clusters and subsectors. This extensive review, in relation to supply chain performance of competing AMEOs identified the internal and external factors listed in Table 1. However, past studies not only have ignored these factors, but also neglected the fundamental difference between AMEOs and other sub-sectors of the textiles industry, and tried to introduce a common solution.

Table 1. Internal and external factors

Factors (internal)	Literature Source
Cost Management	Ma, Lee, & Goerlitz (2016), Neu, Rahaman, & Everett (2014), Kader & Akter (2014), Taplin (2014), Nguyen (2013), Shetty, Kiran, Dash (2013), Sukwadi, Wee, & Yang (2013), Monsur, & Yoshi (2012), Shafiq (2012), Babar & Bilal (2012), Rehman (2012), Ali & Habib (2012), Siddique et al. (2011), Iqbal, Shaikh, Mahmood, & Shafiq (2010), Saxena, & Salze-Lozac'h (2010), Cao, Zhang, Man To, & Po Ng (2008), Kuei, Madu, & Lin (2008), Masson, Iosif, MacKerron, & Fernie, (2007), Koprulu & Albayrakoglu, (2007), Wu, Yeniyurt, Kim, & Cavusgil (2006), Teng & Jaramillo (2005), Bruce, Daly, & Towers, (2004), Christopher & Towill (2001)
Delivery Leadtime Management	Marshall, McCarthy, McGrath, & Harrigan (2016), Mehrjoo, & Pasek (2016), Hishan, Ramakrishnan, Alwethainani, Kazi, & Siddique (2016), Yeh, & Lee, (2014), Routroy & Shankar, (2014), Neu, Rahaman, & Everett (2014), Kader & Akter (2014), Giri & Rai (2013), Shetty, Kiran, Dash (2013), Nguyen (2013), Sukwadi, Wee, & Yang (2013), Noor, Saeed & Lodhi (2013), Monsur, & Yoshi (2012), Babar & Bilal (2012), Ali & Habib (2012), Anbanandam, Banwet, & Shankar (2011), Ramesh & Bhanipati (2011), Yi, Ngai & Moon (2011), Cao, Zhang, Man To, & Po Ng (2008), Rasiah (2009), Masson, Iosif, MacKerron, & Fernie, (2007), Koprulu & Albayrakoglu, (2007), Christopher, Peck, Towill (2006), Lam & Postle (2006), Wu, Yeniyurt, Kim, & Cavusgil (2006), Teng & Jaramillo (2005), Zailani, & Rajagopal (2005), Christopher & Towill (2001)
Quality	Tran & Jeppesen (2016), Hishan, Ramakrishnan, Alwethainani, Kazi, & Siddique (2016), Chaudhry & Faran (2015), Kader & Akter (2014), Noor, Saeed & Lodhi (2013), Jawad & Memon (2013), Jawad & Memon (2013), Karabag, Lau, & Suvankulov (2013), Shetty, Kiran, Dash (2013), Nguyen (2013), Sukwadi, Wee, & Yang (2013), Monsur, & Yoshi (2012), Ali & Habib (2012), Shafiq (2012), Babar & Bilal (2012), Rehman (2012), Makino (2012), Yi, Ngai & Moon (2011), Iqbal, Shaikh, Mahmood, & Shafiq (2010), Rasiah (2009), Abdelsalam, & Fahmy (2009), Park & Lennon (2006), Teng & Jaramillo (2005), Gary & Jaramillo (2005), Zailani, & Rajagopal (2005), Christopher & Towill (2001)
Flexibility	Sardar, Lee, & Memon (2016), Islam & Adnan (2016), Mehrjoo, & Pasek (2016), Hishan, Ramakrishnan, Alwethainani, Kazi, & Siddique (2016), Chaudhry & Faran (2015), Neu, Rahaman, & Everett (2014), Hamid, Nabi, & Zafar (2014), Xie, (2014), Chaen & Fung (2013), Jawad & Memon (2013), Karabag, Lau, & Suvankulov (2013) Shetty, Kiran, Dash (2013), Sukwadi, Wee, & Yang (2013), Nguyen (2013), Monsur, & Yoshi (2012), Iqbal et al. (2012), Babar & Bilal (2012), Allahdad, Bano & Akhtar (2012), Chaudhry & Hodge (2012), Anbanandam, Banwet, & Shankar (2011), Ramesh & Bhanipati (2011), Yi, Ngai & Moon (2011), Gereffi & Frederick (2010), Saxena, & Salze-Lozac'h (2010), Kelegama (2009), Abdelsalam, & Fahmy (2009), Cao, Zhang, Man To, & Po Ng (2008), Kuei, Madu, & Lin (2008), Christopher, Peck, Towill (2006), Lam & Postle (2006), Wu, Yeniyurt, Kim, & Cavusgil (2006), Ofreneo (2009), Teng & Jaramillo (2005), Zailani, & Rajagopal (2005), Humphrey & Memedovic, (2003), Christopher & Towill (2001)
Planning & Resource management	Sardar, Lee, & Memon (2016), Islam & Adnan (2016), Hishan, Ramakrishnan, Alwethainani, Kazi, & Siddique (2016), Chaudhry, Macchiavello, Chaudhry, T & Woodruffhttps, (2016), Ma, Lee, & Goerlitz (2016), Chaudhry & Faran (2015), Kodithuwakku & Wickramarachchi (2015), Hamid, Nabi, & Zafar (2014), Taplin (2014), Neu, Rahaman, & Everett (2014), Kader & Akter (2014), Nelson (2014), Nguyen (2013), Giri & Rai (2013), Karabag, Lau, & Suvankulov (2013), Noor, Saeed & Lodhi (2013), Shetty, Kiran, Dash (2013), Monsur, & Yoshi (2012), Ali & Habib (2012), Allahdad, Bano & Akhtar (2012), Makino (2012), Shafiq (2012), Babar & Bilal (2012), Siddique, Shaheen, Akbar & Malik (2011), Ramesh & Bhanipati (2011), Saxena, & Salze-Lozac'h (2010), Abdelsalam, & Fahmy (2009), Cao, Zhang, Man To, & Po Ng (2008), Masson, Iosif, MacKerron, & Fernie, (2007), Christopher, Peck, Towill (2006), Lam & Postle (2006)
Workplace & Social Compliance	Beswick, (2016), Ma, Lee, & Goerlitz (2016), Marshall, McCarthy, McGrath, & Harrigan (2016), Islam & Adnan (2016), Norton (2016), Tran & Jeppesen (2016), Kozlowski, Searcy & Bardecki, (2015), Castle, (2014), Hamid, Nabi, & Zafar (2014), ILO (Dec, 2014), Nelson (2014), Shetty, Kiran, Dash (2013), Karabag, Lau, & Suvankulov (2013), Nguyen (2013), Shafiq (2012), Babar & Bilal (2012), Rehman (2012), Siddique, Shaheen, Akbar & Malik (2011), Park & Lennon (2006)
R&D/NPD	Kozlowski, Searcy & Bardecki, (2015), Tuntariyanond, Anuntavoranich, Mokkhamakkul, & Wichian (2014), Nguyen (2013), Shafiq (2012), Rehman (2012), Saxena, & Salze-Lozac'h (2010), Kuei, Madu, & Lin (2008), Christopher, Peck, Towill (2006), Patterson, Grimm & Corsi, (2003)

Table 1. Continued

Factors (internal)	Literature Source
Collaboration	Ghosh, (2014), Xie, (2014), Tuntariyanond, Anuntavoranich, Mokkhamakkul, & Wichian (2014), Nelson (2014), Caridi (2013), Chen & Fung, (2013), Jawad & Memon (2013), Caridi, Perego, & Tumino (2013), Giri & Rai (2013), Nguyen (2013), Shetty, Kiran, Dash (2013), Sukwadi, Wee, & Yang (2013), Smadi (2012), Wallace, Kench, & Mihm, (2012), Arshinder, Kanda and Deshmukh (2011), Ramesh & Bhanipati (2011), Saxena, & Salze-Lozac'h (2010), Cao, Zhang, Man To, & Po Ng (2008), Kuei, Madu, & Lin (2008), Masson, Iosif, MacKerron, & Fernie, (2007), Lam & Postle (2006), Teng & Jaramillo (2005), Chen & Paulraj (2004)
Sourcing	Hishan, Ramakrishnan, Alwethainani, Kazi, & Siddique (2016), Chaudhry & Faran (2015), Hamid, Nabi, & Zafar (2014),Kader & Akter (2014), Chen & Fung (2013), Noor, Saeed & Lodhi (2013), Jawad & Memon (2013), Babar & Bilal (2012), Ali & Habib (2012), Makino (2012), Smadi (2012), Kelegama (2009), Su, Dyer, & Gargeya (2008)
Training & Development	Chaudhry & Faran (2015), Chen & Fung, (2013), Ali & Habib (2012), Shetty, Kiran, Dash (2013), Karabag, Lau, & Suvankulov (2013), Saxena, & Salze-Lozac'h (2010), Rasiah (2009), Abdelsalam, & Fahmy (2009), Lam & Postle (2006),Humphrey & Memedovic, (2003)
Technology	Hishan, Ramakrishnan, Alwethainani, Kazi, & Siddique (2016), Chaudhry & Faran (2015), Kodithuwakku & Wickramarachchi (2015), Kozlowski, Searcy & Bardecki, (2015), Hamid, Nabi, & Zafar (2014), Ngai, Peng, Alexander, & Moon (2014), Taplin (2014), Nelson (2014), Caridi (2013), Giri & Rai (2013), Caridi, Perego, & Tumino (2013), Shetty, Kiran, Dash (2013), Monsur, & Yoshi (2012), Babar & Bilal (2012), Wallace, Kench, & Mihm, (2012), Ramesh & Bhanipati (2011), Iqbal, Shaikh, Mahmood, & Shafiq (2010), Saxena, & Salze-Lozac'h (2010), Rasiah (2009), Cao, Zhang, Man To, & Po Ng (2008), Rasiah (2009), Adewole (2005), Teng & Jaramillo (2005), Zailani, & Rajagopal (2005)

Factors (External)	Literature Source
Water & Power	Kiani (2017), Khan, A.F (2016), Islam & Adnan (2016), Shahzad, (2015).Hamid, Nabi, & Zafar (2014), Jawad & Memon (2013), Karabag, Lau, & Suvankulov (2013), Rehman (2012), Saeed (2015), Siddique, Shaheen, Akbar & Malik (2011), Iqbal, Shaikh, Mahmood, & Shafiq (2010), Kelegama (2009)
Physical infrastructure	Giri & Rai (2013), Karabag, Lau, & Suvankulov (2013), Ali & Habib (2012), Iqbal, Shaikh, Mahmood, & Shafiq (2010), Kelegama (2009)
Law & Order	Islam & Adnan (2016), Kodithuwakku & Wickramarachchi (2015), Hamid, Nabi, & Zafar (2014), Saeed (2015), Siddique, Shaheen, Akbar & Malik (2011), Teng & Jaramillo (2005)
Social Compliance	HDR (2015), ILO (Dec, 2014)
Academic & Industry alliance	John, Gregor and Sun (2016), Hamdani (2015), Hamid, Nabi, & Zafar (2014), Mc Cartney (2014), Karabag, Lau, & Suvankulov (2013), Ali & Habib (2012), Makino (2012), Siddique, Shaheen, Akbar & Malik (2011), Iqbal, Shaikh, Mahmood, & Shafiq (2010), Dooley and Kirk (2007)
Clusters & subsectors[1]	Sheikh (2015), Mc Cartney (2014), Kiran, Dash (2013), Karabag, Lau, & Suvankulov (2013), Rehman (2012), Siddique, Shaheen, Akbar & Malik (2011), Shetty, Iqbal, Shaikh, Mahmood, & Shafiq (2010), Yulin & Qazi, (2010), Ofreneo (2009), Islam, 2007)
Trade policies	Hamid, Nabi, & Zafar (2014), Iqbal, Shaikh, Mahmood, & Shafiq (2010), Kelegama (2009)
Financial policies	Hamid, Nabi, & Zafar (2014), Shetty, Kiran, Dash (2013), Allahdad, Bano & Akhtar (2012), Iqbal, Shaikh, Mahmood, & Shafiq (2010), Kelegama (2009), Teng & Jaramillo (2005)

3. Research Methodology

The research design is based on two phases. A phase-1 exploratory study is employed, due to the limitations of literature in the subject area. The outcome of the literature review in conjunction with phase-1 study is used to develop a hypothetical model. To determine the validation of the hypothetical model, the phase-2 large scale survey is conducted. Nevertheless, a pre-phase-2 pilot study is carried-out to determine any possible flaws in the forthcoming phase-2 study. Finally, the phase-2 study is carried out, the data are analyzed, and the final model takes it shape. (Figure-1).

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[1]Textile and Apparel Parks (TAP) is a substitute term for Clusters and Subsectors (CS). During the phase-2 instrument development stage, field experts in AMEOs found the term Clusters and Subsectors confusing and stated that they normally refer it as Textile and Apparel Parks. One of them further gave the reference of renowned Quaid-e-Azam Apparel Park.
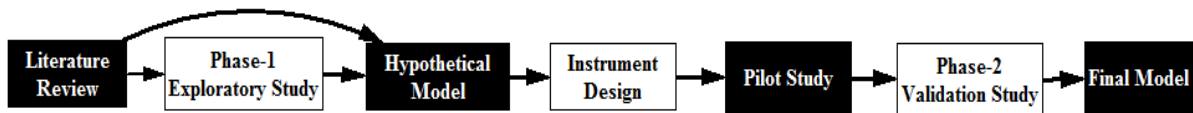https://www.thenews.com.pk/print/187868-Quaid-e-Azam-Apparel-Park-Project

Figure 1. Research Design

A mixed methods approach was employed to gather and analyze data (Table-2). This methodology was employed for its capacity to explore and confirm research inquiry. This approach also provided detailed understandings of research questions. For instance, the qualitative method helped the researcher to explore and gain insight into the related variables and then such variables were investigated for their potential relationships and significance using the quantitative method. Describing the strengths of the mixed method approach, Cresswell (2014) notes that a researcher can better comprehend his or her research problem as opposed to using one approach alone.

Table 2. A Summary of Research Design

	Phase-1 Study	Phase-2 Study
Methodology	Qualitative	Quantitative
Research approach	Exploratory	Explanatory
Instrument Design	Based on Preliminary Literature review	Based on Literature review, Phase-1 study and a Pilot study
Sample selection	Snowball sampling	Purposive sampling
Primary respondents	Members of apparel supply chain including Fabric suppliers, AMEOs, U.S. and EU representing Apparel Buyers based in Karachi.	Karachi-based apparel manufacturing and exporting organizations (KAMEOs).
Sample size	20 respondents recommended by Creswell (1998)	252 respondents based on Krejcie and Morgan (1970)
Data Collection	Cross-sectional interviews	Cross-sectional Survey
Data Analysis	Qualitative Content Analysis	Structural Equation Modelling using SPSS/AMOS
Deliverable	Hypothetical Model	Validated Model

In the phase-1 exploratory study, in-depth interviews were conducted with various organizations in apparel supply chain. The data were collected and analyzed using a qualitative content analysis approach, which helped to develop a hypothetical model. Based on the phase-1 findings and literature review, a pilot study was carried out to verify the phase-2 research instrument. The phase-2 research was designed to validate the hypothetical model. Data were collected from a variety of AMEOs in Pakistan through a large-scale online survey. Data were then analyzed using factor analysis and Structural Equation Modeling (SEM). This quantitative analysis helped develop a final validated model.

4. Phase-1 Exploratory Study

To explore factors affecting the supply chain performance of AMEOs in Pakistan, an exploratory study was carried out in Karachi area. Respondents representing varied segments of the apparel supply chain including EU and U.S. apparel buying organizations, AMEOs, and textile mills (yarn and fabric producers) were interviewed. To further understand the complexities of the issue from broader perspective, academicians having experience in the apparel and textile business, and representatives from the apparel and textile mills associations were also interviewed. (Table-3).

To summarize, this phase of the study identified a variety of factors which can affect the supply chain performance of AMEOs (Table-4). In the following, findings from these interviews are summarized.

Table 3. The phase-1 study: List of the respondents and their demographics

S. No	Participant Ref. Code[1]	Industry Type	Organization Size	Market/Region	Position in Supply Chain	Position in the organization
1	EXRT01	Fabric Vendors	Large	EU, North America	Fabric Vendor	Deputy Manager Sourcing
2	EXRT02	Fabric Vendors	Medium	EU, North America	Fabric Vendor	Chief Executive Officer
3	EXRT03	Fabric Vendors	Large	EU, North America	Fabric Vendor	Senior General Manager (Operations)
4	EXRA04	Apparel	Large	EU, North America	Apparel Manufacturer & Exporter (Knits, Woven)	Manager Accounts
5	EXRA05	Apparel	Small	EU, North America	Apparel Manufacturer & Exporter (Knits)	Director Finance
6	EXRA06	Apparel	Small	EU	Apparel Manufacturer & Exporter Knits	Chief Executive Officer
7	EXRA07	Apparel	Medium	EU, North America	Apparel Manufacturer & Exporter (Knits, Woven)	Managing Partner
8	EXRA08	Apparel	Medium	EU, North America	Apparel Manufacturer & Exporter (Knits)	Director
9	EXRA09	Apparel	Medium	EU, North America	Apparel Manufacturer & Exporter	Chief Executive Officer
10	EXRV10	Vertical	Large	EU, North America	Fabric & Apparel Manufacturer & Exporter (Woven-Denim)	General Manager
11	EXRV11	Vertical	Large	EU, North America	Fabric & Apparel Manufacturer & Exporter (Woven-Denim)	Manager Product Development
12	EXRV12	Vertical	Large	Local, EU, North America	Apparel Manufacturer & Exporter (Knits, Woven)	Manager Maintenance
13	EXRV13	Vertical	Medium	EU, North America	Fabric-Knits only & Apparel manufacturer & Exporter (Knits, Woven)	Manager Materials Management
14	EXRB14	Textile/Apparel	Large	EU, North America	Buyer (Woven, Knits)	Sr. Sourcing Specialist
15	EXRB15	Apparel	Large	EU	Buyer (Woven, Knits)	Manager Merchandising
16	EXRS16	Textile Association	N/A	N/A	Support	Secretary General
17	EXRS17	Apparel Association	N/A	N/A	Support	Secretary
18	EXRS18	Academia/Textile	N/A	N/A	Support	Dean
19	EXRS19	Academia	N/A	N/A	Support	Associate Professor in Management Sciences Dept.
20	EXRS20	Academia/Textile	N/A	N/A	Support	Asst. Professor and Systems Consultant

[1] EXR/T/A/V/B/S (01…n…) = Exploratory respondent textile/apparel/vertical/buyer/support

Table 4. Factors affecting the supply chain performance of AMEOs

Factors (Internal)	Phase-I Respondents
Cost Management	EXRA08, EXRV11 EXRB14, EXRB15
Delivery Lead time Management	EXRV11, EXRB14, EXRB15, EXRS19, EXRS20
Quality	EXRT01, EXRA05, EXRV07, EXRA08, EXRV10, EXRV11, EXRV12, EXRB14, EXRB15, EXRS20
Flexibility	EXRT01, EXRA06, EXRB14, EXRB15, EXRS16, EXRS18, EXRS19, EXRS20
Planning & Resource management	EXRA04, EXRA05, EXRV07, EXRV11, EXRV12, EXRB14, EXRB15, EXRS19, EXRS20,
Workplace & Social Compliance	EXRT01, EXRT02, EXRA05, EXRA08, EXRV10, EXRV12, EXRB14, EXRS20
R&D/NPD	EXRS16, EXRS18, EXRS19
Collaboration	EXRB15
Sourcing	EXRA06, EXRA08, EXRV10
Training & Development	EXRA06, EXRV10, EXRB14, EXRS20
Technology	EXRB14
Factors (External)	***Phase-I Respondents***
Water & Power	EXRA09, EXRV12, EXRV13, EXRS17, EXRS19
Physical infrastructure	EXRB14
Law & Order	EXRT03, EXRA06, EXRA09, EXRV11, EXRV12, EXRV13, EXRS17, EXRS19
Social Compliance	EXRS20
Academic & Industry alliance	EXRS17, EXRS19, EXRS20
Financial policies	EXRT02

4.1 Internal Factors

Managing cost does not seem to be an easy task where AMEOs are already working on very thin margins. As one of the respondents said: "*Profitability in this garment industry is very low……just hand to mouth situation.*"

As regards quality, a participant from an AMEO revealed that one time, owing to an irreparable printing mistake on the wrong side of the placket, the whole shipment got rejected, returned, and resulted in a severe financial loss. Therefore, it is noted that poor quality severely affects the supply chain performance.

Concerning flexibility, one of the AMEOs representatives shared that: "*Apparel buyers prefer those apparel suppliers who offer visibility, compliance and greater flexible*". It was mentioned that buyers with big orders want suppliers to have multiple services in-house. Similarly, the global buyers prefer AMEOs, which facilitate fabric and trims buying, and outbound logistical and commercial services. One of the respondents also shared that: "*Smaller units have a better advantage to make profit in the fashion garments business because of having less complex operations. Small and medium-sized factories can change their set-ups quickly according to market requirements. Pakistan has many small and mid-sized units, but they do not avail of this opportunity*".

Likewise, realizing the benefits of vertical integration, one of the participants shared that: "*We are trying to install our own knitting machines. This will increase our flexibility*". However, some respondents believe that having a vertical integration drives away AMEOs from their core competence and make them less cost efficient. One of the respondents said that that: "*Vertical production increase the cost of production*". Similarly, another respondent maintained that: "*People do not understand, the vertical integration is highly demanding. I have worked for a vertical unit, and controlling the cost was difficult, though, it offered some freedom*".

Besides that, increasing flexibility by frequently producing smaller batches with large variety can result in higher costs of production and additional set-up time. One of the respondents also highlighted that: "*The challenges associated with fashion apparel products include producing smaller quantity; this not only causes a problem in sourcing the raw material at a lower price but also affects the assembly-line efficiency*".

In terms of workplace and social compliance, one of the respondents shared that: "*Because of low-salary and poor working environment, a lot of workers are leaving this sewing job and driving rickshaws or doing something else*". Another respondent commented that: "*Senior management is doing injustice with poor labor; officially on documents*

laborers are hired on normal salaries but get lower in actuality. These workers are extremely poor thus, whatever they find they take it and leave for a little better opportunity after some time. This exploitation makes them insincere to our factory".

However, another participant views it differently and stated that: *"International buyers have a dual face. They want both the compliance and the dirt cheap garments together, that's simply not possible!"*

Environmental concerns were also raised: *"Some units use obsolete technology which causes environmental pollution. The government should enforce environmental laws. Also, the government should give support to apparel industry in establishing the recycling plants. However, for operating these plants, at least 5-10 mills should collectively run a recycling plant in their area. It is expensive and the government should support it. These plants also require operational and maintenance budget on a regular basis. Some of these plants were established but are now closed due to a lack of required budget and required maintenance".*

Concerning planning and resource management, another respondent complained that currently, the presence of detailed planning and visionary leadership is scarce in AMEOs, which has not only resulted in a lack of product and process flexibility but also caused poor optimization of resources.

Challenges were also mentioned about sourcing problems: *"The shortage of cotton and yarn creates shortages for in our production capacity",* said one participant.

"Fabric and trims buying is a major problem. Mostly, buyers demand to purchase fabric from a nominated supplier, and accessories from manufacturers located in Taiwan and China. Sometimes when a shipment of fabric or accessories is delayed, apparel manufacturers have to suffer from the poor use of capacity and consequential loss. Also, unfriendly government policies hinder the sourcing from outside suppliers", added another AMEO representative.

The importance of training and development was stressed by many of the participants, with one of the AMEOs representatives stating: *"Like I always suggest optimizing the investment in training, we should opt for a strategy by offering more focused training opportunities in areas critical for production planning, and apparel manufacturing. In the wake of current poor political situations and regular absenteeism, some employees can also be cross-trained. There are a large number of stitchers but only a few employees are dedicated to pattern making and cutting departments, therefore the absence of pattern makers and cutting experts could halt successive operations such as stitching".*

Despite the dependency of the Pakistani AMEOs, some large players seem to have installed the latest technologies; it was noted that:

"Only the large garments manufacturing units are capable of synchronizing their information system with buyers and suppliers for order taking, labeling, tracking, for size, color, material, and style on a real-time basis through the EDI… and only a few large organizations especially working for large international buyers have systems providing a real-time information about order status, exchange of P.O (purchase order), invoice, specs, pick tickets, and payments".

In addition to such benefits, one of the respondents when relating the importance of technology to the quality shared that:

"Instead of using a computerized marker making for correct pattern development, small units still use manual marker making, which sometimes cause mistakes which then are passed on to cutting department.

Respondent had mixed views about R&D activities, with one respondent stating: *"In comparison to basic apparel products, fashion apparel products demand a competent design and product development department in an apparel manufacturing facility. This case becomes more important when dealing with the comparatively intricate women fashion garments".*

However, some participants viewed research and development as an exclusive requirement for fast-fashion garments. They further considered it as the responsibility of global apparel buyers who share pre-defined specifications with their AMEOs. One of the respondents stated that: *"Research and development is not suitable for basic garments; it is only essential for fashion garments".* Whereas, another commented that: *"R&D is shared with our organization by our buyers and suppliers"*

4.2 External Factors
Coherently to the literature review, participants from AMEOs and academia also showed serious concern on the shortage of water, gas, electricity, and poor law and order. Mismanagement of power generation and supply has caused

disaster in all production sectors of Pakistan (Shahzad, 2015), with respondents stating: "*Electricity short-fall severely affects our production*". The shortage of electricity results in poor resource utilization and lost opportunities. Other relevant statements included: "*We pay heavy charges for getting electricity which are somewhat Rs. 13 per unit. But our competitors in India, Bangladesh, Vietnam and Sri Lanka hardly pay Rs. 8-9 per unit*". Furthermore, "*Big size units keep their own power generation system; but buying these generators is not possible for smaller units. They cannot afford to invest millions of rupees in power generation system. Also, the government does not help*". Nevertheless, the poor enforcement of law and order has also created menace for all aspects of society. A respondent shared that once due to poor law and order situation in the city, a certain material demanded by an EU buyer could not be looked for in the market, which resulted in the loss of that order. Another respondent suggested that: "*Better security condition and good image needs to be promoted*"

Despite Pakistan's pledge to fulfil its social and environmental obligations, one of the immediate advantage Pakistan received from the European Union is a Generalized System of Preferences (GSP) status, respondents were quite critical: "*Government departments including the civil defense only come and collect their bribe, or threat to cancel the safety certificate (enforcement to comply with safety standards). They have no intentions to support organizations in improving their condition in relation to environmental and social standards*". Another important area which needs the government of Pakistan's attention in relation to help AMEOs in improving their supply chain performance is its trade and financial policies. Respondents highlighted the following issues: "*Cotton yield has gone down from 15,000,000 to 10,000,000 bales and importing yarn cost us a lot of duty (Import duty). We do not get our duty drawback on time, now have established a separate unit in finance department to get this issue solved, and get money back. Running a new department cost us money*". Other respondents added: "*Importing policies and political condition increases our leadtime, and then buyers force heavy penalties on us if shipments are late*".

In addition to this, the availability of finance to support business ventures, buying capital equipment to sustain, and expand operations is another challenge affecting the supply chain performance of AMEOs, as pointed out by several respondents: "*Small factories face financing issues most. Our industry could easily perform well especially in knitwear sector which requires low investments in machines. Knitwear sector is more involved in higher profit margin fast-fashion garments, but due to unfriendly government policies, Bangladeshi organizations have outperformed most of us in this area*". Respondents emphasized the need for alliances between academia and industry. One of the respondents reported that: "*TIP (Textile Institute of Pakistan) is working on academic and textile industry alliance model, but we need more institutes for supporting a range of apparel jobs and research levels*". Also, another respondent added: "*It is important to understand that future lies in organic and natural products. I mean synthetic material would be less demanding in the future due to its environmental repercussions. Pakistan has a lot of cotton and if the government, cotton ginners, yarn producers, and research institutes work together to come on the common ground, it would be very beneficial for all parties concerned*".

Unlike other factors, inadequacy of physical infrastructure (road and port congestion) was highlighted by only one respondent. This is coherent to what has been reported by McCartney (2014) who, in relation to Pakistan, observed that the problem in Pakistan is not a shortage of capacity but the management of capacity. The importance of textile and apparel parks was, instead, emphasized by many respondents. One of them stated: "*China has many similar kinds of organizations in the same export zones. It reduces the transportation cost and time, the required quality material is easily available, and also they (Chinese AMEOs) get help from other units if buyer demands variation. But here (in Pakistan), we recently heard that the project of Quaid-e-Azam textile park has been canceled. It is a very bad news for our business*".

5. Conceptual Model Development

The objective of this section is to present a hypothetical model, which aims to improve the supply chain performance of AMEOs in Pakistan and other developing nations. The hypothetical model is based on the factors identified through the phase-1 exploratory study and the literature review. Before developing the hypothetical model, all the items identified through the phase-1 study and the literature review were grouped into common representative clusters (Table-5).

Table 5. Combining the items and developing the constructs

		Independent Variables (Internal Factors)	
A	**B**	**C**	**D**
Joint item code	**Factors (Internal)**	**Items derived from the Phase-I study**	**Items derived from the Literature Review**
CM	Cost Management	P1I2A-Cost	LRI2A-Price comparison, LRI2B-Price level, LRI2C-Price trend (Cost reduction per year), LRI2D-Accuracy of invoice, LRI2E- Sensitivity (Responsiveness) to discrepancies, LRI2F-Internal cost, LRI2G-Ordering & invoicing
DLT	Delivery Lead time Management	P1I3A-Timely Delivery, P1I3B-Time, P1I3C-Delivery Time, P1I3D-Leadtime, P1I3E-Shipment Deadline	LRI3A-Order fulfilment, LRI3B-logistics, LRI3C-Timely delivery (% of timely delivery, no. of early & late deliveries actual vs. quoted lead time), LRI3D-Quantity reliability, LRI3E-Ordering (Prompt ordering process, Flexibility), LRI3F-Packaging (Protectiveness, Unpackaging ease), LRI3G-Adequate delivery of documentation
QLT	Quality	P1I5A-Quality, ISO 17025:2005	LRI4A-Consistency/Reliability, LRI4B-Inspection, LRI4C-Sample Complaint rate, LRI4D-Defect rate, LRI4E-Quality Management
FLX	Flexibility	P1I6A-Flexibility, P1I6B-Vertical Development, P1I6C-Vertical Capacity, P1I6D-Variability In Specifications, P1I6E-Product Variety	LRI7A Demand fluctuation, LRI7B-Forecast errors, LRI7C-Product characteristics, LRI7D-JIT deliveries, LRI7E-JIT production, LRI7F-Customization, LRI7G-Negotiability, LRI7H-Service Level/full-package service, LRI7I-Vertical integration/ Diversification/Differentiation, LR17J-Responsiveness, LRI7K-Spec change due to market fluctuation
PRM	Planning & Resource management	P1I4A-Poor Management, P1I4B-Resource Utilization, P1I4C-Poor Planning, P1I4D-Capacity Utilization, P1I4E-Domestic Market, P1I4F-Improved Capacity, P1I4G-Committed & Competitive Management, P1I4H-ISO 9001:2008	LRI1A-Long-term vision, LRI1B-Top Management commitment, LRI1C-Forecast, LRI01D-Industrial planning (Scheduling & optimization of resources), LRI01E-Production capacity, LRI01F-Capacity utilization, RI01G-Inventory Management, RI01H-Process development/quality/management, RI01I-Systamatic approach, RI01J Fact-based management, RI01K-Customer focus
WSC	Workplace & Social Compliance	P1I7A-Compliance, P1I7B-Certifications, P1I7C-Workplace Standards, P1I7D-GOTS-OE 100 AND/OR OE Blended, P1I7E-OEKO-TEX (CLASS I &II), P1I7F-BCI, P1I7G-ISO-14001, P1I7H-SA8000, P1I7I-WRAP, P1I7J-Sustainability, P1I7K-Permanent employment	LRI10A Workplace safety, LRI10B-Workers compensation, LRI10C-Environmental standards, LRI10D-Product safety, LR110E Permanent Employment opportunities, LR110F WRAP standard
RD	R&D/NPD	P1I8A-Innovation, P1I8B-Design Capability, P1I8C-R&D	LRI11A Product design, LRI11B-Product service improvement LRI12C-Outdated processes, LRI10D-NPD/ R&D/Innovation/continuous improvement, LRI10E-Technical textiles
COL	Collaboration	P1I11A-Internal Information sharing, P1I11B-External Information sharing	LRI5A Information sharing, LRI5B-Poor coordination among supply chain members, LRI5C-Long term relationship, LRI5D-Visibility, LRI5E-Customer involvement, LRI5F-Risk sharing, LRI5G-Communication gap between employees & top management, LRI5H-Complaint handling, LRI5I-Reliability, LRI5J-Trust, LRI5K-Warranty policies; LRI5L-Lack of coordination with suppliers
SOR	Sourcing	P1I1A-Sourcing	LRI6A Supplier development, LRI6B-Timely availability of RM/Greige, LRI6C- accessories
TD	Training & Development	P1I9A-Skilled Labor, P1I9B-Skilled & Permanent Workforce, P1I9C-Training, Human Skills Development	LRI12A Education & experience, LRI12B-Unskilled labor, LRI12C-Skilled, trained & motivated workforce, LRI2D-Compliance certifications (Quality & Social), LRI2E-Continuous improvement program

Table 5. Continued

TEC	Technology	P1I1A-Online-System	LRI8A-Increased automation, LRI8B-Machine upgradation, LRI8C-Obsolete Technology

		Independent Variables (External Factors)	
A	**B**	**C**	**D**
Joint Item code	**Factors (External)**	**Items derived from the Phase-I study**	**Items derived from the Literature Review**
WP	Water & Power	P1E2A-Power Shortage, P1E2B-Electricity, P1E2C-Gas, P1E2DWater Shortage/Fluctuation	LRE3A-Shortage of gas & electricity, LRE3B-Utilities, LRE3C-Price of electricity
PI	Physical infrastructure	P1E5A-Road/Port Congestion	LRE4A-Infrastructure, LRE4B-Communication infrastructure,
LO	Law & Order	P1E3A-Law & Order, P1E3B-Political Strikes	LRE6A-Law & Order situation, LRE6B-Political condition
SOC	Social Compliance	P1E6A-Social Compliance	-
AIA	Academic & Industry alliance	P1E4A-Academia & Industry Alliance	LRE5A-Capacity building program, LRE5B-Education/R&D & innovation, LRE5C-Human Capital, LRE5D- Lack of skilled Workforce, LRE5E-Increasing cotton prices, LRE5G Inconsistent quality of supplies
CS	Clusters & subsectors[1]	-	LRE2A-Textile clusters, LRE2B-Availability of inputs, LRE2C-Fiber modification, LRE2D-Shortage of Raw material, LRE2E-Value addition sector
TP	Trade policies	-	LRE7A-Taxes, LRE7B-Synthetic fiber Import policy
FP	Financial policies	P1E1A-Availability of Finance	LRE1A-Rebate, LRE1B-Shortage of finance

	Items of Dependent Variable - supply chain Performance (SCP)		
Code	**Factor**		**Literature**
EX	Export trend		Herath, (2014)
PFT	Profitability		Herath, (2014)
CP	Competitiveness		Herath, (2014), Dyer, & Ha-Brookshire, (2008),
CA	Competitive advantage		Kauric, Mikulic, & Omazic, (2016); Dyer, & Ha-Brookshire, (2008),

The model has three main components: the dependent variable, the independent variables and, the moderating variables (Figure-2).

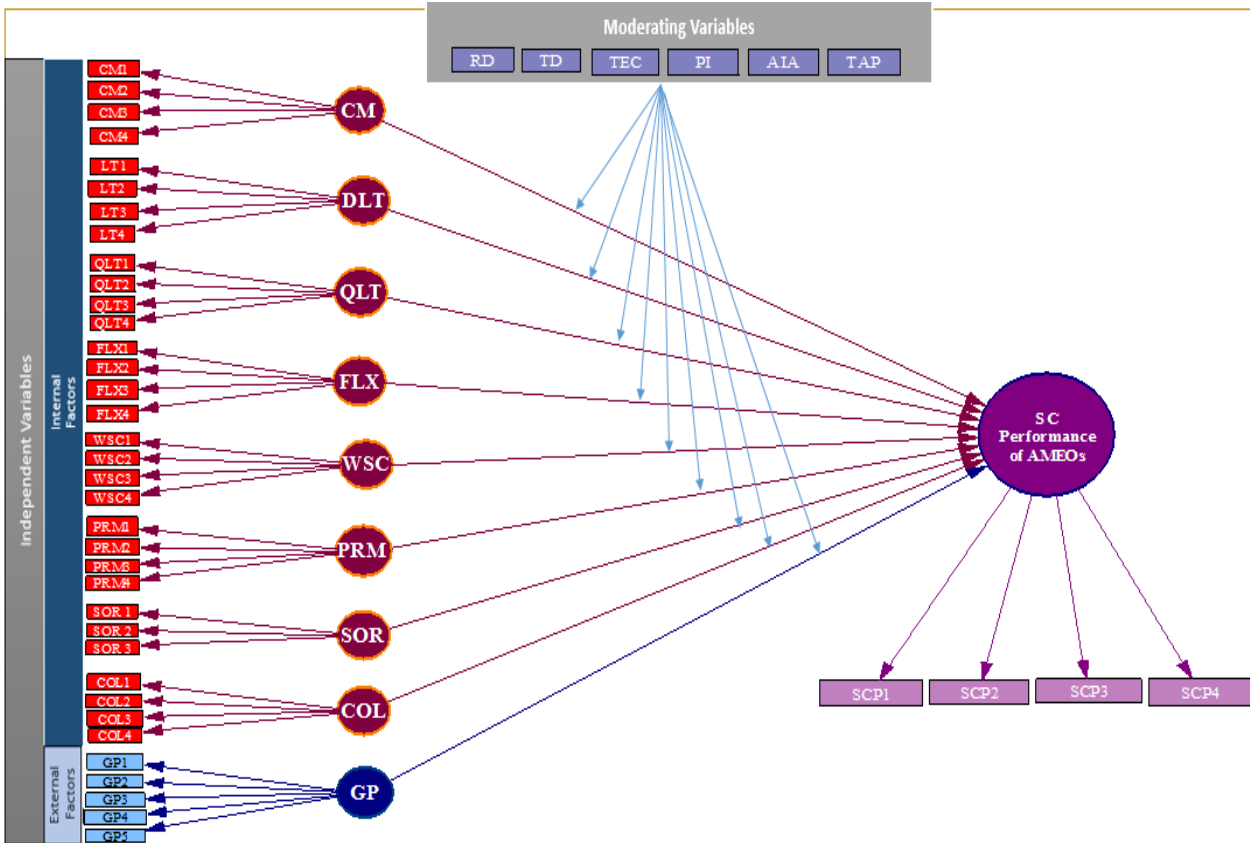| **Independent Variables**	**Moderating Variables**
CM= Cost Management (Internal factor)	RD= Research and Development
DLT= Delivery Leadtime (Internal factor)	TD= Training and Development
QLT= Quality (Internal factor)	TEC= Technology
FLX= Flexibility (Internal factor)	PI= Physical Infrastructure
WSC= Workplace and Social Compliance (Internal factor)	AIA= Academic and Industry Alliance
PRM=Planning and Resource Management (Internal factor)	TAP= Textile and Apparel Parks
SOR= Sourcing (Internal factor)	
COL= Collaboration (Internal factor)	
GP= Government Policies (External factor)	

Figure 2. Hypothetical model outlining the factors affecting the supply chain performance of AMEOs

The major focus of this research are the internal factors, therefore, to limit the individual focus on each external factor, these factors have been clustered into one asGovernment Policy. Thus, to validate the findings of the literature review and the phase-1 study (Table-5), it is hypothesized for the RQ1 and RQ2 that:

H1a: There is a positive relationship between cost management and the supply chain performance of AMEOs.
H1b: There is a positive relationship between delivery leadtime management and the supply chain performance of AMEOs.
H1c: There is a positive relationship between quality and the supply chain performance of AMEOs.
H1d: There is a positive relationship between flexibility and the supply chain performance of AMEOs.
H1f: There is a positive relationship between planning & resource management and the supply chain performance of AMEOs.
H1e: There is a positive relationship between workplace & social compliance and the supply chain performance of AMEOs.
H1g: There is a positive relationship between collaboration and the supply chain performance of AMEOs.
H1h: There is a positive relationship between sourcing and the supply chain performance of AMEOs.
H1i: There is a positive relationship between government policies and the supply chain performance of AMEOs.

This study would further determine which factors are the most significant in relation to supply chain performance of Pakistani AMEOs. Therefore, organizations will place more focus on those factors.

Moderating variables affect the strength of the relationship or correlation between an independent and a dependent variable. Based on the literature review and the phase-1 study Research and Development (RD), Training and Development (TD), Technology (TEC) from internal perspective; whereas, Physical Infrastructure (PI), Academic and Industry Alliance (AIA) and, Textile and Apparel Parks(TAP) were identified as moderating variables.

Table 6. Matrix of moderating variables and independent variables.

		Moderating Variables					
		RD	TD	TEC	PI	AIA	TAP
Independent Variables	CM			▢	▪	● ▪	
	LT		▪	▢	▪		
	QLT	▢	● ▪	▢		● ▪	
	FLX	●	● ▢	▢		▪	▢
	WPS	▢	▢	▪			
	PRM			▪		●	
	COL		● ▢	▢			
	SOR						▪
	GP						

● Phase-1 exploratory study:
▪ Literature review (Pakistani Context):
▢ Literature review (Non-Pakistani Context):

The matrix in Table-6 is derived from the phase-1 study and the literature review. This matrix portrays the relationships between independent and moderating variables. This shows TEC as a moderating variable, which is influencing a large number of independent variables. Whereas, the importance of TD and AIA can also be observed. However, the independent variable GP does not seem to be influenced by any of the given moderators. One of the possible reasons can be the focus of the study. Secondly, since GP is an external factor related to the broader government policies, its dynamics seems to be overarching and complex. Thus, to validate the findings of the literature review and the phase-1 study (Table-5), it is hypothesized that:

H2a: Research & development moderates the relationship between independent factors and dependent factor.
H2b: Training & development moderates the relationship between independent factors and dependent factor.
H2c: Technology moderates the relationship between independent factors and dependent factor.
H2d: Physical Infrastructure moderates the relationship between independent factors and dependent factor.
H2e: Academic & industry alliance moderates the relationship between independent factors and dependent factor.
H2f: Textile & apparel parks moderates the relationship between independent factors and dependent factor.

In addition, after the exploration and categorization of the factors, and the development of a resultant hypothetical model, a pilot study was carried out to improve the validity of the survey instrument before administering it in the phase-2 validation study. Saunders et al. (2016) note that a pilot study increases the validity and reliability of the data. In the pilot study, ten participants in Karachi actively participated and spent on average 24 minutes in completing the draft questionnaire. Then, the participants spent around 40 minutes on sharing their valuable feedback on the initial draft of the instrument and its contents (Appendix. A).

6. Questionnaire Survey

Following the pre-phase-2 pilot study, the phase-2 data were collected through administering a survey instrument. The survey instrument begins with an introductory part stating the basis for the research and seeking consent from potential respondents to become part of the survey. The questionnaire is divided into the following four parts:
- Demographic questions.
- Questions about the main constructs by using five-point Likert scales.
- Questions on moderating factors by using a nominal scale.

The data were collected from the AMEOs located in Karachi. As per the websites of Pakistan Readymade Garments Manufacturers and Exporters Association, Pakistan Knitwear and Sweaters Exporters Association, and Pakistan Denim

Manufacturers and Exporters Association, 727 registered AMEOs were identified; however, the ones[1] located in Karachi were selected to be contacted. To maximize the number of responses, organizations were sent 3 reminders each after every 15 days for around 50 days. A total 327 responses were obtained, however, after screening the data, 4 responses were discarded. Thus, a total of 323 valid responses were used in the data analysis. The needed sample size with reference to Krejcie and Morgan (1970) for the population size of 727 was determined to be 252; having 95% confidence level, and .05% margin of error. Nevertheless, 323 valid responses which correspond to 44.4% of the population were obtained from the sampling frame. The demographic information of the phase-2 respondents is summarized in Table-7.

Table 7. Respondent's summary statistics

Label		**Frequency**	**Percent**
Product Category	Woven	142	44.0
	Knits	172	53.3
	Both	9	2.8
	Total	323	100
Product Style	Basic	192	59.4
	Fashion	78	24.1
	Both	53	16.4
	Total	323	100
Annual Sales Turnover	>150 Million PKR	36	11.1
	<100-150> Million PKR	140	43.3
	<100 Million PKR	147	45.5
	Total	323	100
No. of Employees	>300	29	9.0
	<100-300>	129	39.9
	<100	165	51.1
	Total	323	100
Export Market	European, U.S.A & other Foreign markets	62	19.2
	EU & U.S.A markets	129	39.9
	EU	25	7.7
	U.S.A	107	33.1
	Total	323	100
Education	Master	87	26.9
	Bachelor	227	70.3
	Diploma	9	2.8
	Total	323	100
Years of Managerial Experience	>10	124	38.4
	<6 -10>	140	43.3
	<2 - 5>	59	18.3
	Total	323	100
Area of Experience	Multiple Areas	113	35.0
	Merchandising/Marketing & Sales	140	43.3
	Production	43	13.3
	Sourcing	27	8.4
	Total	323	100
Position in Management Hierarchy	Top Management	75	23.2
	Middle Management	201	62.2
	First-Line Management	47	14.6
	Total	323	100

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[1] According to Garment manufacturing and Exporting Associations of Pakistan around 412 AMEOs are located in Karachi

Exploratory Factor Analysis was carried out to determine the correlation among the variables in the dataset, which led to the confirmation of relationship through the Confirmatory Factor Analysis (CFA). Finally, Structural Equation Modeling was applied to confirm further the hypothetical model. The analysis is carried out using IBM® SPSS® Amos™ 22.

To identify underlying latent factors and possible elimination of weakly related factors, factor analysis was performed. The results showed that all the factors load above .60 on their related factors (Appendix-B). Gefen (2005) states that if a measurement item loads above .60, it loads highly and if it is below .40, it does not. The percentage of total variation among the items (questions) is explained to be 87.74%. Thus, the outcome of the factor analysis confirms 40 items, which are divided into 10 clusters (factors). Whereas the overall reliability of the instrument is estimated as Cronbach's Alpha = 0.961. This shows a high level of internal consistency and suggests that the scales can be used for further analysis.

The results of CFA and SEM are primarily based on the criteria reported by Schreiber, Nora, Stage, Barlow, and King (2006). Following the screening of the output, multiple fit statistics were measured against the commonly used fit indices. Then, the internal structure of the model was assessed and both the convergent validity and the discriminant validity are examined.

A number of fit indices are recommended by researchers to assess the fitness of the scale structure (March, Balla, and Hau, 1996) were used. The following table-8 lists the parameters employed with achieved and recommended values.

Table 8. The Model Fit parameters obtained for the first CFA model

Model Fit Parameters	1st CFA Model	Recommended Value	Recommended By
Chi-Square minimum discrepancy divided by its degrees of freedom	1.30	< 3.0	Hooper, Mullen, Hooper, Coughlan, & Mullen, (2008)
Root Mean Square Error of Approximation	.044	< .05	Hooper et al (2008)
Root mean square residual	.022	0 – 1	Schumacker, & Lomax, (2010)
Goodness-of-Fit Index	.878	> .90	Miles and Shevlin, (1998); Wang, Fan, & Willson, (1996)
Adjusted GFI	.856	> .90	Miles and Shevlin, (1998),
Comparative fit index	.988	> .95	Tabachnick & Fidell, (2007)
Normed-fit index	.949	> .90	Schumacker, & Lomax, (2010); Hu, & Bentler, (1999)
Incremental Fit Index	.988	> .90	Wang, Fan, & Willson, (1996)
Tucker-Lewis Index Non-Normed Fit Index	.986	> .95	Schumacker, & Lomax, (2010) Hu & Bentler, (1999)
p of Close Fit (PCLOSE)	1.0	< 1.0	Schumacker, & Lomax, (2010)

The assessment of fit indices (Table 8) suggests that hypothesized model best fits the parameters defined by multiple Goodness of Fit indices. Following the assessment of the "fitness of good" indices for the hypothesized model, the model was run to develop the CFA measurement model (Figure-5). Furthermore, to evaluate the degree of shared variance between the latent variables of the model, convergent validity of the measurement model is estimated using Composite Reliability (CR), and Average Variance Extracted (AVE). According to results of this test, it is evident from the table-10, that all constructs have high CR values (>0.7), and the AVEs of all constructs remained > 0.5, suggesting high reliability and convergent validity. Further, the results satisfied the condition that the square roots of the AVEs exceed the correlations among the constructs in the research model. Thus, the instrument possesses acceptable construct validity.
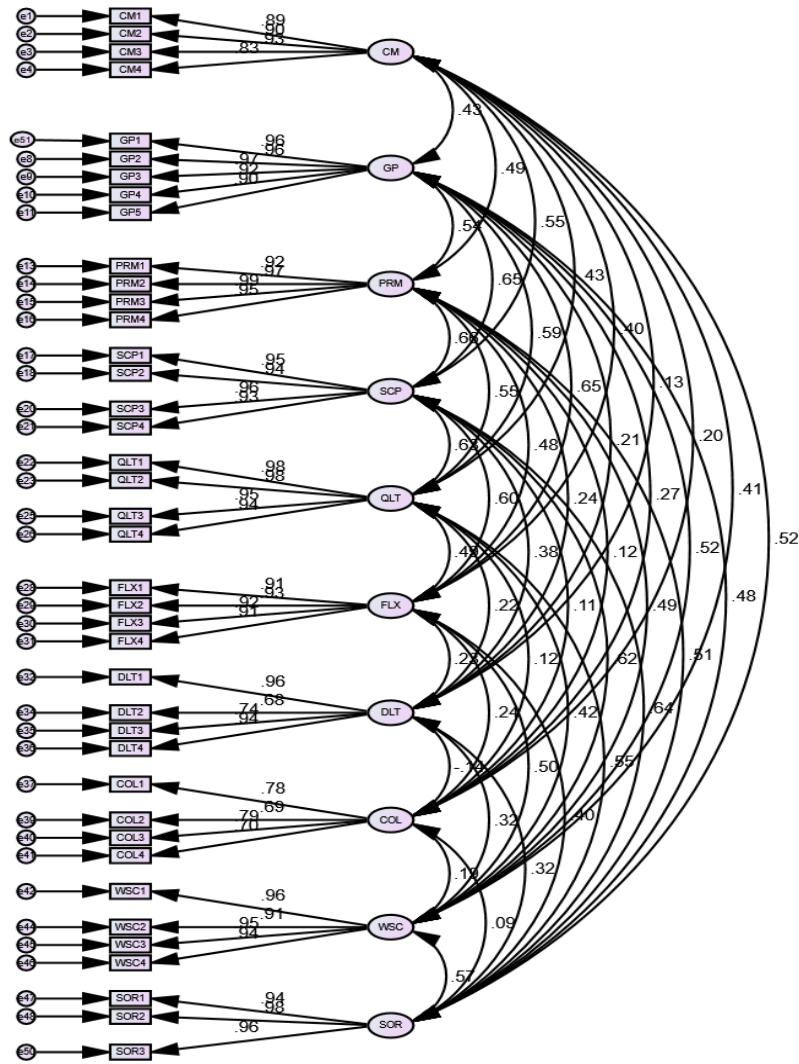
Figure 3. The CFA Measurement Model

It can now be inferred from the results obtained through the factor analysis that the proposed hypothetical model is valid and reliable. Fitting the structural model by using the path analysis with latent variables is carried out next through AMOS™ 22 for running the path model-1 shown in figure-3. The first CFA measurement model does not reveal any insignificant results. Similarly, it is apparent from the table-9 that no item value is found to be weakly correlated in any of the constructs.

Table 9. Individual Item loadings on respective constructs

Construct	Item-1	Item-2	Item-3	Item-4	Item-5
Supply Chain Performance	.95	.94	.96	.93	NA
Cost Management	.89	.90	.93	.83	NA
Delivery Leadtime	.96	.68	.74	.94	NA
Quality	.98	.98	.95	.94	NA
Flexibility	.91	.93	.92	.91	NA
Workplace and Social Compliance	.96	.91	.95	.94	NA
Planning and Resource Management	.92	.97	.99	.95	NA

<p style="text-align:center;">**Table 9.** Continued</p>

Construct	Item-1	Item-2	Item-3	Item-4	Item-5
Collaboration	.78	.69	.79	.70	NA
Sourcing	.94	.98	.96	NA	NA
Government Policy	.96	.96	.97	.92	.90

Whereas, Average Variance Extracted (AVE) estimates that all constructs have high CR values (>0.7), and the AVEs of all constructs remained > 0.5, suggesting high reliability and convergent validity (Table 10). Further, the square roots of the AVEs exceed the correlations among the constructs in the research model. Thus, the instrument possesses acceptable construct validity.

<p style="text-align:center;">**Table 10.** Validity Concern Table of the Revised CFA Measurement Model</p>

	Convergent Validity				Discriminant Validity									
	CR	AVE	MSV	ASV	WSC	CM	GP	PRM	SCP	QLT	FLX	DLT	COL	SOR
WSC	0.967	0.879	0.379	0.216	**0.937**									
CM	0.938	0.790	0.298	0.174	0.410	**0.889**								
GP	0.976	0.890	0.423	0.253	0.518	0.430	**0.943**							
PRM	0.977	0.913	0.436	0.230	0.491	0.491	0.536	**0.956**						
SCP	0.972	0.897	0.436	0.318	0.616	0.546	0.646	0.660	**0.947**					
QLT	0.981	0.929	0.398	0.222	0.417	0.425	0.590	0.546	0.631	**0.964**				
FLX	0.955	0.840	0.423	0.215	0.498	0.402	0.650	0.483	0.603	0.486	**0.917**			
DLT	0.904	0.707	0.144	0.066	0.321	0.130	0.212	0.240	0.379	0.219	0.230	**0.841**		
COL	0.829	0.548	0.073	0.031	0.190	0.199	0.270	0.115	0.111	0.121	0.244	-0.144	**0.740**	
SOR	0.974	0.925	0.412	0.231	0.572	0.524	0.484	0.511	0.642	0.552	0.395	0.321	0.085	**0.962**

The covariance appears under the diagonal row. AVE estimates (diagonal row in bold) are recommended to be 0.5 or higher.

Fitting the structural model by using the path analysis with latent variables is carried out next for running the path model-1 shown in figure 4.
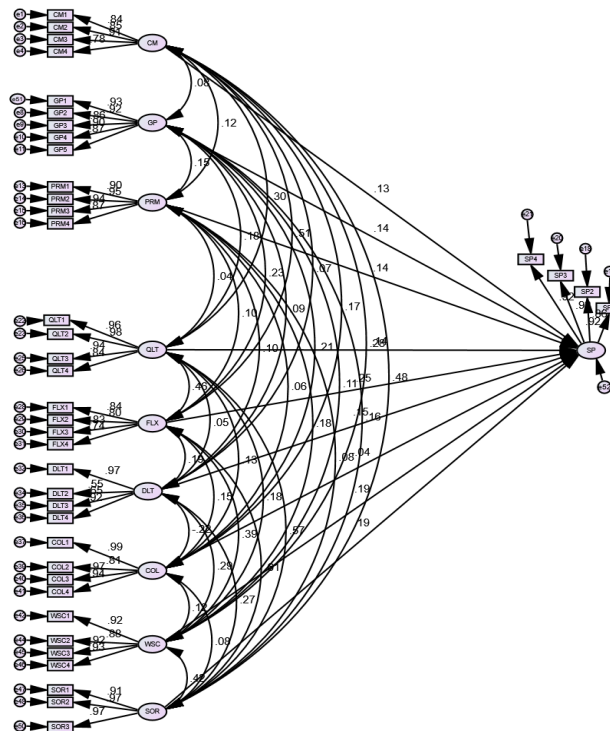

<p style="text-align:center;">**Figure 4.** The first structural path model</p>

To determine the significance of each path, the critical ratios (CR) are estimated (Table-11). The CR value > ±1.96 denotes statistical significance based on the probability level of p=.05 (Byrne, 2010).

Table 11. Regression weights of the 1ˢᵗ path model

			Estimate	**Standardized**	**S.E.**	**C.R.**	**P**
SCP	<---	CM	.116	.120	.042	2.782	.005
SCP	<---	GP	.163	.146	.057	2.866	.004
SCP	<---	PRM	.239	.201	.054	4.460	***
SCP	<---	QLT	.143	.153	.043	3.348	***
SCP	<---	FLX	.178	.144	.059	3.022	.003
SCP	<---	DLT	.150	.116	.048	3.131	.002
SCP	<---	COL	-.054	-.053	.040	-1.351	.177
SCP	<---	WSC	.147	.144	.047	3.151	.002
SCP	<---	SOR	.152	.150	.049	3.110	.002
* indicate alpha level from t-tests - * for p ≤ 0.10, ** for p ≤ 0.05 and *** for p ≤ 0.01							

In reference to table 11, it can be noted that, with the exception of Collaboration to SCP path, all the paths shown in the model are significant as the critical ratios are above 1.96. Therefore, the construct collaboration is excluded and the model is rerun to improve significance (Figure 5).
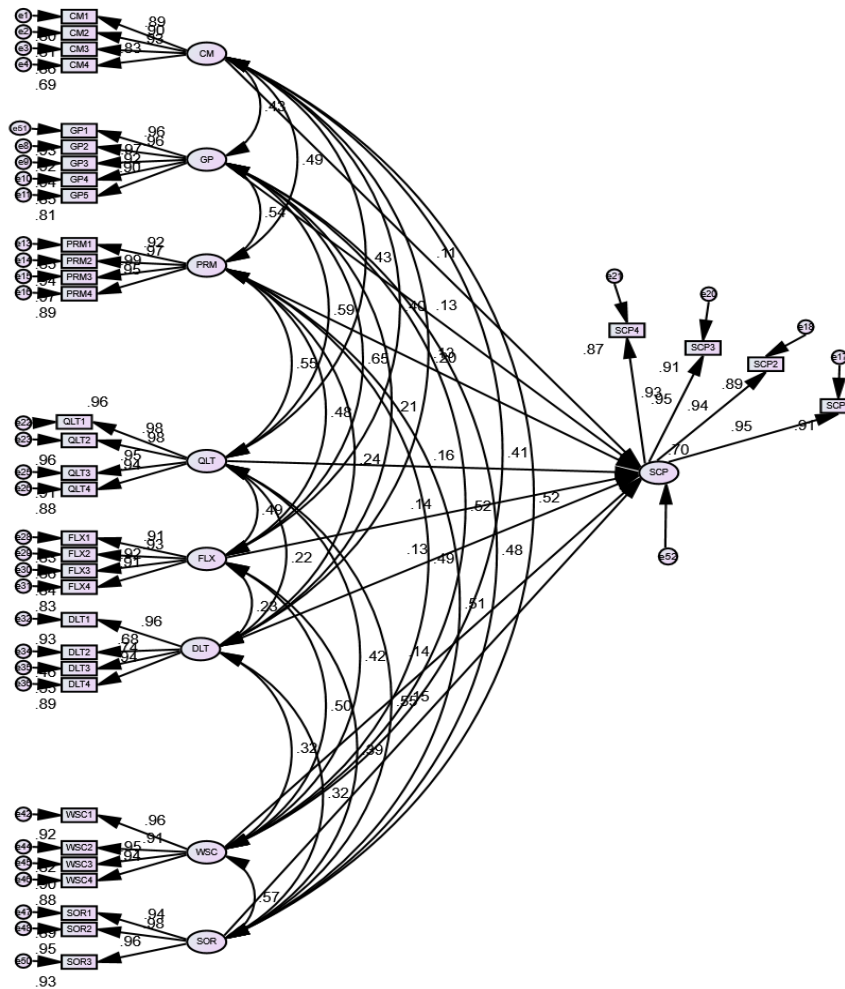

Figure 5. The revised structural path model

With reference to Table-12, all the paths shown in the model are significant as critical ratio were above 1.96. When the model was tested for path analysis, the model explained around 70% of the variance.

Table 12. Regression weights of the revised model

			Estimate	Standardized	S.E.	C.R.	P
SCP	<---	CM	.110	.113	.042	2.638	.008
SCP	<---	GP	.150	.135	.056	2.674	.007
SCP	<---	PRM	.244	.205	.054	4.536	***
SCP	<---	QLT	.145	.155	.043	3.388	***
SCP	<---	FLX	.169	.137	.059	2.893	.004
SCP	<---	DLT	.165	.128	.047	3.552	***
SCP	<---	WSC	.140	.137	.047	3.007	.003
SCP	<---	SOR	.156	.154	.049	3.192	.001
* indicate alpha level from t-tests - * for p ≤ 0.10, ** for p ≤ 0.05 and *** for p ≤ 0.01							

Similarly, the path coefficients suggested that the factor planning and resource management is highly significant in influencing the supply chain performance of AMEOs. The assessment of the fit indices (Table-13) suggests that the hypothesized model best fits the parameters defined by the multiple Goodness of Fit indices.

Table 13. The Model Fit parameters obtained for the revised CFA model

Model Fit Parameters	1st CFA Model	Revised Model	Recommended Value	Recommended By
Chi-Square: χ^2/df (CMIN/DF)	1.30	1.36	< 3.0	Hooper et al (2008)
RMSEA	.044	.033	< .05	Hooper et al (2008)
RMR	.022	.018	0 – 1 (the Lower the better)	Schumacker, & Lomax, (2010)
GFI	.878	.884	> .90	Miles and Shevlin, (1998), Wang, Fan, & Willson, (1996)
AGFI	.856	.861	> .90	Miles and Shevlin, (1998)
CFI	.988	.988	> .95	Tabachnick & Fidell, (2007)
NFI	.949	.955	> .90	Schumacker, & Lomax, (2010); Hu, & Bentler, (1999)
IFI	.988	.988	> .90	Wang, Fan, & Willson, (1996)
TLI Non-Normed Fit Index (NNFI)	.986	.986	> .95	Schumacker, & Lomax, (2010), Hu & Bentler, (1999)
PCLOSE	1.0	1.0	< 1.0	Schumacker, & Lomax, (2010)

The reexamination of the fit indices (Table-13) suggests that the revised model further enhanced the fitness as per the parameters defined by multiple Goodness of Fit indices. Although the chi-square/degrees of freedom ratio (χ^2/df) is lower than recommended value, one of the possible reasons is the sensitivity of the chi-square statistic to the sample size. Therefore, it is more appropriate to look at other fit measures (Brown & Moore, 2012). The Root Mean Square Error of Approximation, which is regarded as one of the most informative fit indices (Diamantopoulos & Siguaw, 2000) reflects a closer fit of the model in relation to the degrees of freedom (Arbuckle, 2012). The Root Mean Square Residual, the Goodness-of-Fit Index, an alternative to the Chi-Square which assesses the amount of variance that is accounted for by the calculated population covariance (Tabachnick and Fidell, 2007) and Adjusted GFI have improved from .878 to .884 and .856 to .861 respectively. Baumgartner & Homburg, (1995) and Doll, Xia, & Torkzadeh, (1994) recommend that the values for parameters GFI and AGFI are still acceptable if they are above 0.8. Similarly, the Normed Fit Index value has also improved from .949 to .955. Besides that, the results for other fit indices including IFI, TLI, and PCLOSE also suggest that the hypothesized model is a good fit. The next part of the analysis discusses the results obtained following the analysis of moderating variables. Like independent variables, moderating variables are also drawn from both the internal and the external categories. Research and development, training and development, and technology fall in the former category. Whereas, physical infrastructure, academic and industry alliance), and textile and apparel parks belong to the latter category. To determine the presence of moderating effect and significance, the approach suggested by Awang, (2015) was adopted. The responses on each moderating variable were dichotomously scored. In statistical terms, the moderating effect is referred as the interaction effect (Wu, &

Zumbo, 2008). To measure interaction effect, variables were separated into two groups. The parameter of each model in comparison to other was then constrained and unconstrained respectively. Each model was then run separately for the estimation. If the difference in Chi-square values for both constrained and unconstrained were significant, the difference of each path coefficient was estimated (Awang, 2015; Gaskin, 2011). The results of moderating tests of the six variables are presented in Table-14.

Table 14. Results of moderation tests

Research and development as a moderator				
	Chi-square	df	p-value	Invariant?
Overall Model				
Unconstrained	1450.721	1116		
Fully constrained	1469.215	1124		
Number of groups		2		
Difference	18.494	8	0.018	NO
Technology as a moderator				
	Chi-square	df	p-value	Invariant?
Overall Model				
Unconstrained	1495.039	1116		
Fully constrained	1510.562	1122		
Number of groups		2		
Difference	15.523	6	0.017	NO
Training and development as a moderator				
	Chi-square	Df	p-value	Invariant?
Overall Model				
Unconstrained	1719.923	1116		
Fully constrained	2123.482	1124		
Number of groups		2		
Difference	403.559	8	0.000	NO
Physical infrastructure as a moderator				
	Chi-square	df	p-value	Invariant?
Overall Model				
Unconstrained	1591.555	1116		
Fully constrained	1595.143	1124		
Number of groups		2		
Difference	3.588	8	0.892	YES
Academic and industry alliance as a moderator				
	Chi-square	Df	p-value	Invariant?
Overall Model				
Unconstrained	1573.525	1116		
Fully constrained	1588.882	1124		
Number of groups		2		
Difference	15.357	8	0.053	NO
Textile and apparel parks as a moderator				
	Chi-square	df	p-value	Invariant?
Overall Model				
Unconstrained	1565.694	1116		
Fully constrained	1580.811	1124		
Number of groups		2		
Difference	15.117	8	0.057	NO

The results show that the constrained and unconstrained groups for all the proposed moderating variables except physical infrastructure (p-value 0.892), are different at the model level which means that there is a moderation between the two groups (p-value 0.018; significant). This can be interpreted that all the proposed moderating variables except physical infrastructure, impact the relationship between independent variables and dependent variable.

7. Discussion

Although a number of factors were identified as significant, planning and resource management was noted to be the most significant factor amongst all, followed by delivery lead time, and quality. However, the critical ratio of PRM stands out highly significant than those of other factors. Findings are quite consistent with the results of Noor, et al. (2013), who carried out their quantitative research in the supply chain of Pakistani textile sector, though, with no distinction to apparel and textile industries. Their results identified four important independent variables affecting the effectiveness of the supply chain of Pakistani textile industry such as planning, on-time delivery, quality, and sourcing, where planning was noted to be the most significant factor. Likewise, in relation to phase-1 study, a respondent representing a Euro-American buying organization stressed that internal planning, management of quality, and social compliance remain significant factors in developing the effective supply chain relations with AMEOs. Similarly, respondents in the phase-2 study also stressed the importance of planning in relation to supply chain performance of AMEOs. This clearly indicates that AMEOs in Pakistan need to adopt a more serious and a professional attitude, and encourage competence to improve their supply chain performance in upcoming opportunities. The above-stated observations clearly indicate the importance of planning and resource management in the wake of the current state of affairs in AMEOs and future opportunities. In terms of moderating variables, internal variables (such as research and development, training and development, technology) and external ones (such as physical infrastructure, academic and industry alliance, and textile and apparel parks) were included in the model. However, as a result of the questionnaire survey, the proposed moderating variable the physical infrastructure was not found significant. Table 15 summarizes the findings of the study.

Table 15. Summary results of the phase-2 study

Main constructs	Results (predictor)
Planning & resource management	Significant
Delivery lead time	Significant
Quality	Significant
Sourcing	Significant
Workplace and social compliance	Significant
Flexibility	Significant
Government policy	Significant
Cost management	Significant
Collaboration	Non-significant
Moderating variables	**Results (moderator)**
Training and development	Yes
Technology	Yes
Research and development	Yes
Academic and industry alliance	Yes
Textile and apparel parks	Yes
Physical infrastructure	No

8. Conclusion

This study has developed a framework for evaluating the supply chain performance of apparel manufacturing organizations. This study included a variety of stakeholders in its exploratory phase, suggesting a variety of internal, external and moderating factors affecting supply chain performance of AMEOs. A conceptual model was derived, and tested through the usage of Structural Equation Modelling. The results of this study have strong theoretical implications on the concept of lean and agile. Most of the studies in relation to supply chain place focus on traditional measures of performance such as cost, quality, lead time, collaboration and flexibility. This study calls for further inquiry in increasing importance of workplace and social compliance, sourcing, and the role of government policies on supply chain performance. Results of this study can provide a reference point to closely related industries such as footwear, home textile, leather and other industries to focus on internal and external factors affecting their supply chain

performance. The results of this study can also be used by AMEOs in similar economies for improving their supply chain performance. The output of this research contributes to the limited literature on AMEOs by presenting a specific model aimed at revealing areas for supply chain improvement. It was applied to weight the factors driving the supply chain performance of AMEOs in Pakistan and to determine important moderating relationships and their significance. The study is characterized by some limitations. First of all, the nature of this research was cross-sectional in nature and owing to time, financial and security constraints, the research remained limited to a certain point in time. Therefore, future studies can be carried out in a longitudinal manner to further explore the validation of the factors affecting supply chain performance of AMEOs. This study is primarily based on the opinion of the field experts of the organizations. Therefore, to present a more complete picture, future studies should base their outcome on organizational reports if they are made available from stakeholders of apparel supply chain. Though this study explored several external factors needing the attention of the government of Pakistan to improve supply chain performance of AMEOs, the primary scope remained focused on internal factors. Therefore, future studies are expected to explore further the implications of each external factor and their relationship with supply chain performance of AMEOs. Similarly, future research may include respondents from concerned ministries to elaborate further the outcome of the studies.

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Appendix

Appendix A. Participants and their comments in Pre-Phase-2 Pilot study

S.no	Ref. Code	Designation	Market	Size	Industry Type
1	P2PV01	GM Marketing	U.S. and EU	Large	Vertical
Commented on decreasing the length of questionnaire, …Asked to remove textile oriented standards GOTS-OE 100 and OE Blended compliance certification …Terms are familiar and language is simple… turnover more than 150 million rupees…number of employees around 500.					
2	P2PV02	Director Operations	U.S and EU	Medium	Vertical
Asked to replace the term Clusters and subsectors with Textile parks…. Stressed on the deficiency of workplace and social compliance in AMEOs…yes language is ok…questions are understandable …around 250 employees in medium size units.					
3	P2PV03	Director Operations/Academician	U.S and EU	Large	Support/Vertical
WRAP is more popular…. may use comparable term…. Asked to decrease the number of questions..e.g. asked to remove product safety issue….highlighted the lack of planning and top management commitment…Organization size is confusing to determine ..even with rate of output as kind of garments are different. So is value......terms are easier.					
4	P2PA04	CEO	EU	Small	Apparel
Requested to decrease the number of questions….rest is fine…asserted the government's role in enforcing social welfare standards in apparel organizations… all the terms are easy to understand and language is easy to understand…large units may have more than 400 to 1000 employees. Small units could have 50 to 100 employees...annual sales turnover of small unit falls on average 70 million.					
5	P2PA05	GM	U.S and EU	Medium	Apparel
Asked to replace terms clusters & subsectors with Textile/apparel parks….Stressed on Flexibility in apparel organization to improve supply chain performance…Difficult to determine the size of AMEOs…for organizational size ..medium size organizations generally in export have more than 100 million sales turnover. If less than 100 would generally fall in small unit...number of swing machines could be used as a reference but again for fashion oriented and fancy garments variety of machines used to get the job done...embroidery machines, buttonhole machines and automated steamers...Labs are generally found in textile mills ... 3rd party inspection is required by the buyers such as involving SGS...					
6	P2PB06	Supply chain Manager	U.S. and EU	Large	Buying House
WRAP's 12 dimensions are enough ...covers all components…….. Language is simple and familiar….					
7	P2PB07	CEO	U.S.A	Small	Buying House
Besides internal factors asserted the inclusion of government policy factor as independent variable, further asked to replace clusters and subsectors with Textile or apparel clusters…gave reference to Quaide-Azam textile park project…….annual sales turnover ranges from 20 million rupees to more than 200 million ...employees may range from as few as 50 to more than 1000					
8	P2PB08	General Manager	EU	Medium	Buying House
Understood all terms… appreciated the instrument and hypothetical model…No standard of AMEOs size…language and terms are fine…small size organizations have less than 100 million rupees of annual sales turnover. Medium around somewhere between 100 to 150 million...and large more than that....No need of labs for AMEOs for Textile units ok....post-washing measurements are important...					
9	P2PS09	Asst. Prof/Manager Research	NA	NA	Support
Highlighted double barrel questions….asked to decrease the number of questions…					
10	P2PS010	Asst. Prof/Researcher	NA	NA	Support
Asked to remain focused of internal factors….suggested to involve representing organizations to gather reliable data					

Appendix B. Factor loadings of variables

	Component									
	1	2	3	4	5	6	7	8	9	10
SCP1										.696
SCP2										.707
SCP3										.691
SCP4										.695
WSC1			.869							
WSC2			.818							
WSC3			.856							
WSC4			.853							
FLX1						.830				
FLX2						.839				
FLX3						.820				
FLX4						.819				
QLT1		.864								
QLT2		.863								
QLT3		.857								
QLT4		.831								
DLT1							.884			
DLT2							.823			
DLT3							.843			
DLT4							.888			
CM1					.853					
CM2					.844					
CM3					.878					
CM4					.821					
COL1								.838		
COL2								.760		
COL3								.845		
COL4								.749		
SOR1									.811	
SOR2									.822	
SOR3									.809	
PRM1				.788						
PRM2				.852						
PRM3				.866						
PRM4				.850						
GP1	.824									
GP2	.834									
GP3	.835									
GP4	.816									
GP5	.803									

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.

a.   Rotation converged in 6 iterations.