Doctoral Dissertation

Antecedents and Outcomes of Industrial Up-gradation through Value Chain of Bangladeshi Apparel Firms Pursuing Leagile Manufacturing Systems

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Dissertation Abstract

Antecedents and Outcomes of Industrial Up-gradation through Value Chain of the Bangladeshi Apparel Firms Pursuing Leagile Manufacturing Systems

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This dissertation has focused on a firm level industrial up-gradation through value chain (IUVC) in the Global Apparel Value Chain (GAVC). The apparel manufacturers of the developing courtiers (DCs) and least developed countries (LDCs) are locked in the low value adding activities of the GAVC. Due to having disadvantage in negotiation and bounded rationality the firms are locked in low value adding steps and cannot integrate to other relevant higher value adding businesses like designing, marketing, procurement and logistics etc. The buyers are hopping from country to country in choosing their supplier whenever they find better option. Moreover, Multi Fiber Agreement (MFA) has been phased out in 2005, and there is no scope for economic diplomacy. Because of these, the firms' risk in sustaining in the acute competition in the GAVC is very high. Therefore, an LDC like Bangladesh has to achieve competitive advantages (CA) through IUVC and that IUVC is not so easy to pursue. To pursue IUVC resource-based view (RBV) can be one of the most feasible options for Bangladesh. Bangladesh has been competing in this field for about three decades. Consequently it can be deemed that if a firm deploys leagile manufacturing systems (LAMS) with quite a good amount of experience in this business, they can utilize their existing resources and capability for decoding the knowledge of the relevant business and thereby, industrial up-gradation through value chain can be pursued. But pursuing IUVC is not the final destination. By IUVC, firms have to yield competitive advantage out of it. Choosing the scope of the CA for a firm in a supply chain also not like Porter's trading off concept between cost and quality. A supply chain is created with a vision that it would select the most suitable firms for the different steps in the value addition from the different countries. Therefore, to gain CA through IUVC, the firms should pursue all sorts of CA simultaneously. This is possible only if the firm can achieve dynamic capability to gain VRIO, explained in RBV. This study has both theoretically

and empirically showed that firms can pursue for cost, quality, flexibility, reliability and quick response simultaneously. This dissertation also showed that through achieving CA the firms can improve all the growth based firm performance like capital growth, profit growth and sales growth.

The dissertation has eight chapters as a whole. Chapter 1 introduces the background of the study, dynamics of GAVC and on the basis of that how resources and capabilities can govern the GAVC for pursuing IUVC and CA and this chapter also states objectives, scope, significance and organization of the dissertation. Chapter 2 provides overview of the apparel industry of Bangladesh. It describes the growth trajectory of Bangladesh apparel industry and the factors contributed for it, types of firms and their variation in terms of value adding activities, challenges of the firms in the post MFA period, the need for restructuring, changes in modern machinery, product diversification status and market diversification status. Chapter 3 is the literature review which provides the definition of all factors for the study, the theories for linking the factors and the logic of the relationship among the factors. Chapters 4, 5, 6 and 7 are main empirical analyses. Chapter 4 describes the distribution of the 180 sample firms according to the resources and capabilities like HRM practices, Information technology (IT) and LAMS. Chapter 5 shows the impact of social compliance factors (SCFs) on HRM practices for LAMS by surveying 75 sample firms. Chapter 6 shows the impact of HRM practices and IT as the antecedent on IUVC by utilizing same samples of chapter 4. Chapter 7 shows the impact of IUVC as vertical integration (VI) on CA and subsequently on firm performance (FP) by utilizing same samples of chapter 4.and 6.

The research questions of this study are: does IUVC follow any linear path or anything else? is there any impact of SCFs on HRM practices for LAMS? is there any impact of HRM practices and IT on LAMS? and is there any impact of IUVC on firm's outcome like CA and thereby CA on FP and how the CA can be pursued? From these chapters (4, 5, 6 and 7), we obtained the following main findings by answering the research questions of overall dissertation.

In chapter 4 the data collected from the 180 sample firms, on the basis of five point Likert

scale are analyzed. It was found that in Bangladesh the up-gradation pattern is not linear unlike Gereffi's idea of linear up-gradation pattern. Firms can be divided in six groups in the pattern of up-gradation like CMT, CMT with design, full path OEM, ODM with partial OEM and full path ODM. This chapter has shown that most of the firms (about 50%) are standing in OEM stage in Bangladesh. It is shown that by implementing HRM practices with more importance the firm may undertake designing activities without fully implementing the activities of OEM.

In chapter 5 the dissertation showed the relation between SCFs and HRM practices for LAMS. This chapter accumulated the scattered relations among the indicators of human factors and the indicators of HRM practices for LAMS. Here it was found that many human factors of leagile and SCFs match to each other. Consequently, this study has revealed the relation between SCFs and HRM practices for LAMS by juxtaposing social compliance factors on human factors for leagile. On the basis of economic goal rather than humanitarian goal of social compliance factors, the relationships are discussed. The study found that ergonomics and worker related compliance factors are two most important social compliance factors for the apparel firm in Bangladesh for implementing HRM practices for LAMS. Then, here it comes health and safety and then non-discriminatory attitude and social dialogue.

Chapter 6 aims at finding out whether firm's resources and capabilities like manufacturing system can contribute to IUVC in the apparel sector of Bangladesh. Gereffi (1999) advocated for IUVC as a good strategy to overcome the problem of being locked in low value adding activity like CMT for the apparel manufacturers of developing countries. But Gereffi did not discuss how to strive for IUVC for the apparel firms. This chapter paved the way for IUVC for apparel firms on the basis of RBV. It shows that resource development through development of asset specificity and knowledge can reduce transaction cost and these are the antecedents of vertical integration. A survey was done on 180 apparel firms in Bangladesh and by using structural equation modeling (SEM), it found that human resource and IT positively influences on LAMS and LAMS positively influence on IUVC. The constructs of LAMS show that the variables responsible for producing fashionable products like customization, product line and differentiation are influencing on designing activity of IUVC, and procurement is influenced

by product line and differentiation, and marketing is influenced by product line, differentiation, volume flexibility and minimum inventory.

Chapter 7 tried to advocate that IUVC as VI can be supportive for gaining several sorts of competitive advantages for the firm simultaneously. The major theories on strategic management like Porter's generic competitive strategy, RBV and capability based view (CBV) advocates that IUVC integration gains CA for the firms. But other studies done on GAVC have neither discussed what should be the relevant CA for apparel manufacturing firms on the basis of above mentioned theories nor empirically showed whether IUVC as VI can gain CA and improve FP. Therefore, this study has picked up the variables for CA examining the above mentioned important theories and linked VI and CA and subsequently with FP. This study has done on the same sample firms as for chapter 6, and by using SEM it found that IUVC which is renamed here as VI has positive influence on CA and CA has significant positive influences on FP. By analyzing the result, this study recommends the apparel manufacturers in Bangladesh that the firms must not stick to the strategy of reduction of labor cost rather they should also try to pursue for other CA like time, quality, reliability and flexibility. But this study suggests such, if the firms are running on LAMS and are pursuing IUVC. This chapter has shown that cost reduction is significantly influenced by design, and quality, quick response and product flexibility are significantly influenced by procurement. Marketing influences only on product flexibility In this way, the firm performances would be improved.

Conclusion chapter asserted that RBV theory can be good logic for IUVC in GAVC. Earlier it was mainly used for describing how firm achieve sustainable CA. Conclusion chapter concluded by showing the deviation of the findings from the major theory like Gereffi (1999). This study deviated from the idea of up-gradation path of Gereffi (1999) that described only linear way. It is also showed here that currently, combination of lean and agile manufacturing system is possible in Bangladesh although agile is suggested to be implement after vast experience on lean by the scholars on LAMS .

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List of Abbreviations

5S	Sort, set in, shine, standardize and sustain
AGFI	Adjusted Goodness of Fit Index
AGOA	African Growth and Opportunity Act
APS	Automated Personnel Scheduling
ATC	Agreement on Textile and Clothing
BGMEA	Bangladesh Garment Manufacturers and Exporters Association
BKMEA	Bangladesh Knitwear Manufacturers and Exporters Association
CA	Competitive Advantage
CAD	Computer Aided Design
CAM	Computer Aided Manufacturing
CBV	Capability Based View
CFI	comparative fit index
CIM	Computer Integrated Manufacturing
CMIN/DF	Discrepancy/Degrees of Freedom
CMT	Cutting-Making-Trimming
COM	Computerized Office Management
CQC	Computerized Quality Control
DCs	Developing Countries
DOT	Department of Textile
EDI	Electronic Data Interchange
EPZ	Export Processing Zone
EU	European Union
FDI	Foreign Direct Investment
FMS	Flexible Manufacturing System
FOB	Free on Board
FP	Firm Performance
FVI	Forward Vertical Integration
GAVC	Global Apparel Value Chain
GFI	Goodness of Fit Index

GIZ	German International Cooperation
GSP	Generalized System of Preference
GTZ	German Technical Cooperation
HRM	Human Resource Management
HRMPLAMS	Human Resource Management Practices for Leagile Manufacturing System
IFI	Incremental Fit Index
ILO	International Labor Organization
IMF	International Monetary Fund
IPN	International Production Network
IT	Information Technology
ITLAMS	Information Technology for Leagile Manufacturing System
IU	Industrial Up-gradation
IUVC	Industrial Up-gradation through Value Chain
JIT	Just-in-Time
L/C	Letter of Credit
LAMS	Leagile Manufacturing System
LDCs	Least Developed Countries
MFA	Multi-Fiber Agreement
MNC	Multi National Corporation
MPS	Modular Production System
MRP	Multiple Resource Planning
MVA	Manufacturing Value Added
NIEs	Newly Industrialized Economies
OBM	Original Brand Manufacturers
ODM	Original Design Manufacturers
OEM	Original Equipment Manufactures
OnlineS	Online Sourcing
OPR	Ordered Probit Regression
PCA	Principle Component Analysis
QR	Quick Response
QRM	Quick Response Management
QRS	Quick Response System
QWL	Quality Work Life

R&D	Research and Development
RBV	Resource-based View
RMS	Reconfigurable Manufacturing System
RMSEA	Root Mean Square Error of Approximation
ROA	Return on Asset
SCF	Social Compliance Factor
SCP	Structure-Conduct-Performance
SEM	Structural Equation Modeling
SMED	Single Minute Exchange Over Dies
TCE	Transactions Cost Economics
TLI	Tucker-Lewis Index
TPS	Toyota Production System
TQM	Total Quality Management
UMCOMTRADE	United Nations Commodity Trade Statistics Database
UNDP	United Nations Development Program
US	United States
VI	Vertical Integration
VRIO	Valuable, Rare, In-imitable and Organized to be Exploited

Chapter 1
Introduction

1.1 Background of the Study

Industrialization is an integral part of economic development. There are rare examples of the countries that have developed without industrialization. It is observed that, rapidly growing economies tend to have rapidly growing manufacturing sectors (Weiss, 2007). The industrial sector especially manufacturing sector has been historically the sector that has driven the growth of the countries and assisted in moving from low to middle-income status. This is because industry can provide comparatively higher wage employment for a large number of workers and can raise social productivity by producing high value added goods on a mass scale (Helper, 2012). Developing countries can earn valuable foreign currency by exporting manufactured products, and in turn the foreign currency can be used to reinvest in newer machines and technologies. In this way, a rapid move up in the technology ladder becomes possible. But Industrialization is not a single, linear process. It is not simply a matter of the gradual accumulation of machinery and technology. The path of industrialization follows a trajectory with a logical relation from one stage to another stage. Here the word 'logical' means meaningful relation between country specificity and the world market scenario. Industrialization is "lumpy" in products, space and time, and different developing countries experience radically different degrees of success in industrialization (Durlauf et. al, 2005). Bangladesh has come across a successful path of industrialization only in the lower sophisticated product like apparel for the last three decades. Bangladesh is the second largest supplier of apparel products in terms of value addition, and because of this, she is the biggest manufacturing value adding country among the least developed countries (LDCs) (BKMEA Manual, 2011). At present 40% of the total manufacturing value added (MVA) of the LDCs is contributed by Bangladesh (IDR, 2009). Although agreement like Multi Fiber Agreement (MFA) and preferential access to European Union (EU) market have hatched the growth of Bangladesh apparel industry, garment factory owners' experience and prudence and workers hard working along with the struggle in their daily life are also big reasons for the

competitiveness of the sector in the world market. This industry is at the middle part of global apparel value chain (GAVC) and struggling hard to maintain its attractiveness to the buyers in the world market. As a part of a global value chain, Bangladeshi firms can device various strategies in positing themselves in the supply chain either by specializing in one step or integrating into several steps. This decision will depend on their capacity to develop the resources and capabilities. This study intends to examine the decision about this integration.

1.2 Role of Global Value Chain in Industrial Development

One of the outstanding features of the process of globalization has been the rapid diffusion of industrial production from the developed to the DCs. In the earlier decades before 1960s, the production was not so much globalised like present. But at present, based on the competitive advantages, both DCs and developed countries are specialized in some steps of the supply chain of internationally traded products. Trade liberalization has facilitated the creation of this distribution of the production process. Earlier, DCs or LDCs with small economy could not achieve economies of scale with their small size economy. But globalization of commerce has given the opportunity to overcome this problem by reaching out to foreign markets. Earlier, poor countries with no research and development budget could not strive for sophisticated products. Now they can do so by participating in the production of only few parts of the sophisticated products. They are getting technological assistance from the multinational corporations (MNCs) of the developed countries in this regard. Sometimes they become able to develop their own technological base. In this way, international supply chain is developed (Sehgal, 2011).

The productions of few parts of internationally traded products on which the DCs and LDCs have competitive advantages are called 'task-based production' (IDR, 2009). Some critics have suggested that "tasks" may be less technologically sophisticated than final products, trapping countries in narrower and less sophisticated production structures. This study agrees with this statement, because it has found out that many DCs and LDCs whose economy hugely depends on apparel manufacturing are trapped in low value adding steps of the value chain and cannot upgrade themselves because of budget constraints and lack of technological knowledge. Both of these limitations are created because of being trapped in low value adding

manufacturing of the LDCs firms, and eventually the firms generate very low profit for themselves. Therefore, it's a vicious circle. The phenomenon of the GAVC can be compared with "smile curve" argument of Stan Shih (Jason et al., 1992). By analyzing the value adding steps of Taiwan personal computer industry, the founder of ACER, Shih found that both the ends of the value chain commands the value added to the product than the middle part. Recent research suggests that more advanced economies that produce more sophisticated products in terms of technology, organization, quality, design and logistics grow faster. Consequently, apparel producing DCs and LDCs have to integrate their less sophisticated business into more sophisticated businesses of the value chain. But this integration is not possible suddenly and not even within few years. It would take evolutionary process, and the countries do not have enough money to finance the project for up-gradation. From the view point of resource-based view (RBV), this has to be done by undertaking very relevant businesses of their current operation as resources and capabilities would support them. On the other hand, from the view point of capability based view (CBV) for maintaining continuity of the process of this up-gradation or integration, the DCs and LDCs firms have to achieve dynamic capability. Consequently the inference that, task-based production confines low-income countries to technologically less sophisticated can be proved wrong if the DCs and LDCs take the advantage of the opportunities created for adding more value by extending the steps in the productions. This opportunity is created because the advanced nation loss the competitive advantage due to rising labor cost in their countries, and the DCs and LDCs are able to learn the know how of that technology and organize, arrange or produce it at a lower price based on country specificity.

1.3 Dynamics of Global Apparel Value Chain (GAVC)

The value chain of the apparel industry is widely spread throughout the world. Since 1980s, the value chain of apparel business have been divided into five separate but interrelated networks such as the raw materials network, component network, production network, export network and marketing network (Gereffi, 1999). The structure of this value chain/supply chain is very dynamic, and it's not static at all. As this industry is of low technology and labor intensive, it migrates from high wage to low wage countries like a 'flying goose' (Akamatsu, 1962). The structure of the supply chain changes like the movement of a reptile. The reptile

advances with stretching and enlarging of its muscles in the body. In the same way, the supplier of raw materials, designers, manufacturers, logistics firms, buyers, exporters and retailers all are inter-connected like the body of a snake. Here the activities under one firm are sometimes stretched or enlarged on the basis of its competitive advantages. For example: in 1980s the apparel firms in Hong Kong and Taiwan were only CMT firms. Later, the firms in these countries enlarged into designing activities. Again they are slowly stretching their activities by releasing cutting-making-trimming activities by sub-contracting to the firms in LDCs. Now LDC firms are enlarging, and it is expected that they will be more enlarged by undertaking commercial activities for becoming original equipment manufacturer (OEM). In some point of time, some of these countries will also have to stretch their activities if their labor cost rises or if they cannot adjust their production process with the cutting edge technology. Now the question may arise that if the structure of supply chain changes like the movement of reptiles by stretching and enlarging and if because of that the industry is hopping from one country to another country, what role it plays in shaping the total welfare of the world. The answer is that there are many positive externalities happened through this movement. For example, through the experience of establishing this less sophisticated apparel industry, the DCs and LDCs at least have emerged as industrialized nations (only for less sophisticated production) which hatches the potentiality for becoming industrialized nation of moderately sophisticated products, and this is possible if technology transfer is happened successfully. From the demand side economy, this industry gives birth or helps enlarge many other supporting industries like accessories industry, buying agents, shipping industry, scrap collecting firms, banks, insurance companies, software and repair firms etc. Besides these, firms invite new technology and modern management to the country, especially if foreign direct investment (FDI) is opened for the sector, and because of this, technology spills over to other relevant industries. Through technological development for maintaining competitiveness, GAVC is now much more productive, prompt and dynamic than the earlier decades. Many poor village girls are now self reliant because of this industry. Many meritorious young people are now becoming business entrepreneurs instead of becoming so called prestigious government bureaucrat. In a nutshell, this business phenomenon is playing an influential role in shaping the total welfare of the world economy.

How the supply chain or value chain of global apparel business move is discussed above. Now the question may be raised why this change occurs from country to country or economy to economy. We know many country- specific characteristics influence on the firms' ability to sustain in the competition. Workers skill, labor cost, research and Development (R&D) for technological research, technological spillover, cost of doing business, government policy, government's agreements in international affairs, national infrastructures etc directly or indirectly influences on firms competitiveness. According to Gereffi (2005), due to the governance structure, the supply chain is constructed by firms' participation from different countries. The following three factors influence designing the supply chain:

:

A. Design of supply chain depends on the complexity of information and knowledge transfer required to sustain a particular transaction, particularly with respect to product and process specifications. For example, in GAVC the manufacturers cannot closely work with the end markets in the developed countries. Therefore, they suffer from bounded rationality about the trend in fashion. Neither the manufacturers can guess the end market trend nor they have proper information about the raw materials market. Very often the suppliers seek extra rent or play many other roles of opportunism.

B. Design of supply chain depends on the extent to which the information and knowledge can be codified, and therefore, transmitted efficiently and without transaction-specific investment between the parties to the transaction. For example, in apparel manufacturing, very often the firms cannot up-grade through the value chain because their scope of doing business is narrow with less sophisticated production. But if the firms try to enrich their knowledge along with gradual adoption of sophisticated technology for better quality and well featured products, they can decode the knowledge of the relevant value adding business like designing or creating an efficient procurement network etc. In this way, the other parties cannot hold them up because of not making transaction specific investment.

C. Design of supply chain depends on the capabilities of actual and potential suppliers in relation to the requirements of the transaction.

In the discussion above, we have already discussed on the opportunity for extending the value adding activities for the apparel firms in the DCs and LDCs, and we have discussed also how the governance of supply chain can influence this opportunity to be extended. In the following section 4.1, we shall discuss how the resources and capabilities can influence the governance of supply chain/ value chain. The understanding of resources and capabilities' influence on governance of supply chain would be a very good logic to understand how resources and capabilities influence on the drive for industrial up-gradation through value chain (IUVC). The impact of resources and capabilities will be discussed in chapter 5. In the subsequent section 6.1, we shall discuss how IUVC facilitates for gaining competitive advantages (CA) and subsequently firm performance (FP) as a result of new positioning of the firm through the value chain. Resources and capabilities are seen as the antecedent factors of IUVC and CA as outcome factors of the same in this study. This up-gradation through value chain for the manufacturing firms in the DCs and LDCs are clearly defined by Gereffi (1999). This will be elaborated in chapter 3 (the chapter for literature review). In a nutshell, IUVC means integrating the CMT activities with other value adding activities like procurement, logistic, designing or branding etc. Here in this dissertation, IUVC will be very often shortly called as industrial up-gradation (IU) as many other scholars (for example. Gereffi, 1999) have termed it shortly. It is discussed that IUVC cannot be achieved all on a sudden. It is a path depended evolutionary process. Therefore, the firms have to develop their resources and capabilities gradually on the basis of their present resources and competences. Before proceeding into those steps of the discussion, the definition of value chain is needed to be understood. This study has segregated the apparel firms' activities according to the value chain activities depicted by Porter (1985). Porter divided the activities of the value chain broadly into two categories. One group is primary activities and the other group is support activities. Primary activities are the inbound logistics, operations, outbound logistics, marketing and sales and services. The support activities are procurement, technology development, human resource management and firm infrastructure. In the table 1.1 the primary activities and in the table 1.2 the support activities are shown:

Table 1.1 Primary Activities in the Value Chain of Bangladesh Apparel Industry:

Name of the Primary Activities	Works done for the activity
Inbound logistics,	Receiving the raw materials, warehousing, inventory control of input materials, keeping materials in the bonded warehouse.
Operations,	Cutting, making (stitching, knitting, weaving), trimming, ironing, packing, sorting and inspecting of the items produced
Outbound logistics,	Storing of the finished goods, loading on containers, transporting though vans to port for shipment.
Marketing and sales	Participating in international trade fair, personal sales calls, web-based communication, putting add in industry specific journal and magazines
Services	Maintaining and enhancing the products' value adding customer support, quality assurance and repair and maintenance service.

Table 1.2 Support Activities in the Value Chain of Bangladesh Apparel Industry:

Name of the Primary Activities	Works done for the activity
Procurement	Purchasing the raw materials and other inputs used in value creating activities. Here online technology along with usage of software can provide some advantages.
Technology Development and Designing	Research and development, process

	automation, introducing and up-grading Computer Aided Design (CAD) and Computer Aided Machinery (CAM), utilization of various inventory management software like Enterprise Resource Planning (ERP) and quality inspection modern device etc.
Human Resource Management (HRM)	Selecting, recruiting, training, monitoring, appraising etc are HRM activities. But these activities have to be firm-specifically tailored for getting maximum output. Lean work force can be very supportive in this regard
Firm Infrastructure	Financing, legal activities, location choice, connecting to easy way for shipment, safety and security like fire protection, canteen facility, maternity care facility, rest room, ergonomics etc. Compliance issues are much related to these activities

From the above mentioned table, we have seen the activities segregated by the value chain as described by Porter (1985). But Gereffi (1999) redesigned the chain for apparel manufacturing firms in the other way.

Gereffi has focused on gradual up-gradation stages rather than dividing the tasks between primary and supportive activities. But interestingly, if we carefully see the value chain design by Porter (1985) and the IU through the value chain of Gereffi (1999), we see that most of the primary activities are the up-grading activities for the CMT apparel firms as described by Gereffi. Then question may be raised what the use of support activities in the framework of

Gereffi is. The answer is that although Gereffi has not told anything about those support activities of Porter, the activities have been seen as the resources and capabilities of the firms by many scholars on GAVC like Yongming et al. (2006) and Grunsven and Smakman (2002). In chapter 3 and 5 we shall discuss how support activities can be seen as the resources and capabilities.

Table 1.3: Relation between Porter's Value Chain and Gereffi's IUVC:

Activities for the up-gradation as mentioned by Gereffi (1999)	Similarity of the tasks in the value chain as described by Porter (1985)
Designing	Operation (support activity in the value chain)
Cutting, making and trimming (the core activities)	Operation (Primary activity in the value chain)
Procurement	Support activity in the value chain
Logistics	Inbound logistic and outbound logistics (primary activities in the value chain)
Branding	Marketing and sales activities (primary activities in the value chain)

While matching the two types of value chains the confusion arises whether designing can be grouped both as a primary activity or a support activity. As Porter described, it falls under technology in the group of support activities. But in the endeavor of integration of businesses, the apparel firms are seeing it as one of the primary activities.

1.4 Resources and Capabilities of Apparel firms

Now we shall see what the available resource and capabilities for the CMT manufacturers are. In the table 1.4 we shall distribute the resources and capabilities required for each task among the support activities as segregated according to Porter's value chain diagram. Here the procurement activities are excluded because according to Gereffi (1999) these activities fall under upgrading activities through value chain.

Table 1.4: Allocation of Apparel Firms' Resource and Capabilities in The Porter's Value Chain's Support Activities

Name of the Support Activities	Resources and capabilities used for doing the activities
Technology Development	Information Technology (IT) set up and modern manufacturing systems (for example lean or agile or leagile manufacturing systems).
Human Resource Management	Workers are great resources if they are trained and knowledge is developed through other means also like multi-skilling, work rotation or problem solving discussion. IT technology skill development can be a great intangible resource for the firms.
Firm Infrastructure	Ergonomic design of the production floor, work floor with enough space and light, canteen, rest room, maternity care room, health check up facility.

After excluding procurement from support activities with a view to match the activities according to the Gereffi's description of IUVC, we have distributed the tasks under three types of support activities as described by Porter (1985). If we broadly categorize these three groups of activities as described in table 4, on the basis of present context of Bangladesh Apparel industry we find four types of resources and capabilities. These are: 1. Modern Manufacturing System 2. HRM practices 3. IT and 4. Social Compliance Factors (SCF) (here it is highly related to firm infrastructure).

If we carefully see into the resources and capability required for supporting activities in the table 1.4, we find that the resource and capabilities here can be divided into another two types: one is tangible and another is intangible. All the hardware and machinery and other firm

infrastructure are tangible assets, and all the experience, skills and knowledge required for operating, coordinating or innovating are intangible asset. Tangible asset involves explicit knowledge and intangible asset involve tacit knowledge. This type of categorization is very important here because in chapter 3, we shall see decoding of knowledge or skills required for relevant business is very important IU, and this is the core issue for this study.

1.5 Resources and Capabilities of Apparel Firms and their Influence on Governance of Value Chain

The factors that determine the governance type of supply chain is described in section 3.1. As described by Gereffi et al. (2005), the main dominating reasons for changing in the governance type are: 1. the asset specificity of the other businesses which cannot be available for the CMT manufacturers for their bounded rationality and 2. the lack of information and inability to decode the knowledge required for the relevant business in the same value chain.

If the manufacturing system of an apparel firm is like that it can generate various relevant knowledge for the firms, there is a possibility that the firm will be a store house of knowledge besides being an apparel producer. In this case, the firm has to be a learning organization which continuously looks for new innovative way of production for gaining competitive advantages in the market. If the work forces with a dynamic manufacturing system can continuously gains knowledge, there is a possibility that the firms can develop the ability to decode the knowledge of the relevant businesses (Nonaka, 1994). Therefore, the risk for acquiring the asset with high asset specificity of the relevant business will also be reduced as the knowledge and experience needed for the new business is already gained by the firm. Consequently, the firm with a dynamic manufacturing system may strive for IUVC. But to establish a dynamic manufacturing system is not so easy because the firms have to implement dynamic work force and supporting technology especially IT for that. For example, lean or agile manufacturing systems are very dynamic manufacturing systems which strive to reduce the wastes, and at the same time it ensures better quality and reduces delivery time by dint of pull marketing system. The underlying principles of these manufacturing systems are continuous improvement and just-in-time. In the similar way, Milgrom and Roberts (1990) termed it as modern manufacturing system. Just they have emphasized on one more thing, and

it is flexibility in production. These manufacturing systems cannot be established, unless the firm has a committed, trained and enthusiastic work force. IT especially designed for lean or agile is also required for these manufacturing systems. Agile is highly depended on information technology. Therefore, if we think that a modern manufacturing system like leagile (combination of lean and agile) can contribute to IUVC, we have to group it with specially designed HRM practices and IT. In this way, the modern manufacturing system like leagile manufacturing systems (LAMS) is related to the factors that influence on governance type of supply chain, and this governance of supply chain actually facilitates IUVC or vertical integration (VI).

Another way that resources and capabilities can have impact on governance of supply chain is pull marketing system. For maintaining pull marketing, the firms have to connect itself to market information network efficiently. Because of that the firms rely on IT by which the firm gets the information about end market and supply market time to time, and thereby can make an efficient procurement. Here the lack of information cannot make any bounded rationality in the manufacturer and the buyers or suppliers cannot seek any extra rent or act as opportunists.

One very important factor that exists as the back tail of HRM is social compliance. SCFs can also be resources for the firms. Theses factors create a suitable environment for the managers to make an efficient work force. In chapter 6, we shall discuss on it.

1.6 Competitive Advantages and Firm Performance Gained by IUVC

Porter is the most influential author in the issue of competitive advantages (CA) both in national level and firm level. One of his important advocacies is that a firm should go either for cost advantage or differentiation (mainly by quality). RBV is another theory which deals in competitive advantage issues. But it does not tell anything about trading off between cost and quality. Rather it describes the mean of gaining CA. It means to gain sustainable CA a firm should make the product and production process valuable, rare, in-imitable and organize itself so that the firm can exploit the resources. In short, they are called VRIO. But there is another view which is very much applicable for firms which do business as a part of supply chain. It is capability based view (CBV). According to this view, a firm can seek for all types of CA like

cost, quality, flexibility or reliability if they continuously try to gain dynamic capability (Sehgal, 2011; Teece et. al, 2007). Through IUVC there is a possibility that firms can achieve that dynamic capability and strive for all the objectives of competitive advantages simultaneously.

The basic logic for gaining CA through integration in the value chain was elaborated by Porter (1985). This study would like to utilize those logics for explaining the relation between IUVC and competitive advantages. But this study sharply contrasts with Porter's idea of trading off between cost and quality. Interestingly, this study finds it more convenient to cling with CBV. The logic for gaining CA through the value chain:

Economies of Scale and Economies of Scope: Whereas, 'economies of scale' for a firm primarily refers to reduction in average cost (cost per unit) associated with increasing the scale of production for a single product type, 'economies of scope' refers to lowering the average cost for a firm in producing two or more products (Hayes and Pisano, 1996). By integrating the business with several other businesses like procurement, logistics or designing the apparel firms can share the common knowledge, information, IT, operational steps and administrative overhead. By undertaking the design activities the firms can go for several different product lines and along with modern manufacturing system like LAMS, they can implement several different production processes. These several different production processes can share the common tasks among themselves. Therefore, through integration the firms can reduce the overall cost by economies of scope and also can increase the differentiation by producing variety of products. This also facilitates product flexibility as integration allows changing of production layout in a flexible way.

Reduction in Transaction Cost: Transaction cost in the supply chain differs due to different global governance types (Williamson, 1991). This governance types depend on some criteria like bounded rationality, opportunism, environmental factors, asset specificity and small number condition. By integration or IUVC the firms can also acquire asset specific value adding activities. For example, designing cost will be reduced much if it is done only by own designers for saving cost by avoiding other designers. Consequently, there will be no scope for

opportunism. If the apparel firms have own procurement division, the suppliers or buyers cannot be able to exploit the manufacturers due to the bounded rationality. Therefore, transaction cost is reduced by IUVC.

Learning: The learning curve mainly deals with the operating efficiency that a firm gains with experience by doing the same thing repeatedly. Another very important way of learning is gaining knowledge by participating in same relevant jobs (Gulbrandsen, 2009). IUVC gives the firms this opportunity very much. The learning through engaging in different relevant jobs, the firms can become more innovative in differentiating the product and also can reduce the cost of production. Another important advantage of learning by IUVC is that the firms can learn by committing mistakes while operating multiple types of businesses. The firms then can take measures for mitigating the mistakes accordingly. This gives the firm the image of reliability. But if the firms had to operate only single business, this vast range of learning would never be gained.

Quick Response: After integrating the CMT activities into designing, procurement or logistics activities the firms can do these by themselves. There is no need for wasting time to communicate and negotiation for doing those activities (Ananth and Mark, 1997). Moreover, the firms can quickly decide about to which order to response and from where to buy the raw materials. Therefore, the time from taking decision to procure raw materials and delivering to the end users is reduced to a great extent.

1.7 Objectives of the Study:

This dissertation focuses on the IUVC of the apparel firms pursuing LAMS in Bangladesh. The overall objective of this study is to find out the antecedent and outcome of Bangladeshi firms pursuing LAMS through empirical studies. The study intends to show the relation between antecedent factors and IUVC on the basis of RBV. Regarding antecedent factors, this study also intends to show that SCFs have a support for implementing HRM practices. Regarding outcome of the IUVC, this study intends to show the relation between IUVC and CA and FP on the basis of Porter's theory of CA, RBV and CBV.

Specific Objectives:

1. To show the relation between HRM practices and LAMS for the Bangladeshi apparel firms pursuing LAMS.

2. To show the relation between information technology and LAMS for the Bangladeshi apparel firms pursuing LAMS.

3. To show the relation between SCF factor and HRM practices for LAMS for the Bangladeshi apparel firms pursuing LAMS.

4. To show the relation between LAMS and IUVC for the Bangladeshi apparel firms pursuing LAMS.

5. To show the relation between IUVC and CA for the Bangladeshi apparel firms pursuing LAMS.

6. To show the relation between CA and FP for the Bangladeshi apparel firms pursuing LAMS

1.8 Significance of the Study:

This dissertation is expected to provide significant information about factors contributing to IUVC of the Bangladeshi firms pursuing for LAMS and also how the CA and FP can be yielded because of this IUVC. The dissertation also shows the patterns of IUVC so far happened in both Export Processing Zones (EPZ) and non- Export Processing Zones non-EPZ firms. The dissertation also shows which of the SCFs are important for implementing HRM practices for designed for LAMS.

For researchers, this study will be an important contribution to the theoretical discussions on Porter's idea on CA, RBV and CBV. This study has mainly tried to extend Gereffi's (1999) idea on IUVC to corporate and business level strategy which was vividly described by Grant

(2010). The dissertation has highly depended on the idea about decoding tacit knowledge through the practice of continuous improvement as propounded by Nonaka (1994).

As for the practitioners, this study would like to suggest whether modern manufacturing system like LAMS can work as a dynamic manufacturing system in the endeavor of IUVC. The top level management of the apparel firms can choose IUVC/ VI strategy as the strategy for gaining sustainable CA. In this endeavor, they must have to mull over suitable HRM practices along with SCFs supporting those practices and also over firm specific IT.

In regard to policy makers, this research will provide useful information for taking a decision about which types of trainings are to be provided for promoting suitable modern manufacturing systems like LAMS. This study would also help the policy makers to take the decision on which type of IT should be given easy access to the local market from other country in the endeavor of IUVC. The dissertation also suggests the government to monitor SCFs meticulously for the betterment of the firms.

1.9 Scope of the Study:

The dissertation utilizes strategic management theories for finding the way for gaining sustainable CA and FP for the Bangladeshi firms pursuing LAMS. This study encompasses the theories of Porter's CA, RBV, CBV and Gereffi's Idea of IU and Nonaka's (1994) idea of explicit knowledge and decoding tacit knowledge. This study selected the firms only from the Dhaka and Chittagong region. As this study strived to see whether by using LAMS, the firms are becoming able to upgrade through value chain, this dissertation went for purposive sampling. It limited the study only within those firms who are utilizing the principles of lean or agile or LAMS. The time span of conducting the survey was August and September of the year 2011. But another short study regarding compliance issues was done in the month of September, 2012.

1.10 Organization of Study:

This dissertation is organized into eight chapters. Contents of each chapter are presented briefly as follows (also refer to Figure 1-1):

Chapter 1: Introduction.

This chapter presents the background of the study, objectives of the study, scope of the study and significance of the study.

Chapter 2: Overview of the Apparel Industry of Bangladesh.

This chapter presents the trajectory of development of the apparel industry in Bangladesh, the factors contribute to the outstanding growth of Bangladesh apparel industry, types of firms, types of production, challenges encountered after MFA phase out, the future need of restructuring etc.

Chapter 3: Distribution of the Firms:

This chapter has segregated the sample firms into different patterns on the basis of value adding activities. It has shown the pattern of advancement of firms from CMT to ODM whether encompassing full path or partial or bypassing any of the intermediate stages for the Bangladeshi firms pursuing LAMS. Therefore, this chapter showed the distribution pattern on the basis of IUVC activities. This study has shown whether there is any significant difference in the indicators for HRM practices, IT, LAMS and FP.

Chapter 4: Literature Review

This chapter reviews previous studies that explained the factors used for IUVC, HRM practices, IT, SCF, CA and FP. This study shows the relationship among IU, its antecedent factors and outcome factors as well

Chapter 5: Impact of SCF on HRM Practices for LAMS

This chapter defines SCFs and indicators of SCF. By collecting secondary data on compliance issues of 75 firms, this study empirically shows the relation between SCFs and HRM practices for LAMS. It found that almost all types of social compliance factors' influence on HRM practices. But ergonomics and worker related compliance factors are more important.

Chapter 6: Antecedents of Industrial Up-gradation

The dissertation defines the indicators of antecedent factors of IUVC like HRM practices, IT and LAMS on the basis of Bangladesh apparel sector. Conducting a survey on 180 firms pursuing for LAMS, this chapter has drawn the following relations: i) relation between HRM practices and LAMS, ii) relation between IT and LAMS, and iii) relation between LAMS and IUVC. Structural equation modeling (SEM) is utilized for analyzing the data in this dissertation.

Chapter 7: Outcomes of Industrial Up-gradation through Value Chain

This study defines all the indicators of CA and FP for Bangladesh apparel sector. Conducting a survey on the same 180 firms pursuing for LAMS as like as the study in chapter 5, this study shows the relation between IUVC and CA and between CA and FP. Like chapter 6, this study also used SEM as the tool for analyzing the data.

Chapter 8: Conclusion

This chapter concludes the entire study with main findings of overall dissertation. This study has tried to show the deviation in the empirical study from the theories described for the study. This chapter has suggested for the implications for practitioners and policy makers about the firms pursuing LAMS. The limitations of the research were also pointed out. Finally, further research was recommended.

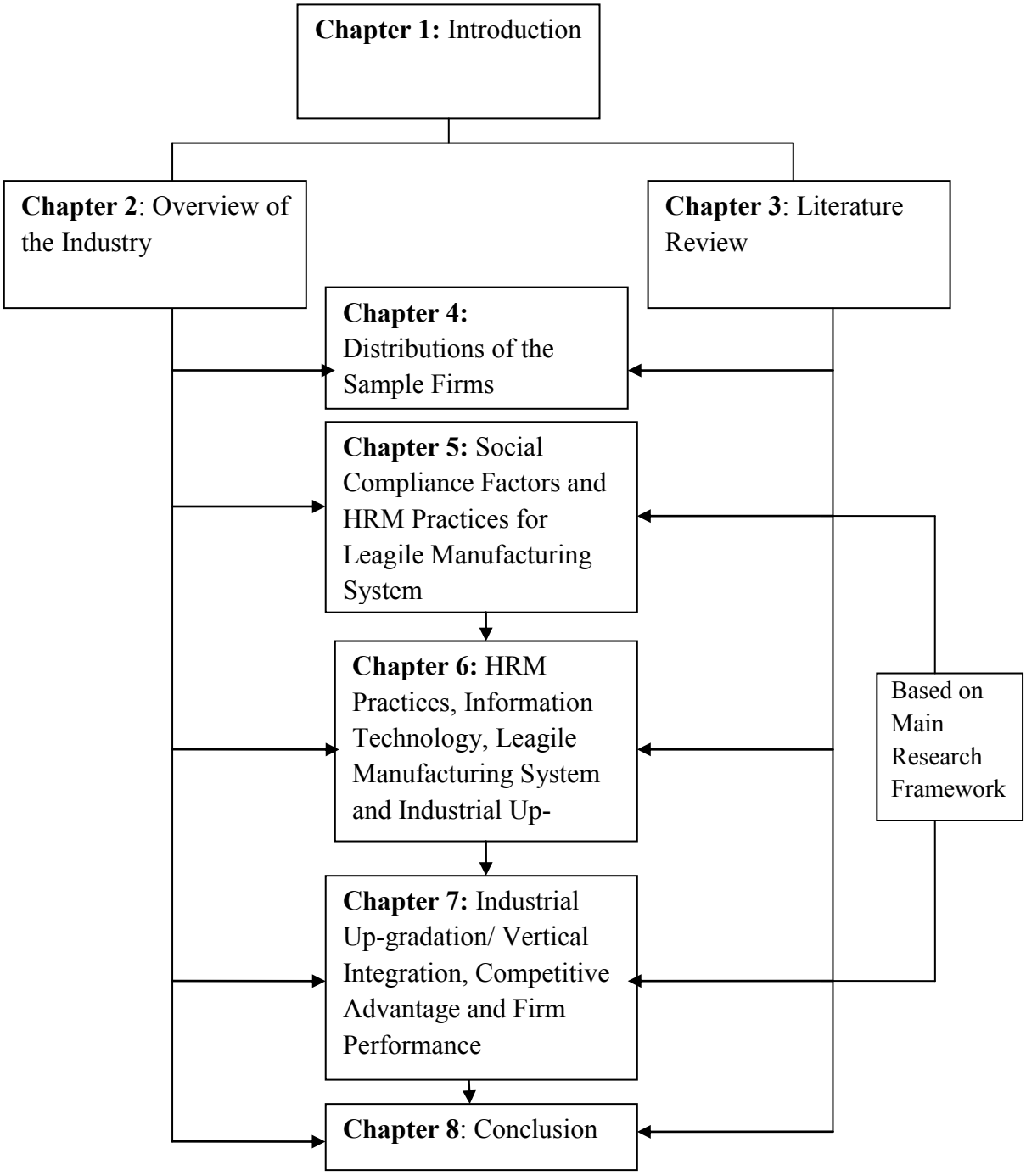

Figure 1.1 Organization of the Study

Chapter 2
Overview of the Industry

2.1 Introduction

The most magnificent thing that happened in the economy of Bangladesh is the growth of apparel sector. According to Staritz et al (2011), currently as of 2011, total 3.1 million people are employed in this sector including technical, non- technical and managerial employees. It comprises 40% of the total employment in the manufacturing sector of the country. Indirectly, more than 10 million people's fate is related to this sector. Many banks, insurance companies, scrap collecting companies, logistics firms, freight agents and various types of suppliers are dependent on the apparel sector. At the beginning, the international trade development agreements like MFA, preferential market access to the EU and specific government support policies harnessed the growth of this sector not only in Bangladesh but also in other developing countries. The sector started in the late 1970s and early 1980s in Bangladesh. At that time quota facilities were promulgated by the developed countries through General Agreement for Tariffs and Trades (GATT), and these quota facilities were not static for a particular region rather hopping from one country to another country at changing degrees (Siddiqi, 2005, Rahman et al. 2008). Bangladesh was one of the beneficiaries of these facilities. Because of quota facilities and abundant supply of labor forces at low cost, many experienced NIEs saw Bangladesh as a good opportunity to invest in apparel sector. In course time, South Korea and other East Asian countries invested in Bangladesh. Realizing the investment spree of these countries, Bangladesh government motivated the banks for providing bank loan at low interest rate and also went for tough negotiation for creating a guaranteed market through availing guaranteed quota facility. These steps encouraged the local entrepreneurs to follow the foreign entrepreneurs. Therefore, soon technology started to be transferred in the locally owned apparel firms through both technological externality and training from the foreign experts particularly from South Korea. Many of the scholars of the discipline of international economics predicted the growth of this sector would be much jolted in Bangladesh after the phase out of MFA. But all the speculations have gone wrong, as the data after 2005 shows more steady growth of this sector in both US and EU market.

Bangladesh's main competitive advantage is low labor costs which is the lowest among main apparel exporting countries in the world. Besides this, this sector has already gained a long term entrepreneurial experience, developed a moderately supportive backward linkages and a relationship network with financial institutions, logistics firms and the international buyers. All these have to be considered as the factors contributing for gaining CA. Because of these, Bangladesh possesses even more competitive apparel sector in the post-MFA period. It is observed from the data of National Board of Revenue that Bangladeshi apparel entrepreneurs have up-graded the technology by importing sophisticated machinery for which the management also up-graded (Rahman et al. 2008). It is observed that because of up-gradation the dynamic firms are able to response more efficiently in the supply chain. Eventually, some of the firms could up-grade their position in the value chain. However, Bangladeshi firms have faced many other challenges for sustaining CA. Some important issues are related to skills gap, particularly at the management, technological, and design and fashion skill levels, as well as challenges related to lead times, labor compliance and concentration in basic products.

2.2 Development of the Apparel Industry

Bangladesh has a long history of textile and apparel production, mostly for the domestic market. Since 1978 Bangladesh has been playing in the international market, and from 1980s South Korea, Taiwan and Hong Kong started to invest in and source from Bangladesh. There are two reasons for the growing interest for investing in Bangladesh by those countries. One is Bangladesh can supply the world's cheapest laborers and the other is Bangladesh enjoyed MFA quota until it phased out. Earlier Bangladesh has a good heritage in weaving and home made clothing and cottage industry for the domestic market but ready-made apparel industry even only for the domestic market came into being in the decade of 1980s. Reaz Garments and Jewel Garments are the pioneers in the idea that tailoring works can be made a corporate business in Bangladesh. These two firms hired professional tailors and rendered training to the helpers of tailors for making the garment goods in a large numbers by batches in production floors. The apparel export sector started on a large scale in the late 1970s and early 1980s when South Korean, Taiwanese and other East Asian manufacturers started to invest in and source from Bangladesh, motivated by MFA quota hopping and by access to Bangladesh's abundant supply of low cost labor. According to Quddus and Rashid (2000) in the year 1978,

Bangladeshi entrepreneur M. Nurul Quader made the breakthrough by establishing Desh Garments Ltd with the cooperation of Daewoo Corporation of Korea. At that time, Daewoo was a large apparel manufacturer but its manufacturing business hindered due to quota restriction. Therefore, they started to reallocate the manufacturing plant to the developing countries like Bangladesh from quota-restricted South Korea. As part of this collaboration, in 1979, Daewoo provided training to Desh supervisors and managers at its plants in South Korea. In this way, the initial transfer of technology and skill happened. By the mid-1980s, the group of apparel firms emerged as an industrial sector of the country and by the end of 1980s, it transpired that this sector gained immense success and would show much potentiality in export growth of the country.

2.3 The factors contributed to rapid growth

According to Staritz (2012), the most important factor that hatched the growth of Bangladesh apparel sector is the low production cost and still at present Bangladesh is dominating the global market because of low labor cost. But low production cost due to low labor cost was not the only factor for astonishing growth of this sector. Besides this, the MFA quota system, preferential market access to the EU, and government support policies hatched the growth of this sector. EU lifted all the quota restrictions for Bangladesh with the partial exception of the United Kingdom and France, which imposed quotas from 1985 to 2001. But the time when Bangladesh reached the triple digit export growth in 2003, the US imposed quota restrictions for 30 product categories which in export tax equivalents to 7.6 percent, and this is lower compared to India (20.0), China (36.0), and Pakistan (10.3) (Mlachila and Yang 2004). Generalized of System of Preference (GSP) was another great factor which contributed the growth of this sector in Bangladesh since 1980s. In the decade of 1980s, the exports to EU were lower than the United States. But after 1990 the export to EU started to surpass the amount of export to the United States. Besides the above mentioned two important factors, another factor was very crucial in raising up this sector. This is government policy. Two government policies fuelled the growth of apparel sector in Bangladesh. The first one is introduction of bonded warehouse in the 1980 for which firms can delay the payment of tariffs until they are ready to consume inputs imported earlier, and if the inputs are used for

producing exports, they are not required to pay the tariff (Ahmed 2009). The second one is back-to-back letters of credit (L/C). This was introduced through which exporters are able to open L/C in a local bank for the import of inputs against the export orders placed in their favor by the final apparel importers (master L/C). Thus, by showing the export order, firms can get credit to pay for imported inputs. At the time of payment for the final good, the cost of the imported items along with interest and other charges would be deducted by the local bank from the proceeds. Hence, manufacturers were excused from the financial involvements in of purchasing of imported inputs, and the financial outlay for apparel manufacturing was reduced to wages, energy, transport, and other overhead costs (Ahmed 2009; World Bank 2005b). According to Staritz et al. (2011), these policies were particularly crucial for the establishment of local firms in the apparel sector in Bangladesh.

2.4 The Growth Trajectory of Bangladesh Apparel Export

From the report of Staritz et al. (2011) prepared for World Bank, it is found that Bangladesh's apparel exports increased significantly from the late 1980s until 2004. Whereas apparel exports accounted for around $1 million in 1978 (Naznin, 2009), import data from Bangladesh's trading partners show that exports increased to $2,544 million in 1995 and to $7,945 million in 2004 (Table 2.1).

Table 2.1: Bangladesh Apparel Export to the World

	1995	1998	2001	2004	2005	2006	2007	2008	2009
Total Value ($ million)	2,544	3,704	5,032	7,945	8,026	10,415	11,181	13,464	14,189
Annual Growth rate (%)	-	10.6	3.5	25.3	1.0	29.8	7.3	20.4	5.4
Share of World Export (%)	1.7	2.1	2.6	2.6	3.0	3.6	3.5	4.0	4.8
Woven and Knit Value ($, million)									
Woven	1,762	2,394	2,968	4,035	3,991	5,051	5,222	6,016	6,412
Knit	782	1,310	2,064	3,911	4,035	5,365	5,959	7,448	7,778

Woven and Knit share of total import value (%)									
Woven	69.3	64.6	59.0	50.8	49.7	48.5	46.7	44.7	45.2
Knit	30.7	35.4	41.0	49.2	50.3	51.5	53.3	55.3	54.8

Source: United Nations Commodity Trade Statistics Database (UN Comtrade). Imports Reported by Partner Countries.

The share of Bangladesh in the global apparel exports increased from 1.7 percent in 1995 to above 3.2 percent in 2004. However, the overall export figures depict a significant change in the composition of Bangladesh's apparel exports with regard to export products and end markets. At the beginning and till the end of 1980s Bangladesh used to produce only woven products, but starting from the early 1990s Bangladesh opened a new chapter in her success story of apparel business by starting the production of knitwear especially sweaters and T-shirts and this production's export growth rate was 15% at the very initial stage of the year 1991. As a consequence of that, the growth rate rose to 31 percent in 1995 and in 2004, knit exports nearly reached 50 percent (Naznin, 2009). The international trade policy of preferential market access to the EU helped a lot in the sudden rise of knitwear production in Bangladesh. Until the early 1990s, the US was the main export destination for Bangladesh's apparel products, but in the 1990s, the EU-15 surpassed the United States as the number one export market. The share of total apparel exports going to the EU-15 remained above 50 percent (or approximately $US1 billion) in the second part of the 1990s and reached 64 percent (or approximately $US4 billion) in 2004. In 1980s apparel exports accounted less than 1% of the total export. But by dint of multifarious successes in this sector, apparel export accounted for 75% of the total export in 2004 (table 2.2). Not only the amount of export grew but also the number of apparel firms increased from around 130 in 1984 to nearly 4,000 in 2004.

Table 2.2: Bangladeshi Apparel Industry: Factories, Employment and Share of Total Export

Year	Number of Apparel Factories	Employment	Share of apparel exports (%)
1981	-	-	0.4
1982	-	-	1.1
1984	134	40,000	3.9
1985	384	115,000	12.4
1986	594	198,000	16.1
1987	629	283,000	27.7
1988	685	306,000	35.2
1989	725	317,000	36.5
1990	759	335,000	32.5
1991	834	402,000	50.5
1992	1,163	582,000	59.3
1993	1,537	804,000	60.6
1994	1,839	827,000	61.4
1995	2,182	1,200,000	64.2
1996	2,353	1,290,000	65.6
1997	2,503	1,300,000	67.9
1998	2,726	1,500,000	73.3
1999	2,963	1,600,000	75.7
2000	3,200	1,600,000	75.6
2001	3,480	1,800,000	75.1
2002	3,618	1,800,000	76.6
2003	3,760	2,000,000	75.0
2004	3,957	2,000,000	74.8
2005	4,107	2,000,000	74.2
2006	4,220	2,200,000	75.1
2007	4,490	2,400,000	75.6
2008	4,743	2,800,000	75.8
2009	4825	3,100,000	79.3

Source: BGMEA (2011)

2.5 Employment

The report of Staritz et al. (2011) prepared for World Bank showed that employment levels in Bangladesh's apparel sector increased significantly, from a little more than 100,000 in 1985 to 3,100,000 workers in 2009. Employment grew from 0.1 million in 1985 to 2.0 million in 2004 (Table 2.2). Except in the year 1999, 2002, 2004, and 2005 this sector always enjoyed positive growth rate in terms of employment and suffered stagnated growth, not negative growth in the mentioned years. According to the data of Bangladesh Department of Textiles (DOT), apparel and textile sectors in together employed 4,200,000 employees in 2009. Employees were split into three categories: textile technologists, nontechnical workers, and general workers. General workers constitute 93 percent of all workers, making this the largest category, with 3.9 million workers. The importance of the apparel sector can be understood by the distribution of employment per subsector. The data from DOT shows that out of 3.1 million workers, 2.5 million were employed in the ready-made garment (RMG) segment and nearly 600,000 in the sweater segment, representing 74 percent of total workers in textile and apparel-related sectors. The knitting industry accounts for 12.0 percent of total employment, spinning for 5.8 percent, dyeing for 2.4 percent, weaving for 2.4 percent, and the power loom segment for 1.2 percent.

2.6 Types of Firms

In comparison to other apparel manufacturing LDCs, Bangladeshi firms are much more locally owned. At the initial stage, FDI played the most important role to build up this industry. But because of many motivating factors, mentioned above Bangladeshi entrepreneurs soon entered into this business in a large number and made their success. This success is little exceptional in comparison to other apparel manufacturing LDCs. Evidence suggests that technological spill over happened from foreign firms to the local firms from the very beginning (Loo Ki, 2005). Out of the 4,220 firms in Bangladesh at the end of 2006, only 83 were wholly or partially foreign owned. Before 2005, Government encouraged FDI only in the EPZs. Moreover, the foreign firms were bound under the restrictions that they have to go for

associated investment in backward linkage industries (spinning and/or weaving or knitting, dyeing, and finishing). But the government removed this restriction through revised industrial policy in 2005. Even after that foreign firms are not found much interested to invest in the non-EPZ area (IMF 2008). The reason may be that the local firms are much resilient in the non-EPZ area in comparison to foreign firms and much culturally accustomed to dealing with laborers in non-EPZ area which is not under incubation facility of EPZ. Bangladesh was able to invite $500 million aggregate FDI in the textile and apparel sector in EPZs from 1983 to 2006, and this amount accounts for around 75 percent of total investment in textile and apparel factories in EPZs. Despite the dominance of FDI in EPZs, the vast majority of apparel firms is located outside of EPZs and is locally owned. According to the data of World Bank Report (2005) EPZ constitutes 1 percent of apparel firms of the entire country and 65 percent of them are owned by foreign owners.

2.7 Types of Value Adding Activities by the Firms in the Apparel Value Chain

According to Moazzem and Rahman (2011), "the development of GAVC and international production networks (IPNs) strengthens the links between various domestic and international enterprises operating in different territories in producing or delivering goods and services. More importantly, these networks ensure the involvement of the most efficient enterprises in the value chain, thus providing an optimum level of return for enterprises, high quality and reasonable prices for consumers, the efficient allocation of resources" .

If we divide the value adding stages of apparel, we see that it is divided into five interrelated but separate stages. These are raw materials network, component network, production network, export network and marketing network (Gereffi, 1999). In the step of production network, the apparel manufacturers are involved mainly in CMT activities. But beside these firms can integrate their activities into commercial activities like logistics, transportation and purchasing and also in designing and branding activities. Firms' ability to involve in the number of activities depends on the firms' ability to set itself in the value chain. Bangladeshi firms have been able to bring some change in respect of value adding functions for the last ten years. Ten years before maximum of the firms were CMT in their kind. A World Bank study (World Bank 2005b) states that in 2005 two-thirds of apparel firms in Bangladesh were

involved in CMT production and many of the experienced firms already engaged in other commercial activities like shipment, banking transaction, import of raw materials, finishing and packaging which are named as Free on Board (FOB) firms by World Bank report. As input sourcing and financing are important steps, the apparel firms are gaining more negotiation power and business experience and saving much time for the buyers. The term used by World Bank as FOB is described as OEM by Gereffi (1999). Besides important progress in upgrading from CMT to OEM production, Bangladeshi firms have only made limited progress in developing more advanced capabilities in design and branding. The firms who can do design activities apart from CMT and commercial activities are called Original Design Manufacturers (ODM), and when it can finally drive for its own brand, it is called Original Brand Manufacturer (OBM). Some of the apparel firms in Bangladesh firms can develop the products by their own and have own design studio. Sometimes they design the product fully or sometimes they negotiate with the buyers about the design and jointly take decision. Many of them perform merchandising tasks by their own and have developed a good relationship network with suppliers and international buying agents. They can take purchasing decision by their own. In Bangladesh some of the large and foreign-owned firms are of this kind, and they can be regarded as OEM firms. These firms are struggling for continuous product upgrading and produce more complex and higher-value apparel such as dresses, suits, jackets, and technical apparel. But for other small and sub-contracted firms this scenario is absent. Although these small firms also make a profit, they do not have much prosperity in the future for sustaining in the competitive market. They have very limited or nonexistent product development, design or marketing, and merchandising capabilities.

2.8 Challenges Encountered during MFA Phase Out

Many of the economics scholars expected that Bangladesh would suffer a massive down turn in the export of apparels in the post MFA era; for example: the statement made in Mlachila and Yang (2004). But Bangladeshi entrepreneurs proved wrong all the predictions made by the economists. Even during the global economic recession of 2008 Bangladesh kept itself robust in the saddle of the winning horse. Here, the main factor worked is the low labor cost which could not be offered by other competitors. From the data of Table 2.1, we see that, total apparel exports increased to $8,026 million in 2005, which accounts for a 1 percent increase

from 2004 (Table 2.1). On the other hand, it is interesting to see that Bangladesh suffered a decline in the share of the total global apparel production in 2004 from 3.2 to 3.0 percent between 2004 and 2005. But it is assumed that Bangladeshi owners soon realized it and equipped with modern machinery. In accordance of that, the share of total apparel export increased again to 3.6 percent in 2006. The challenges of post MFA era were encountered by two ways: one is offering products at low prices and the other is up-grading both technologically and through the value chain of the firms themselves. With the phase out of MFA era, the historic economic recession happened. Surprisingly, this was a coincident for the global apparel market. Many countries lost market, and many countries took the opportunity of Wal-Mart effect and China effect. Wal-Mart effect is about Wal-Mart's business strategy of purchasing low cost products with moderate quality for which some LDCs gained competitive advantage over China by usurping businesses of China. And China effect is about China's ability of expanding export to EU, USA and Japan, and finally China lost its competitiveness to other DCs and LDCs. Therefore, rise of China created a place for the DCs and LDCs in the international trading, but China itself lost some businesses to other DCS and LDCs. Bangladesh is very lucky that the factors which are supposed to contribute for gaining CA clicked at the correct time in that moment of crisis. Bangladesh is one of the countries who could supply the product at a very low cost at the crisis. Bangladeshi entrepreneur kept the labor cost even below the lowest possible rate fixed by International Labor Organization (ILO) and also cut the profit margin as much as possible. Besides complying with low price in the highly competitive market after the economic recession most of the large firms had prepared themselves for the MFA phase out and had invested in new technology and machinery, developed broader capabilities, and established direct relationships with buyers. Smaller and subcontracting firms were not well prepared, and several of them were closed in the context of the MFA phase out. Thus, export growth in the post-MFA was higher for larger firms than for medium and smaller firms (Rahman et al., 2008). The industry was generally highly concentrated in 2004; the top 500 firms exported nearly 75 percent of total apparel exports and the top 650, more than 80 percent (World Bank 2005b).

2.9 The Challenges to be Encountered under the Framework of GAVC

In the clothing sector, a strong value chain exists between suppliers of raw materials and intermediate products in different countries, manufacturers and buyers of these products at the retailers' level, both in developed and DCs. It is called GAVC. In the initial stage of development of the apparel sector, outsourcing was mainly based on location advantage like close geographical proximity of the final market to the producing countries (Nordas, 2004). But with the gradual liberalization of the textile and apparel industries, the fragmentation decisions have been influenced by (a) level of skill and flexibility of the workforce, (b) the availability of capital, (c) the level of technology, transportation and communication infrastructure, and (d) to some extent, supportive domestic policies. In Bangladesh, the apparel value chain has been developing gradually since the early 1980s. Initially, the low cost of production due to very low wage levels motivated foreign firms to shift the relatively labor-intensive part of the production process to Bangladesh. The opportunity to supply apparel under the quota facility to the markets of the developed countries, particularly in the US and EU, has also played a major role in the relocation of production units from developing countries. Entrepreneurs from the South Korea, Taiwan and Hong Kong invested in EPZs during the early 1980s. But this position of Bangladesh in the apparel value chain, determined by the developed countries will not contribute enough for sustaining in the acute competition in the post MFA era. The reason is that Bangladesh does not have much scope for economic diplomacy. For developing the country's economy especially if we consider it from the demand side economy, this position will not generate enough buying capacity among the people involved in this industry. The manufacturers in Bangladesh add a little value to the apparel product, and it is only about 10% (Siddiqi, 2005). To improve these scenarios Bangladeshi firms must have to upgrade their activities. To upgrade the firms for positioning in the better position of the value chain they have to improve the technology, differentiate the products and diversify the market, and the most importantly they have to enrich the work force with human pools of talents. By doing so, the firms can add more value, and therefore can make more profit which in turn enable them for further industrialization. At the same time, the firms can achieve more negotiation power for sharing due profit for themselves.

2.10 The Need for Restructuring:

It is already mentioned that the majority of Bangladeshi apparel firms are involved in CMT production. At present, mostly the foreign buyers undertake and dominate the marketing activities including market research to develop new designs in response to changes in consumer taste. In this part of chapter, the discussion of Siddiqi (2005) will be much highlighted. According to him marketing intermediaries suck almost 60% of the prices at which the products are sold by the retailers as their profit or service charges. The Bangladeshi subcontractors/entrepreneurs earn relatively small margins on CMT charges. To increase their profits, they need to build up their own marketing capabilities, minimize the use of external marketing intermediaries and develop their own marketing capabilities so that they can procure the orders directly from retailers, and distribute their apparels through their own logistic and commercial channels. But opening own outlet in the end market is highly expensive for the Bangladeshi entrepreneurs. At this point of entrepreneurial career it is very difficult for the Bangladeshi owners to open own outlet. But at least they should be able to bypass the foreign buying houses, which now dominate the marketing of garments produced in Bangladesh. They must be active players in the distribution channels. By the evolutionary process through the development of resources and capabilities the owners can develop forward and backward integration. For up-gradation from CMT to OEM or ODM, the firms need a set of combined strategies to promote and market existing products, and to develop, design and to market new products to existing and also new markets and market segments. It may involve both trade creation and trade diversion through market and marketing research. According to Gereffi (1999) also, this can be a substantial way for survival in the acute competition in the global completion of the apparel market.

A very serious weakness of Bangladesh is its image in the global market. In general, buyers have the perception that Bangladesh is suitable for sourcing products for low-end markets only. This perception has to be changed by procuring and processing orders for high-value and high-quality items for prestigious market segments. It must be noted that low wage is only one advantage. But in the new global competition, non-price factors have become more important. Bangladesh must improve in quick response, product quality, product differentiation, market differentiation and service quality. Long lead-time will continue to discourage the buyers to

source merchandises from Bangladesh particularly if the same products are available from Mexico, Caribbean, Sub-Saharan and other Asian countries. Therefore, along with cost of production lead-time, quality and verity must be improved substantially. The areas where the restructuring or improvement is needed are: 1. technological restructuring which means change in the machinery and its required manpower to handle, 2. product diversification, and 3. market diversification. In the preceding chapters we shall see that all these restructuring needs dynamic manufacturing system, good HRM practices and IT. This study finds that LAMS and its required HRM practice and IT is such a system which facilitates all these restructuring. For example, for market diversification and product diversification, product variety, customization and product differentiation are necessary, and these can be implemented by LAMS. It is believed that LAMS can make happened all these restructuring (Gunasekaran, 2001). It is believed by many Bangladeshi scholars that these restructuring and improvement will help Bangladeshi firms upgrading from CMT production base to OEM or ODM production base. Therefore, here in the below these three issues are depicted on the basis of the scenario of Bangladesh Apparel Industry.

2.11 Changes in the Use of Modern Machinery

For up-grading into OEM or ODM, the firms must with their own commercial channel. Otherwise, they cannot become the OEM firms. Therefore, usage of much more modern machinery can be an indicator of their transformation into upgraded production base like OEM or ODM. Available information shows that import of textile and apparel machineries has gone up substantially since 2000. According to Table 2.3, import of machineries over the last five

years was as follows: US$216 million in FY2002, US$246 million in FY2003, US$355 million in FY2004, US$385 million in FY2005 and US$300 million in the

Table 2.3: Import of Machinery from Different Sources

(in Million USD)

Countries	2001-2002	2002-2003	2003-2004	2004-2005	2005-2006 (half)	Trend in Annual Growth Rate (upto 2005-2006)
China	31.13	41.74	74.92	76.42	62.15	32.79
Germany	25.36	40.66	62.78	48.23	36.63	23.64
Hong Kong	4.96	4.43	6.12	4.37	1.82	-.59
India	13.61	13.26	16.58	20.92	9.48	15.13
Italy	9.44	13.46	11.66	25.52	13.67	28.41
Japan	33.74	40.33	68.74	52.29	63.65	18.48
Korea	14.78	15.54	17.43	26.54	16.38	18.72
Singapore	18.78	11.59	12.51	14.34	9.68	-7.33
Switzerland	17.31	12.38	16.16	29.03	15.94	18.18
Taiwan	15.34	17.96	36.23	42.91	36.42	37.87
USA	6.54	6.15	4.87	8.82	7.68	6.65
Others	25.07	28.69	27.20	35.32	26.56	9.74
Total	216.04	246.20	355.20	384.71	300.06	20.98
Countries	2001-2002	2002-2003	2003-2004	2004-2005	2005-2006 (half)	Trend in Annual Growth Rate (upto 2005-2006)
China	31.13	41.74	74.92	76.42	62.15	32.79
Germany	25.36	40.66	62.78	48.23	36.63	23.64
Hong Kong	4.96	4.43	6.12	4.37	1.82	-.59
India	13.61	13.26	16.58	20.92	9.48	15.13

Italy	9.44	13.46	11.66	25.52	13.67	28.41
Japan	33.74	40.33	68.74	52.29	63.65	18.48
Korea	14.78	15.54	17.43	26.54	16.38	18.72
Singapore	18.78	11.59	12.51	14.34	9.68	-7.33
Switzerland	17.31	12.38	16.16	29.03	15.94	18.18
Taiwan	15.34	17.96	36.23	42.91	36.42	37.87
USA	6.54	6.15	4.87	8.82	7.68	6.65
Others	25.07	28.69	27.20	35.32	26.56	9.74
Total	216.04	246.20	355.20	384.71	300.06	20.98

Source: Rahman et al. (2008) (CPD-RMG Database)

first half of FY2006 (July-December). Between FY2002 and FY2005, import of textile and apparel machineries has demonstrated a trend growth of 21 percent. Compared to the have to rely on modern machinery rather than relying on manual operation. For undertaking commercial activities, the firms can no more act as the sub-contracted firm. They have to be the full package manufacturer, and they have to be able to produce various types of quality products import value for these five years import of apparel and textile machinery in the 1990s was rather low. During 1990-91, machinery imported to the country was a mere $78.22 million. With an annual growth rate of 7 percent, the amount rose to $134.5 million in 1999-00.

The data bears testimony to the assertion that efforts towards industrial up gradation through technological up gradation at enterprise level were initiated well before 2005. Robust growth of import of machineries since early 2000 indicates an urge on the part of entrepreneurs to maintain competitiveness in view of China's accession into WTO and the MFA phase out.

Among different types of machineries, the share of import of automatic sewing machines has substantially increased in recent years (from 23 percent in 2002 to 78 percent in the first six months of 2006); on the other hand, share of sewing machines (excluding automatic units) has substantially fallen from 57 percent over the same period, (Table 2.4).

Table 2.4: Import of Garment Making Machineries of Various Types of Machines

(in Million USD)

Description of Machinery	2001-2002	2002-2003	2003-2004	2004-2005	2005-2006
Automatic Sewing Machines	23.36	48.43	67.52	70.41	77.54
Sewing Machines for Industrial Type	57.07	31.29	20.09	17.24	14.75
Ironing Machines and Presses	2.84	2.61	2.36	4.12	2.49
Others	16.72	17.66	10.04	8.24	5.22

Source: Rahman et al. (2008) (CPD-RMG Database)

Table 2.5 bears out that the large enterprises tended to import more automated machineries compared to medium and small ones. Small and medium enterprises tended to purchase these machineries from local markets from commercial importers. The trend indicates that large enterprises would demand larger number of skilled workers to operate these machineries compared to relatively small ones. It is expected that use of automated (multifunctional) machineries will ensure a higher productivity and better quality of output.

Table 2.5: Import of Garment Making Machineries: Share of Different Categories of RMG Enterprises

In percentage

Description of machinery	Share by firm size	2001-2002	2002-2003	2003-2004	2004-2005	2005-2006
Automatic Sewing Machines	Share of Large Enterprise	64.73	73.98	66.16	72.25	72.28
	Share of Medium Enterprise	10.20	10.03	16.35	9.63	11.24
	Share of Small Enterprise	25.07	15.99	17.49	18.13	16.48
		100	100	100	100	100
Sewing Machines of Industrial Type	Share of Large Enterprise	67.43	70.31	63.42	67.96	74.80
	Share of Medium Enterprise	9.91	13.00	11.38	14.87	14.11
	Share of Small Enterprise	22.66	16.69	25.21	17.18	11.08
		100	100	100	100	100

Source: Rahman et al. (2008) (CPD-RMG Database)

According to Rahman et al. (2008), in Cambodia, major operations in the garment factories involve working with manual laying and cutting machines. A few firms work with CAD systems, but this type of technology is not widely in use. In Sri Lanka, most of the garment factories make use of basic sewing machines, and very few have invested in sophisticated technology for cutting and packaging. In Pakistan, most of the machineries and equipments, of low to middle range in terms of sophistication, are imported from the US, Germany, Belgium, France, Japan, China and Thailand. In terms of sophistication, not much variation is observed between Bangladesh and its neighboring garment producing countries.

2.12 Product Concentration/ Diversification

In case of product diversification Bangladesh could not achieve good success except initiating production of knitwear in the early 1990s. Initially, Bangladesh concentrated in the production of only a few inexpensive products for the lower end of the markets, because the foreign buyers decided to source those particular types of apparels. At the initial stage, Bangladesh made production-oriented response to buyers' orders as subcontractors on the basis of CMT, and its response was limited to quota items only. Such limited response was natural because, Bangladesh had neither the opportunity nor the ability to design, promote and market its own products in the international markets. Thus, until 1989, Bangladeshi firms received the orders as subcontractors, and they manufactured and exported only woven garments; for example, basic shirts as quota items. Later on, as a number of large local firms acquired marketing expertise, they diversified into non-quota woven wear. Within a short period of time, another major diversification occurred when Bangladeshi firms diversified into knitwear exports in 1990. The growth trend in the knitwear export is indicated in Table 2.6.

From the data of Bangladesh Garments Manufactures and Exporters Association (BGMEA) website we see that a limited number of products have dominated the export basket of Bangladesh over time. Concentration of export is intensified. Top 5 products such as shirts, trousers, jackets, T-shirts and sweaters accounted for 62.7 percent of total export in 2008, which was 52.2 percent in 2001 (Table 2.6). However, an intra-apparels diversification has taken place over time, where export of shirts have lost its share (from 16.6 percent of total

apparels export in 2001 to 6.5 percent in 2008), and has been outperformed by trousers (17.8 percent), jackets (8.4 percent) and T-shirts (19.6 percent). These changes in the export structure are attributed to the development of backward linkage textiles sector especially in the knitwear products (T-shirts and sweaters), and partly in woven wear products (trousers), which can be said to have enhanced competitiveness of Bangladeshi products in global markets.

Table 2.6: Main Apparel Items Exported from Bangladesh

(in Million USD)

Year (01, April-31,March)	Shirt	Trouser	Jacket	T-Shirt	Sweater
1999-00	1021.17	484.06	439.77	563.58	325.07
2000-01	1073.59	656.33	573.74	597.42	476.87
2001-02	871.21	636.61	412.34	546.28	517.83
2002-03	1019.87	643.66	464.51	642.62	578.37
2003-04	1116.57	1334.85	364.77	1062.10	616.31
2004-05	1053.34	1667.72	430.28	1349.71	893.12
2005-06	1056.69	2165.25	389.52	1781.51	1044.01
2006-07	943.44	2201.32	1005.06	2208.90	1248.09
2007-08	915.60	2512.74	1181.52	2765.56	1474.09

Source: BGMEA website

Based on the database of World Integrated Trade Solution (WITS), Moazzem and Rahman (2011) carried out an analysis on export diversity using the technique of export diversity index. Estimated diversity index of Bangladesh is compared with her major competitors such as China, India and Vietnam in the two major markets, the US and the EU (Table 2.7), and was found to be lower in both categories of products in both the major markets. More importantly, Bangladesh's export diversity in the US has shown a deceleration between 2005 and 2007 both in case of knitwear and woven wear products, while her export diversity to the

EU has demonstrated a strong upward trend in case of knitwear products, and in some extent to in woven wear products.

$$H = \sum_{i=1}^{n} S_i^2$$

Here S_i = share of product i in the export basket of the country concerned.

ΣS_i^2 thus becomes a measure of export concentration with value ranging from 0 to 1, where 0 means the basket is perfectly diversified and 1 means total concentration. For example if only one product contributes to all the exports the index will be 1. But the study conducted by Moazzem and Rahman (2011) has used D=1-H to measure export diversity. So the way diversity index is calculated, the value of 0 means concentration and 1 means perfect diversification.

Table 2.7 : Export Diversity Index of Bangladesh's Apparels

Exporting Country	Year	US		EU	
		Knit	Woven	Knit	Woven
Bangladesh	2005	0.941	0.908	0.713	0.840
	2006	0.902	0.878	0.705	0.829
	2007	0.902	0.859	0.760	0.882
China	2005	0.942	0.971	0.958	0.964
	2006	0.951	0.971	0.964	0.967
	2007	0.958	0.972	0.960	0.968
India	2005	0.832	0.910	0.838	0.915
	2006	0.827	0.915	0.809	0.916
	2007	0.840	0.918	0.823	0.919
Vietnam	2005	0.951	0.961	0.963	0.960
	2006	0.951	0.956	0.957	0.955
	2007	0.932	0.963	0.945	0.962

2.13 Market Diversification

According to Siddiqi (2005), for Bangladesh, market diversification is more important than product diversification. Bangladesh has concentrated only on two markets. This is a very risky situation. It must get out of this vulnerability through market diversification. The ability of Bangladesh to diversify markets will greatly depend on how the global market changes. Much of the global apparel market is defined by the US, EU and Japan. These three markets shared more than 50% of the world's clothing imports in 2008. As a single country, the US is the largest market. Many other Asian, sub-Saharan and Caribbean countries are in direct competition with Bangladesh in exporting to the US. It is natural that, like Bangladesh, they will also follow the strategy of market diversification to cope with the post-MFA competitive pressures. However, Bangladesh will have to take advantage of the expanding market opportunities. Because of migratory nature of apparel production locations, the global market for the low-cost exporting countries has been expanding. In such cases, the loss of one market may not be covered by possible expansion in the other markets. To export few items to many countries is less vulnerable than to export many items only to two countries. According to Moazzem and Rahman (2011) "Bangladesh's export destinations have increased in FY2008-09 compared to that in FY2007-08; from 117 countries to 135 countries for woven wear products, and from 125 to 141 for knitwear products. However, a substantial part of locations remain unexplored despite having potential for considerable expansion of export". Table 2.8 shows export market concentration indices of Bangladesh's apparels in different years. Bangladesh's export is highly concentrated to top five export-receiving countries, and the level of concentration has not changed at a substantial level in case of top 10 or top 20 products. Over time, knitwear has experienced a rise of diversification in terms of export destinations while export of woven wear has experienced further concentration.

Table 2.8 : Export Market Concentration of Bangladesh's Apparels

Year	Knit			Woven		
	Top 5	Top 10	Top 20	Top 5	Top 10	Top 20
2004	0.119	0.129	0.130	0.225	0.229	0.229

2005	0.112	0.132	0.132	0.284	0.287	0.287
2006	0.117	0.128	0.128	0.283	0.286	0.287
2007	0.114	0.123	0.124	0.271	0.273	0.274

Source: Moazzem and Rahman (2010).

From the data of UNCOMTRADE which is further calculated by Staritz et al. (2011), it is found that the EU-15 and the United States comprise 82.6 percent of Bangladesh's total apparel exports, with the EU-15 accounting for 57.1 percent and the US for 24.7 percent in 2009. Woven products mainly go to the US market and knit products mainly to the EU-15. The only other important end markets are Canada (4.4 percent) and Turkey (2.9 percent). The largest export market the EU-15 increased its share from 51.0 percent in 2000 to 57.1 percent in 2009. US however, decreased its share from 42.9 percent to 24.7 percent between 2000 and 2009. Canada more than doubled its export share in the same time period, reaching 4.4 percent in 2009. Turkey also increased its export share, and the rest of the world increased their share from 2.1 percent in 2000 to 8.9 percent in 2009.

2.14 SCFs

Until very recent time, the SCF were not at all good. Recently many reputed firms have much emphasized on the issue. But still in comparison to world standard the compliance standard in Bangladesh is very low. Already it is discussed that the main CA that help Bangladeshi firms to dominate the world market is the low labor cost. But the advancement of Bangladesh apparel firms in term of productivity has been much obstructed by poor compliance standard. One of the major indicators of SCFs is worker related compliance. Worker related compliance encompasses the issues like low wages, lack of appointment letters, long working hours, lack of holidays, late payment, no maternity leave and no dormitories for workers. According to the Ministry of Commerce of Bangladesh 30 percent of factories is non-compliant in the year 1990. But 90 percent of the factories claiming to be compliant have one or more problematic conditions (Staritz et al. 2011). The most problematic issue in compliance is low wages and there is no mechanism for adjusting workers wages to inflation. In the year 2006, there was a big labor unrest in the apparel sector of Bangladesh and the Government responded to the

unrest by increasing the minimum wage from TK 930 ($16) in 1994 to TK 1552 ($24) in 2006. But still this wage was not enough to satisfy the both ends meet for the workers. In 2010, the Government again increased the minimum wage ceiling to TK 3000 ($43). However the new wage fell short of the $75 per month that workers demanded.

According to Staritz et al. (2011) several programs have been taken into hand by the Government for improving the compliance standard. With the association on BGMEA and BKMEA, the government has employed 20 counselors for monitoring 4,000 apparel firms in Bangladesh. But this is not at all enough. ILO, United Nations Development Program (UNDP), the German International Cooperation (GIZ) and the EU are trying to render technical and financial support to the firms for improving the social compliance factor. GTZ which is now known as GIZ have taken several programs to improve the productivity through the improvement of social compliance factors. According to their June, 2011 report based on empirical observations, social compliance not only establishes human rights but factors improve the productivity of the firms (http://www.giz.de/themen/en/20176.htm)

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Chapter 3
Literature Review

3.1 Introduction

This chapter discusses the main theories and the relationship among the variables for this study. In the section 3.2 and the subsections under it discuss the central focus of this study which is IUVC. In the section 3.3 and the subsections under it discuss the definition of the antecedent factors of IUVC. In the section 3.4 the relation between antecedent factors of IUVC and IUVC itself is discussed. Section 3.5 discusses about the outcome factors of IUVC. Section 3.6 discusses the relation between IUVC and outcome factors of IUVC**.**

In chapter 2, it is stated that the apparel firms of DCs and LDCs are facing various challenges to sustain in the global competition. There may be various ways to overcome the problems. According to Rahman et al. (2008) the possible strategies are:

1. According to Razzak (2005) increasing export destinations can secure the markets for the apparel firms because apparel market is more volatile in comparison to other low value adding products' market. Because of this, Bangladesh may start marketing mission for apparel goods in the foreign missions. Increase of export destination will also reduce the business risk. Recently from the export data of the year 2010, it is transpired that Japan may be a significant export destination for Bangladesh. The growth rate of export of Bangladesh to Japan in the year 2008-09 was 17.8%. To pursue this policy Bangladeshi apparel manufacturers have to diversify their products as well.
2. By pursuing economic diplomacy the LDCs like Bangladesh may raise the voice against quota facility. For example, African Growth Opportunity Act is impeding the competitiveness of Bangladesh. Therefore, Bangladesh may pursue for stopping such type to discriminatory measures of US. But the responsibility for persuasion of this strategy is entrusted only with the government. This does not fall under the domain of firms.

3. The most unexercised strategy is IUVC which seems to be sustainable in gaining competitive advantage for Bangladesh Apparel Industry. Bangladeshi policy makers are recently mulling over this strategy although it is already too late. Presently Bangladesh is cutting 10-12% profit margin by engaging her most of the factories in CMT. Therefore, although this manufacturing sector is highly ostensible in size, its outcome in terms of monetary benefit is not so high. Bangladesh can make this sector more competitive by extending its value adding activities from mere CMT to OEM, ODM and OBM.

Form the discussions above, it is transpired that there are two main strategies which can be pursued by the firms for encountering the challenges of global competition. Among the strategies for overcoming the challenges, industrial up-gradation seems to be very pragmatic if we consider the current situation of Bangladesh Apparel Industry in the Global Apparel Industry. To understand why industrial up-gradation may be a necessary strategy, we need to vividly discuss about industrial up-gradation.

3.2 IUVC

Gereffi is the pioneer in advocating for IUVC as a strategy for sustaining competitive advantages for the apparel firms. He depicted the trajectories of garment industries of Hong Kong (Gereffi, 1999), Taiwan, South Korea and China. Gereffi identified four types of IUVC throughout his different literature on IUVC (Zhao and Jing, 2011). According to them these are "1) Process upgrading, referring to improvement of production quality and increasing flexibility of producers by introducing more efficient production methods and better technology. 2) Product upgrading, referring to moving to the production of more sophisticated and high-valued added products or services. 3) Functional upgrading is achieved in terms of acquiring new functions with higher incomes or abandoning old functions generating lower incomes in the value chain. Inter-sector upgrading happens when a firm applies its acquired knowledge to move horizontally into new sectors. 4) Inter-sector upgrading, being achieved by applying knowledge acquired in the production chain in new areas." But later Gereffi (2005) fixed the definition only from the view point of value chain and gave a definition as this, "the process by which economic factors, nations, firms and workers move from low-value to relatively high-value activities in global production networks". Therefore, his idea of IU is

actually IUVC or (VI), and more specifically it is in-house VI if we consider it from the view point of strategic management. In-house VI means extending value adding steps under the same roof or same plant. Therefore, it is to be understood actually as industrial up-gradation in East-Asian apparel firms. It is found that the key to success of East Asian firms in developing a strong position in the GAVC is to upgrade from mere assembly manufacturing or CMT to the full package supplier or OEM (see figure 3.1). Subsequently, firms in the East Asian Newly Industrialized Economies (NIEs) pushed beyond this to develop their own design capabilities ODM, or even the production and marketing of their own brands as OBM (Gereffi, 1999), and eventually became more independent from buyers and repositioning themselves in the chain.

To understand why the East-Asian apparel firms pursued their industrial up-gradation, one has to understand the types of global value chains (GVC). According to Gereffi (2003), there are two types of GVC. One is producer driven and the other is buyer driven. In producer driven value chain, large usually transnational manufacturers play the central role in coordinating the production networks (including their forward and backward linkages). Usually capital and technology intensive industries are tailored by such type of value chain. Buyer driven value chains are controlled by large retailers, marketers and branded manufacturers, because in this business brand, quality control, reputation, passion and fashion are the core values of the product. Buyer driven value chain is spread over both in developing and developed countries. It is observed that the manufacturing stage is distributed over developing countries and product design and marketing tasks are directly done and controlled by developed countries. For example, labor intensive consumer goods industries such as apparel, footwear, toys, handicrafts and consumer electronics fall under such type of value chain. Among these, apparel is one of the best examples of buyer driven value chain. Due to ease of setting up of clothing company with relatively less amount of capital with the prevalence of developed country protectionism under the world politics of MFA and ATC (Agreement on Textile and Clothing), the apparel industry has come across with unparallel diversity in the third world.
As discussed, the GAVC is led by the retailer and so that the design of supply chain is designed by the retailers/ buyers. And as it is previously mentioned that garment manufacturing set up is comparatively easy and not capital intensive and on the other hand,

retailing and advertising are capital intensive, the buyer can easily switch from the manufacturers of DCs and LDCs. Beside this, due to low profit margin, manufactures are locked into low value adding position of value chain. But due to successful enterprising of East-Asian apparel industry, the manufacturer could unlock their position by moving towards higher value adding position through industrial up-gradation. The IUVC stages are: a) from CM/CMT to OEM b) from OEM to ODM and c) from ODM to OBM.

To understand about the strategy of IUVC we need to know the definitions of CM, CMT, OEM, ODM and OBM. According to Gereffi (1994 &2003) the definitions are:

1. CM: CM means cutting and making. Here the garment manufacture receives all the raw materials including fabrics and also it receives all types of logistical support for exporting back to the buyer's specified destination.
2. CMT: It is just like CM, but the firms in this value chain do one extra value addition. That is trimmings of the finished goods.
3. OEM: It means Original Equipment Manufacturer. This type of firms soon become full-range package suppliers for foreign buyers, and developed an innovative entrepreneurial capability that involved the coordination of complex production, trade and financial networks. But they are not involved in designing and specification of the apparels. The OEM exporters have many advantages. By undertaking commercial activities the manufacturers can understand the pulse of international market including the preferences of the international buyers, behavior of the end users, overcoming bounded rationality about the raw materials market and prices prevailing in the end market etc. OEM contractors are expected to develop reliable sources of supply. Moreover, OEM production expertise increases over time and spreads across different activities. Manufacturers learn about the downstream and upstream segments of the apparel value chain from the buyers, and this can become a powerful competitive weapon. But the definition of OEM differs from industry to industry. For example, according to Dictionary of IBM and Computing Technology (1997), in electronics industry a firm can claim itself OEM even if many of the parts are directly purchased from another firm.

4. ODM: It means Original Design Manufacturers. In ODM production process, the firms apart from OEM activities develop design studios. After negotiation with the buyers the firm finalizes a design for the buyers at their own design studio. Then they go for final production. But they do not have their own brand. These types of firms can make the lead time shorter than OEM firms. The reason is that they always have ready design at their hand. Just their need is to take the buyer's approval.
5. OBM: It means Original Brand Manufacturers. After a lot of experience as OEM and ODM, finally some firms can establish their own brand. Although these type of firms are still very rare in DCs.

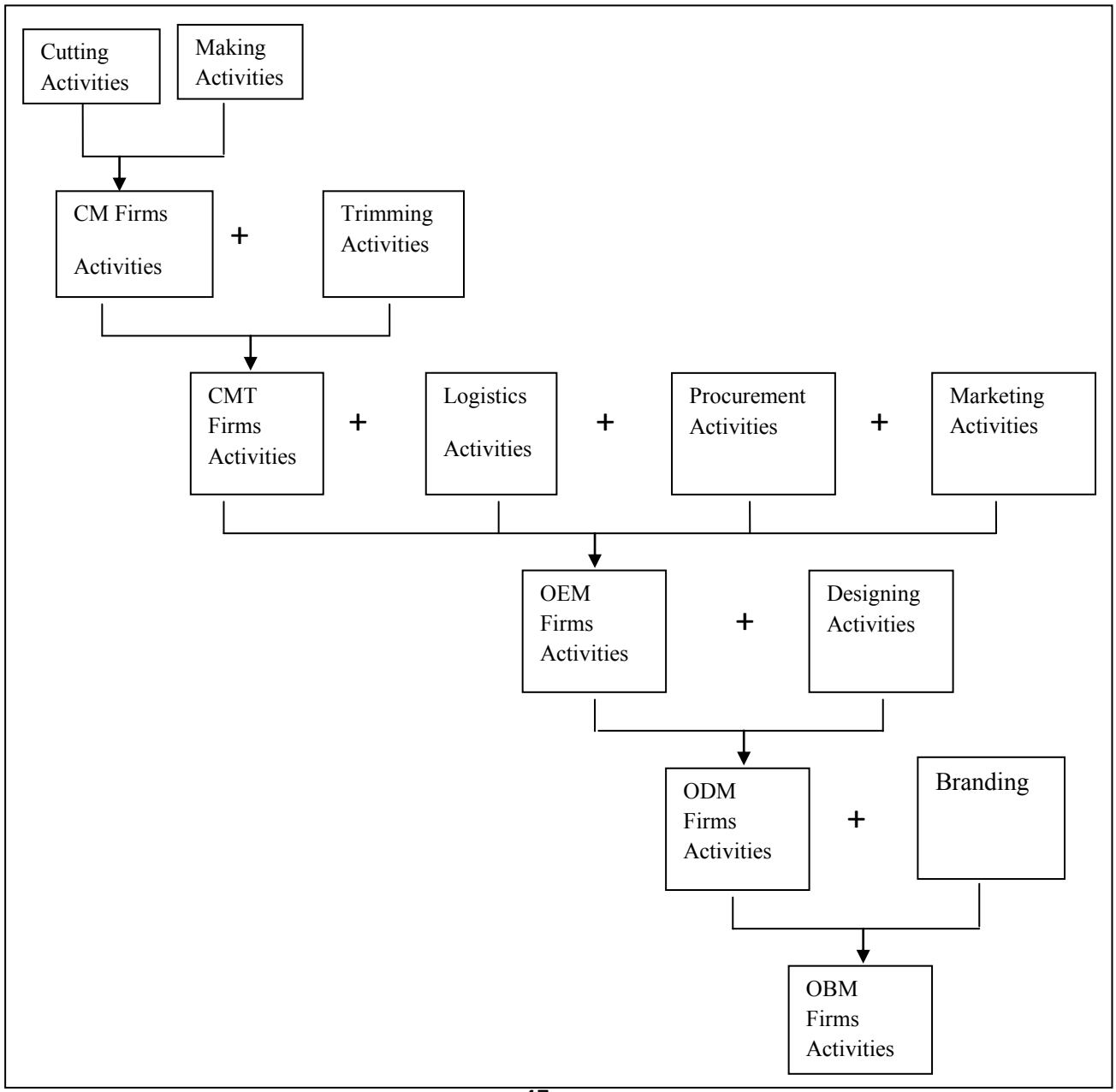

Figure 3.1: In-House Vertical Scope in Apparel Manufacturing.

This type of strategy has mainly two advantages: one is increasing the opportunity to add value per piece of product and therefore making more profit and the other is increasing the influence of the firm in the supply chain and therefore pooling the negotiation power (Porter, 1985; Sehgal, 2011). IUVC strategy does not mean that the firms have to advance step by step. Very often the firms can undertake procuring, designing or marketing activities at the same time at different degree, on the basis of their capabilities (Rahman et al., 2008). This explanation differs from the explanation of Gereffi (1999), because according to Gereffi's explanation IUVC transpired to be a linear process. IUVC may be a risky venture if the firms do not have enough capacity and proper knowledge for running the new businesses. Moreover, it may increase production cost in CMT if adjustment is not properly made among all the value adding steps.

Gereffi's explanation of IUVC into branding, designing, commercial activities especially procurement, logistics function and marketing and distribution can be viewed as a VI from the view point of corporate strategy defined by Porter (1985). If CMT firms integrate themselves to designing, logistics or procurement functions, it means that the firms have increased their scopes of doing business towards up-stream and down-stream. The concept of VI, value chain integration and Gereffi's IUVC in apparel industry are same phenomena.

Bangladesh should follow the same path of IUVC or VI of East Asian nations. The East Asian nations did not achieve this path all on a sudden. They gradually introduced many cutting edge technologies like CAD, CAM and ERP etc and therefore, could pursue for vertical integration by undertaking the relevant businesses.

3.3 Antecedents and Outcomes of IUVC

IUVC strategy should be devised keeping two things in mind. One is how we can drive for IUVC, and the other is what benefit we can avail from IUVC. In short we can say IUVC is the middle point of its antecedents and outcomes. IUVC cannot be achieved all on a sudden. There must be some means and motivation for undertaking the up-gradation mission. Without any preparation and capacity for creating extra value out of IUVC, the firms' owner would not

be encouraged to go for IUVC. Consequently, there must be some antecedent factors which may eventually create a congenial atmosphere for undertaking IUVC mission (Pickles et al. 2006; Grunsven and Smakmen, 2001). If we look at the trajectory of IUVC in East Asian nations, we see that they gradually adopted cutting edge technology and improved human talents. This passion and thirst for improvement for better productivity resulted in IU in 1970s and 80s decades. Therefore, it is easily understandable that IUVC must have some antecedent factors and IUVC is possible to be undertaken only if those factors are strategically used for creating synchronization and harmonization. This is the issue regarding antecedents of IUVC. On the other hand to utilize the benefit of IUVC the firms must have to mull over certain things related to CA and FP which is the issue regarding outcome of IUVC. CA has several definitions and the indicators of CA can be different in different situation and accordingly manufacturers in apparel industry has to sort out what should be indicators for competitive strategy in this particular case and which CA can be yielded from IUVC. FP also can be of several types of indicators and particularly in the case of IU some types of FP can be very prospective. Therefore, IUVC has to be designed under the goal of availing its outcomes.

3.4 Definition of Antecedent Factors

3.4.1 Manufacturing System

Manufacturing system is the strategic arrangement of production activities on the basis of nature of market demand and firm's available human resources and technologies (Gunasekaran 2001). Manufacturing system is chosen on the basis of manufacturing strategy. Manufacturing strategy is to be integrated with firm's business strategy (Anderson et.al., 1989). Skinner (1969) and his disciple Wheelwright (1978) pioneered the idea that manufacturing strategy must have to be aligned with corporate strategy due to rising global competition in the international trade. Wheelwright (1984) elaborated that same functional manufacturing strategy can be shared corporate wide. But their focus was confined within the idea of economies of scale. Skinner's one of the core concepts regarding manufacturing strategy was trading off among the performance criteria like efficiency, dependability, quality and flexibility. Like Porter (1985), he suggested that manufacturers should go either for the differentiation (quality) or for cost in the pursuit of gaining competitive advantage. But if the

firm could go for both cost and differentiation, it could retain all the attributes of manufacturing strategy like efficiency, dependability, quality and flexibility. According to him, due to the economies of scale, if firms go for numerous productions it cannot pursue differentiation. Again quality control would be very tough if go for both large quantity and differentiation. In the same logic, flexibility and mass production is not possible. Therefore, there must be trade off among the attributes. But the trading off concept and the idea of economies of scale of Skinner and Wheelwright was rejected by Gunasekaran (2001). Gunasekaran has shown that how lean and agile manufacturing systems can make cost, quality, flexibility and reliability complementary to each other on the basis of economies of scope. Here both lean and agile manufacturing systems are dynamic manufacturing systems, especially for those businesses where supply chain strategy is very important (Sehgal, 2011). In lean and agile manufacturing systems, pull sale is the marketing principle and because of that, products with required differentiation in the market can be produced without wasting time and materials. According to the logic of economies of scope, in these manufacturing systems the raw materials are used with utmost economy in different production process bound for different styles of products. As both lean and agile deal with different production process under the logic of economies of scope, lean and agile manufacturing system can enhance the firm's knowledge by decoding tacit knowledge (Sehgal, 2011).

In an empirical study, Sun and Hong (2002) showed that if manufacturing strategy and corporate strategy are aligned to each other, the business performances like on-time delivery, inventory turnover, market share and profitability can be improved. In a case based study, Riis (1992) showed that while devising manufacturing strategy, product design and assembly concept should be developed concurrently. In apparel sector, if the firms want to engage in the activities of higher value added, they obviously have to go for vertical integration as discussed earlier. Consequently, in case of apparel sector, there is a good possibility that devising a manufacturing strategy will invite the issues of VI.

3.4.2 Evolution of Manufacturing System

The first manufacturing system that gained popularity in the US at the advent of Industrial Revolutions (1770-1800) is mass production system. At that time, it featured three basic characteristics: division of labor, interchangeable parts and mechanization. Until 1850, this

was the dominant mode of production. By 1890, European method relied more on human skills and less on mechanization or interchangeability. At the same time due to depression in the economy, the need to address questions of organization, coordination and control arose. This interest in organization led to "scientific management" with Frederic Taylor (1865-1915) as its pioneer and chief artisan. Taylor tried to find the "one best way" to perform a given task. Taylor separated the human resources into two parts by those who think and those who execute. He proposed for a planning department in each manufacturing firm. Henry Ford (1863-1947) utilized Taylor's scientific management idea in American automobile industry. Eventually, many of the large industrial producers in most industrialized nations turned to mass production. According to Duguay et al, (1997) mass production system has four main characteristics. These are:

1. It is mainly concerned with reducing costs by increasing the volume of production (economies of scale). It considers trade off between the cross functional performance criteria of quality, time and cost.
2. Innovation is the preferred mean of improving the production system.
3. Direct labor is confined to executing production tasks under the supervision of managers.
4. There is an almost adversarial relationship with suppliers. Suppliers are considered opportunists.

Mass production reached its zenith in the 1960s. Between 1965 and 1973, the growth rate in industrial productivity dropped to 2.4 percent in the US, compared with the average rate of 3.2 percent for 1948-65. MIT commission of US found several weaknesses in mass production systems in the prevailing global competition in the manufacturing industry. These are:

1. There exists intra and inter firm parochialism
2. It concerns about short time horizon. No thinking about continuous improvement.
3. Technological weakness in development and production.
4. No scope for volume and feature flexibility
5. Inadequate attention paid to planning for quality and at the product design stage.
6. Inadequate attention paid to production process.
7. Neglect of human resources.

8. Failure to cooperate with customers and suppliers.

Facing the problem of productivity growth US industries reacted energetically with a variety of approaches in early 1970s like quality of working life (QWL) program, quality circles, development of systems for planning multiple resources and production (MRP). All this approaches were first exercised in Japan in the guise of lean manufacturing system. In the 1980s and early 1990s the US manufacturers campaigned for flexible manufacturing system (FMS), computer integrated manufacturing (CIM) systems, just-in-time (JIT), business process reengineering (BPR), continuous improvement or Kaizen, total quality management (TQM) etc. All these approach were much thought by American scholars but got empirical success first in Japan.

In GAVC, the competition is not among the firms rather among the supply chains. Therefore, mass production system will definitely not be a suitable approach for apparel manufacturers. The reason is that it is not the matter only about economies of scale to decrease the cost. It also takes into account lead time, fast fashion change and quality.

3.4.3 Lean Manufacturing System

The problems faced by mass production system were almost solved by lean manufacturing systems. Lean manufacturing is a production initiative whose goal is to reduce waste in human effort, inventory, time to market and manufacturing space to become highly responsive to customer demand while producing world class quality products in the most efficient and economic manner (Todd, 2000). The concept of lean manufacturing was nothing new but an offshoot of the "Time and Motion" study of Frederick Taylor and Henry Ford's Model T. At the same time Gilberth also contributed much to this idea. The basic difference in Gilberth's work with that of Taylor is that while Taylor was primarily concerned with time reduction, Gilberth was more concerned on making process more efficient by reducing the number of motion. After the Second World War, W. Edward Deming visited war ravaged Japan and mulled over how to make the Japanese factories competitive along with the Japanese managers under the governance of General MacArthur. Following Deming's work, Taiichi Ohno and Shigeo Shingo visited US on behalf of Toyota, and after a lot of observations they

propounded the idea of JIT or Kanban, waste reduction, and pull system. These components in together with other aspects of Japanese factories became a popular manufacturing system named as lean manufacturing system (Naylor, et.al, 1999). While propounding the idea of lean manufacturing systems, Toyota managers rejected the American Ford practice of having specialized jobs for factory workers. Instead, they trained factory workers to handle several types of jobs, now referred to multi-skilling, which was applied to machine lines in Japan. The approach of multi-skilling combined with greater potential of workers led to the development of U-shaped team cell which is one of the essential principles of JIT production. Shingo also worked on set up and changeover. Some other very important focuses of lean manufacturing can be understood by 5s (sort, set in order, shine, standardize and sustain). Lean manufacturing is therefore, focused on getting the right things to the right place at the right time in the right quantity to achieve the perfect work flow while minimizing the waste, being flexible and able to change through maintenance of level schedule. The term "Lean Manufacturing" was first coined by James Womack In his book "Lean Thinking" in 1989 and "The Machine That Changed the World" in 1991.

3.4.4 Agile Manufacturing System

The concept of Agile Manufacturing was introduced by the Iaccoca Institute at Lehigh University (IILU) (Nagel, 1991). According to IILU, agile manufacturing is a manufacturing system with extraordinary capabilities (Internal capabilities: hard and soft technologies, human resources, educated management, information) to meet the rapidly changing needs of the marketplace (speed, flexibility, customers, competitors, suppliers, infrastructure, responsiveness). Agile manufacturing can quickly change over dies that are rearranged according to quickly changing product models or product lines (flexibility). Agile manufacturing system is little more advanced manufacturing system which has many of the characteristics of lean but able to response quickly to the fast changing fashion world. As opposed to lean manufacturing system (high volume/low mix), agile manufacturing system possesses the characteristic of low volume/high mix. Agility enables enterprises to "thrive in an environment of continuous and unanticipated change." Agility can be developed by leveraging employee knowledge, by forming virtual companies and partnerships, and by employing flexible manufacturing technology in order to develop new markets with products

that meet narrow windows of opportunity. The agile work force will be expected to deal with uncertainty and have greater autonomy in responding to unexpected events.

For agile manufacturing systems, one requires to meet the changing market requirements by suitable alliances based on core-complementary competencies, organizing to manage change and uncertainty and leveraging people and information (Gunasekaran, 1998). The global apparel market is highly vibrant in terms of fashion and styles. Not only the first world but also the entire world of teenage people is suffering from fast fashion fever. Yesterday's catwalk dresses are sold like hot-cake in the fashion stores especially in case of ladies wear. In these circumstances, the retailers want quick designing and quick prototyping, quick collection of raw material, quick manufacturing and quick transportation. Things are to be happened only within few weeks. Therefore, agile manufacturing is the most recent demand in the fashion world.

The most important requirement for agile manufacturing is IT. CAD, CAM, ERP, MRP etc are highly required for quick change over and thereby manufacturing. Without implementing quick response system implementation of agile is not possible. One very basic philosophy for gaining profit through agile manufacturing is economies of scopes. By utilizing the idea of economies of scope, the same production processes are utilized for many designs of products just by altering a little in the workflow and the arrangement of the machinery.

3.4.5 Leagile Manufacturing Systems:

In combination of lean and agile system it becomes leagile, and it can be pursued if the firms have quite a good amount of experience in manufacturing (Krishnamurthy, 2007). In comparison to mass production system, LAMS is expected to work better in favor of Bangladesh apparel sector. The reason for this is that, it facilitates both customization and cost reduction (Gunasekaran, 2002). Unlike mass production systems leagile manufacturing systems can be designed to maximize all the performance criteria like cost, quality, flexibility and dependability simultaneously. Because of economies of scope all the performance criteria become complementary for each other in LAMS. For example, flexibility gives opportunity for product variety with a broader range, and product variety gives the opportunity for

economies of scope. Therefore, economies of scope along with multiskilling and JIT management gives the business better production frontier (Hayes and Pisano, 1995).

For implementing LAMS, the firms have to maintain several production lines. Some are based on lean and some are based on agile manufacturing system. In this case, the firm has to take part in several supply chains as the manufacturer. In addition to this, the firm has to take the decision whether it should go for lean or agile system, based on where the decoupling point would take place. According to the Naylor et al.(1999), if decoupling point take place at the upstream stage the end consumer will let the manufacturer much time to prepare the

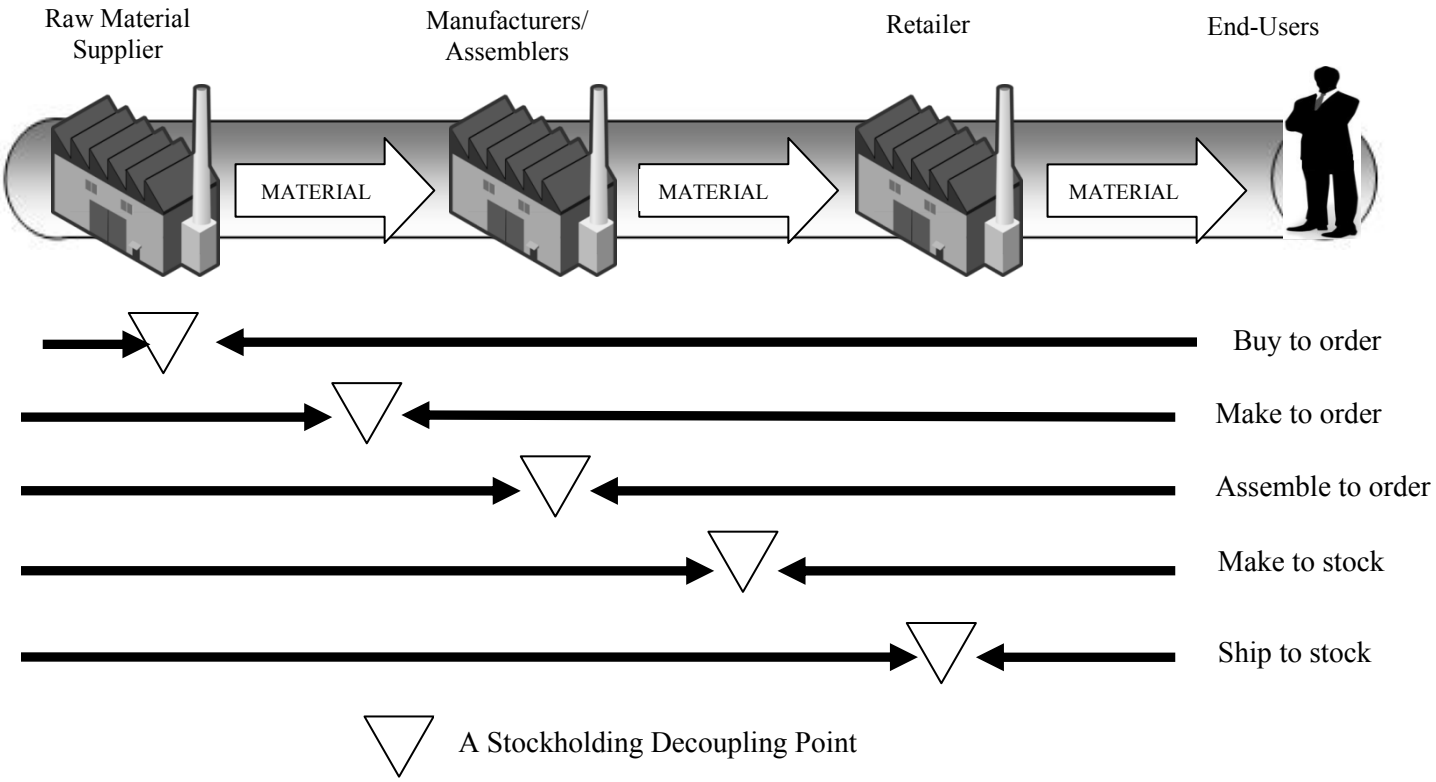

Figure 3.2: Different Possible Positions of Decoupling Point in Supply Chain
Source: Naylor et al. (1999).

ordered goods through the buyers (Figure 3.2). Consequently, they can go for agile system, and can take much type for customization and product differentiation. But if decoupling point takes place at downstream or somewhere near downstream the manufacturer would not get much time. Therefore, they would need to go for lean. If the firm is much experienced, it can

be the player of both types of supply chains. If it can achieve the characteristic of leagile, it would respond to any type of supply chain with any type of decoupling point. In this way the firm can increase the number of buyer or destination.

3.4.6 Human Resource Management Practices for Leagile Manufacturing Systems

The paradigm of lean production calls for integration of the human and technological practices, parallel to the human-centered approach to the design and implementation of advanced manufacturing systems (Genaidy and Karwowski, 2003, Plonka, 1997). Lean production could be seen as an evolutionary socio-technological design since it relies on the active interaction of individuals within the work design. Niece and Molleman (1998) found similarities between lean production and socio-technological design, by analyzing some lean performers. Their comparison is limited by the fact that there is not a unique notion of what elements constitute lean production. According to Dibia and Onuh (2010) also lean manufacturing is a socio-technical system and it clearly views people as a resource to be developed. By doing an exploratory study, they showed that a lean organization needs broad, continuously trained, intelligent and self reinforcing workers prior to establishing automation and technological up-gradation.

Agile is little advanced of lean, and it also requires the same HRM practices (Gunasekaran, 2001; Plonka, 1997). Alford et al. (2000) emphasized that lean practices should be complemented by mass customization. It indicates that a successful lean mission would be ended as leagile system. But without a predesigned HRM strategy a firm's human resources cannot be motivated and made fit for leagile systems. Keeping in mind corporate and business strategy, the HR strategy has to be formulated. HR strategy means the strategy to implement the HRM practices for pursuing corporate strategy. Here in this dissertation, it is advocated that the HRM strategy should be formulated to deploy those HRM practices which may make the workers fit for leagile systems, and therefore, through this leagile systems the firms can integrate into the relevant businesses for IUVC.

There are many research works on relation between HRM practices and business strategy or corporate strategy. But there are few works on relation between HRM practices and manufacturing strategy. The thirst for studying on this relation was first generated by Skinner

(1969) and his disciple Wheelwright (1984) by introducing the manufacturing strategy as the missing link in formulating corporate strategy. Macduffie in 1995 linked various interrelated HRM practices with various dimension of manufacturing strategy. There, he introduced the issue of bundling in HR strategy and organizational logic for relating this bundle of HRM practices with a bundle of manufacturing dimension. The number of dimensions comprising manufacturing performance has been the subject of much debate over the years. Skinner (1974) described several dimensions including short delivery cycles, superior quality and reliability, dependable deliveries, new product development, flexibility in volume changes, and low cost. Wheelwright (1978), focused on efficiency, dependability, quality, and flexibility, and later, Hayes and Wheelwright (1984) changed efficiency to cost. Three years later Krajewski and Ritzman (1987) identified five manufacturing competitive dimensions: cost, high performance design, consistent quality, on-time delivery, product flexibility, and volume flexibility. In a related vein, Hill (1989) outlined a set of ‘‘order winning criteria’’ that fall under the broad auspices of manufacturing. These criteria included: cost, product quality conformance to specifications and reliability, delivery speed, delivery reliability, and volume flexibility, ability to respond to increase in demand. How many dimensions of manufacturing strategy shall be chosen, and how the blend will be prepared are the decision depends on business strategy and corporate strategy. Business strategy deals in the issues of competitive advantages like cost or quality or focusing and corporate strategy deals in the issues of portfolios to be retained or extended or phase out. On the other hand, whether a firm can undertake the required manufacturing dimensions on the basis of business and corporate strategy depends on the possible HRM practices a firm can pursue. But Macduffie (1995) told that the impact of individual practices on performance is misleading because individual practices obviate the effect of a group of HR variables that comprise the system (Ichniowski et al., 1997). Consequently, some researchers have suggested that a ‘bundle’ of inter-related, overlapping HR practices provides several non-exclusive modes of influencing performance (Hackman, 1985; MacDuffie, 1995).

3.4.6.1 Organizational Logic for LAMS

According to the "organizational logic", lean or agile production links together a bundle of manufacturing practices with a bundle of human resource practices. Each of these bundles is made up of interrelated, internally consistent, and even overlapping practices. The two bundles are complementary in that they affect separate aspects of a plant's operations and yet mutually reinforce each other (Macduffie, 1996). Thus, organizational logic means matching manufacturing components and HRM practices in such a way for which both of them pull each other in a complimentary way.

The reason why bundling is necessary for designing HRM practices for flexible manufacturing system (FMS) (LAMS is also a FMS) is explained by Macduffie (1996) by linking bundling, innovation and their impact on performance through manufacturing systems. Innovative HRM practices are likely to contribute to improved economic performance. Here, innovative human resource can only be realized when three conditions are met: i) when employees possess knowledge and skills that managers lack ii) when employees are motivated to apply this skill and knowledge through discretionary effort; and iii) when the firm's business or production strategy can only be achieved because of employees contribution of such discretionary effort (Levine and Tyson 1990; Bailey 1992). All three conditions must be met for HRM practices for its contribution to performance. Unless the workers are motivated to think in an innovative way, they will not be innovative, even if they are skilled. Again if the workers are innovative and also skilled, their impact on firm performance cannot be well realized if they do not have sufficient discretionary decision making power to execute their ideas. Therefore, the HRM practices should be woven in such a way that all these requirements would be fulfilled by one single bundle of HRM practices. Skilled and knowledgeable workers who are not motivated are unlikely to contribute any discretionary effort. Motivated workers who lack skills or knowledge may contribute discretionary effort with little impact on performance. Another dimension of this bundling idea is that it does not involve the individual employees rather the whole group of workers individually (Cutcher-Gershenfeld, 1991). A bundle of interrelated, overlapping HR practices provides several ways for workers to acquire skills (for example, off-the job and on-the job training, job rotation, problem-solving groups) and multiple

incentives to boost motivation (for example, extrinsic rewards such as performance based pay and intrinsic rewards from participating in decision-making and good job design).

Dagher (2008) stated the current HRM practices for LAMS are training of workers, empowerment of workers, mastership, incentives for motivation, multi-skilling, and work rotation. Organizations of many kinds throughout the world have been borrowing specific methods from Toyota which has given birth of the programs like lean manufacturing, lean enterprise, and lean six sigma. The assumption of these lean programs is that the right tools applied to specific problems by trained individuals will dramatically improve business performance in a relatively short period of time. But directly imitating of these programs is a blunder for the lean lovers throughout the world. If we borrow the logic of Macduffie and carefully try to put it in the case of lean and agile manufacturing we see that bundling or interrelated HRM practices are the source of generating human talents in Toyota. Another dimension for the success of leagile is adjusting bundle of HRM practices with the bundle of Manufacturing approaches which we have discussed as the debate between two perspectives of Skinner (1969) and Wheelwright (1984) for one and Gunasekaran (2002), Hayes & Pisano (1996) for the another. It means HRM practices should be integrated with corporate strategy through manufacturing system. Here, all these integration magnitude will depend on what type of competitive advantages the firm is vying for.

3.4.6.2 Increased importance of HRM practices while transforming from Mass to LAMS

Historically, under mass production systems workers were not much groomed-up for thinking the whole production system intellectually. The workers were taught only to operate a single task and they were expected to perform that single task without any flaw very promptly. They were expected to learn a narrowly defined piece of task very quickly. They were kept under close supervision under the supervisors. The only objective of such type of management of X philosophy (McGregor, 1960) was to achieve very good economies of scale. They were not expected to think about the production system and rather they are heavily discouraged to do so. Therefore, the workers used to disown the production plant at their heart. The inner passion for overall improvement never worked in their mind (Shimada and MacDuffie, 1986). In contrast, both lean and agile productions give workers a much more central role in the

production system. To identify and resolve problems as they appear on the line, workers must have both a conceptual grasp of the production process and the analytical skills to identify the cause of problems. Developing an integrated conception of the production system requires that workers directly encounter problems, through the decentralization of production responsibilities such as quality inspection, equipment maintenance, job specification, and shop floor teams. One very important way in developing lean and agile work force is effective problem solving discussion. For making the problem solving discussion effective, the workers should have the experience of multi skilling, training of both off the job and on the job and FMS. The multiple skills and conceptual knowledge developed by the work force under flexible production would not be very useful unless workers are motivated to contribute mental effort and physical effort as well. Workers will only contribute their whole-hearted effort, if they feel that their thoughts are utilized in the production and firm management, and also their advancement in career is aligned with such type of intellectual contribution. Thus, LAMS are characterized by such high commitment HRM practices as employment security, compensation that is partially contingent on performance, and a reduction of status barriers between managers and workers.

3.4.7 SCFs

Compliance means abiding by the local labor laws, laws of the land, ILO conventions, and human rights obligations, local and international environmental regulations and so on by an organization or enterprise etc. in handling day to day operations of the organization (Khaled, 2011). Compliance has now become an obligatory practice by the industry, especially, by the export oriented garment industry. Compliance in the apparel industry means some stringent condition imposed by the buyers belonging to end consumers' countries on the manufacturers with a view to improve humanitarian condition and quality of the product as well (Rahman et al. 2008). It is getting importance after 1993. A non-compliant garment factory nowadays receives less export order. The objectives of SCFs can be divided into two parts: 1. social goal: ensuring humanitarianism 2. economic goal: ensuring good quality product (Dul and Neumann 2009). Here for this study, we shall consider only the economic goal of social compliance factor as our goal is industrial up-gradation of the apparel industry of Bangladesh.

SCF can have an impact on HRM practices for LAMS. It is already discussed in section 3.4.6 that HRM practices should be specially tailored for making it best fit for LAMS, and in section 3.4.6.2 it is discussed that the workers are central focus in LAMS. LAMS must need talented and committed workers. But without good working environment and caring entrepreneur who really values his/her workers as own disciple, the workers never be motivated for dedicating themselves. SCFs hatche sound physical and mental environment for workers, and because of this the workers are spirited and motivated for rendering highest possible commitment and intellectual input.

3.4.8 IT

IT can expedite the implementation of both lean and agile manufacturing (Gunasekaran, 2001). But one argument has a little bit nullified the importance of IT in implementing lean manufacturing system. According to Piszczalski (2002) and Bruun & Mefford (2004), lean advocates that fewer is better. It asks for fewer inventories, less variability, fewer materials handling, fewer options and fewer choices in work and so on. On the other hand, IT often advocates that more is better; or at least IT allows companies to better manage more information, more flexibility, more functions and more varieties and features. Consequently, some features of leagile particularly of lean are against the approaches of IT and again some are in favor of IT. If we consider economies of scope rather than economies of scale, we would find that IT facilitates both lean and agile or LAMS.

IT can expedite LAMS in apparel industry by three ways. Firstly, IT establishes quick response system and smoothen the communication throughout the supply chain. Secondly, if IT is specially designed for the organization, IT can generate idiosyncratic knowledge by combining tacit and explicit knowledge or combining tangible and intangible asset. From RBV it generates CA by making the firms' resources valuable and rare. Thirdly IT makes the manufacturing system smarter by utilizing CAD, CAM and quick changeover mechanism etc. IT brings dynamism in the apparel manufacturing by introducing volume flexibility, feature flexibility, quality control and responding to fast fashion. The ways of influence of IT on LAMS are explained below:

Quick Response: Quick Response (QR) is a type of Just-In-Time (JIT) manufacturing system specifically developed for the apparel industry to help firms respond to consumers' demands within a changing competitive environment. QR requires that apparel manufacturers implement bar-code systems and engage in electronic information sharing with textile mills and retailers (Larson and Lusch 1990; Kincade and Cassill 1993). Quick response (QR) systems emphasize the beneficial effect of reducing internal and external lead times. Surprisingly shorter lead times improve quality, reduce cost and eliminate non-value-added waste within the organization while simultaneously increasing the organization's competitiveness and market share by serving customers better and faster (Stalk, 1988). The reason for happening such may be like that shorter lead time does not allow manufacturers to be extravagant and keep them vigilant in production activities.

Presently, the competition in the global apparel market is not among the firms rather among the supply chains. Starting from raw materials network to the retailers there are many steps involved for value addition. All the steps are highly depended on antecedent of preceding steps. The manufacturers need to know the available raw materials offered in various rates throughout the world. Then, the manufacturer decides to purchase the raw materials by trading off among quality, price, time to get in hand, design and configuration. The QR established through electronic data Interchange (EDI), bar coding, automated inventory management, electronic reorder, product information shared etc. gives the opportunity to the manufacturers and all other stakeholders in the supply chain to share the information instantly with detailed analysis, and thereby, make the right decision about giving order and receiving order. Therefore, the performance of the entire supply chain improves as a whole.

QR systems can reduce the wastage by letting the manufacturers know about the exact quantity to purchase. Consequently, it helps in establishing leagile systems. QR systems help in establishing JIT by dealing in pull approach, taking quick steps and orders, exploring supplier networks, teamwork and participation and continuous improvement.

Idiosyncratic Knowledge: According to RBV, firms need to concentrate on the development of distinctive, inimitable capabilities and own ways of doing things that go beyond the mere

application or exploitation of physical or financial assets progressively commoditized. Such capabilities always, eventually, relate to employees of the firm who at the end of the day develop and apply their abilities, knowledge and skills in organized and coordinated ways, which can be also distinctive. This is called firm specific or idiosyncratic knowledge. This is context-specific knowledge that in fact, gives meaning to the firm's distinctive ways of doing (Bell, 1973; Drucker, 1993). Idiosyncratic knowledge is difficult to imitate because it is not available in open markets; it has to be created inside each of the firms. This requires time, effort, commitment and often a specific context (organizational, social, etc.) by which, it develops its inimitability. For example, the result is often so path-dependent that it is virtually impossible to reproduce the same one.

Mata et al. (1995) stated that managerial IT skills are rare and firm specific, and therefore, they likely to serve as sources of sustained CA. Along with competent of IT skills (human IT asset), Baraldi and Nadin (2006) showed that IT can decode the knowledge in the vertical connection and disseminate the codified knowledge faster in horizontal connection in comparison to those who are less dependent on IT. He told that in the horizontal connection, the resources allied are of heterogeneous character. By establishing common software like EDI or MRP, the firms are brought under common routine from heterogeneous schedules. It means the individuals go through common routine but the ride is different from each other. This gives the opportunity for the firms to decode the knowledge required and again codify the knowledge by tailoring the knowledge according to firms own organizational practice and culture. This idea of Baraldi and Nadin resembles the idea of Nonaka and Takeuchi (1995) where the knowledge creation process is shown by socialization, combination, accumulation and internalization.

Both lean and agile learning are highly firm and context specific. Workers have to be motivated for waste reduction and continuous improvement on the basis of firms' own culture. IT can help in fast decoding of inherent culture of the firm and spread it throughout the firm in the form of knowledge. Again IT can codify the knowledge by giving shape according to its own culture. The magic of IT is its ability to digitalization of knowledge which gropes

sporadically in individuals. Therefore, the firms can practice the leagile auras like waste reduction, continuous improvement, customization or differentiation etc.

3.4.9 FMS

One of the important aspects of LAMS is FMS or reconfigurable manufacturing systems (RMS). According to Meherabi, Ulsoy and Koren (2000 FMS is machining system which can be created by incorporating basic process modules of both hardware and software that can be rearranged or replaced quickly and reliably. Reconfiguration allows adding, removing, or modifying specific process capabilities and controls, software, or machine structure to adjust production capacity in response to changing market demands or technologies. Therefore, through achieving the ability of reconfiguration the firms can remain free or open ended for technological up-gradation. FMS relieves the firms from the harassment of replacement of the entire production system. FMS provides the firms the ability to achieve any type of functionality at any time within a certain range. FMS is too essential for differentiation and customization. Now-a-days quick change over or single minute exchange over dies (SMED) are considered with due importance in apparel manufacturing (Dagher, 2008). One thing is very important for utilizing FMS for apparel industry is maintaining the economies of scope while producing many styles of products. Economies of scope are conceptually similar but practically different with economies of scale. The technique for lowering the average cost through economies of scale is to increase the scale of production. But the technique for reducing the average cost of production through economies of scope is to share the same production components for two or more products. If economies of scope are not considered, apparel manufacturer cannot be able to share the common resource for various production processes, and thereby will not be able to make a profit in the acute competition in GAVC. Therefore, gaining economies of scope by RMS is an important issue for establishing LAMS.

3.5 Theoretical Background in the relation between IUVC and Antecedents of it

3.5.1 RBV

In general, the RBV and CBV of the firm has its roots in Penrose (1959) and more recently Wernerfelt (1984) and Barney (1991). It emphasizes the firm's resources as the fundamental

determinants of competitive advantage and performance. The fundamental principle of the RBV is that the firm sustain in the market, because its resources are valuable, in-imitable, rare and not substitutable (Barney, 1991). From RBV perspective firms are heterogeneous, knowledge bearing entities and their performance depends on using asymmetries in knowledge and uniqueness in capabilities (Conner and Prahalad, 1996). The RBV of the firm provides an analysis of VI that deviates from the market imperfections and oligopoly assumptions of the Transactions Cost Economics (TCE) approaches (Perry, 1989; Joskow, 2005).

From the previous literature, it transpires that, knowledge-based view (KBV) has the same perspective of RBV, and if we deem that knowledge is a resource of a firm we can say that KBV is a branch of RBV. The basic similarity between these theories is that firms have to achieve unique resources for which it can gain more competitive advantages in comparison to other firms. Here, it is seen that privately held knowledge differs much from firm to firm. This phenomenon creates knowledge asymmetry in the market and firms with greater knowledge perform better in associated competencies or capabilities (Barney 1991, Conner and Prahalad, 1996, Peteraf 1993, Prahalad and Hamel 1990) A resource-based theory of the firm thus entails a knowledge-based perspective. Kogut and Zander (1992) has utilized RBV by showing the relationship between knowledge replication and increasing the boundary of the firms. This study borrows this logic and tends to state that a good manufacturing system can create and replicate knowledge more efficiently. Because of this, it can increase its boundary by vertical integration. Kogut and Zander (1992) elaborated that organization knows more than it can express. An Organization is a social community in which individual and social expertise is transformed into economically useful products and services. Organization serves more than a mechanism by which not only social knowledge is transferred but also new knowledge or learning is created. Organization not only creates new information but also it enriches the employees with knowledge. But a dynamic organization can also find out why and when an organization can synchronize existing knowledge and create new knowledge and also can enrich the workers with new knowledge. In this way it can generate combinative capability. By dint of combinative capability, a firm can offer higher order organizing principle which cannot be offered by the market. Firms with dynamic manufacturing system can have combinative capabilities and higher order organizing principles, and thereby get

many technological opportunities by articulating technologies into a language accessible to a wider range of value adding activities. Production under LAMS is so dynamic that it can generate combinative capabilities by combining firm's own tangible and intangible asset. The reason is that LAMS manufacturing systems involve multi-skilling and continuous improvement, and these activities involve intra-transfer of many symbols for learning tacit knowledge. When the tasks of business can intra-transfer the symbol for learning tacit knowledge, the business can integrate itself into other relevant activities. (Porter et al., 2000; Nonaka and Takeuchi, 1995; Nonaka 1994). For example, flexible manufacturing and customization under LAMS are able to blend modern hardware and software technologies in varying degree. Workers gain experience and continuously improve through work rotation and problem solving discussion. This gives the firm workers wide experience and analytical ability on the production system through externalization, internalization, socialization and combination. The ability to utilize different blend of these technologies develop combinative capability and it gives the firm a vast idea on the technology of relevant business. It creates technological entrepreneurship in the owners and managers, and therefore, it becomes able to vertically integrate the firm's business (see Figure 1). In the same way, technological entrepreneurship can be developed if the firm strives to extend its production line or try to invent new process which can reduce waste.

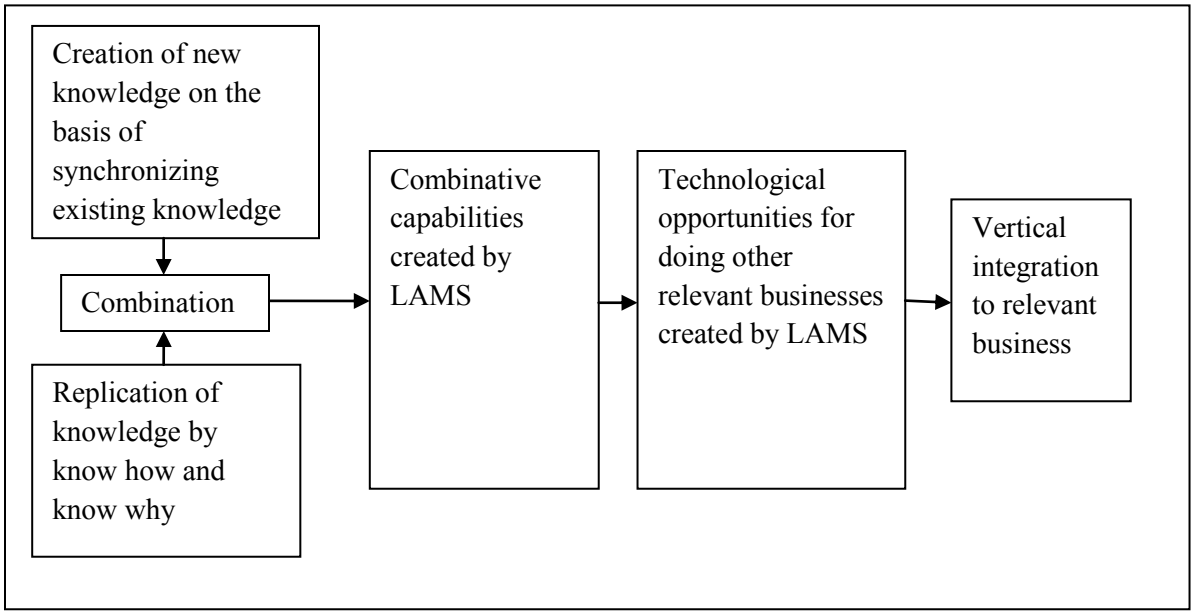

Figure 3.3: Creation of Combinative Capability for Vertical Integration
Source: Author

By the principle of continuous improvement a firm with leagile systems tailors its own resources and knowledge which can overcome the asset specificity of the relevant businesses of the same value chain. Mahoney and Pandian (1992) said that firm's resources which can continuously improve the rent seeking activity are able to diversify the firm's business. Gulbrandsen (2009) found the same type of result by doing an empirical study done on 411 business units. He showed that asset specificity and its closeness to its present competence and its ability to decoding tacit knowledge are positively related to firm's vertical integration (see figure 2). In this study, asset specificity in CMT with LAMS has a closeness to designing, logistics and marketing activities as all are done with ERP software's, QR software's, and much other automated machinery. On the other hand, lean manufacturing have the ability to decode tacit knowledge (Porter et. al, 2000; Nonaka and Takeuchi, 1995). Therefore, LAMS can be deemed as an asset for the firm and it can positively influence in favor of vertical integration. In another empirical study done on 344 firms, based on RBV, Silverman (1999) showed that a firm can diversify into the relevant businesses if its existing technological resources are applicable to relevant businesses.

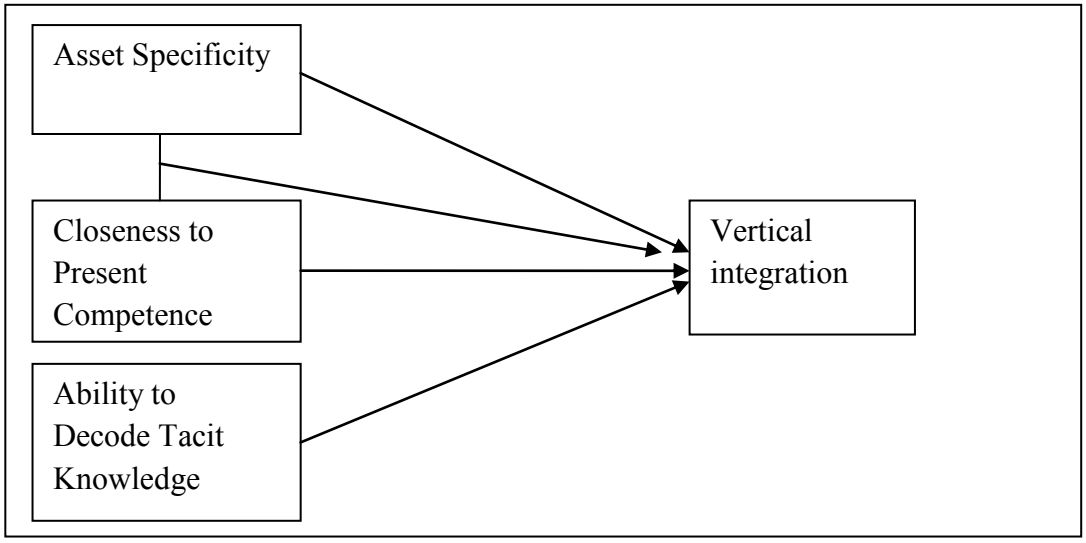

Figure 3.4: Relation of Asset Specificity and Tacit Knowledge to Vertical Integration
Source: Gulbrandsen et.al (2009)

3.5.2 Organizational Economics: Organizational Economics (OE) is a branch of applied economics that studies the transactions that occur within individual firms, as opposed to the transactions that occur within the greater market. OE is the tree of knowledge which combines positive agency theory (Eisenhardt, 1989), property rights (Alchian 1984), transaction cost economics (Williamson, 1985) and evolutionary economics (Nelson and Winter, 1982). TCE analyzes the firm performance on the basis of cost incurred in making an economic exchange. Transaction cost increases when there exist high asset specificity, small number of suppliers/bidders or high bounded rationality. Agency theory analyzes the performance of the firm on the basis of cost incurred for getting a work done by other entities/organizations. Property rights theory focuses on firms performance depending on controlling rights to specific assets, allocated in the contractual relationship. Evolutionary economics deals with the study of processes that transform the economy for firms, institutions, industries, employment, production, trade and growth within, through the actions of diverse agents from experience and interactions, using evolutionary methodology (Ulrich Witt, 2008). Here in this study, TCE and evolutionary economics are utilized for explaining the relationship between antecedents of IUVC and IUVC itself. The reason for choosing these two theories out of four is that these two theories are helpful for explaining how a firm is motivated for IUVC or VI.

3.5.3 TCE: The classical exposition of the TCE argument is contained in Coase (1937) where he considers the question why transactions are shifted out of the market into the institutional framework of production within firms, thereby supplanting the market's price mechanism. Coase defines transaction costs as the costs of using the price mechanism, which he sees in the costs of information (in his language, the costs of discovering what the relevant prices are), and the costs of writing (negotiating and concluding) contracts. In this way, Coase breaks with the neoclassical assumption of the availability of complete information at no cost, and introduces the notion of information asymmetries between the different parties. Secondly, Coase implicitly argued that the writing of contracts will be costly and contract may suffer from subjective or objective limits on information or from self-interest seeking by the parties to an exchange. In a world of non-zero transaction costs, however, the integration of activities into firms can be more efficient than the use of costly transaction mechanisms in the market place. What motivates the integration of activities into firms, then, is the cost of organizing

different activities within hierarchies. Coase (1937) argued "a firm will tend to expand until the costs of organizing an extra transaction within the firm become equal to the costs of carrying out the same transaction by means of an exchange on the open market or the costs of organizing in another firm". Following Coase, Williamson (1991) argued that the choice between different modes of governing contractual relationships follows cost-minimizing criteria. Less cost effective governance modes would be eroded over time by the pressure of competition (Williamson, 1993). He distinguishes between three principle governance modes like markets, hierarchies (firms), and hybrid. According to Williamson (1979) the explanatory factors in the TCE theory of VI are a) asset specificity b) small number condition c) frequency of contract and d) bounded rationality.

Asset Specificity: Asset specificity refers to the extent to which contractual relationships require transaction-specific investment to be made, ranging from non-specific to idiosyncratic investments (Williamson, 1979). The most important problems associated with asset specificity are about human resources and site of the firm. Because of these two resources the firms have to make huge investment for a specific type of value adding activities. Therefore, if somehow that value adding business loses demand in the market the firm has to face big loss. In this way, because asset specificity partner firms are locked into their contractual relationship. Specific assets have their full value only if the partner firms are committed to each other.

Small Numbers Conditions: Small-numbers conditions exist where the number of bidders on either side of a bargain is very limited. This restricts the ability of the other party to the deal to select the lowest cost supplier. The problem becomes severe if the fast comer in the business already takes strategic advantage or fast moving advantage, and if because of these, the other interested and financially able firms loss the ability to replicate the business. In this situation, if the buying or supplying firms are too many in the industry they are held up easily by their counterparts. This is frequently the case where the current contract partner acquires information specific to the exchange relationship (Williamson, 1985). Small-numbers conditions render opportunistic behavior possible. If there were large numbers of bidders, opportunistic behavior would not take place. The reason is that the opportunistic bidder would

be excluded at the next contract renewal (Williamson, 1975). Therefore, to avoid small number condition there should be provision for renewing the contracts. This also saves cost incurred due to existence of incomplete information.

Frequency Problem: Transactions can also be characterized by the frequency with which they take place, and by their duration. Williamson (1979) distinguishes the frequency problem among one-time, occasional and recurrent contract renewal. One-time contracts will usually not require any other governance mode than the market. Recurrently occurring contracts, however, may require a relational governance mode (Kay 1993; Williamson 1979), as the identities of the parties matter to the contract. Generally, if parties transact frequently with each other, learning and reputation effects will decrease transaction costs. But developing routine may also lead to incautious behavior that can be exploited opportunistically. This phenomenon raises transaction costs. Therefore, the partners to long term contracts will aim at ensuring that the contracts are 'watertight'. For example the weaker partner will try to take into account as many contingencies as possible which imply high ex-ante transaction costs. On the other hand, these costs will save the weaker party from high ex-post transaction costs.

Bounded Rationality: Bounded rationality is regarded as a characteristic of uncertainty in contractual relationships that results in costly monitoring and measuring the performance of contract partners. This means that contractual arrangements concerning the human resources necessary to a firm will be formulated so as to reduce such costs. Thus, remuneration systems should be designed around performance measures which are most easily and cheaply ascertained (Lazear 1995). Anderson and Schnittlein (1984) find support for the derived hypothesis that firms are likely to integrate those particular categories of personnel whose performance is most difficult to measure.

Out of the four ways described above, the most influential way of creating higher transaction cost for apparel manufacturers in GAVC is small number condition. In GAVC there are too many manufacturers as opposed to the limited number of buyers and retailers. Because of this, the buyers and retailers can break the relationship with manufacturers at any time without any risk. On the other hand, the manufacturers cannot take any big risk for asset specific

investment as they do not have any assurance of long term relationship with the buyers. Here it is to be mentioned that marketing activities done by buyers and retailers are capital intensive. Therefore, the manufactures are always in the weaker side in negotiation table and loss profit margin to the buyers. Transaction cost in GAVC is also characterized by frequency problem. In some cases of GAVC, routine transaction is the phenomenon. Therefore, the buyers want to impose conditions as many as possible. Imposing stringent compliances is an example of that. Consequently, transaction cost for the manufacturers goes up. In some cases, bounded rationality is also the cause for high transaction cost. The manufacturers cannot guess the corporate objective of the buyers. Therefore, they cannot go for technological advancement or asset specific investment.

Silverman (1999) explained the cause of diversification of business on the basis of reduction of transaction cost through efficient resource exploitation. According to him, TCE suggests that managers should consider alternate contractual method by which a firm can exploit its resources. Application specific resources make the firm unique for certain business activities which cannot be done by other firms in the market. At the same time, there happens both weakness and strength for the firm. The weakness is that the firm's ability to transfer its ability to completely new business is constrained. But the strength is that application specificity can be confidently and quickly workable in the relevant businesses. So related diversification is strongly advocated for those firms whose technology, management and information is application specific or in the language of RBV whose resources are valuable, rare, inimitable and organized. Some studies have focused explicitly on underlying resource requirements across industries to examine diversification patterns. In an empirical study Farjoun (1994) showed that a firm tends to diversify into industries that rely on patterns of expertise similar to those required in its existing industries. Robin and Wiersema (1995) use Scherer's technology inflow-outflow matrix and showed that corporate performance is higher for firms that have diversified into technologically related industries than those that have diversifies into technologically unrelated industries.

3.5.4 Evolutionary Economics

According to Witt (2008), evolutionary economics deals with the study of processes that transform economy for firms, institutions, industries, employment, production, trade and growth through the actions of diverse agents from experience and interactions, using evolutionary methodology. Evolutionary economics explains the phenomenon of how a firm explore the ways for technological and institutional innovation and how the firm on the basis of that innovation, goes for technological entrepreneurship through learning by doing method. Through a historical process the firms come to know which process, ideas and technology are suitable for which situation in the market. Therefore, by dint of their experience and analytical ability the firms can take the right decision for gaining competitive advantages. This is the main perspective of evolutionary economics. Some scholars term it as adaptive efficiency that defines economic efficiency. According to Kalaitzandonakes and Bjornson (1997), transaction cost and evolutionary view are complementary. Transaction cost theory suggests that assuming constant production cost, firms draw their boundaries so that they minimize the transaction costs of governing economic activity (Williamson, 1991). Consequently, TCE advocates for increasing the firm's ability where the other can take opportunity to make extra rent out of incomplete contract. While transaction cost theory provides insights on a firm's motivation to develop new technical know-how internally or through external procurement, evolutionary economics focuses on a firm's ability to develop such know-how (internally or externally) under the conditions of rapid changes. Evolutionary theory stresses the limits of a firm to change, adapt and learn in the short run as it is constrained by its own ability to absorb new knowledge and skills (Nelson and Winter, 1975).

3.5.5 Integrated Theoretical Framework for Connecting Theories for Explaining the Relation between Antecedents and IU

In section 3.5 the relation between LAMS and IUVC is drawn on the basis of RBV, TCE and evolutionary economics. All the theories have contributed to this relation from different point of view. But the underlying logics drawn from these theories to build up this relation are almost similar. Therefore, in this section this dissertation would like to attempt to make an integrated theoretical framework for showing the relation between the antecedents of IU and IU.

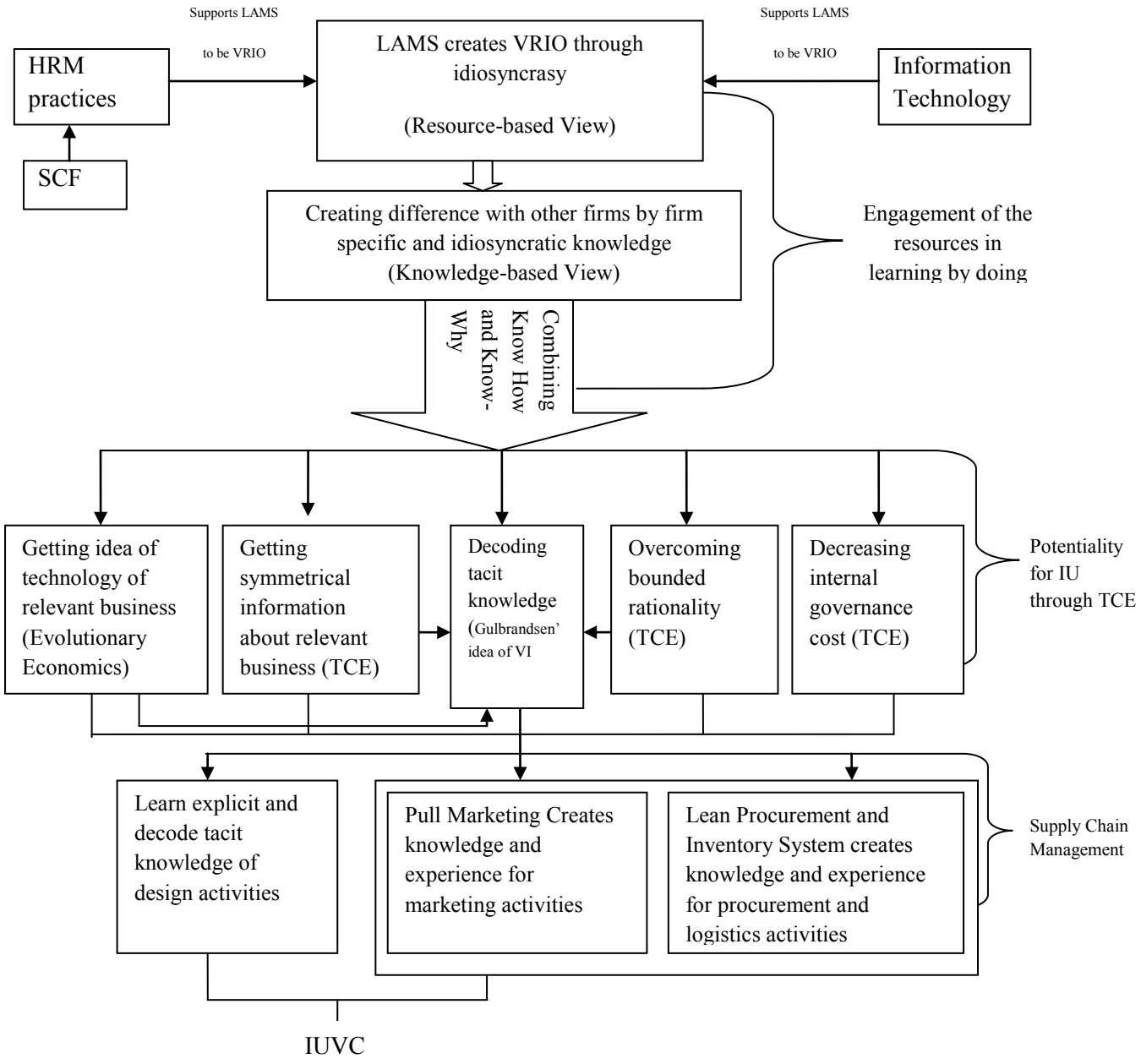

Figure 3.5: Integrated Theoretical Framework for Connecting Theories for Explaining the Relation between Antecedents and IUVC

how and know-why and reduces transaction cost for creating the potential environment for undertaking relevant businesses or IUVC. It is already mentioned in the chapter of introduction that manufacturing system along with that supportive HRM practices and IT can be deemed as the resources and capabilities for the firm. Moreover, in section 3.5, the

resources and capabilities like LAMS are linked with IUVC from the view point of RBV, TCE and evolutionary economics. Now the question arises, where the matching points for these theories are. RBV spawns off knowledge based view. According to Grant (1996) knowledge falls under the domain of RBV. LAMS is such a dynamic manufacturing system which creates idiosyncratic knowledge for the firm, and by dint of continuous improvement, problem solving discussion and work rotation can engage the workers in the quest for know-how and know-why. According to Kogut and Zander (1992), through engaging in know-how and know-why, firms can make the entire manufacturing operation a learning by doing process (evolutionary economics). This learning by doing generates common logical platform for all the theories described earlier like RBV, TCE and evolutionary economics. Because of know-how and know-why, the firms can successfully engage in getting the idea of relevant businesses (evolutionary economics), getting symmetrical information (TCE), decoding tacit knowledge of the relevant business (Guldbransen's idea of vertical integration), overcoming bounded rationality (TCE) and saving governance cost (TCE). In this way, firms' resources like LAMS can be employed for creating potential environment for undertaking relevant businesses or IUVC. Now the question arises, why we should say that this situation is potential for IUVC. Learning by doing, getting idea of the relevant business, getting symmetric information and overcoming bounded rationality etc facilitates in decoding the tacit knowledge of the relevant business. For example, CAD operator of the production floor can be engaged in design activities if he/she has good imagination and idea about designing and proper information about the end users' trend in choice. Engaging know-how and know-why through LAMS creates this process of decoding tacit knowledge. But beside the process of decoding tacit knowledge, firms can engage in other processes of developing potentiality for acquiring explicit knowledge and developing physical resources of the relevant businesses through getting technological idea of the relevant businesses, getting symmetrical information, overcoming bounded rationality and reducing internal governance. This route of relationship to IUVC by-passes the step of decoding tacit knowledge. Therefore, by employing LAMS along with know-how and know-why firms can build up the similar type of physical resources for the relevant businesses. For example, utilization of CAD and CAM machine are required for both production and designing activities; ERP and MRP technologies help to take economic decision both in leagile production and lean procurement and also in lean logistics.

Pull marketing is an essential feature of LAMS which groom up the firms for marketing activities aptly. Lean procurement and inventory management through ERP or onlineS hatch for lean logistics and lean procurement system. In theses ways, IUVC happens through decoding tacit and explicit knowledge and developing similar physical resources for the relevant businesses.

3.6 Definition of Outcome Factors of IUVC

Competitive advantage is a topic which is the central focus of "Strategic Management" discipline. In the discipline of "Strategic Management" there are three dimensions for formulating the strategy for a firm. These are 1. Corporate level strategy 2. Business level strategy and 3. Functional level strategy. According to Porter (1985) any new value adding activities which happen inside the same premise of the firm as the additional business of the core business is in-house vertical integration. On the other hand, according Gereffi (1999) IUVC as a corporate strategy is described as the extending of value adding activities apart from main activities of CMT like designing, logistics, transportation, commercial transaction or branding. Therefore, while drawing the relation between IUVC and CA, study will show the phenomenon of IUVC as VI.

3.6.1 CA

CA refers to an edge that allows an organization to deal with market and environmental forces better than its competitors (Porter, 1985). The indicators of CA are situation specific. Different theories have suggested for different set of indicators for CA. For example Porter's Generic Competitive Generic Strategy states about cost and quality, and it farther suggests that one should not pursue for the both at the same time. It also suggests for focusing. On the other hand, RBV and CBV state mainly about the means of achieving CA and both of the theories do not any objection in dealing many indicators like cost, quality, dependability and flexibility simultaneously. Below how the indicators of CA are conceived in CA in different theories are explained.

3.6.1.1 Porter's Generic Competitive Strategy and CA

The strategy for gaining CA is competitive strategy and it is mainly formulated by targeting three objectives. These are: a) cost leadership- firm's way to gain sustainable cost advantage

b) differentiation- firm's way to differentiate itself from the competitors and c) focusing- firm to choose a segment so that competitive advantage grows out of a focus strategy. It may be of two types: cost focus or differentiation focus. Porter stated that a firm should not hanker after both cost leadership strategy and differentiation strategy.

A significant contribution of Porter in the pursuit of firm's CA is five forces model (1979). Five forces model helps the firm in taking a decision on how to interact with external factors on the basis of its internal factors. The second important thing of Porter in the field of firm's competitive advantage is value chain analysis (Porter, 1985). According to Porter, every firm is a collection of activities that are performed to design, produce, market, deliver and support its product and all these activities can be represented using a value chain. He divided the activities of the value chain into two parts: one is primary activities and the other is support activities. He said that the extent of integration into activities plays a key role in gaining competitive advantages. Another important issue of Porter that is relevant to CA is Bain's (1972) theory of structure-conduct-performance or SCP model. Porter (1981) stated that the relations among industry structure, firm's conduct and firm's performances are not only uni-directional but also circular.

Considering the issue of five forces model, value chain analysis and SCP model Porter stated that the external forces like industry structure, buyers' power, suppliers' powers or the rivalries' power immensely create pressure on the firms. The activities of the entire value chain which are interrelated have to face this pressure. On the basis of the nature of linkages in the value chain and its interfaces with the external factors, Porter suggested that firms should choose either cost leadership or differentiation strategy. But Hill (1988) and Gupta and Somers (1996) empirically showed that a firm can achieve or adopt certain manufacturing systems which ensure both cost effectiveness and customization without sacrificing any of the competitive advantages. Implementation of lean manufacturing system in the Japanese automobile companies is an example of that.

3.6.1.2 CBV and CA

Stalk, Evans and Shulman (1992) brought the concept of CBV. CBV is spawned off RBV and also it logically extends Porter's Generic competitive strategy. In generic competitive strategy, Porter (1980; 1985) improvised the objectives of firm's CA (cost leadership, differentiation and focusing) and resource based view (RBV) further embellishes Porter's explanation of CA by accommodating sustainable CA into it. Generic competitive strategies suggests about the objectives of competitive advantage. But RBV emphasizes on the means of achieving the objectives of CA and it does not suggest anything about the objective of CA. It states that resources have to be valuable, rare, in-imitable and organized to exploit the resources (Penrose, 1959). In together it stands for VRIO. But the missing link between Porter's generic competitive strategy and RBV is that both of them have not given any idea about how a firm can achieve VRIO all on a sudden without having sufficient capability. CBV links these two theories by suggesting that firms have to develop specific capability through path dependent process by dint of continuous gathering of experience (Ray et al., 2004).

To understand why CBV is important to link the generic competitive strategy and RBV, and how CBV prescribes for the objectives of CA we have to find the differences between RBV and CBV. According Helfat and Peteraf (2003), RBV deals not only with assets but also organizational capabilities. Then the question arises how the concept of capability is different in RBV and CBV. In RBV, capability means organizational capability but in CBV, capability means dynamic capability and it covers various entities like organization, individual employees and teamwork etc. In RBV, a resource refers to an asset or input to production (tangible or intangible) that an organization owns, controls or has access to on a semi-permanent basis and organizational capability refers to the ability of an organization to perform a coordinated set of tasks utilizing organizational resources, for the purpose of achieving a particular end result. But in CBV, capability concept brings several important magnitudes which bring dynamism in resource development. Consequently, Helfat and Peteraf (2003) have named the concepts of CBV as dynamic RBV. According to Helfat and Peteraf (2003), Stalks et al. (1992), and Jacobides and Winter (2005), the important concepts, emphasized by CBV but absent in RBV are: i) Specific capability development is more important than general capability ii) Capability is up-graded by an evolutionary process. It

involves several development stages iii) Capability of a firm has a lifecycle and it is path dependent iv) In course of time, capability in firms tries to set a routine for performing highest possible level of functionality. iv) Capability development coordinates individual capability and organizational capability v) Creation of new capability always look for new business opportunity. Therefore, CBV brings the issue of team work and social capital.

Teece (1997) also describes CBV as creation of dynamic capability. Dynamic capability is defined as the firm's ability to integrate, build and reconfigure internal and external competences to address rapidly changing environments. Dynamic capabilities thus reflect an organization's ability to achieve new and innovative forms of competitive advantages given path dependencies and market positions. Therefore, dynamic capability gives momentum to the resources of the firm for which resource continuously makes itself firm specific in a changing environment (see Figure 3).

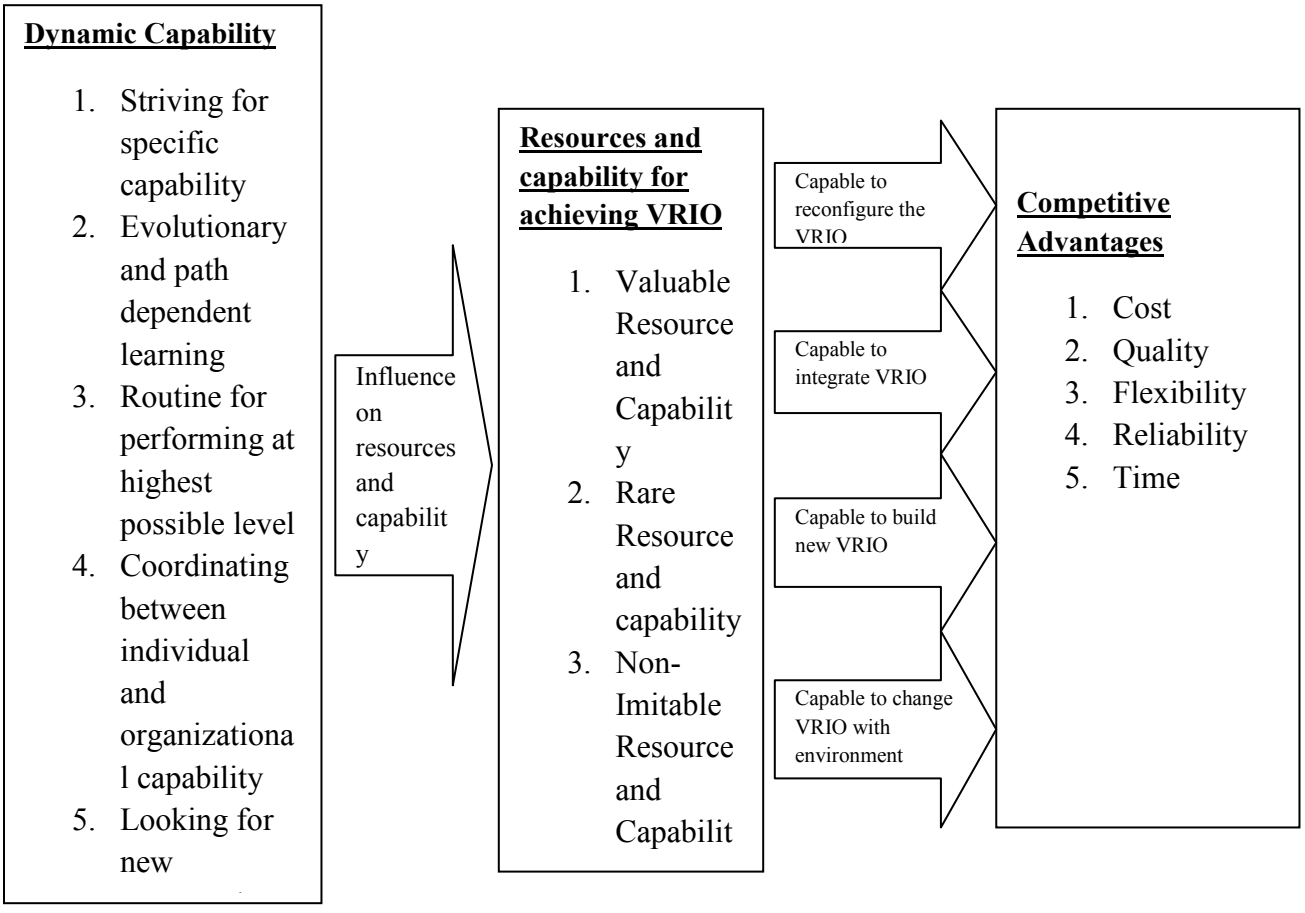

Figure 3.6: Capability-based View and Competitive Advantage

Barney (2001) states that what should be the appropriate business process cannot be always clearly understood in the short to medium term. He asserts that to create any of the advantages of leadership, superior product or superior customer service a firm needs to develop specific capabilities. Until such capabilities are developed, the strategy and its purported advantages remain theoretical. Therefore, according to CBV, it is the capability that actually delivers the advantages sought by the strategies of Porter. But a big difference in pursuing the types of CA between CBV and Porter's generic CA is that unlike Porter's suggestion of either choosing cost or differentiation, CBV supports for many types like cost, quality, dependability or flexibility simultaneously (Sehgal, 2011). The theorists of CBV believe that if the target is specific, and if the process is specific, a firm can strive for several sorts of objectives of competitive advantage.

Sehgal (2011) stated that for devising a strategy for supply chain management, CBV is very important. If a firm wants to integrate itself through a supply chain, CBV is a good analytical approach to justify its position. In supply chain integration, interrelated business processes are to be considered rather than individual process and the single business process which is more prudent to support the entire value chain will be able to stay inside the supply chain, otherwise the firms would be usurped by the competitors. Sehgal finds four types of competitive advantages to be gained by the firms in supply chain management on the basis of CBV. These are: a) cost advantage (whether the business process is cheaper than other firms b) quality advantage (whether defects are lower than other firms) c) time advantage (whether the process is faster than other firms d) efficiency advantage (whether throughput is superior to other firms.

Table 3.1: Progress of The Concept of CA on the Basis of Porter's Generic Competitive Strategy, RBV and CBV and Its Relevance to this Study:

Theories	Main statement or finding	Idea relevant to this study
Porter's generic competitive strategy (Porter, 1979)	Three generic competitive strategies are cost, differentiation and focusing. Firms should choose either cost or differentiation examining the situation on the basis of five forces model, value chain analysis and S-C-P model.	A competitive advantage of an apparel firm may be cost or differentiation, and this has to be decided on the basis of buyers and suppliers power in the GAVC.
RBV (Barney , 2001; Penrose, 1959)	Valuable, rare, in-imitable and organized to exploit the resources are the means of gaining sustainable competitive advantage	It does not suggest anything about the objectives of competitive advantages. Apparel manufacturers have to make its business process, manufacturing process and products different from its competitors to achieve VRIO
CBV (Barney, 2001; Ray et al.,2004, Teece, 1997)	To achieve price leadership, superior product or superior customer service, a firm needs to develop specific capabilities through path dependent process.	With a view to achieving all sorts of competitive advantages simultaneously, apparel firms have to continuously improve their capabilities through experience and knowledge
CBV in supply chain management. (Sehgal, 2011, Li et al., 2006).	For devising a strategy for supply chain management, capability based view is very	By utilizing strategic supply chain (for example leagile) apparel firms should pursue for

	important. Cost, quality, time reliability and flexibility simultaneously should be the objectives of competitive advantages in supply chain management	cost, quality, time, reliability and flexibility advantages simultaneously through capability improvement by path dependent process

3.6.2 Firm Performance

From a financial perspective, the key factors in determining the sustainable growth rate are the generation of earnings and the retention of those earnings in the business. The keys to long-term financial success of any business are earnings behavior (the ability to generate income) and savings behavior (the ability to retain earned income and reinvest it in the business). Thus, the higher the income-generating capacity of the firm business and the larger proportion of that income ploughed back into the business, the higher the sustainable growth rate (Miller et al, 2001). Here in this study Return on Asset (ROA) capital growth, profit growth, and sales growth are the indicators of firm's financial performance. In case of financial indicators except ROA, growth rather than general performance of the financial indicators have been chosen because apparel industries of all the prospering apparel exporting countries including Bangladesh are still in expansionary phase (Rahman et al., 2008) Another important indicator for apparel firms' performance is number of buyers (Razzak, 2005). Due to changing scenario in international trade rules, the buying countries frequently change the suppliers. This tendency of the buying countries creates insecurity among the apparel firms in DCs and LDCs. Therefore, if the firms can ensure more number of buyers, more they can secure the market for themselves.

3.7 Influence of IUVC and CA

3.7.1 Porter's Generic Competitive Strategy and the Relation between VI and CA

3.7.1.1 Value Chain Analysis in Porter's Generic Competitive Strategy: To analyze the specific activities through which firms can create competitive advantages, it is useful to model the firm as a chain of value creating activities. Competitive scope can have a powerful effect on competitive advantages because it shapes the configuration and economics of the value chain. As discussed earlier there are four dimensions of scopes that affect the value chain namely segment scope, vertical scope, geographic scope and industry scope. Among the competitive scopes defined by Porter (1985), the vertical scope's feasibility can be understood by value chain analysis and in case of GAVC, Gereffi defined it as IUVC. According to Porter (1985), the linkages between suppliers' value chain and firm's value chain provide opportunities for the firm to enhance its CA. It is often possible to benefit both the firm and suppliers by influencing the suppliers' value chains to jointly optimize the performance. It is not a zero sum game in which one gains only at the expense of other but a relationship in which both can be benefitted.

The activities through vertical scope are known as VI. For the apparel firms, both the suppliers and lead firms can be benefitted if they analyze what should be the limit of specialization and what should be the limit of integration while devising supply chain strategy. On the basis of five forces model of Porter, the ability of suppliers and lead firms vary from supply chain to supply chain.

On the basis of the value chain analysis, Fronmueller and Reed (1996) divided VI into two parts for describing CA potentials. One is backward vertical integration (BVI) and the other is forward vertical integration (FVI). Perry (1978) found that by BVI, firms can reduce production cost. Because of this, the firms with BVI can get correct information regarding supply conditions and prices. This allows more efficient production schedules and avoids payment of economic rents on supplies. On the other hand, Perry (1978) and Levitt (1980) found that FVI enable the firm to achieve increased differentiation and subsequently safeguard

the resulting potentiality for economic rents. Levitt stated that any product and service can be differentiated if the whole product mix is considered. Successful marketing differentiation depends largely on the consumer's reaction and because of that proximity to the consumer should be increased. Thus, the closer the economic stages, the greater the potential for differentiation. Harrigan (1980) empirically showed that FVI can provide product differentiation advantages that are difficult to imitate. The reason is that for fashion apparel, the retail environment appears to be a significant factor in product differentiation. Consequently, linkages between production and marketing bring the manufacturers close to the final consumer which eliminate risk in product differentiation. But Fronmueller and Reed (1996), in a study done on 1,000 US companies, found that both BVI and FVI play a role in reducing the production cost. FVI can also reduce the cost because it helps in differentiation which in turn reduces opportunity cost and cost incurred due to advertising spillover. But all the roles of BVI and FVI on CA can be brought into effect only if the firms have resources and capability to exploit the opportunities of BVI and FVI.

3.7.1.2 Economies of Scope in Porter's Generic Competitive: Strategy: VI is the combination of technologically distinct production, distribution, selling and other economic processes within the confines of a single firm (Porter, 1987). In discussing different strategic motives for vertical integration, Porter (1980) argues that the strategic purpose of vertical integration is to utilize different forms of economies, i.e. cost savings, like economies of combined operations, economies of internal control and coordination, economies of information and economies of stable relationships. In an empirical survey done by D' Aveni and Ravenscraft (1994) on 466 large companies of USA, it is found that in a vertically integrated firm, economies of scope affect general and administrative and R&D expenditures. Takeuchi and Nonaka (1986) stated that integration results in information transfer, technical learning, and problem solving.

3.7.1.3 TCE and Porter's Generic Competitive Strategy*:* Coase (1937) defined transaction costs as the costs of using the price mechanism, which he sees in the cost of information (in his language, the cost of discovering what the relevant prices are) and the cost of writing (negotiation and concluding) contract. Transaction cost in the supply chain differs due to

different global governance types (Williamson, 1991). This governance types depend on some criteria like bounded rationality, opportunism, environmental factors, asset specificity and a small number condition. Here in the apparel value chain, very often transaction cost is higher for the manufacturers due to opportunistic behavior of the buyers. The number of buyers is small but the number of manufacturers is too many in the apparel supply chain. Because of this, the manufactures are always in the weaker position in the pursuit of bargaining. A good strategy to overcome this problem is to integrate vertically so that the manufacturers can extend their influence throughout the supply chain. Eventually, they can pool the negotiation power. Gereffy (1999) explains same phenomenon by dividing global governances into five types namely market, modular, relational, captive and hierarchy. He explains that apparel firms usually moves from captive type of value chain to relational value chain as they start to attempt for the full package supply including supplying inputs, designing, quality controlling, delivering on-time etc.

3.7.2 The Concept of RBV and the Relation between VI and CA

3.7.2.1 Diversification, Asset specificity and VI in RBV: Silverman (1999) empirically showed that a firm can exploit its resources more efficiently if it diversifies its business into several related businesses. The diversified businesses give the firm an opportunity to share the common resources and at the same time create new resources and capabilities, which are rare to the competitors. Therefore, it creates entry barriers, and production process becomes a valuable resource for the firm, and finally the firm can gain CA. The more related diversification supports more extensive exploitation of application-specific resources than does unrelated diversification (Montogomery and Wernerfelt 1988). Here, it is to be mentioned that in the study of strategic management, VI brings diversification (Grant, 2010). Therefore, the logics of Silverman can also be applicable in VI. Prahalad and Hamel (1990) also said that VI into relevant businesses helps firm acquire complementary competencies. By analyzing corporate data of some top business groups in nine emerging countries, Gullien (2000) showed that the vertically integrated business groups located in an imperfect market economy can attract the foreign buyers and foreign investors more than their competitors. The

main reason he explained is that the vertically integrated businesses can share both domestic and foreign resources prudently. Moreover, vertically integrated firms' resources are of diversified, and therefore, their experience is of diversified nature. Hence, they can absorb foreign technology more quickly than other firms.

3.7.2.2 TCE and VI in RBV: Volberda (1996) stated that in a volatile fashion market, VI may be a burden for the firms in gaining CA. In volatile market, market demand cannot be forecasted. Consequently, the suppliers get the opportunity to seek additional rent and buyers hold additional power in negotiation. But on the basis of agency theory and TCE, Richardson (1996) empirically showed that VI in the fashion market even in volatile environment, helps firms very responsive and after VI their assets and capabilities are at low risk of obsolescence. Therefore, suppliers or buyers do not get any chance to be rent seeker. He further argued that full VI may not be effective but at least control over the value chain or in-house VI is effective for gaining CA. The reason is that the new products mainly involve styling and fabric changes that do not usually require new technology. Hence, investments in design and manufacturing assets are not subject to great risk of obsolescence. Nor are long term alliances at great risk of becoming burdensome because of technical obsolescence.

3.7.3 CBV and the Relation between VI and CA

3.7.3.1 Evolutionary Process and VI in CBV

Jacobides and Winter (2005) stated that specific capability changes the transactional environment, and thereby, reduces transaction cost. Eventually this phenomenon causes VI in the firms. VI creates the scope to create new capabilities by combining the old capabilities of the individual businesses in an evolutionary process. The same phenomenon is described as dynamic capability by Teece et al. (1997). He stated that according to resource based perspective, firms try to create firm specific asset through VI with a view to achieving CA. But in reality firms are not always ready to achieve CA even if it is equipped with resources after VI. Firms have to acquire firm specific management and technological capabilities in an evolutionary and path dependent process for gaining CA (Teece et al. 1997; Afuah, 2001). The notion 'evolutionary' recognizes that history matters. History has to be analyzed because

learning tends to be local. Learning is often a process of trial, feedback and evaluation. The reason is that if too many aspects of firms' learning environment change simultaneously, the ability to ascertain cause-effect relation is confused. Consequently, path dependent evolutionary process is needed to understand the cause-effect relations one by one, then to prioritize the problems and accordingly to develop the capability for achieving CA through VI.

3.7.3.2 Supply Chain Management and VI and CBV

Sehgal (2011) showed that supply chain integration enhances capabilities, and thereby, gains CA. Supply chain is the key functional area for creating competitive capabilities. Supply chain process capabilities primarily help in reducing costs or increasing the efficiency or capital used, while simultaneously supporting operational flexibility and agility, all of which can be directly leveraged to support most basic business strategies based on price, leadership, differentiation or focus**.** According to Sehgal's explanation, supply chain exposes many characteristics of Gereffi's IUVC in GAVC. According to Sehgal (2011), through the supply chain integration following competitive advantages can be gained:

a. ***Time Advantage:*** After vertical integration the firm undertakes different steps of the value chain under the same roof at a time. Thus, negotiation time and transfer time are omitted, and therefore, the entire value chain works faster. Richardson (1996) empirically showed that vertically integrated apparel businesses are fertile scope for implementing Quick Response System (QRS). Utilizing IT like QR apparel firms have developed new capabilities in rapid learning and communication. QR has enabled the savvy designers quickly imitate many designs or even create new designs. In a study done on 643 US firms, Swink and Song (2007) showed that while commercialization of a new product if manufacturing and marketing activities are vertically integrated, the lead time can be shortened. The reason is that if manufacturing and marketing are vertically integrated production planning and demand management activities can be well coordinated. Both manufacturing and marketing personnel can adjust their planning by knowing each other's capability. Studying 150 suppliers of General Motors, Vickery et al. (2003) showed that by integrating supply chain, the firms can share the IT, and because of that the firms can quickly response. This eventually enhances the financial performance.

b. ***Cost Advantage***: After VI, if the firms are involved in procurement activities, the firms can purchase the critical inputs at low price because of combined purchase. The firm can share information and IT so that the production process and business process become cheap. D' Aveni and Ravenscraft (1994) empirically showed that although in few cases, the firms rather losses due to losing specialization in production, by VI, as a whole the firm's business process can save money and the overall administrative cost, R&D cost and media advertising cost are reduced.

c. ***Quality Advantage***: VI allows the firm for standardization, automation and simplification of the process because the firm can deal in an integrated process. Therefore, the quality improves. Another important thing is that because of integration the firm can check the process and find the defects more efficiently. Swink and Song (2006) empirically showed that VI between manufacturing and marketing activities results in greater product design quality where design quality is a holistic concept comprised of both product performance and conformance attributes. The reason is that manufacturing personnel do not understand innovation needed for market very often and locked into conventional solutions and technologies. Consequently, integration opens their eyes and arouses the passion for both product and process innovation. Harrigan (1986) conducted a study on 140 successful and 52 unsuccessful vertically integrated firms, and found that the firms which can successfully transfer the resources internally can ensure the product quality. The successful vertically integrated firms can protect the knowledge about standardization which is unknown to non-integrated firms.

d. ***Efficiency Advantages:*** Vertically integrated firms can control business processes in several steps. Therefore, VI facilitates the firm for more volume flexibility and product flexibility. Because of this, the firm can provide higher throughput for any type of orders of the lead firm. The efficiency advantage can also be created by maximizing asset utilization by VI in the supply chain. Volberda (1996) and Richardson (1996) showed that VI has allowed the firms to achieve a higher degree of operational flexibility than their less integrated competitors. By linking designing and production with retailing through

integration, they are able to manage flexible production to demand within the quickest possible time even in volatile fashion market in a better way.

Table 3.2: Different Concepts of Competitive Advantages and their Relevance To Vertical Integration of Apparel Firms

Theories	Objectives of competitive advantages	Means of gaining competitive advantages	Relation to vertical integration of apparel firms
Porter's generic competitive strategy (Porter, 1979)	There are three generic competitive strategies: cost leader ship, differentiation and focusing.	Sharing information through linkages, sharing common resources among the businesses for economies of scope, reducing transaction cost.	By BVI, VI gives the opportunity to get the information on price, location and availability of resources. This reduces transaction cost. By FVI the firms get the opportunity to come closer to the buyers and are able to differentiate the products and gains economies of scope
RBV (Barney 1991, Penrose 1959)	Does not suggest for any specific objectives of competitive advantages like generic strategy. But it emphasizes on sustainability of competitive advantages	Making resources VRIO: valuable, rare, non-imitable and organized to exploit the resources which is non substitutable.	VI may make the business process asset specific; teamwork after vertical integration may create idiosyncratic bilateral synergy; sharing of knowledge among the businesses will make it firm specific.
CBV (Barney, 2001; Teece,	In course of time by path dependent	Learning by evolutionary process; developing	Vertical integration gives the opportunity to learn and gain

1997, Ray et al., 2004 and Jacobides & Winter, 2005).	process, firms become able to pursue all types of competitive advantages relevant to it businesses like cost, quality, differentiation or efficiency	specific capability by path dependent process, continuously exercising aptitudes and gaining experience.	experience holistically from each business units. Vertically integrated apparel firms have better absorptive capacity to learn and better development capacity in path dependent process.
CBV in supply chain management. (Sehgal, 2011, Li et al. 2006).	Cost, quality, time and efficiency	Supply chain is not a static rather dynamic business steps. A firm at any step can integrate towards backward or forward by dint of its capability if it enhances competitive advantages.	In course of time apparel manufacturers can develop commercial activities like procurement, logistics or marketing activities on basis of present capability. The design masters in production team can become the main designers after lot of experiences. All these improvements through integration may help achieve all types of competitive advantages for the firm.

3.8 The relation between CA and FP

The firm's achievement of CA shall reduce the cost so that definitely this will improve all the financial indicators like ROA, capital growth, profit growth and sales growth etc. (Miller et.al 2001). Superior quality as a CA will increase the market share, so that all the financial indicators will improve (Porter, 1985). Both cost and quality advantage shall increase the buyers' number. Therefore, as a whole, gaining CA shall improve the firm performances. Several researchers have found product CA to be significantly associated with product success

and market performance (Song and Parry, 1997; Li and Calantone, 1998). Swink and Song (2006) empirically showed that new product competitive advantage is positively associated with project's return on investment.

3.8.1 Integrated theoretical framework for connecting theories for Explaining the Relation between IU and Outcomes of IUVC:

In section 6 and 7, the theories on Porter's generic competitive strategy, RBV, CBV and SCM have been discussed. The relation among the theories and CA are also discussed. But we have not discussed the integrated theoretical framework for connecting the theories and CA. Here in below the theoretical framework based on Porter's generic competitive strategy, RBV, CBV and SCM are attempted to be drawn:

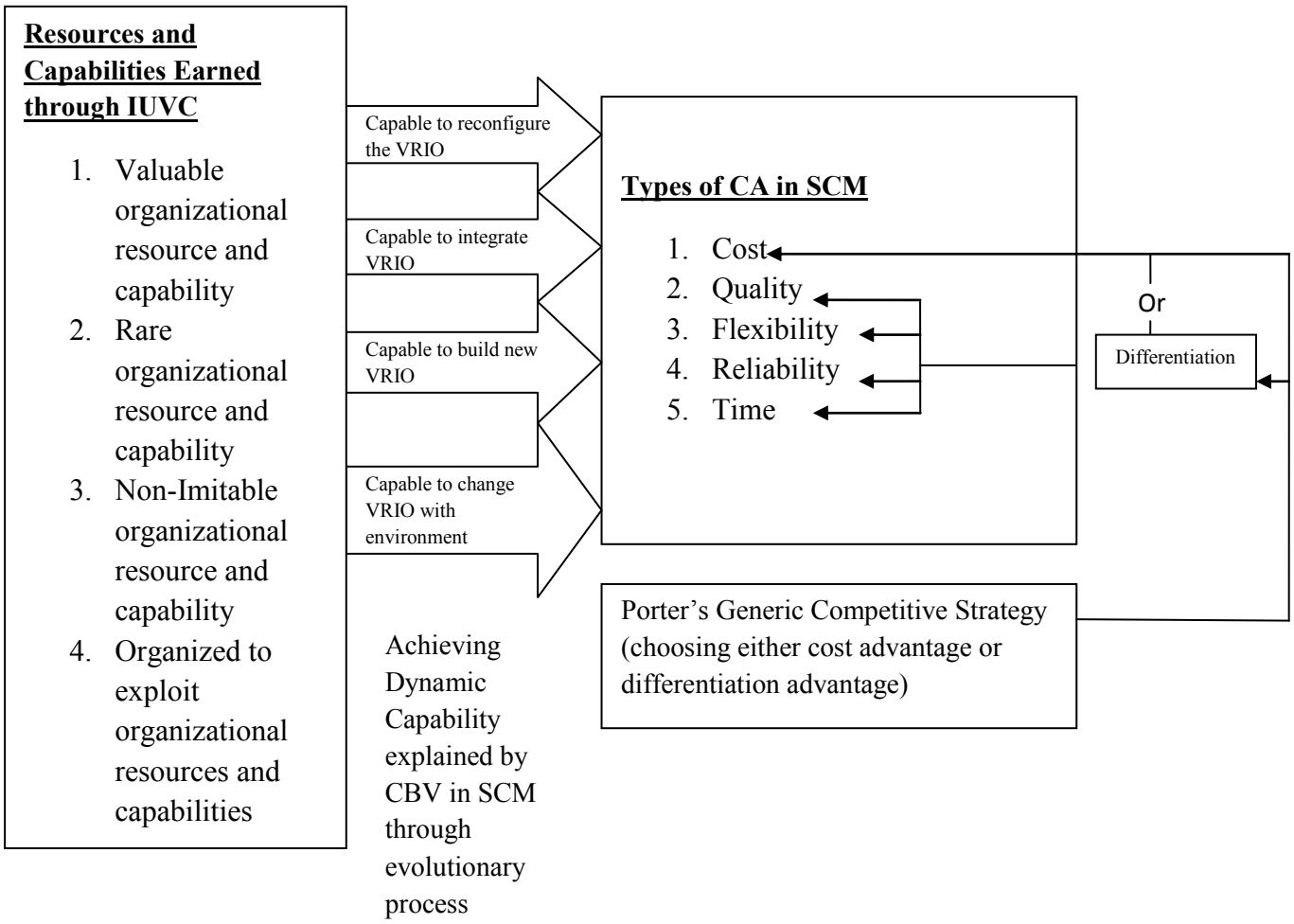

Figure 3.7: Integrated theoretical Framework for Connecting Theories for Explaining the Relation between IUVC and Outcomes of IUVC

The basic logic for drawing the relation between IUVC and outcomes of IUVC is that IUVC helps the firms achieving dynamic capability for their VRIO resources and capabilities, and because of that the firms can strive for all types of CA in the pursuit of SCM. But this logical framework took a historical path to be developed. Before the development of CBV in SCM, Porter's concept of generic competitive strategy was the predominant idea about CA. In the section 3.6.1.1, it is discussed that Porter (1985) argued for three types of CA cost, differentiation and focusing. For this study, we have taken quality, flexibility, reliability and time as the means for differentiation. The most important issue in Porter discussion is that he advocated for pursuing either for cost or differentiation for achieving long term success. The basic reasons for his assertion of such type of idea is that he less emphasized on the idea of economies of scope and manufacturing strategy. Later, there was much debate on his proposition. Hayes and Pisano (1996) was one of them who drew logic of economies of scope and Japanese lean manufacturing for advocating that cost and quality (differentiation) are rather complementary for achieving firms' CA. In section 3.6.1.2, it is shown that RBV and CBV could be a very good advocator for this. If the firms' resources and capability are valuable, rare, in-imitable and organized to be exploited, the firms may attempt for all sorts of CA simultaneously. But there question arises that how a firm without much preparation suddenly get the attributes of RBV like VRIO. Helfat & Peteraf (2003) and Teece (1997) gave the solution by bringing the issue of dynamic capability which attempted for reconfigure, integrate, build and change of VRIO continuously (see figure 3.6). Sehgal (2011) and Li et al. (2006) utilized this idea in SCM and showed that if the firms can develop and adjust both the firm and supply chain on the basis of CBV, the firms can pursue for several types of CA like cost, quality, reliability, flexibility and time. The reason is that an efficient supply chain is created through evolutionary process by exploring the best possible options for the different value adding steps throughout the world. For example, for apparel production China, Korea and India have good CA in fabric production; Bangladesh, Vietnam, Cambodia, Sri Lanka may have good CA in manufacturing, and Hong Kong, Taiwan, Korea, Germany, Italy and France may gave good CA in designing. Therefore, the buyers from the US, EU and Japan try to blend the best performing firms for different stages of value addition from different countries throughout the world. Here, it is build up through many experiments by evolutionary process. Therefore, one of the basic objectives of creation of supply chain on the basis of CBV

is to pursue for all types competitive advantages like cost, quality, reliability, flexibility and time etc. In a nutshell, from the theoretical framework drawn above it can be said that Porter advocated that firms should pursue either for cost or differentiation, but CBV through the concept of dynamic capability argued for all sorts of competitive advantages simultaneously.

Chapter 4
Distributions of the Sample Firms

4.1 Introduction:

In chapter 3, the path of IUVC is discussed as from CM/CMT to OEM, OEM to ODM and finally ODM to OBM for the apparel industry. Gereffi (1994) is the pioneer in chalking out the trajectory of IUVC of the apparel firms in the GAVC. Following Gereffi's idea of IUVC, other authors are also trying to depict the path of IUVC. Apart from Gereffi, the prominent authors in the field are Pickles et al. (2006), Grunsven and Smakmen (2001), Lane and Probert (2005) and Peng et al. (2010) etc. Although the authors told that up-gradation path would follow a linear pattern from the low value adding activities to the high value adding activities, it did not happen so in Bangladesh according to the survey done by Rahman et al. (2008). It transpires from his study that in Bangladesh the up-gradation in apparel sector does not follow a complete linear pattern. The firms may undertake several types of value adding activities starting from low value adding to high value adding at a time. But he did not show this non-linearity of up-gradation by dividing the IUVC activities task by task. This study has attempted to do so by task by task like CMT, designing, logistics, procurement and marketing. This study has done a survey on 180 firms pursuing LAMS (96 in EPZ and 84 in non-EPZ area). Through a cross sectional analysis of the primary data, this dissertation has tried to find how many firms pursuing LAMS are involved in how many IUVC activities successfully. As this is a cross sectional analysis, unlike Gereffi and other scholars, we would like to employ the term "pattern of IUVC" rather than "path of IUVC". The reason is that path means gradual evolvements of the firms through the elapse of time. The pattern of up-gradation found here is not also completely linear. Many of the firms have started to do design activity without completing the implementation of OEM activities fully or partially which is dissimilar to the Gereffi's established idea that firms up-grade from the lower value adding activities to the higher value adding activities. Therefore, firms have broken the ascending order and broke the steps by surpassing the next usual value adding activity. In the next sections, the distribution of the firms pursuing LAMS is shown by the value adding activities. Here, it is to be

mentioned that the value adding activities from descendent to ascendant order is at first CMT, then procurement or logistics or marketing, and finally designing. It is already mentioned that Bangladesh has not yet achieved the ability for branding activity. On the other hand, all the firms at least do CMT activity. Therefore, this study will try to show the distribution of the firms on the basis of procurement, logistics, marketing and designing activities. This chapter would also like to show whether there is any significant difference between the firms of EPZ and non-EPZ. The motivation for this study is to clarify different meso-economic factors for these two types of areas. The firms located in EPZ possess the international exposure. They are accustomed to modern management system and financially capable enough to adopt the IT and HRM practices for LAMS. On the other hand, non-EPZ firms are also not far lagging behind from the firms located in EPZ area. Almost all of the firms in non-EPZ area are owned by the local businessmen, and persons in the top management of those firms are now the second generation entrepreneurs, and they have vast experience and high educational qualifications. Therefore, all types of firms are performing equally in adopting modern manufacturing system and thereby, making sufficient profit.

4.2 Industrial Up-gradation in Bangladesh Apparel Sector

Value Adding Activities:

Cutting-making-trimming= CMT

Logistics= L

Procurement=P

Designing= D

Marketing= M

The value adding activities from descending to ascending should be as follows:

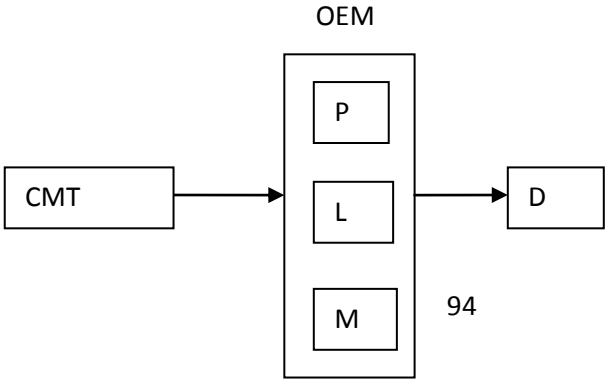

Figure 4.1: Descending to Ascending Order of Value Adding Steps

In the survey, all the firms are engaged in CMT which is the basic value adding activity of an apparel manufacturing firm. Consequently, it is deemed that all the firms are performing CMT activities. Therefore, the up-gradation path will be analyzed from OEM to ODM. But OEM activities can be divided into three broad categories. These are procurement, logistics and marketing to the buying agents and retailers. Among the three activities of OEM which should come first is not decidable because of their different nature of operations. Some firms are performing all the three, some only two and the others are performing only one activity of OEM. Therefore, this study has named the later two types of up-gradation as partial OEM firms, although Gereffi and other scholars have not termed these firms in this regard. Again some ODM firms are also doing designing with partial OEM activities. These firms are named as ODM with partial OEM activities. Some are directly doing designing by-passing OEM activities. These firms are named as CMT with designing activity. The up-gradation stages should be as follows:

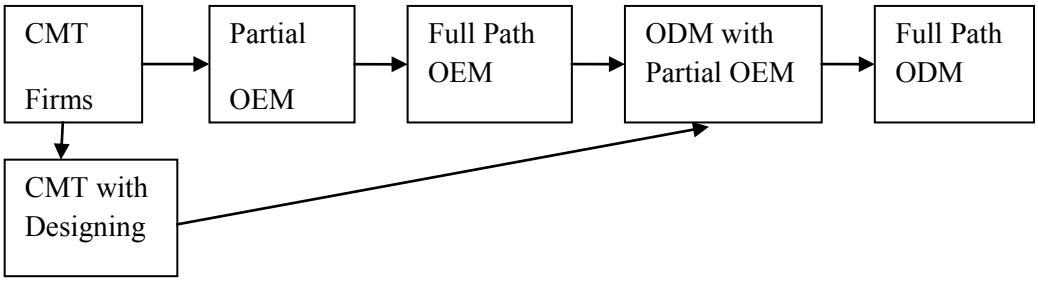

Figure 4.2: The Industrial Up-gradation Stages in Bangladesh Apparel Industry

4.3 Methodology: To conduct the study, purposive sampling was done. The firms were chosen to be surveyed on the basis that the firms had implemented the components of lean and agile manufacturing systems. Both program based implementation and evolutionary development of lean and agile manufacturing systems were considered. 180 firms were

surveyed. 84 firms were surveyed from EPZ area comprising Dhaka EPZ and Chittagong EPZ, and 96 firms were surveyed from non-EPZ area of Mirpur and Gazipur of Dhaka zone. The data were collected on five point Likert scale. The points for various activities regarding IUVC, HRM practices, IT adoption, CA and FP were allotted to 180 sample firms according to the following continuum scale:

Table 4.1: Parameter in the Likert Scale for the Study

Parameter	Point
Not at all performing	1
Not so good	2
Good	3
Very Good	4
Excellent	5

4.4 Successful implementation of different up-gradation stages

The activities which are marked equal to 3 or more than 3 in the Likert scale were regarded as successful implementation of those activities, and according to this the firms status as CMT with design, partial OEM, full path OEM, ODM with partial OEM, and full path ODM are determined.

Table 4.2: Position of the Firms According to the Stages in Industrial Up-Gradation

	CMT with Design	Partial OEM	Full Path OEM	***Total OEM***	ODM with Partial OEM	Full Path ODM	***Total ODM***
Value Adding Activities Apart from CMT	D	M P L (M+P) (M+L) (L+P) (M+P+L)	M P L		(D+M+P) (D+M+L) (D+P+L) (D+M) (D+P) (D+L)	D M P L	
No. of firms (both EPZ and Non EPZ)	3	69	21	***90***	21	41	***65***
EPZ	2	27	11	***38***	4	29	***35***
Non-EPZ	1	42	10	***52***	17	12	***30***

Table 4.3: Distribution of the Firms Pursuing LAMS in Different Patterns of IUVC

	Total Area	Total Area (by %)	EPZ Area	Non-EPZ Area
CMT	25	13.9%	6.7%	7.2%
Partial OEM	69	38.3%	15%	23.3%
Full Path OEM	21	11.6%	6.1%	5.5%
CMT with Designing	3	1.7%	0%	1.7%
ODM with partial OEM	21	11.6%	2.2%	9.4%
Full Path ODM	41	22.7%	16.1%	6.6%

4.5 Up-gradation Pattern: From the table 4.2 and 4.3, we see that firms with partial OEM activities are the highest in number (38%), followed by the full path ODM firms (22%). On the other hand, the lowest number of firms belongs to CMT with design. It has to be underscored that the firms who failed or never tried to pursue IUVC but practicing the attributes of LAMS are 13.9%. Therefore, it can be assumed that maximum of the Bangladesh apparel firms who practices LAMS are in the stage of partial OEM of IUVC, and then it comes the stage of full path ODM. If we assume Gereffi's proposition that firms are supposed to follow linear up-gradation path to sustain the market competition, we found that there are some deviations in the empirical scenario in case of Bangladeshi apparel firms pursuing LAMS.

The up-gradation pattern found in this study has much similarity and little dissimilarity with the study conducted by Rahman et al. (2008). Rahman et al. found that almost equal percentage of firms were existed in the stage of CMT (EPZ 45% and non-EPZ 47.2%), and here in this study as well, in CMT stage almost equal percentages of firms are existed in EPZ and non-EPZ area (EPZ 6.7% and non-EPZ 7.2%). In the study of Rahman et al., the stage of OEM is dominated by non-EPZ firms (non-EPZ 4.5% and EPZ firms are 0.0%). Here in this

study, in the stage of OEM, combining partial and full path, the number of firms for EPZ are 12.2% and for non-EPZ are 11%. In the study of Rahman et al., in the stage of ODM, the number of EPZ firms are little higher than non-EPZ firms. (EPZ 3% and non-EPZ 2.1%). Here, in this study also in combination of partial and full path ODM the percentage of successful firms in EPZ are higher than that of non-EPZ (EPZ 18.3% and non-EPZ are 16%).

In the table 2 and 3 and diagram 4.5, we see that firms are more distributed in partial OEM and full path ODM stages. This up-gradation pattern contrasts with the up-gradation pattern found in the study of Rahman et al.(2008). They found 92% firms are existed in CM and CMT stage whereas only 4.5% firms are found in the stage of OEM and 3% firms are existed in ODM stage. But here, in this study 13.9% firms are in CMT stage, 50% are in OEM stage and 34% firms are in ODM stage (table 4.3). The reason for this huge contrast may be the difference in sampling. The survey done by Rahman et al. was on the basis of representative and stratified sampling. On the other hand in this study, it is purposive sampling. The firms were chosen on the basis of adoption of leagile manufacturing system. If the firms had the least interest and tendency to implement the attributes of lean and agile manufacturing system, they were fallen under the sample. Moreover, the firms were chosen from Dhaka and Chittagong region as these are the most two convenient places to find firm with modern manufacturing and management systems. Therefore, the firms in this sample are much more modern in terms of manufacturing and management, and hence, the up-gradation stages hugely differed between the two samples.

4.6 Value Adding Matrix of Up-gradation Activities:

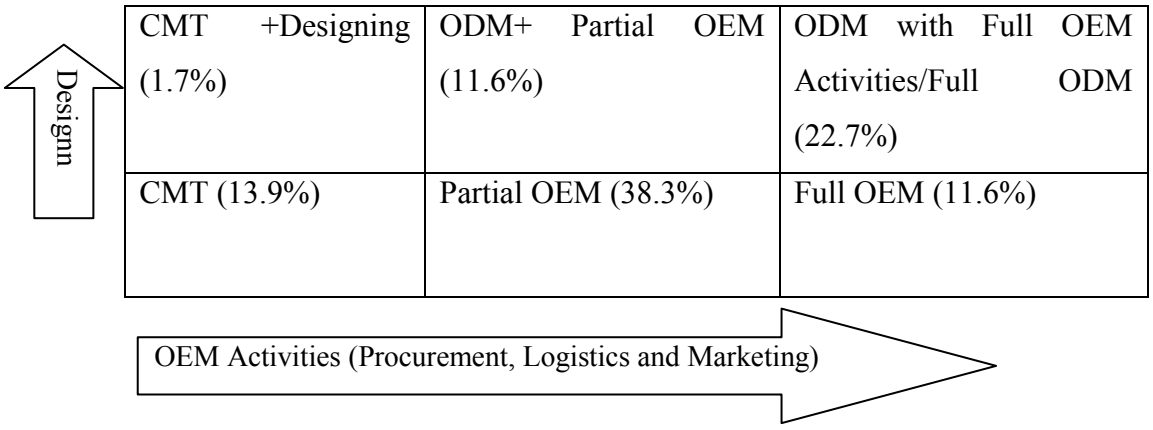

Figure 4.3: Value Adding Matrix

4.7 Firms' Up-gradation Related Activities in Different Parameter

Table 4.4: **Firms' Up-gradation Related Activities in**

	Procurement	Logistics	Marketing	Designing
Not at all performing	21%	25%	17%	38%
Not so good	28%	14%	30%	21%
Good	27%	19%	34%	26%
Very Good	16%	11%	16%	10%
Excellent	8%	31%	3%	5%

Table 4.4: Percentage of Up-gradation Activities

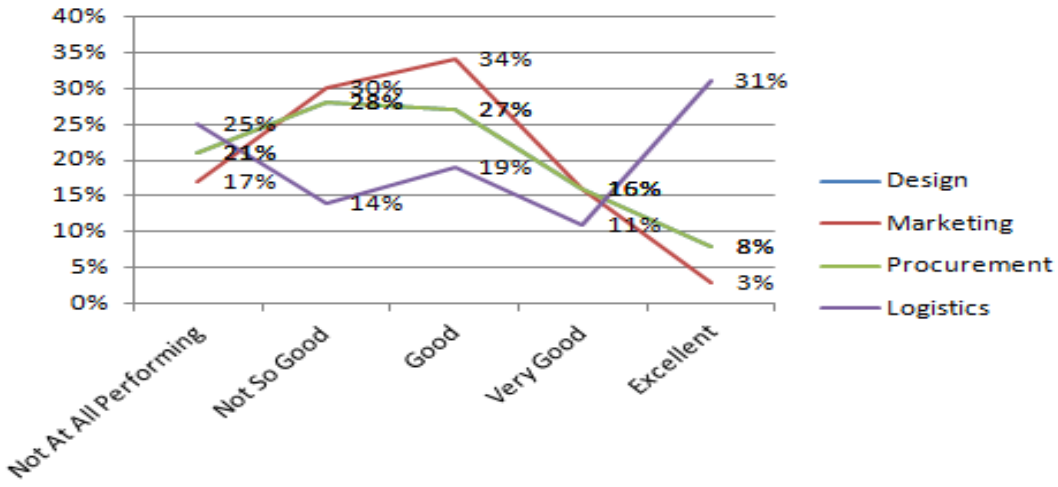

Figure 4.4: Success of Different Up-gradation Activities

From table 4.4 and figure 4.4, we see that except logistics, other three activities follow the same patterns of distributions. In procurement, marketing and designing the firms are mainly at 'not at all performing', 'not so good' and 'good' figure. None of them has the degree of excellent. But many of the firms' (31%) logistics activities are excellent.

4.8 Factor Loading and Composite Mean of the Antecedent and Outcome Factors' Indicators of Differently Up-graded Firms

This study has collected data on various antecedent and outcome factors' indicators in the five point Likert scale. As discussed in chapter 3 (literature review) the antecedent factors are SCF, HRM, IT and LAMS and on the other hand, the outcome factors are CA and FP. Except SCF, all the data were collected by the same field survey of the same 180 firms pursuing LAMS. This dissertation has selected the best possible indicators for the factors mentioned in the conceptual framework on the basis of previous literature. To understand how much the factors explain their respective indicators, this study has conducted exploratory factor analysis (EFA) by utilizing SPSS 18.0. According to Blunch (2008), factor loadings are the correlation coefficients between the indicators and the factors, and the squared factor loadings is the percent of variance in those indicators explained by the respective factor. Therefore, the more the value of the factor loading of an indicator, more it bears the characteristics of the respective factor. Below the factor loadings for the indicators of the respective factors except SCF are shown. Here it is to be mentioned that the eliminated indicators' factor loadings have not been shown here. From the table, we see that design and procurement have higher factor loadings for IUVC than marketing and logistics activities; workers commitment has higher factor loadings for HRM practices for LAMS; ERP and CAM have higher factor loadings for IT for LAMS, and customization and differentiation have higher factor loadings for LAMS. Quality and cost have higher factor loadings for the factor of CA, and capital is the highest for FP.

Table 4.5: Factor Loading Statistics of IUVC, Antecedent and Outcome Factors' Indicators

Factor	Indicators	Factor Loading (Rescaled)
IUVC	Design	.827
	Procurement	.872
	Marketing	.747
HRM Practices	Team Work	.742
	Work Rotation	.764
	Workers Commitment	.863
	Workers Empowerment	.779
	Workers Training	.578
IT	APS	.630
	ERP	.721
	CAM	.737
	CAD	.676
	Online Sourcing	.675
LAMS	Customize	.800
	Differentiate	.771
	Volume Flexibility	.587
	Product Line	.635
	Minimum Inventory	.574
CA	Cost	.745
	Quality	.851
	QR	.510
	Product Flexibility	.633
FP	Capital Growth	.846
	Profit Growth	.769
	Sales Growth	.712

In the next table, this study will show the composite mean values of the factors.

Table 4.6: Composite Mean of IUVC, Antecedent and Outcome Factors'

Indicators	CMT	Partial OEM	Full Path OEM	ODM with partial OEM	Full Path ODM
Design	0.998	1.084	1.447	2.807	2.918
Procurement	1.293	1.744	2.943	2.593	3.462
Marketing	1.313	1.665	2.427	2.024	2.592
IU Composite Mean	**1.201**	**1.498**	**2.272**	**2.475**	**2.991**
Customize	2.124	2.242	2.700	2.714	2.640
Differentiate	1.993	2.199	2.409	1.977	1.950
Volume Flexibility	1.477	1.539	1.761	3.020	2.919
Product Line	1.444	1.411	1.578	2.314	2.152
Minimum Inventory	2.145	2.269	2.222	1.683	1.688
LAMS Composite Mean	**1.837**	**1.932**	**2.134**	**2.341**	**2.270**
APS	1.651	1.859	2.086	2.055	2.167
ERP	1.839	2.210	2.433	2.504	2.650
CAM	2.160	2.283	2.257	2.734	2.449
CAD	2.074	2.349	2.323	2.490	2.445
Online Sourcing	1.722	1.637	1.940	1.918	2.283
IT Composite Mean	**1.574**	**1.723**	**1.840**	**1.950**	**1.999**
Team Work	2.226	2.311	2.782	2.714	2.640
Work Rotation	1.659	1.54053	1.766	1.977	1.950
Workers Commitment	2.350	2.546	2.804	3.020	2.919
Workers Empowerment	1.611	2.004	2.385	2.314	2.152
Workers Training	1.415	1.544	1.661	1.683	1.688
HR Composite Mean	**1.852**	**1.989**	**2.280**	**2.341**	**2.306**
Quick Response	1.741	1.928	2.076	2.148	2.360
Quality	2.114	2.203	2.505	2.647	2.589
Product Flexibility	1.743	1.867	2.022	2.004	2.200
Cost	2.132	2.613	2.467	2.823	2.760
CA Composite Mean	1.932	2.153	2.267	2.405	2.477
Capital	1.954	2.066	2.326	2.448	2.587
Profit	1.723	1.752	1.970	2.246	2.216
Sales Growth	1.816	2.065	1.869	2.079	2.156
FP Composite Mean	**1.831**	**1.961**	**2.055**	**2.258**	**2.320**

Due to small number of observations the CMT with design pattern's composite mean will not be shown here. For finding the composite mean value, the indicators inside the factors should be represented according to their importance based on how much they are explained by the respective factors.

Already it is mentioned that by the value of factor loadings, we may understand the correlation coefficients between the indicators and the respective factors. In other words factor loading shows how much the indicator's variance is explained by the factor. This value of the factor loading can be utilized for finding out the composite mean values of the factors. Usually mean is the division of the summation of observations by the number of observations. Therefore, if the sample sizes for the different patterns of IUVC are different, they can be brought under a common scale by finding the mean values of them. Zhou et al (2010) showed that if there are different sample sizes for different indicators, the composite mean of the factors can be found out by multiplying the mean values and the factor loadings of all the indicators. They did it by software for EFA, where mean is multiplied by the factor loading for the particular sub group. This study would like to follow the same process, but mean value will be multiplied by the factor loadings for the whole 180 firms, and thereby, here it will be done manually. The reason is that this study has divided the data into six patterns of IUVC, and unlike software based calculation this study would like to multiply the mean values for different patterns by the factor loadings found for all 180 firms rather than factor loadings for particular pattern of IUVC. The reason for multiplying the mean values of the indicators for different five patterns with the factor loadings done for 180 firms is that this will give us common scale for understanding the composite mean of the factors for different patterns, and this will also help us to compare the result found out here in this chapter, and the result found out by structural equation modeling (SEM) in the preceding chapters. Therefore, the mean value of the each of the indicators have been multiplied by the value of the factor loading of the indicators found in EFA for all 180 firms, and then all the indicators values have been summed up for each of the factors and finally the composite mean of each of the factors has been found out by dividing the value by the number of indicators belonging to the respective factor.

Table 4.7: Significance Status of the Indicators' Difference in Mean*Factor loading between each of the Pattern of IUVC with its Preceding Pattern of IUVC.

	HRMPLAMS	ITLAMS	LAMS	CA	FP
Difference between CMT and Partial OEM firms	Not Significant	**Significant**	**Significant**	**Significant**	not Significant
Difference between Partial OEM and Full OEM firms	**Significant**	**Significant**	**Significant**	Not Significant	Not Significant
Difference between Full OEM and ODM with Partial OEM firms	Not Significant	Not Significant	Not Significant	Not Significant	**Significant**
Difference between ODM with Partial OEM and Full ODM firms	**Significant (the value is higher for lower value adding steps)**	Not Significant	**Significant**	Not Significant	Not Significant

From the descriptive statistics for composite mean, we see that almost all the indicators gradually increases with the advance of the value adding steps except few of the cases. It is noticeable that 4 out of 5 of the HRM practice indicators showing little higher value in the stage of ODM with partial OEM step than full ODM step. Even, two of the IT indicators are higher in value in full OEM step also. This is very interesting. From this result, it may be deemed that if firms can give importance on HRM practices, they can achieve the stage of full ODM, even bypassing some or all the activities of OEM. In case of two IT indicators (CAD and CAM), the values are higher in the step of ODM with partial OEM than full ODM firms. Therefore, it may be deemed that CAD and CAM are also influential indicators for overcoming the problem of not having OEM activities in the endeavor of becoming full ODM firms.

Already from Table 4.6, it is understood that almost all the factors except HRM practices and two indicators of IT are higher in value in the preceding steps in comparison to the earlier steps. Here, in table 4.7, the dissertation would like to show the significance of the difference of each of the steps and its preceding steps. The significance of the results were found out by paired sample t-test using SPSS 18.0. Paired samples t-test usually finds the significance of

the difference of the samples of matched pairs of similar units (David et al. 1997). Here, the common units are the indicators but the pair is made out of two consequent preceding patterns of IUVC. As this is a study of social science, the significance was assumed when the calculated values were less than the table value in 5% significance level (Hazewinkel, 2001). In this way, this study has found that a different case here is the difference between ODM with partial OEM and full ODM for HRM practices. Here, the less advanced step is higher in value, and this gap is significant according to t-test. In case of IT, the same case happened for the same two steps but here the result is not significant. The reason for having higher value for HRM practices in ODM with partial OEM may be because these firms want to quickly catch the advanced stage of full ODM by implementing ODM components by ding of creative, talented and skilled human resources. The problems supposed to arise due to not having full OEM activities are covered by skilled human resources. Therefore, they can strive for design activities and can become ODM with partial OEM firms

4.9 Conclusion

Gereffi (1999) and Grunsven & Smakman (2001) stated that the apparel firms undertake the IUVC activities step by step starting from CMT to designing via commercial activities. But this study has shown that firms pursuing LAMS may undertake any type of activity without following any order starting from descending to ascending. This chapter has shown that most of the firms pursuing LAMS are standing in OEM (comprising partial and full path) stage which is about 50% in Bangladesh. This study has shown that in terms of advancement in the up-gradation stage EPZ firms are ahead of non-EPZ firms although the difference is not so big.

Chapter 5

Impact of Social Compliance Factors on Human Resource Management Practices for Implementing Leagile Manufacturing system

5.1 Introduction:

LAMS is a socio-technical system where workers are the heroes for the success in manufacturing systems (Paez et al. 2004). LAMS demand very systematic work flow, but human body is not a part of machine. A worker cannot evenly work for a long time like a machine. A worker is an emotional being, passionate for some objectives in life and surrenders to physical fatigue. On the other hand, he/she has limitless potentiality for innovating new idea for the product or production process. HRM practices bound for implementation of LAMS requires creativity, commitment and vision for limitless and continuous improvement of manufacturing systems. Therefore, LAMS must need some working environment which can facilitate these required conditions for HRM practices bound for LAMS. This study has found that SCFs which are a much debated issue nowadays for the entrepreneurs of Bangladesh apparel industry can play a vital role in developing HRM practices contributing for LAMS along with contributing to the promotion of human rights (Rahman et al, 2008). Good working place with good management is complementary to good practice of HRM (Dagher, 2008). In the previous literature on LAMS, scholars have shown only the relation between HRM practice and indicators of LAMS. But this study would like to dig deeper by relating SCF and HRM practices bound for LAMS.

5.2 Literature Review

5.2.1 LAMS in Bangladesh Apparel Sector

In chapter 3, we have discussed LAMS in brief, and also we have discussed how important the specially designed HRM practices for LAMS. LAMS has to be made fit in accordance with the firm's specific characteristics. Every firm has its specific characteristics which enables it gaining a positioning in the market, and due to its firms specificity its resources and

capabilities like HRM practices and IT are supposed to be unique. Therefore, HRM practices should be best fit in their nature while designing it for LAMS. Otherwise, LAMS would not be effective. The organizational logic of Macduffie (1997) is already discussed in chapter 3. Here, we have clearly understood that a specific bundle of HRM practices will commensurate with a specific bundle of indicators of manufacturing system. Therefore, LAMS highly depends on specially designed HRM practices.

5.2.2 HRM Practices for LAMS

LAMS would vary from place to place or country to country. Therefore, the indicators of LAMS have to be carefully selected on the basis of manufacturing scenario of a particular place or industry of a country. For Bangladesh apparel industry, Dagher (2008) stated that the current HRM practices for LAMS are work rotation, workers commitment, workers' empowerment, mastership of the seniors, problem solving discussion, training and teamwork etc.

5.2.3 SCFs

In chapter 3, we have already briefly discussed the definition of SCFs. In the preceding sections we shall discuss the objectives of social compliance, and how as a factor it would influence on HRM for LAMS.

5.2.4 Objectives of SCFs

Usually social compliance means ensuring labor rights with a view to pursuing export order. In the area of international politics, it is seen as a non-tariff barrier which is an outcome of bilateral relations. But if we combine international relations, economics, business administration, sociology and psychology, we see that social compliance have various magnitudes of influences on manufacturing activities. According to the discussion of Dul and Neumann (2009), it transpired that the objectives of compliance can be divided into two broad categories: 1. Social goal: ensuring humanitarianism 2. Economic goal: ensuring good quality product. The social goal and economic goal of SCFs can be well elaborated by the discipline of business ethics. The following two sub-sections about social goal and economic goal of SCFs have been constructed from the idea about how social goal and economic goal of

businesses can be ensured by practicing the aura of good business ethics, and this study utilized the idea of Crane and Matten (2010) in this regard.

i) Social Goal: Ensuring humanitarianism

From Marxist perspectives, the society is divided into several classes, on the basis of rent seeking attitude. The class of laborers/ workers is termed as alienated class and cannot make any additional rent except what is required for meeting their both ends meet. The workers are bound to abide by the contract established by the owners although owners are not bound to listen to the claims of the workers. The reason for the opportunity for this exploiting is rich people's accumulation of capital. It means that capital is at the hand of owners, and it is the single most powerful factor of production. The situation prevailed in the western world until the autocratic era of the rulers. But with the flourish of the democracy, people's welfare is becoming the central issue in the endeavor of politics. Therefore, the owners cannot always hold up the mass workers for seeking extra rent. Workers can also put pressure on the owners through political discourse. The incident of Chicago movement, which is known as the May Day drew a big attention to the politicians, thinkers and social activists. In course of time, labor laws started to be established throughout the states of the US. Soon Europe also started to establish labor laws for the betterment of all classes of people. Eventually, in the year 1919, International Labor Organization (ILO) came into being. But in the DCs and LDCs where democracy is still in premature state, labor rights are not realized by the entrepreneurs although the governments of these countries are signatory to ILO conventions. The passion for labor rights are not yet socially embedded in these countries. Still child laborers are heinously used. Owners do not need to make full payment to the child laborers so that they can seek extra rent by it. Women workers are highly discriminated in terms of payment. Social and religious beliefs favor the owners to compensate less to the women workers. Lack of government supervision created the opportunity of not to invest for healthy working environment for the workers. Therefore, many parliamentarians in the developed countries are raising their voice and implementing various legal instruments for barring import of labor intensive products from those countries where human factors are not considered in the manufacturing plants. In these circumstances, the apparel buyers have employed various

agencies who monitor compliance factors in the apparel manufacturing houses and on the basis of that buyers take the decision whether they would buy product from them or not.

ii) Economic Goal: Ensuring Good Quality Product

For the politicians and social workers, compliance is a very important issue for promoting human rights. But as a coin has another side, compliance has an economic side, which is rather highly in favor of the owners. Marx's elaboration of theory of class struggle was highly ostensible until market boundaries were not opened. But in the age of free market economy the entrepreneurs have to fight a tough battle in terms of CA, and human factors are directly related to achieving CA. Among human factors sufficient wages, convenient and comfortable working place, health and safety, equality in employment, motivation for self actualization by good manner etc. have enormous influence on absorptive capacity of the workers, and on the other hand, their mental stability and concentration on job, analytical ability and commitment for quality improvement generates revenue for the firms (Jensen, 2002). Therefore, establishing humane norms are very important compliance issue in GAVC. This study strives to look for the antecedents issues of HRM practices for LAMS which means this study confines itself within economic goal of compliance. There are many issues surrounding social compliance in GAVC. But this study has tried to carefully select only those issues of the factors which may have influenced on economic goal on the basis of previous literature review.

5.2.5 Problems about Compliance according to Dul and Neumann (2009)

How SCF can economically contribute to the firms by improving HRM practices is always a critical question in the forum of apparel firm owners. Maximum of the entrepreneurs in the apparel industry have the traditional idea that implementing SCFs would be burden for the firms, and because of this the firms would loss competitiveness in terms of cost. This confusion among the owners is taking place because SCFs are imposed for many other purposes, and the owners think that SCFs are imposed only for those purposes. But actually apart from the other purposes SCFs' one of the challenging purposes is to economically

contribute to the firms, and this is mainly beneficial for the firm itself. The following issues hatch the confusions among the owners of apparel firms:

1. Non-compliance could be cost reducing for both buyers and manufacturers. But it is against the development policy devised by both developed countries and DCs. Therefore, SCFs is imposed over firms of DCs and LDCs by the buyers of developed country. But very often the manufactures in the LDCs think this is the only reason for imposing SCF on them (Khaled, 2011).
2. Non-compliances are against millennium development goals. Therefore, the UN bodies are also interested to implement SCFs in the apparel industry of the LDCs. But again the manufacturers often think this is the sole reason for imposing SCF (Khaled, 2011).
3. Sometimes intentionally imposed by developed countries as Non-tariff Barrier. Therefore, it is always a suspicious thing for the business people in DCs and LDCs **(**Dul and Neumann, 2009**)**.
4. It is experienced as time consuming and costly activity. It is not set up as a strategy for the company. Because of this, owners without long term vision are not interested to implement SCFs **(**Dul and Neumann, 2009**)**.
5. Very few firms have their own ergonomists. Maximum of the firms outsource it. Therefore, the firms managers never understood the inner significance of SCFs **(**Dul and Neumann, 2009**)**.

5.2.6 The Social Compliance Issues Promoted by the Government of Bangladesh

The compliance issues monitored by Bangladesh Government are selected in the light of ILO convention, international buyers' proposal and the investors' negotiation with the government (Rahman et al. 2008). But as it is mentioned earlier that all the compliance issues may not be directly related to economic benefit of the organization, these are essential for ensuring human rights. Before going into selecting the compliance factors which are related to economic benefit, we shall have glimpses over the general compliance issues promoted by Bangladesh National Parliament Secretariat with the association of Bangladesh Export Processing Zones

Authority (BEPZA), BGMEA and BKMEA (Bangladesh Gazette on EPZ Workers Welfare Association and Industrial Relations, 2010; BEPZA Instructions, 1988).

i) **Social Protection:** The employers have to ensure the condition of employment providing appointment letter/ contract paper, ID card, service book for workers, uniform, confirmation letter and timely promotion etc. The employers have to ensure appropriate working hours, rest period, weekly holidays, various kinds of leaves and maternity benefit. Welfare facilities like rest room, provident fund, trustee board, bank account and group insurance have to be provided. No gender discrimination can be made on the basis of wage, working hours and forced labor. Environmental protection has to be ensured by installing effluent treatment plant and properly keeping chemicals and hazardous materials.

ii) **Social Dialogue and Employment Relationships (including human development):** The compliance indicators for this category are employers have to provide the platform for conducting the activities of Workers' Welfare Association. HR activities have to be conducted by a separate department by specialized officers. Grievance handling procedure should be conducted by certain organizational policy. The employers by their own initiatives should make the workers aware about their rights and responsibilities.

iii) **Health and Safety at Work:** The compliance indicators for this category are medical outlet service safety & security measures (including preparedness of tackling an emergency situation like fire, etc.), pure drinking water, first aid boxes available, washing facilities, personal protective equipment, occupational accidents and diseases recorded.

iv) **Fire and Safety at Work:** The compliance indicators for this category are fire extinguishers/Equipments (Date, Quantity), fire hydrants smoke/heat detector/sprinkler, fire drill (evacuation plan, fire fighting etc.), proper storing of goods and emergency exit.

The SCF instructed by the Bangladesh Government that the SCF consists both social and economic objectives. For example, group insurance, provident fund and fire and safety are more about social objectives and contract paper, appointment latter, grievances handling procedure, washing facility, rest room etc have both social and economic objectives.

5.2.7 The Common Social Compliances Chosen From Heterogeneous Requirements of Buyers

Buyers' requirement regarding compliance is heterogeneous. This lack of uniformity in different brands' requirements often creates confusion among suppliers. The reason is that a large number of suppliers do business with several brands. Moreover, although all buyers talk about following the code of conduct which refers to maintaining and adherence to top local legislation as a minimum requirement, when monitors are appointed by buyers, they tend to follow detailed checklists provided by respective brands which are usually local legislation plus. Therefore, this is a difficult task to sort out all different lists of compliance factors and it is more difficult to find out which compliance factors are directly related to HRM practices for gaining economic benefit.

Realizing the problems of heterogeneity in the requirements of the buyers Rahman et al. (2008) have divided compliance issues into five broad categories: Ergonomics 2. Workers related compliance program 3. Non-discriminatory attitude in respect of employment and wages 4. Workers health and safety program and 5. Workers association or social dialogue. Doing a survey on 190 firms in Bangladesh Rahman et al. (2008) found significant relations between compliance and productivity. In their survey, they found that labor productivity in less compliant firms is US$ 1411, in moderately compliant firms is US $ 1342 and in highly compliant enterprises US $ 2213.

5.2.8 The Similarity between Human Factors in LAMS and Compliance Issues in Apparel Sector

There are many pieces of literature on human factors to be designed for leagile workforce. The factors explained by the authors are nearly similar like the factors of compliance. The name of

the factors used in human factors for leagile and compliance issues in the apparel sector is almost similar. The basic difference is that compliance issues have two goals: ensuring human rights and ensuring economic benefit for all the stakeholders, and on the other hand, human factors for leagile workforce are explained targeting only the economic benefits of all the participants in the value chain. Therefore if, we juxtapose the compliance issues over human factors for lean workforce, we can sort out the factors and indicators that should be relevant for HRM practices for LAMS. Here, in Table 5.1, there is a short review of the literature on human factors for LAMS workforce:

Table 5.1 Literature Review on Human Factors in Lean and Agile Workforce

Author's Name	**Title**	**Major Findings**
Paez et al. (2004)	The Lean Manufacturing Enterprise: An Emerging Socio-technological System Integration	Lean requires a comprehensive set of human practices. Lean requires congenial environment for creative thinking, problem-solving focus, and teamwork
Lewchuk and Robertson, D (1997)	Production without Empowerment: Work reorganization from the perspective of motor vehicle workers	Work-load, health and safety conditions, empowerment, and relations with management are influential factors for lean in comparison to mass production system
Dul and Patrick Neumann, W. P (2009)	Ergonomics contributions to company strategies	Changes in Ergonomics like Operations engineering and process innovation, downsizing, lean production, business process re-

		engineering etc have positive impact on firms' corporate strategy.
Taira (1996)	Compatibility of HRM, Industrial Relations, and Engineering Under Mass Production and Lean Production: An Exploration	Lean production requires workers with considerable intellectual preparations. Therefore, workers union can hatch team spirit which is motivating for lean production
Plonka (1997)	Developing a Lean and Agile Work Force	Tasks designed ergonomically can help in mistake proofing which is helpful for implementing lean and agile workforce. Machines need to be designed for ease of preventative maintenance and for rapid return to service when failures do occur. Labor unions will have to seek CA and be willing to learn more about their competitors. In this respect, labor union is essential for implementing lean and agile workforce.
Paez (2005)	Moving from Lean Manufacturing to Lean	Creative thinking, teamwork and problem solving focus

	Construction: Toward a Common Socio-technical Framework	are key elements for lean construction. Best fit HRM is needed for adjusting with volume, location, complexity and uncertainty.

After reviewing the literature on human factors for lean and agile work force, we find the relevant compliance factors for HRM practices targeting for implantation of LAMS. These are as follows: 1. Ergonomics 2. Workers related compliance 3. Health and safety arrangements 4. Social dialogue and employment relationships and 5. Non-discriminatory attitude.

5.2.9 Impact of SCFs on HRM Practices for LAMS

5.2.9.1 Impact of Ergonomics on HRM practices for LAMS

Ergonomics is the scientific discipline concerned with the understanding of interactions among human and other elements of a system that applies theory, principles, data and methods to design in order to optimize human well-being and overall system performance (International Association of Ergonomics, 2007). Ergonomic analysis of work flow has deep relation with Taylor's time and motion studies. Both of them study how to reduce unnecessary movement and expedite value adding activities with the least possible time and movement). Rahman et al. (2008) selected the following indicators for ergonomics in apparel sector: i) Space Line Ratio ii) Space-Worker Ratio iii) Worker-Machine Ratio iv) Worker Line Ratio.

Much of the engineering dimension of lean production is buried in the phrase of Womack et al. (1990) "workers actually adding value to the car on the line". Lean engineering must maximize value added, which requires every minute of working time to be adding value. This is no trivial principle. Many research findings in the United States indicate that workers waste a good deal of their "working" time in motions that add no value to the product such as waiting, queuing, moving, carrying, inspecting, and other activities not contributing to the making of the product (Maskell, 1991, p.124). Ergonomics enhances HRM practice for LAMS which can facilitate the HR managers to find out a better way of doing of the above mentioned tasks by mathematical analysis and by trial and error basis. Ergonomically designed firms are

supportive for practicing workers rotation by letting proper man-machine allocation. Moreover, these firms can also make on-the-job training effective by creating congenial atmosphere for learning. Ergonomically designed firms create much less fatigue or mental disturbance by allowing smooth movement. Therefore, workers are psychologically motivated to show their commitment for better quality.

5.2.9.2 Impact of Workers Related Compliance to HRM Practices for Leagile System

LAMS requires talented human resource with good analytical ability. The system itself should be like that it brews up intellectual environment among the workers. On the other hand, according to scientific management, systematic management of personnel activities can be a motivating factor for nurturing cognitive performance of the workers. Maintaining ID card, recruiting through proper appointment letter, compensating on the basis of experience, weekly holiday, maternity leave, day care and canteen facility etc are some managerial tool for maintaining disciplined personnel management. These facilities are in fact, needed for attaining full concentration on the work by the workers (Rahman et al., 2008). By providing these facilities, the firm may expect much commitment and team spirit from the workers. Therefore, a properly managed work force may be motivated for implementing LAMS.

5.2.9.3 Impact of Health and Safety Arrangement to HRM practices for LAMS

As it is mentioned earlier that LAMS needs an intellectual environment where workers' success in innovating new product and production process is expected to be happened very often. Without good health and safety arrangement, the workers passion for this cannot be expected to turn up. In the traditional mass production systems, the only thing expected from workers is obedience (Dagher, 2008). Health and safety net were much neglected for the workers in mass production system. But in LAMS workshop floor, human resource is the central focus and without betterment of the workers the charisma from workers cannot be expected. Workers are the heroes of LAMS.

5.2.9.4 Impact of Social Dialogue and Employment Relationships on HRM practices for LAMS

Lean and agile manufacturing are a socio-technical approach of production. Both of these need to harmonize the technology and management with social norms of the firm. Therefore, social dialogue among the workers and managers is very important here for designing and shaping the work flow, production process and layout of machinery. In this social dialogue, the workers participation is highly important. Not only participation of the workers but also their meaningful brainstorming debate is also necessary to find out human related factors for improving lean and agile manufacturing system.

Workers association can ensure their sincere participation in this social dialogue and to make the outcome of the debate a socially embedded knowledge. Freeman and Medoff (1984) found that in the unionized firms, the workers may bargain for productivity improvement and so that they can share more profit. They told "the greatest merit of productivity bargaining is that it is cooperative, not adversarial". Empirical research on union impact generally shows that wages and productivity are higher in unionized firms than in non-union firms. Both unionized and non-union firms have adopted various workplace innovations. But there are differences between the two types of firms in selecting the style of innovations. Unionized firms are more likely to choose team production systems, quality of work life and quality circles. Therefore, it can be said social dialogue arranged by workers association or union can positively influence in the establishment of HRM practices for LAMS.

Workers' participation in social dialogue can contribute a lot by creating a congenial atmosphere for diverting the workforce towards lean and agile culture. Through regular arrangement of problem solving discussion, work rotation, keeping notes of workers newest innovation, grievance handling and summarizing, the lean and agile matters can be properly done, and this can be happened if workers association and a separate HR department are existed (Rahman et al. 2008).

5.2.9.5 Control Variables: Impact of Organizational Context on HRM Practices

Doing a survey on 326 Chinese firms, Ding and Akhter (2001) has empirically showed that organizational context like firms' size and age have an impact on HRM practices. Siddique

(2005) and Dagher (2008) described that owners qualification determines how important the issues of HRM practices will be in an apparel firm. Therefore, this study would like to take some control variables while showing the impact of social compliance factors on HRM practices for LAMS. Firm size like number of workers may have a negative impact on HRM practices. This may be more logical for implementing HRM practices for LAMS, because LAMS need qualified workforce with good analytical ability. Large work force very often cannot ensure this qualification of workers (Dagher, 2008). On the other hand, firms' size on the basis of capital is expected to positively influence on HRM practice for LAMS. The reason is that firms with more capital would be able to arrange necessary infrastructure for LAMS like arranging training, machinery suitable of quick changeover or CAD, CAM machine for customization. Firms' age is expected to contribute positively to the implementation of leagile workforce. As it is mentioned in chapter 5, lean and agile learning is evolutionary in nature. Consequently age is expected to positively influence on HRM practice for LAMS. The reason is that more age of the firms would have more experience in evolutionary learning. An important organizational context which is particularly necessary for leagile implementer is owners' qualification. Here, owners' qualification means owners educational background, experience, innovativeness and vision. Leagile is a visionary venture for any firm as it requires much art for both waste reduction and quality enhancement along with differentiation. Moreover, the firms who strive to make SCFs and HRM practices complementary for each other, this issue is more applicable (Dagher, 2008).

5.3 Conceptual Framework

On the basis of the literature review this study has constructed the conceptual framework by assuming the indicators of HRM practices for LAMS as the dependent variables and the indicators of SCFs as the independent variables (Figure 5.1). As discussed in the sub section 5.2.9.5, a few of the firm characteristics also have been put as the independent variables.

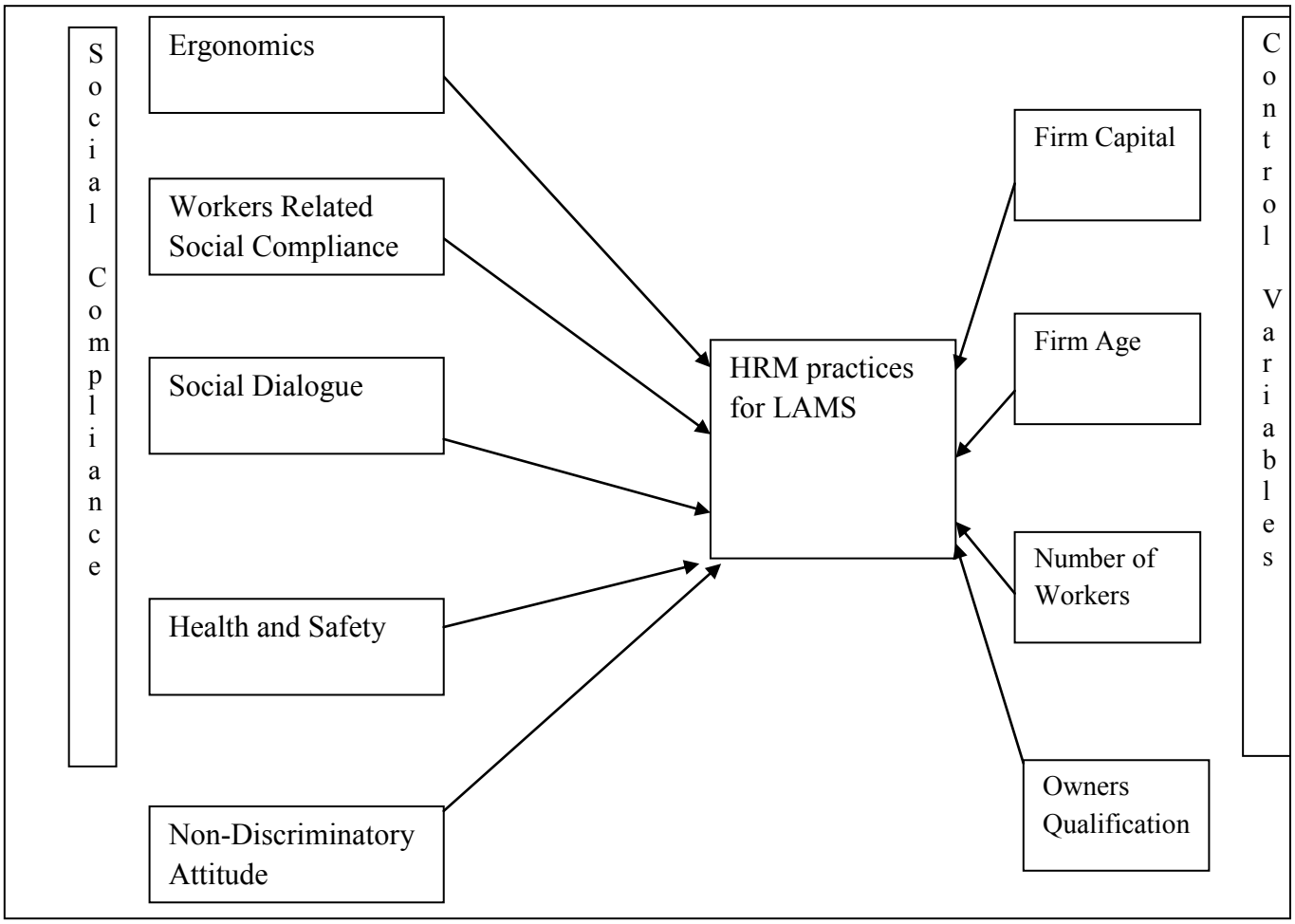

Figure 5.1: Conceptual Framework of Impact of Social Compliance Factors on Human Resource Management Practices for Leagile Manufacturing System

5.4 Hypotheses

H 5.1: The more the implementation of SCFs the more implementation of work rotation

H 5.2: The more the implementation of SCFs the more implementation of workers commitment

H 5.3: The more the implementation of SCF the more implementation of workers empowerment

H 5.4: The more the implementation of SCFs the more implementation of workers mastership

H 5.5: The more the implementation of SCFs the more implementation of problem solving discussion

H 5.6: The more the implementation of SCFs the more implementation of training

H 5.7: The more the implementation of SCFs the more implementation of teamwork

5.5 Research Methodology

Sampling was purposive in nature as only the firms who have implements HRM practices for LAMS were selected. The nature of the data is secondary, and it is not collected directly from the firms. GIZ office in Bangladesh has implemented both social compliance issues and lean manufacturing system as a pilot project in 40 experienced factories, and these factories have also some of the characteristics of agile. GIZ has their own evaluation system for monitoring those factories. This study collected date from the evaluating officers of that GIZ project on the basis of their previous monitoring experience. In the same way, data on another 35 factories from Dhaka EPZ were collected from the counseling officers (monitoring officers for compliance) of Dhaka EPZ. The reason for collecting secondary data is that compliance is a sensitive issue in Bangladesh, and most of the firms want to keep highest possible confidentiality about it. Therefore, it could be biased if data were directly collected.

A questionnaire was prepared for the monitoring/ evaluating officers of GIZ and EPZ. They were asked the questions on the firms on the basis of five point Likert scale. Therefore, the collected data are perceived rather than objective. About control variables, the data for capital, number of workers, and age of firms were directly collected. But the data about capital of the firm is later changed into Likert scale by putting 5 to the firms with higher amount of capital and 1 to very lower amount of capital. The reason of this conversion is that there was much discrepancy in the amount of capital between EPZ firms and non-EPZ firms as non-EPZ firm do not want to show their real amount of capital. The data on owners' qualification was also collected by Likert scale. Here, both owners' experience and owners' academic qualification were equally considered. Then by ordered probit regression (OPR) in SPSS 18.0, the dependent variables belonging to HRM practices were regressed one by one for each of the indicators of HRM practices with the set of variables of the control variables. Then again dependent variables of HRM practice were tested by regressing with the same set of control

variable and also the set of social compliance factors. The reason for employing OPR is that OPR provides an appropriate framework for statistical analysis whenever the data of dependent variables are ranked rather than numerical.(Daykin and Moffatt, 2002). Here all the data collected in Likert Scale which means the data collected on the basis of the agreement of the respondents like strongly disagree, disagree, neither disagree not agree, agree and strongly agree. Therefore, all the data collected for both independent and dependent variables are ordinal in nature which means they are ranked rather than numerical.

5.5.1 Collection of Data about the Variables

In order to collect the necessary data for testing the hypothesized model, we made a list of variables. The list of variables had two groups. One group consists of the variables regarding SCFs and the other is about HRM practices for LAMS. Before introducing the list of variables, we kept an introductory part asking questions about general matters of the firm. The data about SCFs and HRM practices for LAMS are preserved according to the own organizational method by GIZ and EPZ, and these two organizations are different from each other in their measurement methods. Therefore, for keeping the consistency in the collected data, all the data have been converted into Likert scale by the officers of GIZ and EPZ themselves.

5.5.2 Firms Profile

Secondary data were collocated on 75 firms. 40 firms' data were collected from GIZ officers and these were non-EPZ firms in Dhaka area. 35 firms' data were collected from the EPZ officers of Dhaka EPZ area. Here it is to be mentioned all the firms under this survey are pursuing LAMS

5.6 Data Analysis and Results

5.6.1 OPR

Table 5.2: Data Analysis for the Regression between SCFs Indicators and HRM Practices for LAMS

	Beta Coefficient of SCF in influencing on HRM Practices for LAMS						
SCF as independent Variables	Work Rotation	Workers Commitment	Workers' Empowerment	Mastership of the Seniors	Problem Solving Discussion Group	Training	Teamwork
Ergonomics	.377*	.525**	.451*	.419*	.560**	.235	.402*
Worker Related Compliance	.660***	.089	.581***	.383*	.446**	.200	.397**
Social Dialogue	.461***	.469***	.044	.186	.097	.005	.285*
Health And Safety	.542**	.373	.419*	.493**	.253	.357*	.150
Non Discriminatory Attitude	.155	.164	-.085	.008	.512**	.765***	.262
Capital	.303**	.358**	.453***	.241*	.376***	.215*	.154
Firm Age	-.053*	-.046*	.-004	-.035	-.041	.056**	-.030
Number of Workers	.000	.000*	.004	-.117	.000	.000*	.003
Owners Qualification	.061	-.166	-.222*	-.076	.151	.086	-.216*

Pseudo R^2 during regression with only control variables	Cox and Snell .321 Nagelkerke .339 McFadden .132	Cox and Snell .256 Nagelkerke .271 McFadden .102	Cox and Snell .327 Nagelkerke .355 McFadden .154	Cox and Snell .245 Nagelkerke .263 McFadden .105	Cox and Snell .328 Nagelkerke .350 McFadden .143	Cox and Snell .077 Nagelkerke .081 McFadden .026	Cox and Snell .205 Nagelkerke .215 McFadden .075
Pseudo R^2 during regression with both control and social compliance variables	Cox and Snell .661 Nagelkerke .699 McFadden.368	Cox and Snell .426 Nagelkerke .450 McFadden .191	Cox and Snell .540 Nagelkerke .584 McFadden .301	Cox and Snell .483 Nagelkerke .519 McFadden .248	Cox and Snell .578 Nagelkerke .617 McFadden.312	Cox and Snell .239 Nagelkerke .251 McFadden.091	Cox and Snell .454 Nagelkerke .476 McFadden .198
Model Fitted with the Significance level	***	***	***	***	***	**	***

At the end of Table 5.2, the adjusted R^2 is given for regression with dependent variables with control variables and with both control variables and the variables of SCFs. R^2 is the ratio between explained sum of square (ESS) and total sum of square (TSS) of the observations. When R^2 is adjusted by the degrees of freedom it is called adjusted R^2. Here we see that in each case of the dependent variables adjusted R^2 increase when the variables of social compliance factors were added to the control variable. It means social compliance factors can explain the movement in the dependent variable in a good way.

5.6.2 Results

Recommendation on Hypotheses

Table 5.3: Results shown by Hypotheses

Hypotheses	*Recommendation*
H 5.1 : The more the implementation of SCF the more implementation of work Rotation	*Partially Supported*
H 5.2 : The more the implementation of SCF the more implementation of workers commitment	*Partially Supported*
H 6.3: The more the implementation of SCF the more implementation of workers empowerment	*Partially Supported*
H 5.4: The more the implementation of SCF the more implementation of workers mastership	*Partially Supported*
H 5.5: The more the implementation of SCF the more implementation of problem solving discussion	*Partially Supported*
H 5.6: The more the implementation of SCF the more implementation of training	*Partially Supported*
H 5.7: The more the implementation of social compliance factors the more implementation of teamwork	*Partially Supported*

5.6.3 Relations in the Regression

Dependent Variable: Work Rotation

Work Rotation is significantly influenced by ergonomics, worker related compliance, health and safety and social dialogue. If ergonomics moves by 1, work rotation moves by .377; if worker related compliance moves by 1 the work rotation moves by .660; if health and safety moves by 1 work rotation moves by .542 and if social dialogue moves by 1, work rotation moves by.461

Dependent Variable: Workers Commitment

Workers' commitment is significantly influenced by ergonomics and social dialogue. If ergonomics moves by 1, workers' commitment moves by .525; and if social dialogue moves by 1, workers' commitment moves by .469.

Dependent Variable: Workers Empowerment

Worker empowerment is significantly influenced by ergonomics, workers related compliance and health and safety. If ergonomics moves by 1 worker empowerment moves by .451; if worker related compliance moves by 1 the workers empowerment moves by .581; and if health and safety moves by 1, workers empowerment moves by .419.

Dependent Variable: Mastership

Mastership is significantly influenced by ergonomics, workers related compliance and health and safety. If ergonomics moves by 1 mastership moves by .419; if worker related compliance moves by 1 the mastership moves by .383; and if health and safety moves by 1, mastership moves by .493.

Dependent Variable: Problem Solving Discussion

Problem Solving Discussion is significantly influenced by ergonomics, worker related compliance, and non-discriminatory attitude. If ergonomics moves by 1 problem solving discussion moves by .560; worker related compliance moves by 1 problem solving discussion

moves by .446; and if non-discriminatory attitude moves by 1, problem solving discussion moves by.512.

Dependent Variable: Training

Training is significantly influenced by health and non-discriminatory attitude If health and safety move by 1 training moves by .357; and if non-discriminatory attitude moves by 1, training moves by .765

Dependent Variable: Teamwork

Team spirit is significantly influenced by ergonomics, worker related compliance and non-discriminatory attitude. If ergonomics moves by 1 team spirit moves by .402; if worker related compliance moves by 1 team spirit moves by .397; and non-discriminatory attitude move by 1, team spirit moves by .285.

5.7 Discussion

From the result, we see that two of the most important variables of SCFs are ergonomics and worker related compliance. Then health and safety and non-discriminatory attitude come. Ergonomics has appeared as the most important independent variables which have significant influence on 6 indicators of HRM practices for LAMS. It has a significant impact on work rotation, workers' commitment, workers empowerment, mastership of the seniors, problem solving discussion and team spirit. Without arranging proper man-machine allocation workers commitment cannot be expected. Therefore, ergonomics has significant influence on it. Work rotation cannot be executed properly if the worker-machine ratio is too high or too low. Same is the case with mastership and worker empowerment. If production floor is too congested or unevenly designed, the workers cannot teach each other and cannot follow chain of command well, and there will not be any good team effort. Problem solving discussion cannot be arranged in a hazardous working place where workers are frustrated due to frequently development of fatigue. As Taylor always underpinned that movement in the work floor and the interaction between man and the machine have to be scientifically designed, this study once more found the authenticity of this relation. Much of the time and wastes can be saved by proper allocating of the machine and placing the workers properly, and these are the prime

objectives of HRM practices for LAMS. As a whole, ergonomics appeared to be the most important social compliance factors for the HRM practices for LAMS.

Workers related compliance appears to be another very important variable in this study. It has an impact on work rotation, workers empowerment, mastership of the seniors, problem solving discussion and team spirit. Workers related compliance appears to be a very important factor, because it creates congenial atmosphere for the workers. HRM practices for LAMS need to perform not only through a systematic work flow but also the practices need to create some emotional attachment with the workers. Here, workers related compliances like appropriate working hours, rest period, weekly holidays, various kinds of leaves and maternity benefits and other welfare facilities create a soothing environment for the workers and accordingly that workers are committed for work rotation, problem solving discussion and team work or for being properly trained. Another important dimension of workers related to compliance is that discipline gained by implementing this compliance ensures workers empowerment as well.

Non-discriminatory attitude has influence on mastership of the seniors, problem solving discussion, training and team spirit. A work environment with discriminatory attitude cannot ensure proper reward of one's performance. In this environment, somebody enjoys extra facility at the cost of other's working. This creates frustration and this does not let the workers for thinking passionately for the firm. Therefore, discrimination does not make problem solving attitude effective. Commanding over juniors with discriminatory attitude also creates frustration. Consequently, mastership of seniors also needs non discriminatory attitude and same logic is applicable for on-the-job training. Discrimination destroys group dynamics, and therefore, team spirit also needs non discriminatory attitude in the organization. Non-discrimination is highly effective on realizing workers commitment.

Health and safety have significant influence on workers empowerment, mastership of the seniors and training. Human being cannot be seen as a part of the machine. A worker encompasses emotion, passion and physical fatigue while working. As an emotional being a worker cannot work all the time equally, but he/she has limitless potentiality in innovation.

Therefore, health and safety can ensure a balanced combination for physical convenience and mental spontaneity in the work floor. Where there is the development of good mental faculty, there is the implementation of effective empowerment throughout the workers. Mentally frustrated workers cannot be a good learner. Therefore, health and safety has also influenced on training and mastership of the seniors.

Social dialogue has significant influence on work rotation and workers commitment. Social dialogue ensures participation of all the workers in generating innovative idea. If any idea of the workers or even very junior workers is neglected, through social dialogue that negligence can be brought into the attention of the managers. Therefore, it ensures everyone's importance in idea generation and eventually enhances commitment of the workers. On the other hand, through social dialogue, workers exchange views and ideas with the managers. By this dialogue the managers understand which workers are lacking in which type of skills, and accordingly the managers can conduct the operation of work rotation to fill the skill gap. In this way, social dialogue enhances the implementation level of work rotation. As a whole social dialogue is a motivating factor for all the workers for sharing a common passion with the top management or owner.

5.8 Conclusion

Many scholars along with Paez et al. (2004) have shown the relation between social compliance factors and HRM practices for LAMS where the components for both compliance and HRM came in a scattered way. But this study has given those scattered indicators a formal shape by putting them into SCFs and HRM practices for LAMS. This is the only study which has empirically showed the relation between SCFs and HRM practices for LAMS. From the literature review, it transpired that almost all the social compliance factors should have relations with all the indicators of HRM practices for LAMS. But this study has found some compliance factors like ergonomics and worker related compliance are important for more indicators of the HRM practices, and other indicators are also important for some particular indicators of HRM practices for LAMS. But as a whole SCFs has appeared to be an important prior condition for implement HRM practices for LAMS.

Chapter 6
Impact of Antecedents on Industrial Up-gradation through Value Chain of the Firms Pursuing Leagile Manufacturing Systems

6.1 Introduction

It is already discussed in chapter 3 about the GAVC that the value chain of the apparel industry is widely spread throughout the world by five separate but interrelated networks such as the raw materials network, component network, production network, export network and marketing network (Gereffi, 1999). It is already mentioned earlier that the firms in the DCs and LDCs cannot break the shackle of being trapped in the low value adding activities. In regard to this problem, the firms can follow two main strategies to break up the status quo. These two main ways are increasing export destinations and pursuing IUVC. Between these two strategies, pursuing IUVC is the most substantial but the least unpaved strategy for enhancing competitiveness and increasing profit margin for firms in the DCs and LDCs. To pursue for IUVC the firms have brought change in their corporate strategy, business strategy and functional level strategy. According to the theory of organizational economics, reduction of transaction cost can pave the way for enlarging the boundary of the firms within the industry, and also outside of the industry for pursuing diversified businesses. The issue is well dealt by corporate strategy. On the other hand, according to RBV, resources and capabilities development can help reduce transaction cost by achieving various degree of tangible and intangible asset or by another meaning achieving explicit and tacit knowledge. Therefore, if the firms arrange the functional strategy in such a manner that the resources and capability are improved, and hence, firm's tangible asset and intangible assets are also developed, the firms may be able to change the corporate strategy by undertaking relevant businesses. In this way, resources and capabilities development can contribute to IUVC. Therefore, we may find out the resources and capabilities of the firms as the antecedent factors of IUVC for the apparel manufacturers in the GAVC. By searching the resources and capabilities those are relevant to the antecedent factors for hatching IU, the study found that a modern manufacturing system

can be vey important resources and capabilities for the firms, and currently in apparel firms throughout the world, LAMS is considered to be highly productive instrument. But this is not the end, because as the back tail of LAMS, appropriate HRM practices and information technology can also be the resources and capabilities for the firms.

6.1.1 The competition in the GAVC

The DCs and LDCs face fierce competition among themselves in the apparel manufacturing business because of availability of low cost labor in these countries (Porter, 1990). On the other hand, in the step of marketing network a firm needs to invest a lot, which is not suitable for the firms of DCs and LDCs. Therefore, very often the marketing firms in developed countries put stringent conditions of low production cost on the manufacturing firms in DCs and LDCs. Eventually, these countries are very often locked into low value adding activities and cannot strive for further industrialization. To overcome this problem, some of the firms in DCs and LDCs are trying to develop their resources and capabilities to extend their businesses into relevant businesses of the same value chain like design making, procurement, logistics and marketing etc. This is not an easy way to do. They have to utilize their resources and capabilities in such a dynamic way that they can enhance the firms' performance by positioning themselves in supply chain strategically. HRM practices and IT can make the manufacturing system unique resources for the firm, and therefore, the firms can decode the firm specific knowledge of relevant businesses in the endeavor of VI. Manufacturing system especially LAMS has to make its required HRM practices and IT through best fit approach, because LAMS has some special business objectives. The main focus of LAMS is waste reduction and at the same time striving for customization and differentiation.

It is already discussed in chapter 3 that countries with different economic status enjoy CA in different positions in the value chain, and accordingly, Bangladesh has CA in manufacturing stage of the value chain. But this competitive advantage is due to low labor cost, and many countries in Asia, Africa and Caribbean region are ready to offer low labor cost (Grunsven and Smakman, 2002; Gereffi, 1999). There are many other issues which are responsible for making the market extremely competitive for Bangladeshi apparel manufacturers. For example, due to world politics the US and EU favor different countries in different time.

AGOA is such a kind of favor as mentioned here. Geographical distance with US and EU, fast fashion fever, competition among the supply chain rather than individual firms are also important causes for making the industry highly competitive. Therefore, Bangladeshi apparel firms have to bring a change in their corporate, business or functional level strategy.

6.1.2 IUVC as the Strategy in GAVC

By analyzing the trajectories of garment industries of Hong Kong, Taiwan, South Korea and China, it was found that the key to success of East Asian firms in developing a strong position in GAVC was to upgrade from mere CMT to the full package supplier or OEM. Subsequently, firms in the East Asian NIEs pushed beyond this to develop their own design capabilities for becoming ODM firms or even the production and marketing of their own brands for becoming OBM firms (Gereffi, 1999), thus becoming more independent from buyers and repositioning themselves in the chain. The reason behind this type of strategy regarding up-gradation in value chain is that apparel market is buyer driven chain, not a producer driven chain like automobile market. The producer has the opportunity to advance on the basis of both their resources and capabilities as apparel manufacturing is not capital and technology intensive, and the manufacturers do not have much bargaining power in the negotiation table with the buyers. This type of strategy mainly has two advantages: one is increasing the opportunity to add value in per piece of product and thereby, making more profit, and the other is increasing the influence of the firm in the supply chain and thereby, pooling the negotiation power (Porter, 1985; Sehgal, 2011). IU strategy does not mean that the firms have to advance step by step. Very often, the firms can undertake procuring, designing or marketing activities at the same time at different degrees on the basis of their capabilities (Rahman et. al 2008).

6.1.3 The Strategy Option for Bangladesh

Bangladesh should follow the same path of IUVC of East Asian nations. The East Asian nations did not achieve this path all on a sudden. They improve their manufacturing system day by day. They gradually introduced many cutting edge information technologies like CAD, CAM and ERP etc along with required firm specific HRM practices and therefore, could pursue IUVC strategy. Bangladeshi firms are also adopting the modern technology gradually as the firms here, have been successfully fighting the battle for more than three decades. For

the last three decades through an evolutionary process, Bangladeshi entrepreneurs have realized the importance of modern manufacturing, and hence two top associations of Bangladesh apparel firms, BGMEA and BKMEA launched several programs on establishing lean manufacturing system (BKMEA Manual, 2008). While doing so the firms are wearing their two arms: one is human resource and the other is information technology.

In the chapter 3, in literature review, the logical relation among human resource, IT and LAMS, and the relation between LAMS and IUVC are already discussed. For describing the relations, the RBV was an important view point. Here, in the second part in the literature review for this chapter the variables of LAMS, HRM practices, IT and IUVC are briefly discussed. In the third part, the chapter discusses research methodology on the basis of SEM, and in the fourth part it analyses the result. In the fifth, sixth and seventh part the implications of the study, future research direction and conclusion are respectively presented.

6.2 Literature Review

6. 2.1 LAMS in Bangladesh Apparel Sector

In chapter 3, LAMS is already discussed and especially regarding how these two manufacturing systems can be combined. In the corporate mission of VI, both the characteristics of lean and agile are influencing factors. In Combination of these two system, it becomes leagile, and it can be pursued if the firms have different production lines; for example. Some production lines are based on lean and some are based on agile (Naylor et al. 1999). The components of leans are QR, volume flexibility, JIT attempting for zero inventory, waste minimization, standardization of production method and cleanliness-setting-sorting. The components of agile are customization and differentiation. The components which fall under both the manufacturing system are quick changeover and number of product lines. Therefore, as a whole the components of LAMS should be QR, volume flexibility, JIT attempting for zero inventory, waste minimization, standardization of production method, cleanliness-setting-sorting, customization, differentiation, number of product lines and quick changeover. For the apparel factories, the determinants of leagile manufacturing system are JIT for minimum inventory management, waste minimization, continuous improvement, quick changeover,

QRS, product variety, customization and product differentiation (Dagher, 2008). To establish leagile system, it needs quite a good amount of experience in manufacturing (Krishnamurthy, 2007). One very important point to be noted here that agile may have many of the characteristics of lean, as it is already mentioned that agile system is evolved from lean after acquiring lot of experiences. Another thing is to be noted here that the components of LAMS may mutually reinforce each other. For example, quick changeover expedites customization.

6.2.2 Descriptions of the Indicators of LAMS

Here is a short description of the indicators of LAMS:

JIT for minimum inventory management: JIT is the concept which combines pull system of marketing and inventory management with the minimum possible quantity for supporting that pull system. In the pull approach of marketing the manufacturer starts to produce after he/she is demanded or ordered to produce the amount of products. In commensurate with quantity of products ordered, the manufacturer keeps the raw materials in the inventory only of that amount. In Bangladesh, it is very difficult for maintaining the inventory exactly the amount needed for producing the ordered products because of poor communication infrastructure (Dagher, 2008). Even then, the manufacturers are trying to reduce the inventory to the minimum level, and many of the successful large enterprises do not keep the inventory for more than 3 or 4 days. By following this principle, on one hand, the firms can reduce the cost for inventory management and on the other hand, the firms can avoid many of the unnecessary additional inventories which are later sold out as scrap if these are not utilized fully in production. Moreover, due to pull approach every step in the production process become prudent to utilize the time properly and hence can reduce much of the delivery time.

This JIT system was made popular by the Toyota Production System (TPS). After the World War II, Toyota did not have a big market as like as Ford. Therefore, they could not reach the economy of scale by producing huge number of motor vehicles. They started to produce many verities with minimum wastages and timely supply. The approach of JIT showed up in this way although many other scholars told about it earlier in the United States.

Waste minimization: According to Liker (2004) there are three types of wastes in Toyota Production System: 1. muda 2. mura and 3. muri. Muda is the additional unnecessary activities that do not add any value to the final product. For example, if somebody carries the scraps for double time. Muri is about overburdened people or equipment. This is something opposite to muda. Muri is pushing a machine or person beyond the natural limit. Mura is unevenness. Unevenness results from an irregular production schedule or fluctuating production volumes due to internal problems.

Wastes can be identified by other two types in the Toyota Production Systems. These are: 1. Flow and 2. Point. Flow is related to the movement of materials and information with a direct impact on lead time and Point is related to work behavior affecting directly the cycle time of the processes. In apparel firms, 80% wastes are related to point type of wastes and 20% are related to flow type of wastes (Dagher 2008). The reason is that like motor and electronic firms materials and information flows are not so complex and critical in apparel production. The wastes are happened due to lack of proper practice in CMT.

Continuous Improvement: Lean is a never ending journey. The soul of lean is the continuous improvement principle (Kaizen). Every new customer order, new operation and new worker brings new problems and new waste, which in turn interrupts continuous flow again. The essence of continuous improvement is the notion that engineers, managers and line workers should collaborate continually to make the production tasks systematic and identify the incremental changes necessary to make work go more smoothly (Womack and Roos, 1990). The first step in continuous improvement is problem identification, and each and every team member must be willing to and able to identify the problem. These problems can be identified through work standardization designed to detect deviation.

Cleanliness-setting-sorting: Cleanliness-setting-sorting is derived from the 5s. 5s is a very important component of lean manufacturing system as described by Womack et al. (1990). 5s means sorting, set in order, shine, standardize and sustain. As we have already segregated standard as standardization and sustain as continuous improvement, we need to deduct these two attributes from 5s for this dissertation only, and because of that we have termed the rest

three attributes as cleanliness-setting-sorting. Mainly these components of LAMS are related to cleanliness and orderly setting of the machinery and materials. These are indirect but very crucial factors for implementing LAMS. Factories are like living organisms. The healthiest organisms move and changes in a flexible relationship with their environment. In an unhealthy factory, workers are groping for constant searching for parts, equipment and tools. Disorganized and grubby surroundings are actually a sign of a factory that inevitably produces too many defective goods, misses too many delivery deadlines and suffers from low productivity and morale (Dagher, 2008). The pillars of cleanliness-setting-sorting of the visual workplace program are designed to make the company a more pleasant place to work, to give the workers greater job satisfaction and to give the worker the opportunity to provide creative input in to the way in which the work should be done. Building up 5s pillars (here cleanliness-setting-sorting) also reduces the wastes. As a whole cleanliness-setting-sorting pillars improve the image of the company.

Quick Changeover: Quick changeover is also known as single minute exchange of dies (SMED). Quick changeover is a set of techniques that make possible to perform equipment setup and changeover operations within 10 minutes (Dagher, 2008). It helps factories in producing small quantities with less waste by making cost effective production. In apparel firms, quick changeover involves two major actions. These are the changing of the specification in the machinery and the physical movement of the line workers. In this situation, sewing machinery requires technical adjustments to the norms of the product, and in some cases line workers require training on specific tasks due to lack of flexibility. Here, the major challenge is to eliminate the movement of workers to smoothen the machinery movement and adjustment using a parallel approach. The objective of the parallel approach is to change immediately the first machine while the second is still performing last bundle or pieces of current style.

QRS: According to Forza and Vinelli (1997), QRS brings the entire value chain of the business under one phase starting from the producers of yarn up to the sales outlets- with the aim of reducing time spans that elapse from the textile design stage to the purchasing of the garments by the final consumers. In QR strategy time compression is seen as a goal on one

hand and on the other, as an instrument for the improvement of company performance in terms of efficiency and the level of service offered. It can also have the effect of reduction in prices. IT plays a vital role in QRS. This helps in online communication with all parties of the value chain, and on the other hand, it also helps in taking decision about purchasing, sourcing and producing economic order quantity on the basis of the demand or supply of the parties in the value chain.

Product Variety: There was a stereotyped idea in the paradigm of mass manufacturing system that product variety hampers economy of scale and thereby, reduces cost advantage. But this conception is not always true. The implication of product varieties installs breadth of product lines which may share the common production processes and other resources (Hill, 1988; Hayes and Pisano, 1996). Therefore, product variety rather reduces production cost if we consider it from the view point of economies of scope. By dint of waste minimization and quick change over, product varieties is more plausible in lean manufacturing system. Product variety also increases the demand for the product, and therefore, volume of production is increased.

Customization: Customization means producing of products with special features for the customer with specific taste. According to Rosenau and Wilson (2001) "customization in apparel firms is the process of personalizing a garment by manufacturing it to an individual's specific body measurements or other specifications such as silhouettes, fabric, color and embellishments". In lean manufacturing, high level of customization is not possible. But it is already mentioned that if the firm gains enough experience in lean it can achieve some degree of agility. The use of CAD and CAM has given the opportunity to operate production lines with many designs with many types of product features. As mentioned in 6.2.1 that quick changeover is also a big contributor in this field. Therefore, the firms in this age can go for customization keeping the cost advantage intact. Customization gives the production workers wide range of learning, and because of this the workers may be able to adopt the skill of designing activities.

6.2.3 Two important requirements of LAMS

Appropriate human resource and firm specific IT are highly important for achieving success in implementing LAMS. According to Paez et.al. (2004) and Ward & Zhou (2006), LAMS has two antecedents to be effectively adopted i) HRM practices for LAMS (HRMPLAMS) and ii) information technology for LAMS (ITLAMS). Without HRMLAMS and ITLAMS, LAMS is like heart without blood circulation system. For achieving the objectives of LAMS, these two aspects have to be coordinated properly.

6.2.4 HRM Practices for LAMS

According to Dibia and Onuh (2010), lean manufacturing is a socio-technical system and it clearly views people as a resource to be developed. Therefore, it needs such a set of HRM practices which is specifically tailored for the firm's specific requirements on the basis of its manufacturing systems and its response to the market. In chapter 3, HRM practices for LAMS is already discussed. Here, the study explored the relevant HRM practices for leagile manufacturing system which are supposed to be variables for this study. These variables are not fully similar on the basis of country and industry, because HRM bound for LAMS is not only a management issue but also a cultural matter. Therefore, we need to carefully specify the components of HRM practices for LAMS. Dagher (2008) stated that the current HRM practices for LAMS in Bangladesh are training of workers, empowerment of workers, mastership, incentives for motivation, multi-skilling, and work rotation. It is already mentioned that agile requires the same basic foundation of lean in the firm. Therefore, the HRM practices for lean can be deemed as the HRM practices for agile also.

6.2.5 Descriptions of the Variables of HRM Practices for LAMS

In the chapter 3, it is mentioned that HRM practices should be interrelated and complementary from the view point of organizational logic. It means that we have to choose the HRM practices which are bundled, and therefore, it will have an effective and meaningful influence on the bundle of LAMS**.** The description of the practices/ variables is as below:

Team Work: Team work is the spirit of co-operating each other in leanness and accomplishing the assignments. When the team is responsible rather than an individual worker, the success of anybody becomes success of everyone and failure of anybody becomes failure of everyone. Therefore, all the members take care of each other as the reward or penalty is imposed in combined. According to Dagher (2008) in the apparel sector for establishing lean and agile system, team work is needed for the following reasons:

i) Team work builds an environment of multi-process handling and develop disciplined and trained workforce.
ii) Team work builds u-shape cells and devises defect prevention measures.
iii) Team work facilitates minimum required number of workers and the optimal work distribution.
iv) Team work improves quick changeover.
v) Teamwork establishes pull production and very helpful in finding the defects and in detecting missing items.
vi) Team work gradually introduces Kanban system.

Workers Empowerment: Workers empowerment is an important attribute for lean and agile establishment. Since workers creativity and innovative thinking must have to be reflected in the continuous improvement of the endeavor of LAMS, workers freedom in expressing their thoughts and the reflection of their thoughts to the day to day production activities have to be ensured through workers empowerment (Dagher, 2008). If the decision making power is concentrated to the few managers of the firms, they would not let the workers involve in decision making process. Again if they let to do so they will snatch away the credit for that. Empowerment also motivates the workers to think about the development of the factory whole heartedly. Therefore, workers empowerment is very important for LAMS.

Workers Commitment: Commitment means dedicating oneself for keeping a promise made to others. Since there is no end of continuous improvement and there are so many unpaved ways for achieving new innovative process for improvement, workers commitment for dedicating themselves was one of the basic reason for dramatic achievement of championship of Japan in manufacturing in 60s, 70s and 80s decade. The reasons why in LAMS workers

commitment is so important in comparison to other manufacturing systems are as follows (according to Dagher, 2008):

i) LAMS is a never ending journey and it needs daily attention from its members

ii) LAMS journey require creative workers' thoughts to be embedded in the organization and every worker's new thinking has to be scrutinized

iii) Workers usually do not want to accept any change in the organization as there is a threat to loss of job. Consequently, they do not want to adjust with the change. But a firm with committed workers will not face this protest from the workers. If workers thinking are embedded in the changing process, they will tend to accept the change for the betterment of the organization.

iv) LAMS deal not only with production floor. It is integrated with other department like HR department, IT department, accounting office and administration. Therefore, it requires promise of all categories of people within the organization.

V) LAMS suggest not following any recipe. The workers have to be engaged in the experiment of every process. Otherwise, LAMS attribute cannot be achieved. Consequently, LAMS require high commitment.

For realizing workers commitment, the top management has to be careful in many pragmatic issues. When the workers participate in decision making process and when they see that their innovative thoughts are highly considered by the top management, their commitment for better service and continuous improvement can be realized. This tendency of the workers is highly related to teamwork as well. Team work can ensure workers participation in decision making process and team work ensures everybody's importance in the project by disapproving autocratic tendency. Therefore, workers commitment and team work is mutually enforceable. On the other hand, worker empowerment by decentralizing the power structure is also directly connected to workers commitment. Empowerment yields to self actualization, which in turn develops commitment.

Workers Training: In the DCs and LDCs the apparel workers are given on-the-job training only. Very few firms provide formal training for few days. Training either on the job or off-the-job is important for implementing LAMS, because training ensures the systematic way of

learning on a daily basis (Womack and Roos, 1990). Without training learning happens haphazardly. Somebody can learn properly and somebody cannot. LAMS are such systems where each of the workers constitutes a think tank. Therefore, everybody should be associated in decision making process and training can ensure the grooming up of all the workers. Consequently, training is a very important prerequisite of LAMS. Although in many Bangladeshi apparel firms only on-the-job training is provided, this alone is very important for making a good work force for implementing LAMS.

Work Rotation and Multi-skilling: Multi-skilling enables the employees for performing several related jobs in the factory. It can be done through work rotation. Multi-skilling enriches the workers with deep insight about the work. Multi-skilling develops analytical ability on a number of related works. They develop both tacit and explicit knowledge through multi-skilling on related jobs (Nonaka, 1994). Therefore, the workers can contribute al lot in problem solving discussion session.

Mastership of the Seniors: In Toyota, mastership of the seniors is termed as the senpai-kohai relations (Womack and Roos, 1996). Mastership of senior provides the opportunity to learn from the experienced workers for which the company does not need to bear any extra cost. On the other hand, this makes a harmonious relation among the workers. It develops leadership and self esteem in the successful senior workers. As a whole, it expedites learning and knowledge generation.

6.2.6 IT for LAMS

In chapter 3, the IT for LAMS is already discussed. According to Bruun and Mefford (2004), the aspects of lean manufacturing which can be improved through the use of IT are pull approach and kanban production systems, inventory reductions, quick steps and orders, quality at source, supplier networks, teamwork and participation and continuous improvement. In the case of Bangladesh apparel firms, this study also finds almost same sort of aspects of lean practices. Regarding agile manufacturing IT enables the firm's manufacturing systems in localized exploitation, internal integration, business process redesign, business network redesign and business scope redefinition (Burgess, 2002). If we relate these issues of agility

as mentioned by Burgess with the agile practices in Bangladesh apparel firms, we can find that IT enables the apparel firms in customization, differentiation, product variety, quick change over and flexibility.

6.2.7 Descriptions of the Indicators

The indicators of information technology for LAMS (ITLAMS) are: enterprise resource planning (ERP), CAM, CAD, automated personnel scheduling (APS), computerized quality control (CQC) and computerized office management (COM). Here is a short description of the variables of ITLAMS:

ERP: According to Bidgoli (2004), ERP systems integrate internal and external management information across an entire organization, embracing finance /accounting manufacturing sales and service, customer relationship management etc. ERP systems automate this activity with an integrated software application. The purpose of ERP is to facilitate the flow of information between all business functions inside the boundaries of the organization and manage the connections to outside stakeholders.

According to Khaled (2008), big apparel firms need to handle grandiose amount of raw materials. These materials needed to be tracked in time, supplied to the production floor at the correct place and person in the correct time. ERP helps a manger in all these activities by providing the information by one click. ERP also helps in production and shipment planning. For large companies, it is difficult to sort out which pieces of the tasks are the priorities for shipping out according to the order received. There are bundles of tasks for one order. On the other hand, there are many assignments common for several orders. ERP, in this case can make an order of assignments and determine the amount of materials and human resources needed for accomplishing several orders in such a way that the common things can be shared for several orders. Therefore, shipment can be possible at the least possible production and business cost. ERP is also utilized for total material sourcing.

CAM: According to US Congress Office of Technology Assessment (1984), CAM is the use of computer software to control machine tools and related machinery in the manufacturing of

work pieces. CAM may also refer to the use of a computer to assist in all operations of a manufacturing plant, including planning, management, transportation and storage. Its primary purpose is to create a faster production process and to arrange the tools for more precise dimensions and material consistency, which in some cases, uses only the required amount of raw materials (thus minimizing waste), while simultaneously reducing energy consumption. Software controls the parts of the machine with different speed and different options according to chosen specification of the operator. In apparel firms, besides quick cutting and making, CAM is used for changing the design and size promptly.

CAD: CAD system can demonstrate various designs, and it has computer controlled cutting systems for simulation of the prototype. Designers are able to use CAD systems to create full color renderings on the basis of their new design ideas, complete with draped fabric prints or woven designs (Rosenau and Wilson, 2001). Once the styles are finalized, patterns can be drafted and graded and made accurate, and in this way a cost effective marker can be made. What once took days or weeks can now be accomplished in hours. These advances allow quick response manufacturing. Another big advantage of CAD is economic cut quantity. It means silhouetting maximum number of clothing out of a given quantity of fabrics.

APS: According to Khaled (2008), recording of employees' attendance is computerized in the apparel firms of Bangladesh nowadays. Attendance can be recorded from time card by scanning technology. This expedites the process of keeping record. If this is done with appropriate format, it can help making salary sheet by a computer. This will help the managers in eliminating unnecessary idle workforce. In LAMS, unevenness of human resource is to be avoided to follow the principle of muri. Therefore, APS is helpful for LAMS. From workers' perspective, this technology make the workers alert about utilizing the time properly. As a whole this technology makes the factory disciplined.

OnlineS: By onlineS whole process of procurement can be done by systematic and cost effective way (Rosenau and Wilson, 2001). All these things are very much commensurate with the principle of LAMS, because onlineS can reduce time and reduce cost of raw materials by purchasing it at the appropriate quantity at the appropriate price.

CQC: CQC during manufacturing reduces time inspection and increases perfection of the product. In Bangladesh, the large manufacturers have started CQC. They use metal detector and inspectrometer for fabric inspection. For color testing they use Gram Square Machine (GSM). All these are helpful for detecting defect in the apparel (Khaled 2008).

COM: Here in this study, COM indicates about usage of office management software like accounting software, data processing software and software for communicating within office like Microsoft Office Outlook etc. It is expected that for the modernity of manufacturing system the office management have to be adjusted with other things of the production floor.

6.2.8 IUVC

In chapter 3, the concept of IUVC is already discussed.

6.2.9 The Indicators of IUVC

The indicators of IU are logistics, procurement, marketing, designing and branding. In Bangladesh branding is still unexplored by the owners of the firms. Therefore, branding will not be the indicators for this study. Here is a short description of the indicators of industrial up-gradation:

Logistics

This is one of the activities that have to be undertaken by the firms to become OEM firms. Logistics is a burden for the small and poorly financed firms, because much of their hard earned money is spent out for this activity. Logistics needs transport vehicle, official activities with buying and purchasing agents and an IT set up for online purchasing and shipment (Gereffi 1999). These activities of the firms are not endorsed by the buyers or retailers until the firms have a good office and enough experience in commercial activities (Rahman et al., 2008). In Bangladesh, many of the CMT firms have started their business with one or two production lines. They are just surviving in the industry. But for becoming self reliant and for expanding their business they need to be visionary. Establishing logistics along with other commercial activities is a part of that endeavor. Utilizing IT for lean and agile manufacturing

may also energize the firm for undertaking at least IT part of logistics activity. Moreover, lean logistics is an essential ideology for LAMS where unnecessary distances in the movement of materials are avoided. Therefore, an experienced firm in leagile systems may be able to undertake logistics activities easily in comparison to the firms with ordinary manufacturing systems. In this way, the firms can integrate the business through the value chain.

Procurement

This is also one of the activities that have to be undertaken by the firms to become OEM firms. Merchandising managers are the key role player in procurement. According to Rosenau and Wilson (2001), after 1990, merchandising managers are becoming the key decision makers in the firms which were not the same in the earlier decades. After consulting with the merchandising managers about which raw materials are available in the international market and which products are in demand, the production managers take the decision about their work schedule. The merchandising managers make the relation between the manufacturers and the world market through procurement activities, in addition to his/her pricing and selling activities. Most of the firms in Bangladesh who are producing on CMT basis do not have procurement activities. Their procurement activities are done by the buyers or the agents employed by the buyers. Therefore, much of their share in profit is sliced down. But in this age of QR paradigm, the buyers want the firms to have the full package supplying capacity. This is beneficial for both the buyers and the manufacturers. Therefore, establishing procurement activities is a timely demand for the CMT firms. This will reduce the time in the entire value chain and will enhance the decision making capacity of the firm managers. But undertaking procurement activity is not an easy task. By practicing LAMS, the firms can have the exercise on problem solving discussion and brainstorming session for continuous improvement. By doing this, the firms can also make an intelligent procurement, which is related to production decisions. Moreover, lean procurement system is embedded in the LAMS like purchasing materials on the basis of pull marketing system and avoiding double purchase of the common items. Therefore, firms experienced in LAMS may be able to undertake procurement activities easily.

Marketing

It is already mentioned in chapter 2 and 3 that the GAVC is divided into five interrelated business network as mentioned earlier like raw materials network, component network, production network, export network and marketing network (Gereffi, 1999). For connecting all the steps, marketing activities are required. But after the production of the apparel product there remains two more steps for marketing. One type of marketing is done when the production network is connected to the marketing network, and the other is done when the marketing network is connected to the end users. It is already mentioned that Bangladeshi firms not yet explored the branding activities. Therefore, their marketing activities are limited only with the international buying agents or retailers. This type of marketing activities is fallen under OEM tasks as per the explanation of Gereffi (1999). But many of the apparel firms cannot directly connect with the international buyers or directly with the retailers like Zara, Mark and Spencer or Nike etc. They depend on the local buying agents for their marketing activities. The reason is that their production capacity is low, product variety is limited and commercial activities are so less that for the international buying agents it is not profit worthy to directly connect with them (Rahman et al., 2008). Another problem with this type of firms is that their quality is not always reliable. Therefore, in Bangladesh there are many local buying houses who mediate between the manufacturers and the international buyers and retailers. These buying houses ensure the quality of the product by taking the risk on their shoulder, and reduce time by quickly arranging the product with required specification. But this also reduces the profit of the manufacturers to a big extent. Moreover, the retailers nowadays want to communicate directly with the manufacturers for maintaining quick response strategy. They want to deal with full package manufacturers. By adopting lean and agile manufacturing systems, the firms can produce the products with many varieties. Besides this, they can have a good IT set up along with commercial activities. Consequently, the firms with leagile manufacturing can attract the international buying agents, and may expedite the establishment of marketing activities.

Designing

After becoming OEM, designing is the next establishment which is required for up-grading into the next step named as ODM. But designing is the most critical task in the apparel

production. A designer cannot be made so easily. The cultural and educational background is very important for having the tendency for becoming a good designer (Rosenau and Wilson, 2001). The local surroundings, family culture and by born characteristics influence in grooming up a good designer. A good designer is a good observer of the current society and understands very well the demand of the teenage. He/she has good knowledge over human psychology. As a whole he/she has a good aesthetic sense. The DCs and LDCs still do not have a good pool of designers for supporting their mammoth size of the apparel industry. Therefore, it always happens that the designs are prepared in the developed countries and then sent through online to the manufacturers for production. The interesting thing is that the design masters of the manufacturing firm, who work on the designs sent through online from developed countries very often develop good sense on design through experiences (Rahman et al., 2008). In course of time, these design masters who continuously work with CAD system, develop own efficiency on design and can modify the design of the main designers of the developed countries. It is observed that in course of time, many of them could become full fledged designers by dint of their own expertise. Many of them at present can at least negotiate about design with the designers who are sitting in the developed country. Very often the buyers are approving their designs, as well. Moreover, the present oriental society is highly exposed to western culture. Therefore, the local designers can sensitize the zest of the teen age people of developed countries. In this way, the OEM firms in Bangladesh can undertake designing activities, and thereby, can extend its activities through value chain.

Branding

According to American Marketing Association (2001) branding is the activities of putting term, sign and symbols to differentiate product from others. Brand is something which provides or determines the status of the user. A strong brand creates emotional attachment with the product. Consequently brand is something which surpasses the core value of the product by many times. But for creating the brand value a firm has to go through a tough battle through its consumer marketing activities. Here it is to be mentioned that in apparel business consumer market is much capital intensive in comparison to industrial marketing or the marketing that happens from manufacturers to the international buyers. It must have to be proved in consumer marketing that the brand operators really do care for the customers. In

apparel marketing, styles and quality are two important issues which create brand value to the customer. The stronger the brand images the higher the price of the product, because the target is to differentiate not only the product but also the user. Maintaining an apparel brand in developed countries is very expensive. The marketer has to take the whole risk of the entire gamut of the product lines in the retailing store. Sometimes the marketer makes a huge profit and sometimes incurs loss. This high risk business is still very difficult to operate for the apparel manufacturer in the LDC like Bangladesh. But the trajectory of GAVC shows that Hong Kong, Taiwan, Thailand, China could successfully upgrade to this stage to some extent, and they have prospect in this regard. But Bangladeshi firms still have to go a long way to mull over branding.

6.2.10 Relationship among the Factors

6.2.10.1 Impact of HRM practices to LAMS:

According to Forrester (1995) and Gunasekaran (2001) the impact of HRM practices on individual leagile production are as follows:

Continuous improvement: Japanese promulgated the system of multi-skilling and problem solving discussion group for a better idea generation etc. Therefore, time to time continuous improvement is possible.

QRS: Through training along with team spirit and workers commitment. QRS can be maintained. QRS needs coordination among all the steps in the value chain. Training, team spirit and commitment develops passion and urge for responding quickly to the next step in a coordinated way.

5s: Team spirit and workers commitment would hatch the passion for maintaining all the production tools orderly and in tidy manner. Multi-skilling gives the workers the knowledge about the usage of many types of working tools and the importance of them. Therefore, they can arrange the working tools in an appropriate sequence.

Product Variety: Multi-skilling, training and continuous improvement develop innovative thinking among the workers. Therefore, the workers can create various design and specification about a single product. In this way, product variety can be happened.

JIT and Waste Minimization: Incentives for performance and team work motivate the workers for highest possible utilization of raw materials and energy. Team work also creates commitment in the worker to promptly response to the next step of the value chain. Thus, JIT and waste minimization is possible.

Flexibility: Work rotation and multi-skilling enable the work force to work in any type of production layout. Thus, volume flexibility or feature flexibility is possible.

Customization: For customization the most important required trait is to be able to change quickly the production layout and to adjust the human capital accordingly. Multi-skilling, workers empowerment and training enrich the abilities of workers to such a level that the workers can do that.

The Relationship on the basis of RBV: From the RBV perspective, firms are heterogeneous, knowledge bearing entities and their performance differs due to knowledge asymmetry (Conner and Prahalad, 1996). Kogut and Zander (1992) argue that firm exists because they have higher order organizing principle that market cannot offer. Production under LAMS is such a socially complex and historically evolved process which has to be learnt through a long term experience (Sehgal, 2011). In this long term process, the firms organize and enrich their pool of human capital by doing mistakes and correction. This pool of human capital becomes firm specific and very difficult to replicate or imitate for the other firms, because the trajectory of experience differs from firm to firm. In the apparel sector of Bangladesh, by adopting a bundle of human resource practices the individual firms may build up their own pool of talented human capital for LAMS.

6.2.10.2 Impact of IT on LAMS: From the previous literature the study has found out that the IT can influence many production aspects of LAMS such as QR, quick changeover, customization, differentiation, feature flexibility, number of product lines, JIT attempting for zero inventory and waste minimization. Here, in the below the relations between IT and the individual aspects of leagile production systems are explained:

JIT: The commercial principle of JIT (attempting for zero inventory) is pulling approach. In pulling approach, production planning begins with the last link in the supply chain, the final

customers of the products or services. By using IT for transmitting point of sale transactions and ordering down the supply chain, the member firms can keep their production in line with final demand and reduce inventories throughout the chain (Sotirova 2005). By using EDI, the firms in the supply chain are able to produce what exactly is needed in the next step.

Waste Minimization: The production managers can estimate exactly what amounts of raw materials are necessary to keep in the inventory by using CAD and CAM (Womack and Roos, 1996). Online sourcing also facilitates for buying the raw materials what is exactly needed at the available cheap price. By using CAD and CAM, the scraps are less created while cutting the fabrics. Therefore, IT reduces wastes.

Customization: From the view point of agility, IT can quickly analyze what to do by the firms in terms of quantity, quality, design and pricing by using EDI, MRP and ERP (Gunasekaran, 2001). By using CAD and CAM, the apparel firms can make various prototypes. Then, on the basis of demand of the market, they can choose any of those prototypes. Consequently, mass customization is feasible.

Flexibility: Flexibility can be of two types in LAMS: one is volume flexibility and the other is product flexibility (Wheelwright, 1984). IT allows the firm to gain the advantage of both type of flexibility. Due to the advantage of getting advance information about the available sources of raw materials through the internet, the firms can produce any amount of finished products economically. Again IT allows the factory not only to integrate the activities within manufacturing premise but also to integrate manufacturing with such function as procurement and marketing. In this way, process predictability is possible, and economics of manufacturing can shift from economies of scale to economies of scope. Consequently, product flexibility is also possible without hampering volume flexibility (Goldhar and Jelinek, 1985). Modular Production System (MPS) can help the managers in this regard. MPS means the ability of compartmentalization of production functions and requirements into operational units that can be manipulated between alternate production schemes to achieve the optimal arrangement to fit a given set of needs.

Product Variety: In an empirical study conducted by Gao (2005), it is found that IT is associated with increased product variety in manufacturing firms mainly through enabling more product innovations. Based on a sample of 1,000 manufacturing firms, it is found that there is a relationship between product variety and different inventory levels. The reason is that by maintaining different inventory level the firm can analyze various possible combinations of styles and available raw materials in hand. Therefore, the firm can produce many varieties.

Differentiation: Differentiation can be done in two ways: either by quality improvement or by adding different features. IT can aid the implementation of quality improvement in a lean enterprise. It can allow rapid transmittal of quality problems throughout the firms so that everyone in the supply chain is aware of them. Besides this, IT can help creating different features of products by CAD and CAM.

The Relationship on the basis of RBV

RBV states that to gain sustainable competitive advantage, firms' resources should be valuable, rare, in-imitable and organized to be exploited (Barney, 1991). IT helps firm produce faster, communicates with suppliers and buyers faster, and reduces mistakes so that it improves the quality. IT can reduce wastages by proper planning of the production. IT can reconfigure various processes quickly and brings flexibility (Womack, Jones & Roos, 1990; Sotirova, 2005). Consequently, IT can implement a valuable LAMS. IT hatches innovation by facilitating various alternative ways of business manufacturing process and product design (Rosenau and Wilson, 2001). Therefore, customization is possible by organizing the resources in various ways. IT helps producing idiosyncratic knowledge when the IT and design specialists work together as a team (Powell and Den-Micallef, 1997) which results in continuous improvement, differentiation and customization. Thus, IT makes LAMS rare and non-imitable. IT can integrate within and between the firms so it links all the process of the supply chain (Ward and Zhou, 2006). Consequently, IT can organize the firm's resources to be more exploited.

6.2.10.3 Impact of LAMS on IUVC

In the chapter 3, in 3.5 the relation between LAMS (as antecedent of IUVC) and IUVC was discussed. Consequently, in the next part we shall construct the conceptual framework and the hypotheses for this study.

6.3 Conceptual Framework

As per the above discussion, although there are empirical studies on the relation between manufacturing strategy and corporate strategy and the relation between RBV and IUVC/VI, there is no empirical study on the relation between manufacturing strategy particularly LAMS and corporate strategy particularly IUVC/VI. Most importantly, there is no empirical study on apparel sector to show the relation between HR practices and IT on LAMS. This study will strive to find the impact of HRMPLAMS and ITLAMS on LAMS and the impact of LAMS on IUVC *(figure 6.1)*.

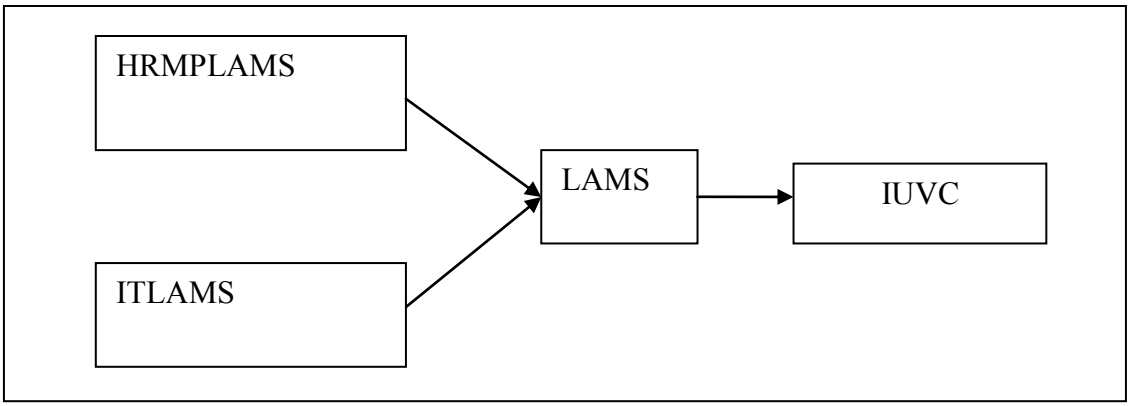

Figure 6.1: Conceptual Framework of Impact of HRM Practices and IT on LAMS for IUVC of Apparel Industry of Bangladesh.

6. 4 Hypotheses

H 6.1: The greater the firm's initiatives for HRM practices, the greater the implementation of LAMS.

H 6.2: The greater the firm's initiatives for establishing IT, the greater the implementation of LAMS

H 6.3: The greater the implementation of LAMS, the more the IUVC of the firm

6.5 Research Methodology

A questionnaire survey is implemented to collect data by Likert scale. Therefore, the collected data are perceived rather than objective. Then by using SPSS 18.0, the collected data of the observed variables are extracted as component by exploratory factor analysis (EFA) to identify the factors. Further the factors are tested against confirmatory factor analysis (CFA) by AMOS 20.0 and finally under structural equation modeling, the conceptual model was estimated by AMOS 20.0. To examine the impact of the individual indicators rather than factors, this study has also performed ordinal regression as ordered probit regression. The reason for employing ordered probit regression rather than ordinary least square regression is that the dependant variables have the characteristics of ranking from 1 to 5 in likert scale and the sample size is not so big.

6.5.1 Structure of the questionnaire

In order to collect the necessary data for testing the hypothesized model, we construct a questionnaire consisting of six parts. The first part is the introductory part asking about general matters of the firm. In the second part, questions are asked about which value adding steps the firms are involved with except CMT like designing, procuring and marketing activities. The third, fourth and fifth part are consisted of questions about the characteristics of LAMS, HRM practices and IT respectively.

6.5.2 Respondent profile

The survey is conducted on 180 firms located in both EPZ and non-EPZ area. All these firms are pursuing LAMS either on program based or on evolutionary process. 100 firms from two EPZ area namely Dhaka EPZ and Chittagong EPZ are surveyed and remaining 80 firms are surveyed in non-EPZ area like Mirpur, Gazipur and Ashulia under greater Dhaka region.

6.6 Data Analysis and Results

6.6.1 EFA

As per the conceptual model, this study has constructed the structure of the model consisted of four factors namely HRM practices for LAMS (HRMPLAMS), IT for LAMS (ITLAMS),

LAMS and IUVC. All these four factors are theoretically inter-linked according to the description of literature review of this study. Hence we do not need to find any other relationship patterns by conducting EFA for all the variables together. Rather this study tries to check whether the variables we are going to use for each latent variable are unidirectional and able to explain the latent variable with sufficient variance. If any of the observed or manifested variables are not suitable for explaining the unobserved/ latent variable, it should be eliminated from the group of the observed variables on the basis of component matrix or rotated component matrix in Principle Component Analysis (PCA). After constructing the components, if any satisfactory relation among the components are not found, reformulation by eliminating the observed variables having less standard deviation and too dispersed mean can be done. The variables can be eliminated until a satisfactory value of Cronbach's Alpha is obtained (Blunch 2008). After reformulation, the study is expected to find a satisfactory relationship among the cluster of variables.

Table 6.1: Descriptive Statistics of the Indicators Retained after EFA

Descriptive Statistics

	Mean	Std. Deviation	Analysis N
Design	2.216	1.197	180
Procurement	2.616	1.206	180
Marketing	2.583	1.051	180
Logistics	3.061	1.582	180
APS	3.094	1.117	180
ERP	3.222	1.179	180
CAM	3.233	1.196	180
CAD	3.472	1.155	180
OnlineS	2.755	1.217	180
Customize	3.033	1.263	180
Differentiation	3.083	1.082	180
Volume Flexibility	2.783	1.079	180
Product Line	2.727	.967	180
Minimum Inventory	3.694	1.324	180
Teamwork	3.366	1.186	180
Multi Skilling	2.311	1.346	180
Workers Commitment	3.144	1.233	180
Workers Empower	2.672	1.280	180
Workers Training	2.755	.949	180

Before doing EFA the internal consistency among the questions regarding each factor was checked by reliability test. It was done by measuring Cronbach's alpha. Cronbach's alpha for ITLAMS, HRMPLAMS, LAMS and IUVC were respectively .732, .748, .702, .722 which indicate that the questions regarding each factor are unidirectional (the accepted level is .70) (Cronbach and Shavelson, 2004). Then PCA is performed in SPSS 18.0 for EFA.

In the EFA for HRMPLAMS teamwork, multi-skilling, workers commitment, workers empowerment and workers training constructed one meaningful component but mastership of the seniors is eliminated. The observed variables used for EFA for ITLAMS are ERP, CAM,

CAD, APS, OnlineS, CQC and COM. Except CQC and COM all the variables constructed one latent variable. In the EFA for LAMS the observed variables are QR, quick changeover, customization, differentiation, volume flexibility, number of product lines, JIT attempting for zero inventory, waste minimization, standardization of production method, cleanliness-setting-sorting. Out of all the variables only customization, differentiation, JIT for minimum inventory, number of product lines and volume flexibility constructed one component and the rest are eliminated. And finally in the EFA for IUVC designing, procuring and marketing activities constructed the component but logistics is eliminated. The main reason for eliminations in all the cases is due to lack of correlation with the rest of variable or due to low factor loading. The value of Kayser-Meyer-Ohlin (KMO) test in EFA for ITLAMS, HRMPLAMS, LAMS, and IUVC are .701, 812, .736 and .697 respectively. The accepted level for KMO test is 0.6.

6.6.2 Confirmatory Factor Analysis (CFA)

6.2 Table: *Model Fit Statistics in CFA*

Model fit indicators	GFI	AGFI	CMIN/DF	RMSEA	IFI	TLI	CFI
Good model fit	>.90	>.80	<3	<.05	>.90	>.90	>.90
Value in the model	.888	.848	1.895	.071	.898	.873	.896
Value after reformulation in the model	.901	.864	1.457	.050	.935	.921	.933

After doing EFA, a diagram according to the conceptual framework is drawn in AMOS 20.0 and run for CFA. In CFA each item is restricted to load to pre-specified factor and items were pre-specified according to the result of EFA.

From the Table-6.1, drawn below, we see that before reformulation and running modification indices, no one of the model fit statistics is good. So, reformulation process is done and modification indices are obtained according to the process of Blunch (2008). According to the suggestion of modification indices again CFA was conducted and good model fit statistics are found. The model fit statistics before and after running modification indices are as follows:

Before doing EFA the Cronbach's alpha is found out and in all cases the values were higher than acceptable value .70. The composite reliability of the construct is .78 (higher than expected level .70) which indicate good internal consistency and average variance extracted (AVE) is .54 (higher than accepted level .50). Convergent validity was evidenced by the significant standardized loadings of each item (.40 or higher) on its corresponding construct.

6.6.3 SEM Estimation

After CFA by AMOS 20.0 the model is estimated by same AMOS under SEM (see figure 3). All the relations in the model are proved significant in the estimation having t-value less than .001 for two tailed test.

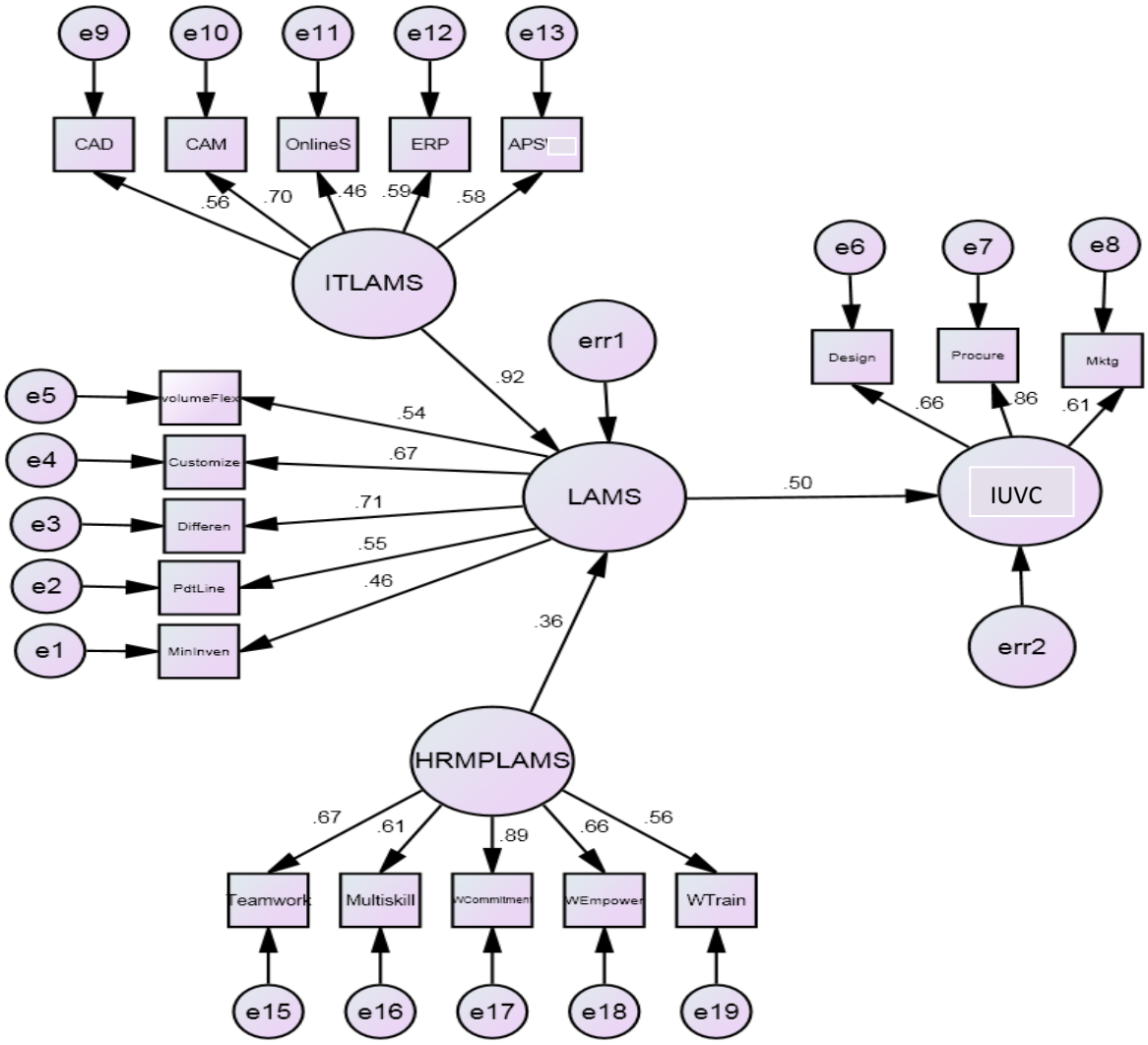

Figure 6. 2: Diagram of Structural Equation Modeling by AMOS20.0

Table 6.3: Model Fit Statistics in SEM

Model Fit Indicators	GFI	AGFI	CMIN/DF	RMSEA	IFI	TLI	CFI
Good Model Fit	>.90	>.80	<3	<.05	>.90	>.90	>.90
Value in this model	.910	.876	1.513	.054	.943	.930	.942

6.6.4 Results:

From ITLAMS to LAMS: From the estimation we see that LAMS is significantly influenced by ITLAMS. Here, if the standard deviation of the later goes by 1, the standard deviation of the earlier will go by .92.

From HRMPLAMS to LAMS: LAMS is significantly influenced by HRMPLAMS. Here, if the standard deviation of the later goes by 1, the standard deviation of the earlier will go by .36.

From LAMS to IUVC: IUVC is significantly influenced by LAMS. Here if the standard deviation of the later goes by 1, the standard deviation of the earlier will go by .50. Therefore, all the hypotheses are supported.

6.7 Impact of Individual Indicators of LAMS on the Individual Indicators of IUVC

A weakness of SEM estimation is that it cannot show the impact of individual indicators on the indictors of another factor. Therefore, from the SEM estimation the policy maker and the owners of the firms would not be able to know about which indicators of LAMS are responsible for implementing which type of IUVC activities. This problem would be solved by performing regression for all the indicators of IUVC and all the indicators of LAMS. In this sub-section this study, will deem each of the indicators of IUVC as the dependent variables and the indicators of LAMS as the independent or explanatory variables. For each of the

dependent variables which are the indicators of IUVC will be separately tested against the independent variables by employing OPR. The reason for employing OPR is that OPR provides an appropriate framework for statistical analysis whenever survey responses are ordinal rather than numerical (Daykin and Moffatt, 2002). Here all the data collected in Likert Scale which means the data collected on the basis of the agreement of the respondents like strongly disagree, disagree, neither disagree not agree, agree and strongly agree. Therefore, all the data collected for both independent and dependent variables are ordinal in nature which means they are ranked rather than numerical.

Table 6.4: Result of OPR between Indicators of LAMS and Indicators of IUVC

	Beta Coefficient of Indicators of LAMS in Influencing on IUVC Activities			
Indicators of LAMS as Independent Variables	Design	Procurement	Marketing	Logistics
Customization	.216*	.190	.067	.007
Product Line	.441***	.248*	.297*	-.201
Differentiation	.362**	.01***	.365**	.004
Volume Flexibility	-.229	-.034	.256*	.267*
Minimum Inventory	.006	-.041	.198*	-.054
Pseudo R^2	Cox and Snell.142 Nagelkerke .151 McFadden .054	Cox and Snell .210 Nagelkerke .220 McFadden .077	Cox and Snell.113 Nagelkerke .042 McFadden. .042	Cox and Snell .027 Nagelkerke .028 McFadden .009
Model Fitted by the significance level	.001	.001	.005	.426

Results of OPR:

i) From Table 6.3, we see that design activities are significantly influenced by customization, product lines and differentiation.

ii) Procurement activities are significantly influenced by product lines and differentiation.
iii) Marketing activities are significantly influenced by volume flexibility, minimum inventory, product lines and differentiation.
iv) Logistics activities are significantly influenced only by volume flexibility. But the regressions with all other independent variables are not fit in the model.
v) The most important variable in LAMS is differentiation because it significantly influence on all the IUVC activities except logistics which is not unidirectional with other activities.

6.8 Analysis of the results

The relation between ITLAMS to LAMS

IT can disseminate the information about demand and every details of the product throughout the supply chain by using EDI. Consequently, the people involved in every step can prepare themselves timely. And this also enables the people in every value adding step to search for the required quantity of raw materials at the cheap price. Many combinations between quantity, quality and price are available for them. On the other hand ERP enable the firm to coordinate this quantity, quality and price both internally and externally for the manufacturers. Therefore, minimum inventory management is possible. CAD and CAM along with ERP enable the firms to maintain volume flexibility through quick change in the production layout. CAD and CAM can also analyze various designs and their required amount of raw materials. Therefore, customization through economic cut quantity without spending extra time and energy is possible. CAD and CAM can produce economies of scope in cutting. It means cutting fabrics for several styles with the minimum quantity of fabrics at the lowest possible cost.

The relation between HRMPLAMS to LAMS

All the observed variables under the construct of HRMPLAMS are helpful for improving LAMS. Workers empowerment and incentives for performance together improve workers' decision making power. All these traits encourage the workers for local learning and help finding out the solution for firm specific problems. Therefore, the workers become experts on

many manufacturing techniques. All these tendencies develop a learning environment. These also help in establishing standardization the production method with continuous improvement. At the same time because of these the workers can decode tacit knowledge and explore many technological opportunities. These things help the workers for achieving customization, volume flexibility and product variety. The reason is that customization, volume flexibility and product variety depend on how the existing technologies can be utilized in different ways and how quickly the production process can be changed in the manufacturing system. Therefore, workers empowerment and incentives for performance motivate the workers to be able for LAMS. On the other hand, workers training are supposed to improve their knowledge on LAMS. Customization, product variety, differentiation and flexibility are knowledge dependent. Therefore, training is sure to improve their knowledge on the entire production aspect. Another thing on which training should have a good impact is JIT attempting for the minimum inventory. Multi-skilling is also helpful for new idea generation for the workers. New idea generation is very essential for customization and product variety (Gunasekaran, 2001). These are fashion oriented and these need imagination. Therefore, all together, the HRMPLAMS has a significant impact on LAMS.

The relation from LAMS to IUVC

All the observed variables under the construct of LAMS make a meaningful relation with IUVC. Among the observed variables found after EFA and CFA, customization and differentiation belong to the agile manufacturing system and rests belong to both lean and agile manufacturing systems. Product lines fall under both lean and agile manufacturing systems. From the OPR have come to know that customization, product lines and differentiation have a significant impact on designing. The reason for this influence might be like that designing is an innovation and IT dependent activity and on the other hand customization and differentiation are also innovation and IT based activities. Therefore, these must have an impact on designing activity. For increasing product lines the firms need to imbue design capability both manually and technologically. Therefore, product lines also significantly influenced on design activities. For implementing differentiation and increased production lines, modular productions are helpful (Dagher, 2008). Here, it is to be mentioned that modular production system can make the procurement activity cost effective. The reason

is that in modular production, it needs to change production planning for various types of similar products of different designs within a short period of time. The construct of LAMS shows that leagile attributes are responsible for fashion oriented, and modular production systems are unidirectional and have an impact on IUVC. From the OPR also we have found that differentiation and product lines have a significant influence on procurement activities. Therefore, in a nutshell we can say fashion oriented and modular production oriented leagile components help implementing design and procurement activities. On the other hand, in terms of significance, marketing activities are mostly influenced by both lean and agile components like volume flexibility, minimum inventory, product lines and differentiation. Logistics activities are influenced by volume flexibility.

In EFA, while developing the construct for LAMS, some of the very important indicators like standardization of production method, waste minimization, cleanliness, setting and sorting in order and mastership of the seniors were excluded in reformulation process. These observed variables had lower standard deviation, and their mean values were dispersed from the median and because of these, they had low correlation with other leagile variables. And their variances and factors loadings were also not sufficient to explain particular logical factor. Even though the construct for LAMS does not represent fully the concept of LAMS, it has a significant relation with IUVC. The reason for this ability to influence may be the adequacy of experience of apparel firms in apparel production.

The construct of IUVC with three variables designing, procurement and marketing and distribution advocate for market oriented strategy in VI. The reason may be the firms' success is heavily dependent on proper segmentation in market with quick delivery. Logistics was excluded due to not being unidirectional with other observed variables. Its correlation with other indicators of IUVC is also poor. The reason for not having enough degree of correlation may be the nature of operation is not relevant to other IUVC activities. For example, designing, procurement and marketing and distribution are IT dependent and market oriented but logistics is not.

6.9 Conclusion

Gereffi (1999) stated IUVC as a business strategy for survival and sustaining growth for the apparel manufacturers and this study has striven to draw a clear picture of how to generate the internal strength through LAMS for that IUVC. This study has shown the dire importance of IT and HRM practices for implementing LAMS. This study also found out that leagile system even fractionally (partial group of indicators) are working out in Bangladesh for IUVC. This study has shown that variables of leagile related to producing fashionable products like customization and differentiation are significantly influencing on design which is the highest value generating activity for IUVC in Bangladesh. The most important variable in LAMS is differentiation because it significantly influence on all the IUVC activities except logistics which is not unidirectional with other activities. The study reveals that Bangladeshi firms if not fully at least potentially are able to utilize LAMS for IUVC and able to increase firm performance.

Chapter 7

Impact of Vertical Integration on its Outcomes in the Firms Pursuing Leagile Manufacturing Systems

7.1 Introduction

It is already discussed in chapter 3 (the chapter for literature review) and chapter 6 (the chapter for antecedent factors of IUVC) about IUVC and its antecedent factors. But IUVC would never be pursued as a part of corporate strategy of a firm, unless it yields back CA for the firm. We know from the chapter of literature review that IUVC is the phenomenon of VI in the discipline of strategic management (Porter, 1985; Grant, 2010) and VI is a mission of corporate strategy. Therefore, it is possible to logically deduce that the CA yielded from IUVC can also be yielded from VI in the same way under the discipline of strategic management. Some of the visionary firms in DCs and LDCs are trying to develop their resources and capabilities to vertically integrate their businesses into relevant businesses of the same value chain like design making, procurement, logistics and marketing. Their objective is to gain CA and hence to overcome the problem of low value addition provision and to pool negotiation power with the lead firms (the buyers or retailers) in the supply chains. If the firm can do so, it is expected that they can improve firm performance. But this is not an easy way to do. Very often, VI becomes burden for the firm if the firm cannot efficiently utilize the common resources and make out synergy from the bundle of businesses. Another difficult issue to mull over is the types of CA in apparel firms. Judging from Porter's generic competitive strategy, RBV, and CBV the types of CA have to be carefully selected on the basis of the nature of apparel business, apparel supply chain, apparel buyers and final consumers.

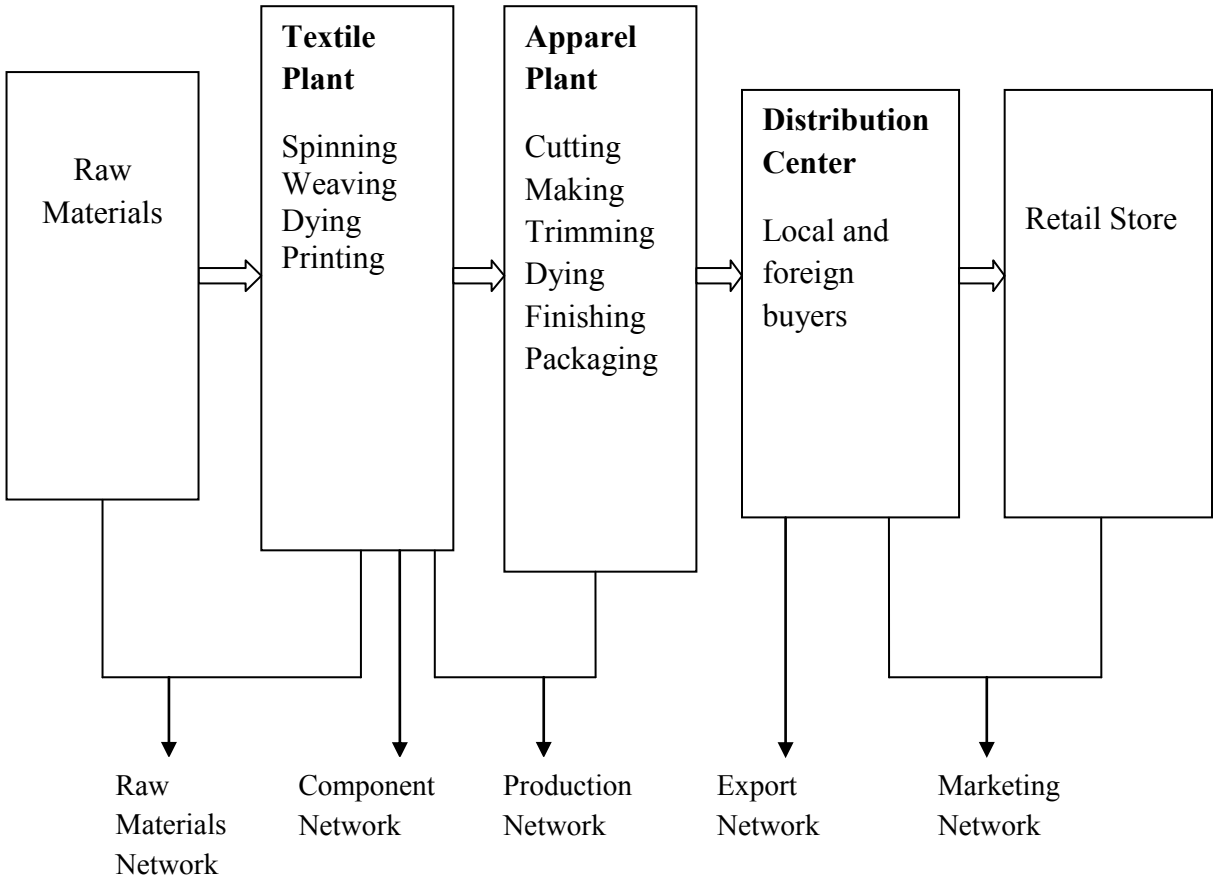

Figure7. 1: Stages in Global Apparel Value Chain

Source: Modified from Gini, S. F. (2002).

7.2 VI as IU Strategy in GAVC

Gereffi (1999) is the pioneer in advocating for IU as a strategy for sustaining CA for the apparel firms, on the basis of the trajectories of garment industries of Hong Kong, Taiwan, South Korea and China. His idea of IUVC is actually VI and more specifically it is in-house VI, if we consider it from the view point of strategic management. In-house VI means extending value adding steps under the same roof or same plant. Therefore, the IUVC in East-Asian firms described in chapter 4 and 5 was actually nothing but in-house VI. The figure 7.1 depicts the stages in GAVC. But one very important activity has not been shown by both Gini (2002) and Porter (1985). It is design activity. In the stages of GAVC depicted by Gini, we do

not find this activity which is an important target for IUVC. But this activity should be one of the concerns of primary or support activities for a firm in the endeavor of IUVC. In another point of view this can be a support activity in the value chain. Whether it will be a support activity or primary activity will depend on how design activity influences the firms endeavor of gaining CA. The concept of VI of Porter (1985) can be taken for better understanding the VI in GAVC. If CMT firms integrate themselves to designing, logistics or procurement functions, it means that the firms have increased their scopes of doing business towards up-stream and down-stream. From this perspective, the concept of VI, value chain integration and Gereffi's IUVC in apparel industry are same phenomena. Therefore, these three concepts are similar. But the scholars dealing in the issue of IUVC in apparel industry have not drawn the attention about this similarity with due importance earlier.

In the chapter for literature review (chapter 3), the logical relation between VI and CA and between CA and FP are already described. Over there, Porter's corporate strategy on value chain integration was an important view point. The second part of this chapter will describe the definitions of the indicators of CA and FP. In chapter 5 which is the study on the antecedent of IUVC has already described the factor IUVC. In the third part of this chapter, research methodology will be discussed on the basis of SEM and in the fourth part the result will be discussed.

7.3 Literature Review

7.3.1 VI as a Competitive Scope

VI can have a significant impact on a business entity in positioning itself in the industry with respect to cost, differentiation and other strategic issues, and because of that vertical scope of the firm is an important consideration in corporate strategy. According to Porter (1985) for devising corporate strategy the firms have to consider four types of competitive scopes namely segment scope (scope of product varieties), vertical scope (the extent of in-house activities), geographic scope (the range of regions and countries to operate) and industry scope (the range of related industries to operate). From Porter's explanation we find, VI is one of the competitive scopes for devising corporate strategy.

7.3.2 Advantages and Disadvantages of VI

VI has many advantages and disadvantages. According to Grant (2010) the advantages of VI and other competitive scope of corporate strategy are based on following three concepts namely- a) increase of economies of scope in resources and capabilities; for example, in apparel business, firms can share the common IT resources like CAD, CAM and ERP or can reduce communication and transportation cost for several related businesses like logistic and marketing. b) transaction cost reduction; for example, apparel firms can increase control over input through supply chain integration and this also gives the opportunity for differentiation, increasing entry barrier, pooling negotiation power, investing in highly specialized assets and c) decrease of costs of corporate complexity; for example, the apparel firms can improve supply chain coordination, capturing upstream and downstream profit margin. The disadvantages of vertical integration are: a) increased bureaucracy b) not gaining specialized competency and c) costly exit barrier etc.

As we have already mentioned that if we consider Gereffi's idea of IUVC as the only accepted definition of IUVC for apparel firms in GAVC, we find that the concepts of IUVC and VI for apparel sector are same. Therefore, the variables determined for IU in chapter 5 and 7 shall remain the same for the factor VI in this chapter. But the question may arise why the term 'IUVC' is needed to be changed into VI for this chapter. The answer is that the concept of IUVC is relatively less used in the study of strategic management. But the term of VI is widely used in the discipline of strategic management. On the other hand strategic management is the discipline which is very suitable for analyzing the outcome of corporate or business mission of a firm. As the objective of this chapter is to find the outcome of IUVC of the apparel firms which can be regarded as the corporate strategy of the apparel firms, this chapter would like to employ the term 'VI' rather than 'IU'. And as already in the chapter 6, the variables of IUVC have been discussed, this chapter will skip elaboration of the relevant variables for VI.

7.3.3 Descriptions of Outcome Factors

Chapter 3 has already defined outcome factors of VI. In the next step, the relevant indicators of the outcome factors of VI as IU will be discussed in brief.

7.3.3.1 CA

In the chapter 3, the concept of CA has been elaborated from the view point of Porter's generic competitive strategy, RBV and CBV. The relation between VI and CA also described on the basis of same theories. In this regard, value chain analysis, TCE, economies of scope, asset specificity, evolutionary economics and dynamic capability etc were the important logic for drawing the relations. Here, in the below the variables of CA are briefly discussed:

7.3.3.1.1 The Variables for CA for Apparel Manufacturing Firms

The means of gaining CA according to all the above mentioned theories are supportive for explaining or advocating the relation between VI and CA generally. But while selecting the types of CA in the case of Bangladesh apparel firms we have found that all the theories are not relevant to this particular case. For selecting the types of CA in this case, we need to consider certain issues like: i) the advantages for which the buyers select the apparel manufacturers ii) the external and internal forces and the position of the apparel manufacturers in supply chain or GAVC. About the first point, if we try to find out the CA for which a manufacturer is selected, we see that all the relevant CA like cost, quality, flexibility and time advantages are important in case of GAVC (Razzak, 2005). The explanation for this phenomenon is that one of the basic reasons for the creation of global supply chain for apparel business is to ensure both cost and quality with no less importance of QR. If only the quality were the objective of CA, the US or EU countries or Japan would not have shifted their production to the DCs and LDCs. By shifting the production location, they want to achieve both the advantages of cost and quality. And they can ensure it by manufacturing the products in the courtiers with cheapest possible labor, do the design where the most creative designers are groomed up, deploy an efficient buying agent who can arrange quality products very quickly. This is very flexible and easy to arrange for them because there are so many countries who can offer them these services. Therefore, if the firms from DCs or LDCs want to extend their value chain they have to compete targeting all types of CA and they have to keep in mind that they are not

fighting the battle not with other firms but with other supply chains. Then the second point, regarding the position of the manufacturers in the supply chain, we see that apparel manufacturers are positioned in the middle of GAVC and their negotiation power is weak (see figure-1). The reason is that, there are too many manufacturers (rivalries) to offer products at low cost and at the minimum possible lead time. To influence over suppliers and buyers they have to fight the battle with all the relevant CA. And this cannot be achieved by comparatively financially and technologically weak (in comparison to China, Taiwan and Hong Kong) Bangladeshi firms very quickly (Rahman et al, 2008). They have to achieve it through evolutionary process. Therefore, situation demands for following the strategy of CBV which support to struggle for all the relevant CA like cost, quality, product flexibility and time advantage and reliability. Again according to Wheelwright (1984), manufacturing flexibility can be of two types: volume flexibility and product flexibility. In case of time advantage, due to usage of software in apparel manufacturing, time advantage is well understood as QR system (Ananth and Mark, 1997). Therefore, the variables for CA are cost, quality, QR, volume flexibility, feature flexibility and reliability.

Cost

Cost as the objective of CA is advocated by almost all the theories on CA. In the apparel industry, cost is the most important CA after the phase out of MFA. Bangladesh demonstrated its strong resilience after MFA regime due to offering surprisingly low labor cost which is one of the biggest manufacturing overheads for apparel making (Staritz, et al., 2012). Apart from reducing labor cost, there are many other ways to reduce the cost and which are essential to follow for the Bangladeshi firms as in the near future, many Sub-Saharan African countries and Asian countries like Vietnam, Cambodia and Laos may offer even lower price than Bangladesh.

One very important way of reduction of cost is reduction in transaction cost. Coase (1937) defined transaction costs as the costs of using the price mechanism, which he sees in the cost of information (in his language, the cost of discovering what the relevant prices are) and the cost of writing (negotiation and concluding) contract. For apparel manufacturers, transaction cost appears in the form of paying higher amount of purchasing cost for receiving input and receiving lower amount of profit for supplying product to the international buyers. In apparel

value chain the manufacturers are much subjugated in the negotiation table, because the buyers or the suppliers have many options for switching the manufacturers. There are too many manufacturers in the DCs and LDCs. But there are only few suppliers. Moreover, the opportunity to know about the raw materials producing market is not possible for the manufacturers. Therefore, they suffer from bounded rationality and the suppliers take the opportunity for seeking the extra rent in the supply chain. But if the manufacturers are full package supplier with their own logistics and procurement business they can have a wide network and many alternative options for buying raw materials. In this way, they can reduce the cost.

Another way for reduction of cost is utilizing economies of scope (Hayes and Pisano, 1996). Whereas 'economies of scale' for a firm primarily refers to reductions in average cost (cost per unit) associated with increasing the scale of production for a single product type, 'economies of scope' refers to lowering average cost for a firm in producing two or more products. This concept suggests for using the common overhead for several items. Therefore, the average cost goes down. By operating in several relevant businesses the firm can share the common administration, infrastructure and in some cases common technology. Therefore, VI as IUVC facilitates in creating the opportunity for economies of scope.

Evolutionary process of learning also helps reducing the cost of various operations for a vertically integrated firm. A vertically integrated firm can interchange the idea and experience among the individual business units. Therefore, the learning opportunity for OEM or ODM apparel firms is higher than mere CMT firm. For example, if we take only the case of manufacturing function, we see that through evolutionary process and continuous improvement the workers can identify the best production process which is the best suitable for pull marketing system (Pisano, 1991).

Quality

Quality is a very important objective of CA and is becoming the prime concern for the retailers. Quality is the most important indicator for differentiating a piece of apparel. As the living standard of the end users is going up, quality wears in terms of defects rate are highly demanded by them and thereby, by the retailers. Porter (1985) stated that a firm should either

go for quality or for cost advantage. But according to Hill (1988), quality and cost advantages are rather complementary, if we consider these from the view point of economies of scope. Japanese lean manufacturing system also proved that by practicing both cost reduction and quality improvement strategy.

VI can play a positive role in improving quality of apparel. Vertical integration allows the firm for standardization, automation and simplification of the process, because the firm can deal in integrated process. In integrated process, if defects take place in one step of production process, it can be asked to stop from another step of production process. Consequently, quality improves. Another thing is that because of integration the firm can check the process and find the defects more efficiently.

In GAVC, the CMT manufacturers cannot get information about good quality raw materials at reasonable price. As they do not have procurement activities, very often the suppliers take the opportunity of the CMT firms' bounded rationally and supply poor quality raw materials at high cost. If these CMT firms can integrate their business into procurement and other commercial activities they can reduce the transaction cost and also can ensure the quality of the materials. Therefore, VI can ensure the supply of good quality raw materials.

Quick Response (QR)

One of the most important elements in gaining CA in apparel industry is QR. In chapter 6, QRS was a variable of antecedent factor IT. But here the study has taken QR as an outcome. Here QR is not the system but the result of process for quickness. Sometimes it is described as lead time. On the other hand QRS acts on the single phase/ activities throughout the entire chain right from the producers of yarn up to the sales outlet-with the aim of reducing the time spans that elapse from the textile design stage to the purchasing of the garments by the final consumer (Forza and Vinelli, 1997). According to Razzak (2005), lead time is a very important mean of gaining CA for the apparel firms in Bangladesh as the distance between Bangladesh and the US and Europe is further in comparison to many of its competitors. QR is possible if the total supply chain is efficient. Only few of the stakeholders' efficiency will not work out. If any of the firm in the supply chain is laggard in responding to the next value adding step, the firm would be dropped out from the supply chain as there are many

alternatives for the buyers. Therefore, the apparel firms should have their own procurement and logistics and other commercial activities, so that they can arrange the raw materials quickly, take the decision about production quickly and also can get the appropriate information about the end market quickly (Richardson, 1996). If they have their own design studio they can design the products or modify the design as soon as the trend of style is changed in the end market. Business integration through VI can improve the QR tremendously.

Designs and styles of apparels are very often seasonal. Sometimes the manufacturers have to device the production plan much earlier of the demand. In the product development process, merchandisers constantly face the problem of determining what consumers will want to purchase in near future. The longer the time frame between developing a concept of style and delivering products on the basis of that style to retail stores, the greater the risk of errors and associated mark down (Rosenau aand Wilson, 2001).

Product Flexibility

Product flexibility means bringing flexibility in adding or changing the product feature in a cost effective way (Wheelwright, 1984). As mentioned earlier that this is the age of fast fashion. What is the yesterday's demonstration in the cat walk is demanded in the fashion store today. Because of this, the manufacturers need to be fully vigilant in changing the feature of product according to the fast changing fashion world. This is too important for the ladies wear. But devising product flexibility is not an easy task. The production process has to have the ability to be changed very promptly with utmost perfection. Quick changeover or SMED techniques along with teamwork is highly important for product flexibility (Dagher, 2008). VI can reduce the pressure in arranging this quick change by ensuring various alternative procurements. If the firm is integrated with design activities the designer sitting in the buying country can quickly reach to a solution by joint discussion over online. Sometimes the designer of the manufacturing firm is enough to respond to the design demanded.

Reliability

Wheelwright (1984) stated that products of some firms may be priced higher than the products of others, and may not have some of the features and workmanship. But they do work as

specified, they make the delivery on time and the company stands ready to mobilize its resources instantly to ensure that any failures are corrected immediately. Wheelwright termed this type of competitive advantage as dependability. Some scholars define it as reliability. Reliability can be a great CA in apparel sector, because very often there are too many defects in the products which are a great disturbance for the retailers. Retailers want to remain utmost loyal to their valued customers. Therefore, the retailers want a supplier who is very responsible and trustworthy. And this trustworthiness cannot be achieved by the manufacturers within a short time. It requires time with devotion. Japanese buyers put much stress on this reliability. They want to be ensured that whatever the variety of the product or the feature of the product, it must be reliable as par the specification of the order. There cannot be any deviation. Because of these characteristics of the Japanese buyers, Bangladeshi apparel manufacturers needed much time to get entered into Japanese market (Moazzem and Rahman, 2010)

VI into procurement, logistics and design activities can ensure the reliability of a manufacturer to a great extent. When the firm has its own procurement or logistics they can arrange the production materials on time at the exact amount. They can enjoy much flexibility in the management and can respond to the buyers more efficiently as per the promise made to the buyers. Transaction cost and transferring time also become less for logistics and procurement because of VI. Therefore, they can act instantly. Again design activities facilitate the firms in responding appropriately to the demand of the fashion freak teen aged society of the developed country.

7.3.3.1.2 FP

In chapter 3 (literature review) the indicators of FP and the relation between CA and FP were already described. . The indicators for firm performance were ROA, capital growth, profit growth, sales growth and buyers' number.

7.4 Conceptual Framework

As per the above discussion, this study will strive to find the impact of vertical integration on competitive advantages and the impact of competitive advantages on firm performances of Bangladesh apparel sector *(see figure7.2)*.

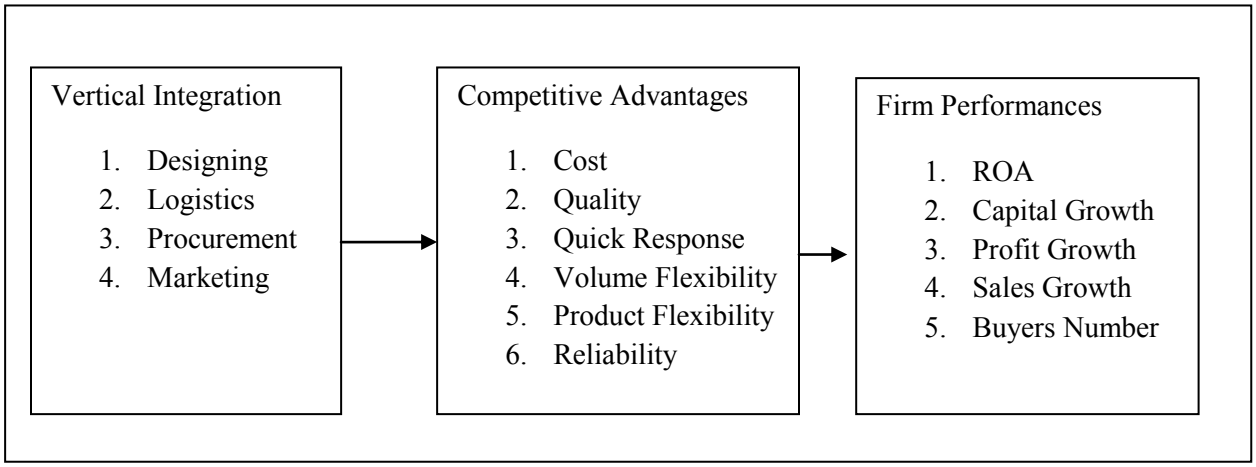

Figure 7.2: Conceptual Framework

7.5 Hypotheses:

H 7.1: The more extending the businesses by VI, the more achieving of CA for the firm.

H 7.2 : The more achieving of CA, the more realizing of FP.

7.6 Research Methodology

A questionnaire survey is implemented to collect data by Likert scale. Therefore, the collected data are perceived rather than objective. Then by using SPSS 18.0, the collected data of the observed variables are extracted as component by EFA to identify the factors. Further the factors are tested against CFA by AMOS 20.0 and finally under SEM, the conceptual model was estimated by AMOS 20.0. Just like chapter 6, to examine the impact of the individual indicators rather than factors, this study has also performed ordinal regression as OPR.

7.6.1 Structure of the questionnaire

In order to collect necessary data for testing the hypothesized model, we construct a questionnaire consisting of four parts. The first part is the introductory part asking about general matters of the firm. In the second part, for judging the degree of VI, questions are asked about which value adding steps the firms are involved except CMT like designing, procuring and marketing activities. The second part and third part consist of the questions about CA like cost, quality, feature flexibility, reliability and QR. The fourth part consists of questions regarding FP like capital growth, profit growth, ROA and increase in the number of buyers. But during the conduct of the survey everyone could not give answers about ROA because of lack of knowledge about it, and here it is to be mentioned that almost all the respondents were either production mangers or merchandisers.

7.6.2 Respondent Profile

The survey is conducted on 180 firms located in both EPZ and non-EPZ area. 100 firms from two EPZ areas namely Dhaka EPZ and Chittagong EPZ are surveyed and rest 80 firms are surveyed in non-EPZ area like Mirpur, Gazipur and Ashulia under greater Dhaka region. Here it is to be mentioned that these same 180 firms are sample firms for chapter 6 also which means these firms are pursuing LAMS either on program based of on evolutionary process.

7.7 Data Analysis and Results

7.7.1 EFA

As per the conceptual model, this study has constructed the structure of the model consisting of three factors namely VI, CA and FP. All these three factors are theoretically inter-linked according to the description of literature review of this study. Hence we do not need to find any other relationship patterns by conducting EFA for all the variables together. Rather this study tries to check whether the variables we are going to use for each latent variable are unidirectional and able to explain the latent variables with sufficient variance. If any of the observed or manifested variables are not suitable for explaining the unobserved/ latent variable it should be eliminated from the group of the observed variables on the basis of component matrix or rotated component matrix PCA. After constructing the components, if any

satisfactory relation among the components are not found, reformulation by eliminating the observed variables having less standard deviation and too dispersed mean can be done. The variables can be eliminated until a satisfactory value of Cronbach's Alpha is got (Blunch, 2008). After reformulation the study is expected to find a satisfactory relationship among the cluster of variables.

Table 7.1: Descriptive Statistics of the Indicators Retained after EFA

Descriptive Statistics

	Mean	Std. Deviation	Analysis N
Design	2.216	1.197	180
Procurement	2.616	1.206	180
Marketing	2.583	1.051	180
Logistics	3.061	1.582	180
Reliability	3.216	1.465	180
Quick Response	2.950	.935	180
Quality	3.022	.909	180
Feature Flexibility	2.905	.913	180
Cost	3.483	.988	180
Capital Growth	2.677	1.011	180
Profit Growth	2.550	1.037	180
Sales Growth	2.844	1.087	180
Buyers Number	3.755	.931	180

Before doing EFA the internal consistency among the questions regarding each factor was checked by reliability test. It is done by measuring Cronbach's alpha. Cronbach's alpha for VI, CA and FP were respectively .701, 708, .722 which indicate that the questions regarding each factor are unidirectional (the accepted level is .70) (Cronbach and Shavelson, 2004). Then EFA is performed in SPSS 18.0.

The observed variables used for EFA for VI are procurement activities, logistics activities, design activities and marketing activities. All the variables except logistics have constructed the component of VI. Logistics is eliminated due to low factor loading and not being unidirectional with other variables. In the construct of CA cost, quality, feature flexibility and QR constructed the component. Volume flexibility and reliability were eliminated due to not being unidirectional and having low standard deviations. And finally for FP capital growth, profit growth and sales growth make one construct. Buyers' number was eliminated due to not being unidirectional with the rest of the variables and having low standard deviation. The main reasons for eliminations in all the cases are due to lack of correlation with the rest of variable or due to low factor loading. The value of KMO in EFA for VI, CA and FP are 669, .720 and .619 respectively. The accepted level for KMO test is 0.6.

7.7.2 CFA

After EFA, a diagram according to the conceptual framework is drawn in AMOS 20.0 and run for CFA by connecting the unobserved variables by double headed arrows. In CFA each item is restricted to load to pre-specified factor and items were pre-specified according to the result of EFA.

From the table below, we see that all the value in the model fit indicators proved good except RMSEA. But according to Schermelleh-Engel et al., (2003) RMSEA less than .05 is good and RMSEA less than .08 is acceptable. So the value of RMSEA .062 is acceptable.

Table 7.2: Model Fit Statistics

Model Fit Indicators	GFI	AGFI	CMIN/DF	RMSEA	IFI	TLI	CFI
Good Model Fit	>.90	>.80	<3	<.05	>.90	>.90	>.90
Value in this Model	.91	.848	1.895	.071	.898	.873	.896

Before doing EFA the Cronbach's alpha of the entire gamut of variables are found out and it is .793 which is higher than the acceptable value .70. The composite reliability of the construct is .75 (higher than excepted level .70) which indicate good internal consistency and AVE is .61 (higher than accepted level .50). Convergent validity was evidenced by the significant standardized loadings of each item (.40 or higher) on its corresponding construct.

7.7.3 SEM Estimation

After CFA by AMOS 20.0 the model is estimated by same AMOS under SEM (see Figure7.3). All the relations in the model are proved significant in the estimation having t-value less than .001 for two tailed test. The model also qualifies in the model fit indicators (table 7.3)

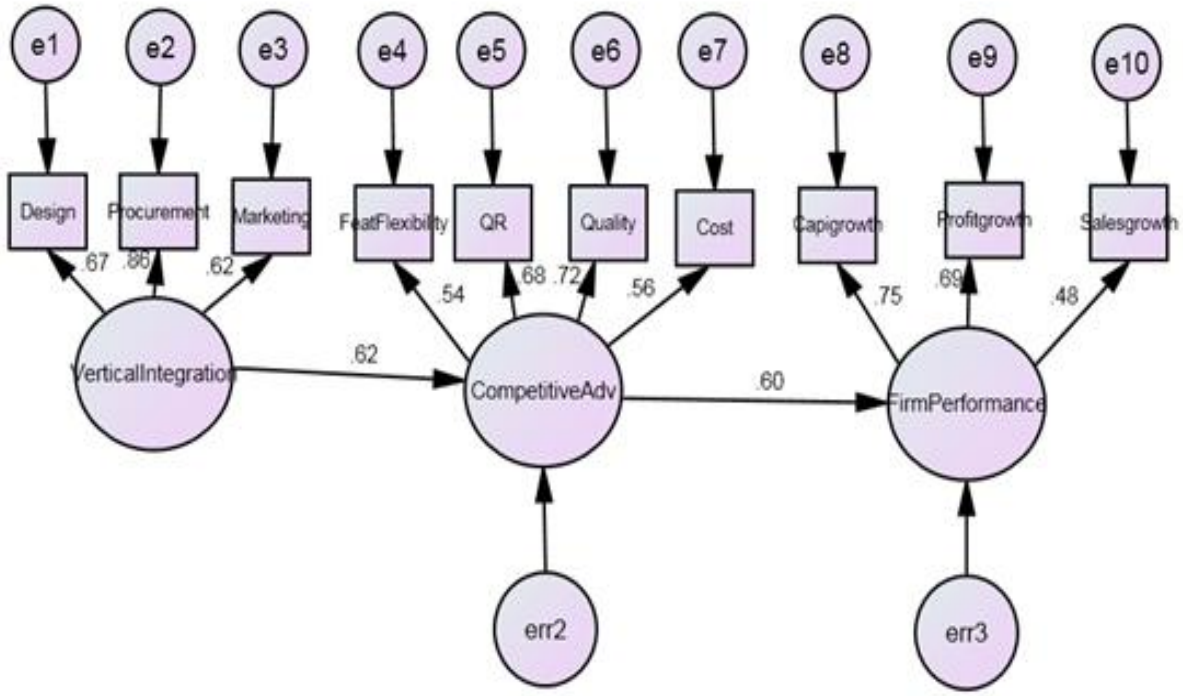

Figure 7.3: Diagram of Structural Equation Modeling

Table 7.3: Model Fit Statistics in the Estimation of Structural Equation Modeling

Model Fit Indicators	GFI	AGFI	CMIN/DF	RMSEA	IFI	TLI	CFI
Good Model Fit	>.90	>.80	<3	<.05	>.90	>.90	>.90
Value in this Model	.943	.905	1.551	.056	.960	.945	.959

7.7.4 Results

From VI to CA: From the estimation we see that CA is significantly influenced by VI. Here, if the standard deviation of the later goes by 1, the standard deviation of the earlier will go by .620.

From CA to FP: FP is significantly influenced by VI. Here if the standard deviation of the later goes by 1, the standard deviation of the earlier will go by .602.

Therefore, both of the hypotheses are supported.

7.7.5 Impact of Individual Indicators of VI on the Individual Indicators of CA

As mentioned in chapter 6, SEM estimation cannot show the impact of individual indicators on the indictors of another factor. Therefore, from the SEM estimation the policy makers and the owners of the firms would not be able to know about which indicators of VI are more responsible for which types of CA. This problem would be solved by performing regression for all the indicators of CA and all the indicators of VI. This sub-section will deem each of the indicators of CA as the dependent variables and the indicators of VI as the independent or explanatory variables. For each of the dependent variables which are the indicators of CA will be separately tested against the independent variables by employing OPR.

Table 7.4: Result of OPR between Indicators of VI And Indicators of CA.

	Beta Coefficient of Indicators of IU in Influencing on CA				
Indicators of IU as Independent Variables	Cost	Quality	Quick Response	Product Flexibility	Reliability
Design	.277***	.232*	.277*	-.081	.037
Procurement	.173	.574***	.572***	.442***	.151*
Marketing	.072	-.177	.118	.247*	-.048
Logistics	-.007	-.039	-.012	.067	.767
Pseudo R^2	Cox and Snell .077 Nagelkerke .082 McFadden .029	Cox and Snell .149 Nagelkerke .161 McFadden .062	Cox and Snell .213 Nagelkerke .230 McFadden .092	Cox and Snell .026 Nagelkerke .028 McFadden .009	Cox and Snell .029 Nagelkerke .030 McFadden .009
Model Fitted by the significance level	.006	.001	.005	.001	.276

Results of OPR:

1. According to Table 7.4, cost is significantly influenced only by design activities.
2. Quality is significantly influenced by design and procurement activities.
3. QR is significantly influenced by design and procurement activities.
4. Product flexibility is significantly influenced by procurement and marketing activities.
5. The relation between reliability and other variables of VI are not fit in the model.
6. The most important variable of VI is procurement for influencing on CA, because it significantly influences on three types of CA (quality, quick response and product flexibility)

7.8 Discussion

The Relation between VI and CA:

All the observed variables under the construct of VI are helpful for improving CA. There may be many reasons for explaining the influence of VI on CA. First by VI into designing, procurement and marketing, the firms can set a strategic planning keeping ahead the overall vision. Market situation of procurement influences manufacturing planning, and in the same way the ability of manufacturing and designing influences each other. Therefore, the firms can pursue realistic goals and objectives. Involvement in procurement and marketing activities gives the merchandiser opportunities to follow a market calendar. It drives the activities of product development schedule, sales appointment, manufacturing planning and shipping schedule. It establishes timetables for the completion of each season's line, sales objectives for the product in the lines, and it starts and stop dates for shipping customers' orders. Because of these, the firms can reduce the lead time through enhancement of QR.

From the OPR, in Table 7.4, we see that QR is significantly influenced by design and procurement activities. The explanation for this influence is that designing ability reduces much time by avoiding various communications with outside designers, and procurement saves time by avoiding involvement of separate procurement agents. According to Rosenau and Wilson (2001), by supply chain integration, especially by BVI the firms undertake the sourcing decision. This gives the firm both cost advantage and product flexibility. From Table 7.4, we see that cost is significantly influenced by design which is a one type of BVI. By undertaking design activities, the firms can reduce much of the transaction cost which happens due to opportunistic behavior of the design firms. Form Table 7.4, we see that product flexibility is significantly influenced by procurement and marketing activities. Involvement in marketing activities brings the managers closer to the buyers. Consequently, they can sensitize the trend of style, color, size based on direct observation, historical data and statistical analysis. On the other hand, procurement activities facilitate purchasing required raw materials at the lowest possible rate at the time when it is needed. In this way, the firm gains many options through flexible and economic procurement for producing several types of products.

Therefore, procurement and marketing respectively help the firm in changing the features of the product. Quality is also significantly influenced by design and procurement. Very often, design from outside is not suitable for the production process of the firms. But internally generated design match with the production system of the firms, and this ensures the quality in terms of defect of the products. By self-managed procurement, the firms can purchase good quality raw materials. Therefore, procurement also facilitates the gaining of quality advantage. By VI the merchandisers can establish product information management system which provides the opportunity for online fashion designing and web based data management. Because of all these activities, personnel working throughout the value chain acquire idiosyncratic knowledge, and the businesses after VI gain idiosyncratic bilateral synergy.

According to the explanation of Rosenau and Wilson (2001), when procurement and marketing personnel and the designers work together like a team, it provides a healthy environment that enables the designers to achieve the most effective styling result. Therefore, VI has enabled the Bangladeshi firms gain CA by product flexibility and quality.

For all those above mentioned reasons, the variables under the construct of VI have significant positive impact on CA. But we must have to explain why the indicator logistics were excluded and why its factor loading was low in comparison to other indicators. The reason may be like that the nature of operation of logistics is different from the rest of the indicators of VI. Logistics mainly involves transportation and materials handling. Although nowadays logistics are very technical in terms of planning for reduction of spatial distance from the business point to business point, it is not so much IT oriented like other indicators. Moreover, the resources are not common between logistics and other indicators of VI. For example, CAD and CAM can be used both for production and designing; ERP can be use both for procurement and marketing. Because of these, logistics cannot be able to create economies of scope with other indicators of VI. But in terms waste minimization and time reduction it much goes with LAMS principles. But as a whole, logistics seems to be different from other indicators of VI. Therefore, the knowledge decoding ability of LAMS might not work in case of logistics as per the result of EFA.

The Relation between CA and FP:

From the result, it is seen that the construct of FP is influenced by the construct of CA. According to Miller (2001), reduction in the cost of manufacturing increases profit and reduction in cost and up-gradation of quality in together increase sales. Therefore, extra revenue earned by VI is ploughed back as reinvestment in the business. Consequently capital is also increased. Here all the indicators found after EFA are growth oriented. The reason for having uni-dimensionality of the growth oriented indicators is that Bangladesh is now at enlargement stage of manufacturing as described in chapter 1 by depicting the analogy of the movement of reptile. From Table 2.2 of chapter 2 we got the picture of growing tendency of the sector. Therefore, it can be logically deduced that the firm without growth will not be able to sustain in the marker and should not have any relation to IU. Therefore, we have found all the growth oriented indicators after running EFA. But the other indicators like buyers number with different dimensionality was chosen for SEM estimation, the result for the entire model could be different. The reason for exclusion of buyers' number may be buyers' number is firm's exogenous nature variable to a little extent and number of destinations of buyers depends on the bilateral and multilateral politics. Consequently, this is not unidirectional with other observed variables.

7.9 Conclusion

Gereffi (1999) stated IUVC/VI as a business strategy for gaining CA and firm performances for apparel manufacturers and this study has striven to show this relation empirically. Previous studies on apparel firms' strategic management have not shown the relation between VI and CA on the basis of several important pieces of literature like Porters generic competitive strategy, RBV and CBV in together. Consequently, this study has tried to accommodate all the important pieces of literature contributing in the field of CA. As opposed to Porter's generic CA this study has tried to show empirically that both cost and differentiation (quality, QR, flexibility and reliability) can be pursued by the firms. This has supported the concepts of Hayes and Pisano (1996), Hill (1988), Gupta and Somers (1996) and Sehgal (2011). Therefore, this study recommends the apparel firm owners of Bangladesh that they should not stick only to labor cost reduction strategy for exploiting growth opportunity. They should mull

over other objectives also for gaining CA for making profit. The owners and managers have to keep in mind they should try to improve their resources and capabilities in a way that they can share these in new opportunities of businesses. This would give the fitness for survival in GAVC. The study reveals that Bangladeshi firms can pursue for IUVC/VI, and this will gain CA for the firms and thereby, achieve FP.

Chapter 8

Conclusion

8.1 Summary of Main Findings

This dissertation has focused on a firm level analysis of antecedents and outcomes of IUVC/VI of apparel firms pursuing LAMS in Bangladesh. Regarding the stages of up-gradation in chapter 4, this study has shown that maximum of the firms pursuing for LAMS are in the stage of OEM. The study has shown that 34% of the firms are in the stage of ODM either encompassing all or partially the intermediate stages. Out of all the ODM firms 22.7% completed all the intermediate stages and 11.6% have bypassed one or more intermediate stages. Therefore, this study shows that reaching the advanced stages of IUVC is possible without encompassing the intermediate stages. This study has shown that reaching the stage of ODM may be possible without all the activities of OEM by stressing upon HRM practices and CAD and CAM of IT.

This study is the pioneer in showing empirical relation between SCFs and HRM practices (chapter 5). Previously some scholars like Paez et al. (2004) showed few of the indicators of social compliance and HRM practice for LAMS sporadically. But this dissertation have accumulated all the scattered indicators for these two factors and showed the relation both logically and empirically. It has shown all the HRM practices for LAMS are significantly influenced by the partial variables of SCF. Ergonomics and workers related compliance factors are more important than other SCF variables.

The most important finding of this study is that LAMS contributes to the endeavor of IUVC by the apparel firms (chapter 6). Therefore, the logic for which this study advocated for has got the authenticity. The main logic utilized here is that LAMS enriches the workers' knowledge through the practice of the LAMS. The knowledgeable workers groomed up through multi-skilling, training and commitment are able to decode tacit knowledge along with learning explicit knowledge of the relevant businesses. Therefore, the apparel firms with LAMS can have the potentiality for IUVC. The dissertation has seen HRM practices, IT and

LAMS system as the resources of the firms. It tried to show that by facilitating LAMS, both HRM practices and IT make the whole manufacturing system of the firm a valuable, rare and organized system to create knowledge for the firm. This knowledge is very valuable for the firms because by that knowledge firm can decode the firm specific knowledge of the relevant businesses. This study also showed that HRM practices and IT positively influence on implementing LAMS. Beside the way of decoding tacit knowledge, LAMS also facilitate for sharing the common resources among the relevant businesses like designing, procurement and marketing. For example, using of CAD, CAM and ERP are necessary for LAMS which can be utilized for all the relevant businesses stated here in this study as IUVC activities.

The construct of LAMS, made by EFA shows the existence of the indicators responsible for fashion oriented manufacturing attributes like customization and product variety are existed in the construct (Chapter 6). In the SEM, we found that this construct influences on IUVC. From this analysis, we can say that manufacturing plant which produces fashion oriented products would facilitate in implementing IUVC. By employing OPR, this study found that customization and differentiation are significantly influencing on design which is the highest value generating activity for IUVC in Bangladesh. The reason may be like that customization and product differentiation can decode the tacit knowledge of relevant businesses along with other indicators of LAMS. According to the result of OPR the most important variable in LAMS is differentiation because it significantly influence on all the IUVC activities except logistics which is not unidirectional with other activities. The reason may be like that differentiation creates a wide learning curve which contributes in generating knowledge for several relevant businesses in the same value chain.

Another very important finding of this study is that through IUVC, nearly all the objectives of CA can be pursued by the firms pursuing for LAMS which is very much unlikely according to the idea of Porter's (1985) competitive strategy (chapter 7). The study has explained this phenomenon by CBV theory where dynamic capability is an important issue. Dynamic capability is the capability that continuously pursue for VRIO as described in RBV. Dynamic capability gives much CA for the firms in the supply chain. The reason is that the firms in the supply chain work under many sorts of pressures like timely delivery, supplying quality products at the lowest possible price and producing products at any amount of order.

Therefore, when a firm can up-grade itself through value chain or can vertically integrate it indicates that the firm has achieved dynamic capability. This logic has got authenticity by this study as it has shown that through IUVC the firms can pursue for cost, quality, feature flexibility and QR simultaneously. By employing OPR in chapter 7 it is shown that cost is significantly influenced by design; quality is significantly influenced by design and procurement; QR is significantly influenced by procurement and marketing and the relation between IUVC activities and reliability is not fitted in the model. From the result it transpires that design and procurement are the two most important indicators for achieving CA for Bangladesh firms pursuing for LAMS.

Very interesting finding of this study is that all the factors are even partially influencing on the next steps depicted in the conceptual framework (chapter 6 and 7). Exclusion of some of the indicators through EFA due to lack of uni-directionality and having impact of HRM practices on LAMS and LAMS on IUVC show that LAMS and HRM practices even partially influence the industrial up-gradation. But one thing we have to keep in mind that this exclusion of the variables does not mean that full set of variables would not work in the conceptual model, because it is a limitation of SEM that it cannot show any result for the full set of variables. SEM can produce an estimated model only after eliminating the variables with less unidimentionality.

Table 8.1: Summary of Main Analysis Findings

Hypotheses	Conclusion
H 5.1 : The more the implementation of SCF the more implementation of work Rotation	Partially Supported
H 5.2 : The more the implementation of SCF the more implementation of workers commitment	Partially Supported
H 5.3: The more the implementation of SCF the more implementation of workers empowerment	Partially Supported
H 5.4: The more the implementation of SCF the more implementation of workers mastership	Partially Supported
H 5.5: The more the implementation of SCF the more implementation of	Partially

problem solving discussion	Supported
H 5.6: The more the implementation of SCF the more implementation of training	Partially Supported
H 5.7: The more the implementation of SCF the more implementation of teamwork	Partially Supported
H 6.1: The greater the firm's initiatives for human resource practices, the greater the implementation of LAMS	Supported
H 6.2: The greater the firm's initiatives for establishing IT, the greater the implementation of LAMS	Supported
H 6.3: The greater the implementation of LAMS the more the IUVC of the firm	Supported
H 7.1: The more implementation if IUVC/VI, the more achieving of CA for the firm	Supported
H 7.2: The more achieving of CA, the more realizing of FP	Supported

8.2 Implications

8.2.1 Implications for Academicians

This study is empirical in nature. Although many of the theoretical underpinnings discussed in the chapter of literature review matched with the real scenario depicted from the sample enterprise, there are some interesting deviations. Gereffi (1999) asserted a linear up-gradation of the apparel firms starting from CM, CMT, OEM, ODM and finally OBM. But this study found that in case of the firms pursuing for LAMS, more than one third of the ODM firms reached the position by-passing some of the activities of OEM. Therefore, this study shows that the path is not always linear for the firms pursuing for LAMS.

This study has linked LAMS and IUVC on the basis of Nonaka's idea of decoding tacit knowledge through some important practices in organization like experiencing several relevant works through routine improvement in the production process. Previously scholars tended to practice RBV for finding the means of CA. Few scholars like Silverman (1999) have utilized RBV for chalking out the way for diversification. But this study most probably for the

first time has showed empirically that firms' resources and capabilities like manufacturing systems, HRM practices and IT can be utilized for IUVC which is actually VI from the view point of strategic management.

Previously Sehgal (2011) advocated that in supply chain all the relevant CA should be pursued, because global supply chain is designed for keeping the opportunity for pursuing all sorts of CA. Therefore, firms interested for value chain integration should pursue for all types of CA. This study is highly inclined to this logic for the case of GAVC and Bangladeshi firms' pursuing LAMS in GAVC. But this study has deduced the logic from several other popular theories in strategic management like RBV and CBV (chapter 7). Here it is shown that how VRIO of RBV can be realized by developing dynamic capability. This study most probably for the first time has linked RBV and CBV for showing that persuasion for several CA is possible for the firms pursuing LAMS.

8.2.2 Implications for Practitioners

From the analysis it transpires that for IUVC in apparel manufacturing firms, adoption of LAMS can be a suitable functional level strategy and this strategy can be pursued by implementing IT and HRM practices which have the same inherent principle of LAMS like waste minimization, time reduction or continuous improvement. While implementing leagility, the firm owners have to keep in mind that trained, empowered and committed human resource is the prior condition for leagile production in the apparel sector of Bangladesh. Consequently, the apparel firms should arrange training for the workers, and also the workers should be empowered for taking innovative decision and this will enhance their commitment. From the construct of ITLAMS it is understandable that the IT elements which can help producing variety of products and also help for customization through economies of scope are influencing on LAMS. From the construct of LAMS, it is understandable that firms hankering for fashionable clothing market would find LAMS influencing on IUVC. Consequently, the firm owners may think about increasing of production lines which are able to create product varieties. The machinery should be equipped with the ability targeting for customization and flexible production system The owners should strive for differentiation more in comparison to other LAMS variables for pursuing IUVC.

From the analysis, it transpires that for sustaining in the international market, IUVC or VI can be a suitable strategy for the apparel firms pursuing LAMS in Bangladesh. Designing, procuring and marketing and distribution are very relevant businesses where same type of human resources and IT resources like CAD, CAM, and ERP etc. can be utilized. Moreover vertically integrated firms can be created vertically integrated IT, HR and business processes which are harder to be replicated by the competitors. This would provide the firms the advantage of asset specificity and idiosyncrasy of knowledge. Therefore, the firms should set a corporate strategy to integrate themselves through supply chain, even if it is not possible at the beginning. Case studies of Hong Kong, Taiwan and China tell us that CMT firms can successfully become OEM or ODM in course time through gathering of experiences (Gereffi, 1999). But it needs visionary objectives. Consequently, Bangladeshi apparel firms pursuing LAMS, even if they are not capable to drive with big capital at the beginning, should have an objective of VI step by step.

From Rahman et. al (2008) and Paul-Majumder & Sen (2001), it is found that many firm owners in Bangladesh still believe that maintaining low labor cost through coercion is the only way to gain CA and thereby, to achieve FP. But likewise Taiwan and Hong Kong this study has proved that apart from cost advantage, improving QR, quality, differentiation and feature flexibility are also important CA for achieving FP for the firms pursuing LAMS. Therefore, the Bangladeshi apparel firm owners and managers who are pursuing LAMS may be able to broaden the scope of CA by striving for IUVC.

8.2.3 Implications for policy makers

Already with the government encouragement, BGMEA and BKMEA have been trying to promote lean manufacturing system. But government has not conducted any empirical survey to know what the outcomes of government initiative for promoting lean are. This study has shown that leagile can contribute to IUVC. Therefore, if the BGMEA and BKMEA think that IUVC can be a substantial way for surviving in the global competition they can promote the components of agility besides the components of lean. Government agencies can train the apparel workers for both lean and agile by including customization and product differentiation techniques in production.

It transpires from this study (chapter 6) that fashion oriented manufacturing process contribute to IUVC through value chain for the firms pursuing LAMS. It indicates that the fashion oriented firms have created a scope to engage in designing activities. Although this fashion orientation in production is the result of the success of the design masters who learnt about designing while operating the productions under LAMS in evolutionary process, the firm can maximize this opportunity of fashion orientation by recruiting professional designers or rendering training on design to the present design masters. Therefore, government can establish more designing institute in Bangladesh. At present there are very few design institutes (only 7) in Bangladesh for the mammoth size apparel industry comprising 4,000 firms. Consequently it is too less for the industry. Government should take initiative in this regard.

8.3 Limitations of the Study

While conducting the field survey this study interviewed only one person from each of the firms (either production manager or merchandising manager). But there were several aspects in the questionnaire encompassing leagile, IT, HRM and management issues which are not supposed to be answered by one person. But due to time limitation all the relevant persons could not be interviewed.

While capturing the degree of implementation of various activities in apparel firms by the questionnaire on the basis of Likert scale, this study could not design the indicators on the basis of specific technological skill. But technological skill could be a good indicator for understanding how specific skill for different activities contributes to IUVC.

One of the basic limitation of SEM is that it cannot show the result for the conceptual model with the indicators who have lack of unidimentionality with other indicators of the respective construct or factor. Therefore, this study could not show what the results would be if all the indicators/ variables were incorporated in the model estimation.

The four main analytical chapters except chapter 5 regarding social compliance factors and HRM practices for LAMS are based on same field study. It means for three chapters the sample size and methodology are same. But the data for the study of chapter 5 is based on secondary data. The reason for collecting secondary data for this study is that the firms do not

want to make public about their social compliance standard, and even if they disclose they would not be impartial about rating their compliance standard. It could be biased if the data on compliance were collected from the firm managers. Therefore, the GIZ officers and EPZ officers who impartially monitor the firms under their supervision were asked to convert their already recorded data on compliance into Likert Scale. In this way, the study tried to maintain the pureness of data. But because of that the dissertation has lost the opportunity to link completely the social compliance factors to rest of the variables. However, we can have a holistic picture from the conceptual framework as all the EPZ firms are common in both dataset.

8.4 Recommendation for Further Research

This study has shown how LAMS even fractionally influences on IUVC. Therefore, another study can be done for finding out why other observed variables are not unidirectional and if they are also within the construct, whether the impact will be higher on IUVC or not.

The data collected here are of subjective nature (Likert scale). Consequently, another study can be done on objective data if possible to collect.

This study has tried to find the contribution of firms' resources and capabilities in IUVC. Another study can be done the impact of technological spillover on IUVC of Bangladeshi Apparel Firms.

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Annex-A

Serial Number:

Date:

Questionnaire of PhD Study: Antecedent and Outcome of Industrial Up-gradation through Value Chain of Bangladeshi Firms Pursuing Leagile Manufacturing Systems.

Firm Information

1.1 Ownership a. Local Proprietor----------

b. Joint venture with foreign firms----------

c. Foreign Ownership----------

d. Others----------

1.2 Location of Firm a) EPZ Area---------- Name of EPZ----------
b) Non- EPZ Area----------

1.3 Operations Involves (Tick Mark)

a. ☐ Cutting-Making-Trimming
b. ☐ Procurement
c. ☐ Logistics

1.4 Type of Garments: ☐ Knitting ☐ Woven ☐ Sweater ☐ Others

2.0 Queries on Vertical Integration

2.1 In your firm the design activities are done at following degree:

Scaling	Design Activities
1	Having the ability of copying design and replication.
2	Having design studio to better design implementation
3	Having design studio to negotiate with buyer
4	Having full designing ability for few product lines
5	Having full design ability for all the product lines

2.2. In your firm the following activities are done by the firm itself at the following degree:

Business Activities	1= Very few done by the firm 5= Fully done by the firm Less than 20% More than 80%				
	1	**2**	3	4	5
Procurement Activities					
Inbound and outbound Logistics					
Direct Marketing 2*					

Direct Marketing: Direct marketing is selling of products directly through the retailers or brand owners as opposed to selling through agencies or buying houses.

3.0 Queries on Manufacturing Strategy:

3.1. Queries on Technical Orientation

3.1.1. In your firm the degree of utilization of Computer Aided Manufacturing is as follows:

Guideline for Scaling:

There are many scopes for utilizing Computer Aided Manufacturing.

Scope of Utilization of CAM : CAM can be used for 1) cutting 2) making 3) trimming 4) washing and 5) dying

Scale (Scopes)	Activities in Computer Aided Manufacturing	Scale (Quantity)	Quantity under utilization of Computer Aided Manufacturing
1	Only in one scope	1	1-20%
2	Two scopes	2	21-40%
3	Three scopes	3	41-60%
4	Four Scopes	4	61-80%
5	Five Scopes and above	5	81-100%

3.1.2 In your firm the degree of utilization of Computer Aided Design is as follows:

Guideline for Scaling:

There are many scopes for utilizing Computer Aided Design.
Scope of Utilization of CAD : CAD can be used for 1) Drawing 2) Markering 3) Patterning 4) Styling 5) Designing and Coloring

1=Low utilized 5= Highly utilized

Scale (Scopes)	Activities in Computer Aided Designing	Scale (Quantity)	Quantity under utilization of Computer Aided Manufacturing
1	Only in one scope	1	1-20%
2	Two scopes	2	21-40%
3	Three scopes	3	41-60%
4	Four Scopes	4	61-80%
5	Five Scopes and above	5	81-100%

3.1.3 In your firm the degree of utilization of Automated Inventory Management is as follows:

Guideline for Scaling:

Automated Inventory Management includes the following activities: 1) Data Management on Inventory 2) Computer Based Decision on which materials to purchase 3) Computer Based Decision on how much to purchase 4) Computer Based Decision on when to purchase 5) Computer based prediction on future selling

Scale	Activities in Inventory Management	Scale	Quantity under utilization of Automated Inventory Management
1	Doing one activity	1	1-20%
2	Doing two activities	2	21-40%
3	Doing three activities	3	41-60%
4	Doing four activities	4	61-80%
5	Doing five activities and above	5	81-100%

3.1.4 In your firm the degree of utilization of Automated Materials Handling is as follows:

1= Not at all utilized			5= Highly Utilized	
1	**2**	3	4	5

3.1.5 In your firm automation and the-inter link among the computerized systems is efficient for Quick Response System at the following degree:

Quick Response System: QR System is the efficiently arranging and integrating the computer controlled activities in the apparel firm for shortening internal and external lead time.

1= Not at all interlinked			5= well interlinked	
1	**2**	3	4	5

3.2 Queries on MIS:

3.2.1 In you firm the following aspects of Management Information System have been achieved at the following degree:

MIS Aspects	1= Low degree of achievement 5= Well Achieved				
Intranet Based Intra-Organizational Information Sharing					
Automated Personnel Scheduling and wage determination					
Automated Demand Forecasting					
Computer based quality control and inspection					
Computer based data management					
Computer based costing and accounting					
Online access to industry information					

3.2.2 In your firm the following aspects of online sourcing and online selling of have been achieved at the following degree:

Guideline for scaling

Online sourcing and selling have the following activities: 1) online searching about the vendors 2) online selection of the vendors 3) online negotiation 4) online invoicing 5) online money exchange

Activities	Scaling for Online Sourcing		Scaling for online selling	
Doing one activity	1		1	
Doing two activities	2		2	
Doing three activities	3		3	
Doing four activities	4		4	
Doing five activities and above	5		5	

4 Queries on Market Orientation of Manufacturing Strategy:

4.1.1 In your firm the degree of product customization is as follows:

1= low customization			5= highly customized	
1	**2**	3	4	5

Product Customization: means tailoring or designing the clothing according to the specific taste and need of the customers

4.1.2 In your firm the degree of product differentiation is as follows:

1= low differentiation			5= high differentiation	

Differentiation has to be measured on the basis of skills in maintaining relationship network with the buyers, developing innovative marketing techniques, influencing/controlling channels of distribution, utilizing highly skilled merchandiser and product quality.

4.1.3 In your firm the product quality can be deemed as follows:

1= low quality			5= high quality	
1	**2**	3	4	5

4.1.4 In your firm the product cost can be deemed as follows:

1= very expensive			5= low cost	
1	**2**	3	4	5

4.1.5 In your firm the product dependability and reliability can be deemed as follows:

1= not reliable			5= highly reliable	
1	**2**	3	4	5

Dependability/reliability: means the trust and confidence on the factory's timely delivery and maintaining product specification properly

4.1.6 In your firm flexibility in terms of volume of production is as follows:

1= Low Flexibility			5= Highly Flexible	
1	**2**	3	4	5

Guideline of Scaling

Scaling for increase in production	Scaling for decrease in production	Range
1		Remain Cost Effective if distracted by 10% production
2		Remain Cost Effective if distracted by 20% production
3		Remain Cost Effective if distracted by 20%production
4		Remain Cost Effective if distracted by 30% production
5		Remain Cost Effective if distracted by 40% and above production

4.1.7 In your firm flexibility in terms of product features is as follows:

1= Low Flexibility			5= High Flexibility	
1	**2**	3	4	5

Product Features: means the added parts, functions or benefits of the product. Example: if retailer order demands for styling accessories in women blouse or buttons or zipper in shirts/ trousers.

5.0 Queries on Lean and Agile Manufacturing:

5.1 Production Aspect

5.1 In you firm the following aspects of production have been achieved at the following degree:

Lean and Agile Aspects	1= Low degree of achievement 5= Well Achieved				
Reconfigurability of Production (capability to change the production layout)					
Computer Based Prototyping					

5.2 In you firm the following aspects has been achieved at the following degree:

5.2.1 Zero Inventory (JIT): Means management's effort to minimize the size of inventory upto the amount of zero by maintaining smooth and efficient supply chain by letting no time to be wastage in making communication and delivery. The objective of maintaining zero inventory is to save the cost of maintaining unnecessary inventory and the same time arranging the supply of raw materials in proper stage of production at the due time in accurate quantity.

Scale	Venture for Zero Inventory
1	71% and above
2	41%-70%
3	21%-40%
4	11% -20%Inventory
5	0-10%Inventory

5.2.2 Waste Minimization (JIT): means management's effort to minimize the waste accumulated due to inefficiency in production operation and maintaining unnecessary inventory.

Scale	Venture for waste minimization
1	11% and above waste
2	7-10% waste
3	5-7% waste
4	4-5 % waste
5	0-3% waste

Product Mix: Means the number of same related of products

5.2.3 Product Line:. Means the number of total varieties under product mix. Here question is about the summation all varieties under all product mix

Scale Product Mix	Number of same related products	Scale for Product Line	Number of total variety under Product Mix
1	1 item	1	3
2	2-5 items	2	
3	6-8 items	3	50
4	8-12 items	4	
5	13-and above items	5	200

6.0 Queries on Lean and Agile Manufacturing:

In you firm the following organizational aspects are existed at the following degree:

Organizational Aspects	1= Low degree of achievement 5= Well Achieved				
Team Based Structure					
Work Rotation					
Multitasking					
Commitment Based Assignment for workers					
Commitment Based Assignment For staffs					
Empowerment of the workers					
Empowerment of the Staff					
Decentralized Organogram					
Mastership of the Seniors					
Standardization of Operation					
Cleanliness/sorting and setting in order of materials					
Productivity of					

Workers					
Ability of Virtual Enterprising 1*					

Virtual Enterprising: Virtual enterprising is subcontracting any task of production to other agency

7.0 Queries on Human Resource Practices:

7.1 In your firm training is sufficient for the workers :

Scaling for workers	Training
1	7-21 days training
2	1-2 month on-job training
3	3-4 month on-job training
4	4-6 month on-job training
5	6 months on-job plus formal training

7. 2 In your firm training is sufficient for staffs:

Scaling for staffs	Training
1	7-21 days training
2	1-2 month on-job training
3	3-4 month on-job training
4	4-6 month on-job training
5	6 months on-job plus formal training

7.3 in your firm the switching experience of the workers are at following degree:

Scaling for switching experience	Switching time
1	1 time switching
2	2 times switching
3	3 times switching
4	4 times switching
5	5 times switching and more

7.4 In your firm experience is sufficient for the workers and staffs:

Sufficiency of Experience	Scaling for Staff Experience	Scaling for Worker's Experience
On average 1 year Experience	1	1
On average 2-3 years Experience	2	2
On average 4-5 years Experience	3	3
On average 5-7 year Experience	4	4
On average 8 and above Year Experience	5	5

7.5 In your firm recruitment is based on selection to following extent:

Category of Employees	1= Not at selective			5= highly selective	
	1	**2**	3	4	5
Staffs					
Employee					

7.6 In your firm "problem solving discussion" is performed to following degree:

Category of Employees	1= Not performed			5= well performed	
	1	**2**	3	4	5
Staffs					
Employee					

7.7 In your firm "continuous employee development" is practiced a the following degree:

Category of Employees	1= Not practiced			5= well practiced	
	1	**2**	3	4	5
Staffs					
Employee					

Definition of continuous employee development: Employees are equipped with new knowledge regularly and they helped to retain this knowledge.

7.8 In your firm the following practices of Human Resources regarding **workers only** are happened or bear importance to what degree?

HR Practices	1=Does not happen or bear importance 5= Highly happens or bear much importance
Control over workers	
Team based structure in workers	
Incentives for performance	
Health and safety compliance	

7.9 In your firm learning from foreign expertise is happened or bear importance to what degree?

HR Practices	1=Does not happen or bear importance 5= Highly happens or bear much importance				
	1	2	3	4	5
Learning from foreign expertise					

Learning from foreigners: means two source of learning : 1) learning from the foreign buyers as they provide a guideline for production and put pressure form maintaining the compliance factors 2) Leaning from the foreign employees who are employed as managers

8.0 Queries on the firm performance

8.1 Last year your firm achieved growth in terms of capital as follows:

Scaling	Growth
1	No growth
2	1-10% growth
3	11-20% growth
4	21-40% growth
5	41% and above growth

8.2 Last year your firm achieved growth in increasing of production lines as follows:

Scaling	Growth
1	No growth
2	1-10% growth
3	11-30% growth
4	30-49% growth
5	50% and above growth

8.3 Last year your firm's performance in increasing sales was as follows:

Scaling	Growth
1	No increase
2	1-10% increase
3	11-20% increase
4	21-40% increase
5	41% and above increase

8.4 Last year your firm's performance in the growth of profit was as follows:

Scaling	Growth
1	No growth in profit
2	1-10% growth in profit
3	11-20% growth in profit
4	21-40% growth in profit
5	41% and above growth in profit

8.5 Last year your firm's performance in Return on Assets was as below:
The return on assets (ROA) percentage shows how profitable a company's assets are in generating revenue.

$$\text{ROA} = \frac{\text{Net Income}}{\text{Mode Of Total Assets}}$$

Scaling	Return on Asset
1	
2	
3	
4	
5	

8.6 Your firm's schedule performance (lead time) is as follows:

1= Not good		5= Very good performance		
1	**2**	3	4	5

8.7 Your firm's number of buyers are at following scale:

Scaling	Number of buyers, retailers and brand owner
1	01
2	05
3	10
4	15
5	20

THANK YOU VERY MUCH; THIS IS THE END OF THE SURVEY.

If you would like to have a copy of the findings of this survey, please provide your contact details below:

NAME:----------

DESIGNATION: ----------

COMPANY NAME: ----------

ADDRESS:

CONTACT NO. (Office)---------- (Mobile)----------

E-MAIL:----------

Annex-B

Serial Number:

Date:

Collection of Data on Variables Social Compliance Factors on Human Resources Management practices for Implementing Leagile Manufacturing System in the Apparel Industry of Bangladesh.

Firm Information

1.1 Ownership a. Local Proprietor----------

b. Joint venture with foreign firms----------

c. Foreign Ownership----------

d. Others----------

1.3 Location of Firm a) EPZ Area---------- Name of EPZ----------
b) Non- EPZ Area----------

1.3 Operations Involves (Tick Mark)

d. ☐ Cutting-Making-Trimming
e. ☐ Procurement
f. ☐ Logistics
g. ☐ Marketing to the buyers
h. ☐ Designing

1.4 Type of Garments: ☐ Knitting ☐ Woven ☐ Sweater ☐ Others

2.0 Queries on Lean and Agile Manufacturing:

2.1 **Zero Inventory (JIT):** Means management's effort to minimize the size of inventory up to the amount of zero by maintaining smooth and efficient supply chain by letting no time to be wastage in making communication and delivery. The objective of maintaining zero inventories is to save the cost of maintaining unnecessary inventory and the same time arranging the supply of raw materials in proper stage of production at the due time in accurate quantity.

Scale	Venture for Zero Inventory
1	50 days and above inventory
2	30-50 days inventory
3	10-30 days inventory
4	6-10 days inventory
5	2-5 days inventory

2.2 Waste Minimization (JIT): means management's effort to minimize the waste accumulated due to inefficiency in production operation and maintaining unnecessary inventory.

Scale	Venture for waste minimization by amount of materials	By labor time
1	5% and above waste	30% utilization
2	4% waste	40% utilization
3	3% % waste	50% utilization
4	2% % waste	60% utilization
5	1% waste	70% utilization

2.3. In your firm the degree product line and product mix are as follow:

Product Line:. Means the number of total varieties under product mix. Here question is about the summation all varieties under all product mix **Product Mix:** Means the number of same related of products

Scale Product Mix	Number of same related products	Scale for Product Line	Number of total variety under Product Mix
1	1 item	1	3
2	2-5 items	2	5
3	6-8 items	3	10
4	8-12 items	4	20
5	13-and above items	5	30

2.4 In your firm the degree of product customization is as follows:

1= low customization			5= highly customized	
1	**2**	3	4	5

Product Customization: means tailoring or designing the clothing according to the specific taste and need of the customers

2.5 In your firm the degree of product differentiation is as follows:

1= low differentiation			5= high differentiation	

Differentiation has to be measured on the basis of skills in maintaining relationship network with the buyers, developing innovative marketing techniques, influencing/controlling channels of distribution, utilizing highly skilled merchandiser and product quality.

2.6 In your firm flexibility in terms of volume of production is as follows:

1= Low Flexibility		5= Highly Flexible		
1	**2**	3	4	5

Guideline of Scaling

Scaling for increase in production	Scaling for decrease in production	Range
1		Remain Cost Effective if distracted by 3% production
2		Remain Cost Effective if distracted by 5% production
3		Remain Cost Effective if distracted by 10%production
4		Remain Cost Effective if distracted by 15% production
5		Remain Cost Effective if distracted by 20% and above production

2.7 In your firm flexibility in terms of product features is as follows:

1= Low Flexibility		5= High Flexibility		
1	**2**	3	4	5

Product Features: means the added parts, functions or benefits of the product. Example: if retailer order demands for styling accessories in women blouse or buttons or zipper in shirts/ trousers.

Some other features of leagile manufacturing system

Serial No.	Lean and Agile Aspects	1= Low degree of achievement 5= Well Achieved				
		1	2	3	4	5
2.8	Continuous Improvement					
2.9	Re-configurability					
2.10	Standardization of Operation					
2.11	5s: Cleanliness/sorting and setting in order of materials					

3.0 Queries on HRM practices for Lean and Agile Manufacturing:

In you firm the following organizational aspects are existed at the following degree:

Serial No.	Organizational Aspects	1= Low degree of achievement 5= Well Achieved				
		1	2	3	4	5
3.1	Work Rotation					
3.2	Commitment Based Assignment for workers					
3.3	Empowerment of the workers					
3.4	Mastership of the Seniors					

Serial No.	Organizational Aspects	1= Low degree of achievement 5= Well Achieved				
		1	2	3	4	5
3.5	Problem Solving Discussion Group					
3.6	Team spirit among workers					
3.7	Incentives for performance					

3.8 In your firm training is sufficient for the workers :

Scaling for workers	Training
1	7-21 days training
2	1-2 month on-job training
3	3-4 month on-job training
4	4-6 month on-job training
5	6 months on-job plus formal training

3.9 In your firm experience is sufficient for the workers.:

Sufficiency of Experience	Scaling for Worker's Experience
On average 1 year Experience	1
On average 2-3 years Experience	2
On average 4-5 years Experience	3
On average 5-7 year Experience	4
On average 8 and above Year Experience	5

3.10 In your firm recruitment is based on selection to following extent:

1= Not at selective		5= highly selective		
1	**2**	3	4	5

4.0 Queries on Social Compliance Factors:

Serial No.	Ergonomic Aspects	1= Not ergonomic designed 5= Well ergonomic designed				
4.1	Space line Ratio					
4.2	Space-Worker Ratio					
4.3	Worker-Machine Ratio					
4.4	Workers Line Ratio					
4.5	Average of Ergonomics					

Serial No.	Worker related Compliance factors	1= Low degree of achievement 5= Well Achieved				
4.5	Appropriate age					
4.6	Appointment letter					
4.7	Work experience,					
4.8	Working hour					
4.9	Wage payment					
4.10	Incentive and facilities					
4.11	Other fringe benefits (holiday, leave, maternity care)					
4.12	Average of worker related Compliance factors					

4.13 In your firm workers dialogue is allowed and supported to following degree:

1= Not at all allowed and supported 5= fully allowed and supported				
1	**2**	3	4	5

Scaling for dialogue among workers	
1	No dialogue
2	At least managers and workers has the will for dialogue
3	Dialogue is done in transparent way
4	Trust is built up in transparent way
5	Development and regular use of dialogue structure

In your firm workers 'health and safety' compliance is realized to following degree:

Serial No	Category of health and safety	1= Not at all realized 5= well realized				
		1	**2**	3	4	5
4.14	Eradication Chemical and mechanical hazard					
4.15	Casualty protection					
4.16	Fire drilling					
4.17	Regular health check-up					
4.18	Average of health and safety					

In your firm non-discriminatory attitude is practiced to following degree:

Serial No.	Category of discrimination	1= Not at all practiced 5= well practiced				
		1	**2**	3	4	5
4.19	In terms of gender					
4.20	In terms of payment and overtime work					
4.21	Average of non-discriminatory attitude					

THANK YOU VERY MUCH; THIS IS THE END OF THE SURVEY.

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