

1-1-2014

Interdependence of value chain links: A tale of three cities

Muhammad Rizwan Saleem Sandhu
Virtual University of Pakistan, Lahore

Muhammad Zaheer
Virtual University of Pakistan, Lahore

Follow this and additional works at: <https://ir.iba.edu.pk/businessreview>



Part of the **Business Commons**



This work is licensed under a **Creative Commons Attribution 4.0 International License**.

iRepository Citation

Sandhu, M. S., & Zaheer, M. (2014). Interdependence of value chain links: A tale of three cities. *Business Review*, 9(1), 64-78. Retrieved from <https://doi.org/10.54784/1990-6587.1228>

This article is brought to you by *iRepository* for open access under the **Creative Commons Attribution 4.0 License** and is available at <https://ir.iba.edu.pk/businessreview/vol9/iss1/5>. For more information, please contact irepository@iba.edu.pk.

ARTICLE

Interdependence of Value Chain Links: A Tale of Three Cities

Muhammad Rizwan Saleem Sandhu
Virtual University of Pakistan, Lahore

Muhammad Zaheer
Virtual University of Pakistan, Lahore

Abstract

Most of the products in the world are produced and delivered by value chains which are the sum name of value adding activities performed in a sequence by different firms working in different countries. And in most of the cases value chain actors belong to both developed and developing world and adding different amount of value to value chain for producing and distributing products. Some value chains are driven by buyers and other work under the leadership of producers. Those who hold the intangibles gain more than those who hold tangibles in a value chain because intangibles .e.g. brands, designs etc provide more sustainable competitive advantage and are more difficult to imitate than tangibles .e.g. machines, buildings etc.

The role of developing country firms is maximum original equipment manufacturer and minimum job processors but the role of original brand and design manufacturer is mostly performed by developed country firms. Members working in developing countries are mostly SMEs and exist in clusters. Most of SME clusters in developing countries are linked with global value chain and in some cases with global value chains. These SME clusters are spontaneous and have emerged without any policy support but for upgrading they do need policy support at all levels.

SME clusters in developing countries consist of sub-clusters and may involve more than one cities forming different links of value chain. Different studies show that SME clusters in developing countries are confronting different issues .e.g. lack of sufficient energy sources, lack of training centers, poor quality of inputs etc. On one hand these issues are restricting them to be innovative and on the other hand reducing their competitiveness. To transform from static and dynamic clusters to innovative clusters they obviously need some solid demand driven policy measures at every level.

Introduction

This study focuses on the value chain links of surgical instruments manufacturing cluster of Sialkot, Pakistan which involves three cities, Gujranwala, Daska and Sialkot of Punjab, Pakistan and the global market for the instruments which consists of USA, Europe in particular and the world in general. The main focus of the study is the surgical instruments global value chain links within Pakistan with special focus on the surgical instruments forging units in Daska as it forms important value chain link but remains unexplored as far as its issues, type and structure, the way they are integrated at forward and backward end and their

relationship at horizontal end, is concerned. Previously Nadvi (1999; 2005) has studied the surgical instruments cluster of Sialkot to which Daska and Gujranwala are two important links but his main focus was manufacturing exporters of Sialkot and their external links with global market. As Nadvi (1999) recommended that the cluster needs to upgrade in the value chain which in our opinion is not possible without upgrading the backward linkages of the cluster therefore the study will explore the issues, types and structure of surgical forging units working in Daska which act as supplier to the firms operating in Sialkot.

Purpose

Purpose of the study is to explore the characteristics and value chain dynamics of surgical forging industry/ sub cluster/value chain link of Daska.

Methodology

For this study purposive sampling has been used to collect data from 25 surgical forging firms of Daska out of total population. The estimated population size is around 50, as per the figures provided by the President of Informal Association of surgical Forging firms in Daska, so we have collected data from 50% of firms. In addition to surgical forging firms data were also collected from two stainless steel furnaces, one rolling mill, one stainless steel scrap dealer and regional office of (TDAP) Trade Development Authority of Pakistan, Sialkot, research officer of SCCI (Sialkot Chamber of Commerce and Industry, Sialkot) . Purposive sampling technique has been used because exact sampling frame was not available and data was collected on the opinion of president of the association and the researcher. According to Zikmund (2003) for a study in which respondents have certain characteristics and study aims at specific objectives purposive sampling is suitable and same is argued by Kothari (1990) and Babbie (2004). Structured interviews have been used to collect data from surgical forging firms of Daska and unstructured interviews were used to collect data from steel furnaces, steel rolling mills, and scrap dealer, TDAP, Sialkot and SCCI, Sialkot. Personal structured interview technique was most suitable in our study as respondents were uneducated and required explanation of questions to respond on one hand and on the other hand specific and gathered information was required to complete the study. Use of personal structured interviews has been recommended by Kothari (1990) in descriptive studies. Aaker, Kumar and Day (1998) argued that personal interviews are suitable when large amount of information is required. (Bremner & Bell, 2003; Babbie, 2004) discussed that through structured interviews replies of interviewees can be aggregated in a reliable way.

Literature Review

Value chain is the sequence of value adding activities involved in the production and distribution of a product (Schmitz, 2005), it includes conception, design, production and marketing of a product (Kaplinsky and Morris, 2000) and all value added activities of a value chain are linked as a string (Gereffi, 1994 ; Kaplinsky and Morris, 2000 ; Schmitz, 2005). The value chain is also known as commodity chain (Gereffi, 1994), Value system (Porter, 1985), value stream (Womack and Jones, 1996). In global context the same concept is called global value chain (Kaplinsky and Morris, 2000; Humphrey and Schmitz, 2000; Schmitz, 2005; Nadvi and Halder, 2005) which involves more than one country, region or continent. Value chain is understood as because many products used in the world are the result of a sequence of specialized production activities performed in different countries. Each activity in the value chain adds some value and forms a link of whole value chain and links within a value chain are interdependent (Kaplinsky and Morris, 2000).

Before proceeding further there is need to address two questions, what is difference between generally understood concept of value chain and Micheal Porter's concept of value chain?, And what is difference between value chain and supply chain?

According to Porter (1985) value chain is the sum name of all the value adding activities performed by a single firm to produce and deliver value in the shape of product to end user and Porter's value chain involves primary value adding activities e.g. inbound logistics, operations, outbound logistics, marketing and sales and after sale services, and support activities e.g. firm infrastructure, human resource management, technology development and procurement, whereas it is argued that it is not necessary that a single firm performs all the activities to produce and deliver a product to end user for example see Kaplinsky and Morris (2000, p.7). In reality production of many products involves different firms of same or different countries (Gereffi, 1994; 1999; Humphrey and Schmitz, 2000; Giuliani, 2005; Nadvi and Halder, 2005) therefore it can be inferred that general concept of value chain is broader than the concept of Porter's value chain and Porter's value chain is termed as corporate value chain (Sorensen, 2008) which is restricted to the value adding activities within a firm and Porter calls generally understood concept of value chain as value stream which is the result of the vertical integration of different corporate value chains.

What is then, the difference between value chain and supply chain? Sturgeon (2001) argued that supply chain is the part of value chain because supply chain involves all value added activities that lead to and support the end use of a set of related products, less the activities of the lead firm whereas if activities of lead firm are included the stream of value added activities is called value chain. Lead firm is the powerful actor who governs the chain (Schmitz, 2005) and its position may be different depending upon the nature of value chain (Gereffi, 1994) as it may be transnational producer in case of producer driven value chain, and mega retailers in case of buyer driven value chains.

It has been learnt that global value chains involve processing factories located in different developed and developing countries (Gereffi, 1994; Nadvi, 1999; Humphrey & Schmitz, 2000; Mytelka & Farinelli, 2000; Kaplinsky & Morris, 2000; Nadvi & Halder, 2005). It is interesting to note that all value chain links, each level in value chain forms a value chain link, add different amount of value. It is argued that developing countries add physical value and developed countries add intellectual value and resultantly the latter gains more than the former (Schmitz, 2005).

In the literature there is a common understanding that there are two types of value chains, buyer driven value chain which is mostly found in consumer goods industries such as garments, footwear, toys etc, and producer driven value chain which is found mostly in capital and technology intensive industries such as auto mobiles, aircrafts, computers, heavy machinery etc. Buyer driven chains are led and coordinated by large retailers, marketers and brand manufacturers which act as lead firm whereas producer driven chains are governed by large transnational manufacturers acting as lead firm (Gereffi, 1999; Kaplinsky and Morris, 2000; Humphrey & Schmitz, 2000).

In most of the industries/products, global value chain is organized as it is governed by the lead firm in developed country which outsources its activities to developing country SMEs which act as job processors or original equipment manufacturers for the lead firm and are mostly clustered in sector specific regions. Some of the developing country clusters which

are the part of global value chain of their respective industry are Sinos Valley foot wear cluster, Brazil (Schmitz,1995; 1999), Tiruppur Cotton Knitwear Cluster, India (Cawthorne, 1995), Ludhiana Woolen Knitwear Cluster, India (Tewari, 1999), Shoes Cluster in Guadalajara and Leon, Mexico (Rabelloti, 1995; 1999), Agra Footwear Cluster, India (Knorringa, 1999), Blue jeans Cluster in Torreon, Mexico (Bair and Gereffi, 2001), Sialkot Surgical Instruments Cluster, Pakistan (Nadvi, 1999) as discussed in Schmitz and Nadvi (1999) and Thompson (2005) and Sialkot Sports Wear Cluster, Islamabad Marble and Granite Cluster, Wazirabad Cutlery Cluster, Pakistan (SMEDA and UNIDO, 2006) .

Discussion

1.1 Geographical Location & Brief History of Sialkot Surgical Instrument Cluster

Surgical instruments cluster is located in the industrial district of Pakistani Punjab which is known as Sialkot and famous world over for its surgical, sports and leather goods. The city of Sialkot is situated in north-east of Pakistani Punjab at the edge of great mountains of Kashmir. It is near to Jamu and 125 KM north-west of Lahore, the capital of the province Punjab. Total population of Sialkot is about 3 million and consists of mainly Punjabi, Kashmiri and Pashtuns. The people are strongly embedded in family and *bradri* system which also influence the business environment (Nadvi, 1999).

History of the Sialkot surgical cluster dates back to 100 years, the last decade of 19th century. The emergence of the cluster is considered as historic accident (Porter, 1990; Krafman, 1991; Ghani, 1996) as after knowing the fact that Ironsmiths & Blacksmiths of Sialkot were engaged in metal working such as manufacturing of swords, shields, daggers and knives etc since the time of Mughal Empire, the British doctors of local hospital got repaired surgical instruments to their satisfaction. The American Mission Hospital established in the district in the last decade of nineteenth century also got repaired its surgical instruments from the local Ironsmiths. Being impressed from the craftsmanship and skills of artisans the dean of the American Mission Hospital ordered the local Ironsmiths to manufacture some of the surgical instruments which they did to the hospital's satisfaction. Gradually more and more orders were placed both within and outside the Sialkot. Till 1920 Sialkot was supplying instruments to all parts of sub-continent (Nadvi, 1999; Ghani 1996; SIMA, 2010). The cluster emerged in the real sense when the British decided to take the Sialkoti Ironsmiths as an alternative source of supply of surgical instruments for war purposes, as on one hand World War II increased demand of surgical instruments in Britain and on the other hand Germans cut the supply line of allied forces. The British developed in 1940's the surgical development center known as MIDC (Metal Industry Development Center,1942) with the mandate to monitor quality and provide guidance to local informal sector firms engaged in manufacturing of surgical instruments (Ghani,1996; Nadvi,1999 ,2005 ; TDAP,2010 ;SIMA, 2010).

The cluster attracted the interest of German based Tuttlingen surgical cluster, the world leader in exports of surgical goods, in 1970's and developed long term relationships, this was the time Sialkot surgical cluster became the part of global supply chain. Over the years Sialkot firms gained the status of OEM (Original Equipment Manufacturer) from job processors and over took the German cluster in the production of traditional hand held surgical instruments (Nadvi, 1999; 2005; SIMA, 2010; TDAP, 2010).

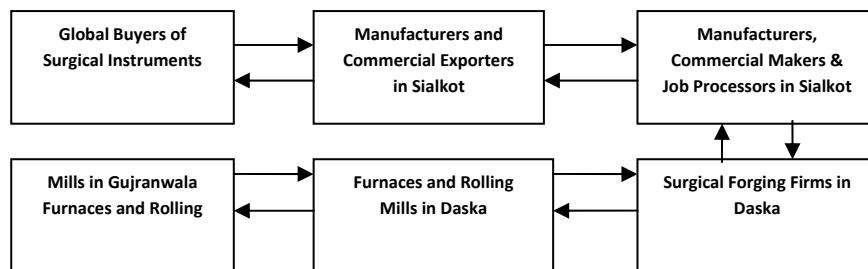
In 1982 USA increased the demand of disposable instruments from Sialkot which really helped cluster to progress. In 1982 SDPTL (Sialkot Dry Port Trust Limited) was established to handle the customs affairs and provide warehousing facility to the cluster firms

by the Sialkoti firms through their trade and industry associations as a private sector venture, this effort is considered the evidence of joint action,(Nadvi,2005 ; TDAP,2010; SIMA, 2010).

In mid of 1990's whole of Sialkot surgical instruments cluster faced quality restrictions imposed by FDA, USA (Food & Drugs Administration) and EU (European Union) for not conforming with ISO 9001 & USA Good Manufacturing Practices Standards which were well responded by the joint action of cluster members initiated and organized by Sialkot Chamber of Commerce and Industry (SCC&I) (Ghani, 1996; Abnoyi, 2001; Scmitz, 2005; Nadvi, 2005; TDAP, 2010).

Although emergence of cluster was accidental yet many other factors contributed to its success such as the availability of skilled labor, inputs suppliers, repair facilities and other support industries in the region. It is interesting to note that major part of the skilled labor Pakistan received at the time of its independence was due to the transfer of population across the newly born states, Pakistan & India (Khalid & Rahim, 1986). Another important point is noted that the cluster progressed without the deliberate support of public sector and its success is mainly attributed to the collective efficiency gains produced by passive external economies and active joint actions of cluster players (Nadvi, 1996; 1999; 2005; Mytelka & Farinelli, 2000; Thompson, 2005).

Figure 1.1
Sialkot Surgical Instruments Value Chain



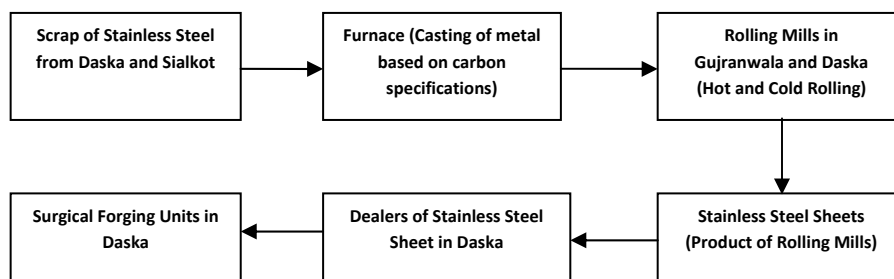
Source: Author Survey, 2010

Two way arrows in figure 1.1 has a purpose as arrow from left to right starting from Global Buyer of Surgical Instruments shows the flow of order from international buyers to local cluster actors and arrow starting from Furnaces and Rolling Mills in Gujranwala shows the flow of production activities involved in the production of surgical goods to international buyers.

1.2 Value Chain Links of Sialkot Surgical Instruments Cluster

Gujranwala: This is a well known industrial district of the Punjab, Pakistan which is the house of light engineering products like fans, utensils, electric motors and many more. It is clear from the figure 1.1 that furnace and rolling mills working in Gujranwala form the first link of surgical instruments value chain as this supply stainless steel to the forging firms in Daska as inputs for the forging of instruments. About 15 to 20 furnaces and rolling mills are working in Gujranwala and 10 are working in Daska. It has been noted during survey that some furnaces and rolling mills are under single ownership and working together while some are owned by different owners and are physically apart from one another.

Figure 1.2
How does a furnace and rolling mill works to produce sheets of stainless steel?



Source: Author Survey, 2010

In the value chain, the job of a furnace mill is to cast metal based on carbon specifications as per customer's requirements.

It is clear from the process shown in figure 1.2 that furnaces of stainless steel first get scrap both from local and international sources, according to the product specifications, test their composition to know the percentage of carbon; then they put the scrap and other alloys into the electric furnaces which melt the scrap for one and half hour at heat produced by 1000 KW/h of electricity to cast the metal of a particular specification. It is important to note that there is a considerable difference between locally produced steel and imported steel as local steel can only be used for the production of disposable instruments which are used once.

During the melting process metal fluid is tested three times in the laboratory and every time more scrap and alloys are added to get the metal of desired specification by removing the carbon deficiency. After the satisfaction of desired composition of metal fluid, it is poured into moulds either manually or mechanically to give it a shape of steel blocks, locally called "Gooli". Furnaces send metal blocks to rolling mills which convert it into stainless steel sheets according to buyer's (forging firms) specifications by applying hot and cold rolling process. The former process refines the metal sheet and the latter refines it finely. Rolling mills deliver steel sheets to forging firms in Daska. Author's survey show that steel furnaces working in Gujranwala and Daska are of different sizes but those working for surgical segment range from 250 kg to 1 ton of size and size of the furnace is based on the weight of the furnace as mentioned. Most of the furnaces work in two shifts and production capacity of a medium size furnace is 13 tons per day in two shifts, this classification is based on the explanations by local industry experts, author also learnt that any furnace which has per day production capacity up to 5 tons of steel is considered small but it could not be learnt that which range a large furnace size starts from. In Gujranwala electric furnaces have replaced the mechanical furnaces, as per local industry experts there are two main differences between electrical and mechanical furnaces, the latter requires furnace oil for working and is less cost efficient but in the former heat is produced by electricity and is more cost efficient. Electric furnace is more cost efficient as on one hand oil is more expensive and on the other hand performance of electric furnace is better.

These furnaces buy scrap from their customers (forging firms), from Sialkot & Daska, from local scrap dealers who buy scrap from local and international sources, and then cast the scrap according to the buyer's specifications. According to the furnace owners they have long and healthy relationships with their customers and often sell on credit, discuss the issues, visit and are visited by them. Author has found no knowledge linkages between furnace and forging firms. It has also been observed that there is no inter firm cooperation at horizontal level rather there is intense rivalry based on prices. Furnace owners informed that they don't receive any institutional support. Industry experts informed that most of them are not using bank finance and their major problems are lack of infrastructure, power failures, lack of managerial skills, lack of planning, lack of technology and technical knowledge and lack of formal institutional support. The information was supported by author's survey of three furnace owners and two bankers.

Four types of employees are working in furnaces, supervisor (lower management), furnace operator (Semi-skilled), Molder (Low skilled) and unskilled helper. Furnaces working in Gujranwala and Daska play an important role as a first value chain link and other chain links depend on their performance.

These furnaces have spontaneously emerged without any policy support. The entrepreneurial profile is not very strong as most of the entrepreneurs fall into the category of artisan entrepreneurs. Their level of education is low and they are informally trained and use traditional ways of business management. It was also noted that most of the furnaces are family owned and fall into the category of informal sector firms.

1.3 *Daska: A Sub Industrial District*

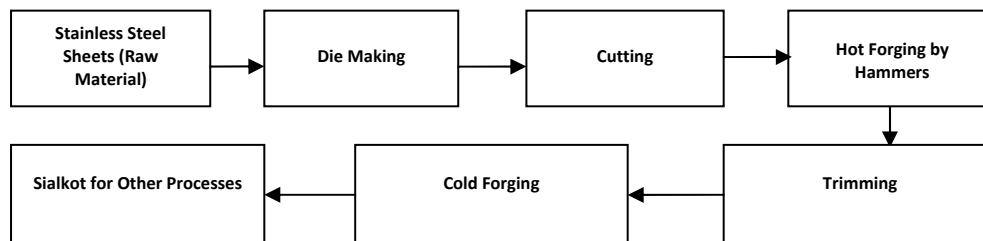
A sub industrial district situated exactly in between Gujranwala, Sialkot and Samrial, well known for its metal working and craftsmanship. Historically its small scale engineering industry earned a name in the production of tube wells from 1960-1974 (An interesting case study of the emergence, growth and decline of an industry over the span of 15 years as it was discussed by Aftab and Rahim (1986,1989). Daska is also famous for its production of agricultural implements and washing machines. Currently, in Daska different industries are working in SME sector such as agro-engineering, surgical forging, automotive parts etc. In nutshell it can be written that Daska is the house of small scale engineering industry which is feeding different value chains. Here our point of focus is surgical forging firms which feed the surgical manufacturers and exporters in Sialkot. Daska forms the second link of surgical instruments value chain.

1.4 *Emergence of surgical forging industry in Daska*

The history of surgical forging in Daska can be traced back to 1950s when Mr. Haji Sardar shifted from Sialkot to Daska and started manual forging of surgical instruments in 1958. After this startup some other entrepreneurs of Mughal caste background also started forging at small scale, this is the same way generally industries emerge in a geographical area as discussed in Solvell (2009). The business did not get impetus unless in 1978 hammer forging technology replaced the manual forging. 1980s was the same period when tube well (slow speed diesel engine) industry was at its decline so many of the entrepreneurs shifted to surgical forging business as it was growing and demand for surgical instruments was increasing in international market. Since then industry is growing with a reasonable pace and most of the firms in the industry were started in 1990s. The industry went through major technology change in 2004 when manual die making was replaced by spark vision machine

which made die making very convenient, as manual die making was a long and painstaking activity, and enhanced its quality. Currently, it is an industry of reasonable size as there are more than 40 firms linked with international market through Sialkot surgical export firms. According to industry experts Daska forges 40% of all scissors and 90% of all forceps which are exported to international market by Sialkot export firms after further processes.

Figure 1.3 How do forging units work?



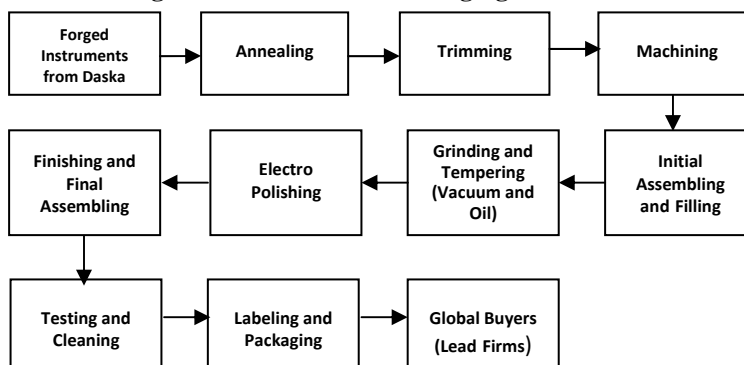
Source: Author Survey, 2010

The figure 1.3 above shows the working process in a typical forging unit. The process starts when forging units receive steel sheets as a raw material, and then they make dies, cut the sheets and forge them through hammers, trim to remove unnecessary metal from the forged instrument pieces and finally use cold forging process and deliver the pieces to Sialkot for further processes.

1.5 Sialkot: An Industrial District

An important and leading export oriented industrial district of Pakistan which is the house of different industrial clusters like sports goods, leather goods, and surgical goods etc. All the industrial clusters working in Sialkot are of international repute and contribute a considerable amount to the export earnings of Pakistan as according to TDAP (Trade Development Authority of Pakistan) the exports made from Sialkot in the year 2007-2008 were US \$ 255 million. Sialkot has a history and tradition of metal working since the times of Mughal Empire or even before. The surgical instruments manufacturing cluster emerged back in 1890s when local ironsmiths repaired and manufactured instruments on the request of local mission hospital. After this historical accident the cluster emerged and grew over the years and became a leading exporter of hand held surgical instruments made of stainless steel

Figure 1.4 Processes after forging in Sialkot



Source: Author Survey, 2010

1.6 Current Profile of Sialkot Surgical Cluster

According to TDAP (2010) presently about 2400 small, medium and large size surgical instruments manufacturing and exporting firms are working in Sialkot which are supported by thousands of vendors, specialized in different surgical processes, and forging firms working in nearby town Daska. The surgical firms working in Sialkot are also supported by institutions like MIDC (Metal Industries Development Corporation), VTI (Vocational Training Institute), ATC (Apprentices Training Centre), NIDA (National Institute of Design and Analysis), SMEDA (Small and Medium Enterprise Development Authority), SIMTEL (Surgical Instruments Material Testing Laboratory) and associations like SCCI (Sialkot Chamber of Commerce and Industry) and SIMAP (Surgical Instruments Manufacturers Association of Pakistan).

The firms in surgical instruments manufacturing industry can be classified as under:

1. **Manufacturing Exporters:** These are firms which manufacture instruments and export to global buyers/markets either directly or through agents working in foreign markets. According to TDAP, SIMAP and SCCI these are of three types:
 - a. **Large size Firms:** Around 25 to 30 large firms perform 70% to 80% in house manufacturing of instruments and rely upon other medium and small firms and job possessors for the remaining 20% to 30% jobs.
 - b. **Medium size Firms:** About 1000 medium size firms perform 40% to 70% in house processes and outsource the remaining part to makers and vendors.
 - c. **Small size Firms:** Around 1200 small size firms perform 30% in house process and outsource remaining to vendors and makers.
2. **Non Export Manufacturers:** These are in a large number and only perform different manufacturing processes in house as a subcontractor for export firms according to latter's specifications.
3. **Commercial Makers:** These are also in a large number, they don't have own manufacturing facilities or at maximum a facility with one or two last processes like polishing and packaging. They receive order from export firms and get it manufactured from vendors and non export manufacturers.
4. **Vendors:** There are a large number of vendors working in Sialkot. They are specialized in one or more instruments manufacturing processes like annealing, milling, grinding etc. They work as process subcontractors for makers and export firms.

According to TDAP the non export manufacturers, commercial makers and vendors are about 2000 in number.

1.7 Product Profile

The surgical instruments cluster manufactures over 2000 different types of precision instruments mostly from stainless steel which are used in all branches of medical, surgery, dental and veterinary (Nadvi,1999), these include mainly scissors, forceps (200 types), scalpels, needle holder, surgical knives, specula, clamps & retractors (Nadvi,1999; Board of Investment, Government of Pakistan, 2006).

According to the recent diagnostic study (TDAP, 2010), Pakistan mainly produces two types of instruments, disposable Instruments and Re-usable instruments. Disposable instruments are made for one time use only and are mainly exported to USA; while the Re-usable instruments can be used for 10-15 times after sterilization and mainly exported to European market. The difference between two types is of metal quality, in disposable instruments local made steel is used but in re-usable instruments imported steel is used, and not of technology. Both types of instruments are of low value added category and a product of low tech. According to Nadvi (1999, 2005) the surgical instruments industry is divided into two segments .i.e. Mature Product Segment (Traditional), there are 2000 different types of classical hand-held instruments within mature product segment like scissors, knives, forceps, scalpels etc mainly made of stainless steel. These are standardized products for which technical specifications are known and blueprints are available. Technology and skills of appropriate steel, die making, forging, grinding, milling and filling of metals to high level of precision are required which are held by Sialkot surgical cluster firms and new products segment, these include Minimum Invasive Instruments, Endoscopes & Surgical Implants. In addition to metalworking skill the knowledge of optical lens, electrical, miniaturized image enhancing lights and video technology is required which is absent in Sialkot surgical cluster but present in its forward partner German based Tuttlingen surgical cluster. Sialkot surgical cluster is lacking new product development skill because of lack of high knowledge absorptive capacity (Giuliani, 2005) and also lack strong forward linkages with end users and high tech industry.

1.8 Dynamics of Cluster

The Sialkot surgical cluster is connected with the Global Value Chain through main global firms of western origin which act as lead firms (Schmitz,2000), drive the cluster and form the forward part of cluster vertical integration (Nadvi,1999). In terms of backward linkages, cluster is linked with a large network of vendors, subcontractors and suppliers of material, labor and machinery (Nadvi, 1999; Ghani, 1996). Sialkot surgical cluster enjoys the benefit of collective efficiency from both external economies and joint action (Ghani, 1996; Nadvi, 1999; Mytelka & Farinelli, 2000; Schmitz, 1999; Giuliani, 2005).

1.9 Vertical and Horizontal Ties of the Cluster Firms

Vertical integration: Vertical integration has two dimensions backward and forward, in backward ties the instruments manufacturing firms are closely connected with their vendors and suppliers. There is found evidence of close cooperation both in bilateral and multilateral terms (Ghani, 1996; Nadvi, 2005; TDAP, 2010). Manufacturers and exporters provide specifications to their subcontractors, vendors and suppliers. In forward ties, being the part of GVC (Global Value Chain) firms in Sialkot are connected with OBM (Original Brand Manufacturers) and lead firms of international origin. Process of order flow and specifications starts from the buyers who order and specify the product after that manufacturing process is monitored. It is noted that firms in Sialkot cluster only have knowledge using capabilities and knowledge changing capabilities are missing (Nadvi, 1996; 1999; 2005; Giuliani, 2005).

According to Nadvi (2005) Sialkoti firms mainly use following four channels to access international market:

1. Foreign buyers who purchase complete instruments from Sialkot and supply to the world market through retailing and wholesaling.

2. Foreign particularly German producers who subcontract all or part of their production.
3. Independent Pakistanis based in foreign.
4. International sales offices of Sialkoti firms

Horizontal Integration: there are two types of horizontal ties observed in Sialkot, bilateral ties and multilateral ties; former exists between two firms dealing in the same product. It is noted that such ties are rare in Sialkot mainly because of mistrust and fierce competition among firms (TDAP, 2010; Nadvi, 2005; Thompson, 2005) and latter exists among more than two firms to achieve mutual goals. There is strong evidence of multilateral horizontal ties among firms in Sialkot surgical cluster in different occasions such as formation of SDPTL in 1980s, facing challenges of quality restrictions imposed by the west in 1990s and development of SIAL(Sialkot International Airport Limited) through SIMAP and SCCI (Ghani, 1996;Nadvi, 1999; TDAP,2010).

There is cut throat competition among firms in the cluster. Most of the firms are producing low tech products. The organizational structure of small firms is “Poor floor-shop organization” and operations are either run by entrepreneur himself or by a low level supervisor called Munshi (TDAP, 2010; SIMA, 2010; SCCI, 2010). Entrepreneurs are not equipped with modern management and technical skills which are one of the causes of low international competitiveness of the sector, moreover we neither find any managerial nor technical skills development certificate and degree awarding institute of quality (Ghani, 1996; Nadvi, 2005; TDAP, 2010).

The success of local firms is attributed to the externality gains of clustering because of well developed local market of inputs, services and skilled labor helped ensured inputs at competitive prices (Nadvi, 2005).

1.10 Common problems faced by the cluster

According to a recent diagnostic study by TDAP (2010) common problems faced by the sector are Cut-throat price competition among the firms, Unwillingness of entrepreneurs to develop themselves, increasing costs of raw materials, high cost of labor, shortage of skilled labor, Lack of trust among entrepreneurs, No proper human resource department, One man show practices, financial problems for medium and small enterprises, lack of new technology awareness in SMES. Nadvi (1999, 2005) has identified following three challenges faced by Sialkot Surgical Instruments Cluster:

1. Cost based competition in international market
2. Advances in medical technology and surgical procedures
3. Greater pressure of compliance with international standards

1.11 The Flow of Work Orders

Only the manufacturing exporters have links with global buyers. They receive orders directly and indirectly through their foreign agents from global buyers. The global buyers specify the type, quality, quantity and design of the instruments by a sample after negotiating price and delivery time. Export firms after receiving orders, according to their size subcontract the different manufacturing processes to non export manufacturers, makers and vendors. As noted earlier mostly the processes after forging are performed. For the forging of instruments orders are placed to the forging firms working in Daska which in turn get the


stainless steel sheets of particular specification from furnace and rolling mills working in Gujranwala and Daska.

For some instruments imported steel is also used which is provided to forging units by Sialkoti firms. It is important to note that mainly two types of instruments are produced in Sialkot, disposable instruments and reusable instruments. Sialkot is the final value chain link within Pakistan which is linked with global buyers who act as OBM (Original brand manufactures) and ODM (Original design manufacturers).

Entrepreneurial profile of Sialkot is mixed but mainly weak (Nadvi, 1999; TDAP, 2010) as most of the first generation entrepreneurs are uneducated but second generation entrepreneurs are well educated. In non export and vending firms owners are uneducated and informally trained. Organizational structure in export firms is better but in vending segment is traditional floor shop. Most of the firms are family owned generation after generation. There is evidence of vertical cooperation but without knowledge sharing and there is no strong evidence of cooperation and trust at horizontal level. The cluster is mainly facing problems of lack of skilled labor, effective institutional support, lack of training, lack of brands and own designs and lack of planning and vision. Mistrust and lack of cooperation at horizontal level is a common feature at all supply chain links within Pakistan.

Conclusion

It can be concluded from the study that currently value chain links of surgical instruments industry in Pakistan are facing the following problems of Lack of formally skilled labor, Lack of formal education, Informal sector organization/firms, Low wage rates, High labor turnover, Insufficiency of skilled labor, No capacity building, No R&D/No in house knowledge generation, Lack of formal quality assurance system, Lack of horizontal and vertical knowledge linkages, No formal industry association, No cooperation at horizontal level, Lack of trust: There is mistrust everywhere in the forging industry, Lack of quality raw material, No formal planning, Passive learning, Poor physical infrastructure, Lack of management and general training institute, Lack of government support, Poor supply of power/energy, Increasing prices of inputs, Lack of collective vision, Contentment of the entrepreneurs, Lack of formal source of finance.

These issues may be addressed by taking these measures of Establishment of training and research centre, Establishment of a mini steel mill, Establishment of formal industry association, Networking of firms, Linking forging firms with industry benchmark, Linking forging firms with end users, Introduction of formal quality assurance system, Industry specific Islamic banking products. 

References

- Abramovitz, M. (1986). "Catching Up, forging Ahead and Falling Behind". *The Journal of economic History*,46:2, 385-406.
- Aftab, K. , Rahim, E. (1986). "The emergence of a small-scale engineering sector: The case of tubewell production in the Pakistan Punjab". *Journal of Development Studies*, 1743-9140, Volume 23, Issue 1, 1986, Pages 60 – 76
- Aftab, K. , Rahim, E. (1989). "Barriers to the growth of informal sector firms: A case study". *Journal of Development Studies*, 1743-9140, Volume 25, Issue 4, 1989, Pages 490 – 507

- Abonyi, G. (2003). “Challenges of Industrial Restructuring in a Globalizing World: Implications for small and medium scale enterprises (SMEs) in Asia”. *ISEAS Working Paper 3(200)3*.
- Athiyaman, A. (2009). “Uncovering and Developing Industry Clusters”. *Contemporary Management Research*,5:1, 51-66.
- Bell, M. , & Albu, M. (1999). Knowledge Systems and Technological Dynamism in Industrial Clusters in Developing Countries. *World development*, Vol. 27, No. 9, pp. 1715-1734.
- Babble, Earl. (2004). *The Practice of social Research*. WaDSworth :Thomson.
- Bryman, Alan., Bell, Emma. (2003). *Business research methods*. London: Oxford University Press.
- Brenner, T., Muhilig, A. (2007). “Factors and mechanisms causing the emergence of local industrial clusters- A Meta Study of 159 cases”. *Max Plank institute of economics, evolutionary Economics Group,Germany*.
- Bord of Investment, Government of Pakistan. (2006). “Pakistan Light Engineering sector.” Pp.4-17.
- Cawthorne, P., 1995, “Of Networks and Markets: The Rise and Rise of a South Indian Town, the Example of Tiruppur's Cotton Knitwear Industry,” *World Development*, Vol. 23, No. 1, pp. 43-56.
- Day., Kumar & Aaker. (1998). *Marketing Research*. John Willey & sons. Inc.
- Ghani, J. (1996). Sialkot's Entrepreneurial Spirit. *CMER Working paper No. 96-10*.
- Gereffi, G., 1999, “Industrial Upgrading in the Apparel Commodity Chain: What Can Mexico Learn from East Asia?” Paper presented at conference on “Business Transformation and Social Change in East Asia (II),” Institute of East Asian Economies and Societies, Tunghai University, Taichung, Taiwan.
- Gary, Gereffi. (1999). A Commodity chains Framework for Analyzing Global Industries. *Duke University, Durham, NC 27708-0088, USA*.
- Humphery, John. (1995). Industrial Reorganization in Development Countries: From Models to Trajectories. *World development*, Vol. 23, No. 1,pp. 149-162.
- Humphrey, J., & Schmitz, H. (2000). Governance And Upgrading: Linking Industrial Cluster And Global Value Chain research. *IDS Working Paper 120*, Brighton: Institute of Development Studies.
- Humphrey, J. and Schmitz, H. (2001) 'Governance in Global Value Chains', *IDS Bulletin* 32.3:19-23
- Kothari, R. C. (1990). *Research Methodology*. New Age International Publishers.
- Knorringa, P., 1999, “Agra: An Old Cluster Facing the New Competition,” *World Development*, Vol. 27, No. 9, pp. 1587-1604
- Kaplinsky, R., &Morris, M. (2000).” A Handbook for Value Chain Reseach”. *Prepared for the IDRC*.

- Ketels, C., Lindqvist, G., Solvell, O. (2006). “Cluster Initiatives in Developing and transition Economies. (On line) Available [http:// www.cluster-research.org, www.sse.edu/csc](http://www.cluster-research.org, www.sse.edu/csc)
- Messener, D., & Meyer-Stamer, J. (2000). “Governance and Networks. Tools to Study the Dynamics of Clusters and Global Value Chains”. *Institute for Development and Peace, University of Duisburg*.
- Mayer-Sramer, J., & Haemes-Liedtke, U. (2005). “How to Promote Clusters”. *Mesopartner Working paper 08*.
- Nadvi, K. and H. Schmitz, 1994, 'Industrial clusters in less developed countries: review of experiences and research agenda', Discussion Paper No 339, Brighton: Institute of Development Studies, University of Sussex
- Nadvi, K. (1999a). “The Cutting Edge: Collective efficiency and international competitiveness in Pakistan”. *Oxford Development Studies*, 27:1, 81-107.
- Nadvi, K., (1999b). “Shifting Ties: Social Networks in the Surgical Instrument Cluster of Sialkot, Pakistan,” *Development and Change*, Vol. 30, pp. 141-175
- Nadvi, N. (1999c) “Collective Efficiency and Collective Failure: The Response of the Sialkot Surgical Instrument Cluster to Global Quality Pressures,” *World Development*, Vol. 27, No. 9, pp. 1605-1626.
- Nadvi, K., & Halder. (2005). “Local clusters in global value chains: exploring dynamic linkages between Germany and Pakistan”. *Entrepreneurship & Regional Development*, 17:5, 339-363
- Nadvi, Khalid. (2008). “Global Standards, global governance and the organization of global value chains”. *Journal of Economic Geography*, pp. 1-21.
- Porter, Michael E., "Competitive Advantage". 1985, Ch. 1, pp 11-15. The Free Press. New York.
- Porter, E. Micheal. (1990). “The Competitive Advantage of Nations” (Review of the Book). *Harvard Business Review*, 73-93.
- Rabellotti, R., 1995, “Is There an ‘Industrial District Model’? Footwear Districts in Italy and Mexico Compared,” *World Development*, Vol. 23, No. 1, pp. 29-41.
- Rabellotti, R., 1999, “Recovery of a Mexican Cluster: Devaluation Bonanza or Collective Efficiency?” *World Development*, Vol. 27, No. 9, pp. 1571-1585.
- Saxenian, A., 1994, *Regional Advantage - Culture and Competition in Silicon Valley and Route 128*, Cambridge, MA: Harvard University Press
- Schmitz, H. , & Nadvi, K. (1999). Clustering and Industrialization: Introduction. *World Development*, Vol. 27, no. 9, pp. 1503-1514.
- Sturgeon, J. Timothy. (2001). How Do We Define value Chains and Production Networks. *Industrial performance centre, MIT*.
- Schmitz, H. (2005). “Value Chain analysis for Policy-Makers and Practitioners”. *IDS, Sussex, England*.

- Solvell, O.(2009). “Clusters: *balancing Evolutionary and Constructive Forces*”. *Stockholm, Ivory Tower*.
- Tewari, M., 1999, “Successful Adjustment in Indian Industry: the Case of Ludhiana’s Woolen Knitwear Cluster, *World Development*, Vol.27, No. 9, pp. 1651-1671.
- Thompson, T., 2005(a), “Cooperation in Developing Country Industrial Clusters: Marketing in an Age of Globalization,” mimeo, University of Maryland.
- Thompson, T., 2005(b), “Intra-cluster Cooperation and Relational Contracting in Pakistan’s Surgical Instrument Cluster: An Empirical Study,” mimeo, University of Maryland.
- Thompson, T., 2005(c), “Industrial Clusters in Developing Countries:A Survey of the Literature”. *The Lahore Journal of Economics*10 : 2, pp. 15-34
- TDAP, (2010). “Diagnostic Study on Surgical Instruments Cluster Sialkot”. *Unpublished Document*.
- Womack, J.P., Jones, D.T. (1996), "Beyond Toyota: how to root out waste and pursue perfection", *Harvard Business Review*, Vol. 74 No.5, pp.140-53.
- Zikmund, G. Williams.(2003). *Business Research Methods*. Thomson South Westrn.

It is the unique privilege of the leader to strength men. Nowhere else in contemporary industrial society does that Privilege come to grips with opportunity so directly as in the organizations in which men work. To exercise the privilege demands sensitivity to subtlety and forthrightness of action, that *creative fusion* of aggression and affection which summons forth the highest human talents. The man whose leadership is the product of such fusion in the service of an ideal is aptly called the exceptional executive.

Harry Levinson