

Surgical Industry at a Glance

Abstract:

Surgical instrument manufacturing industry originated in the early 1940s in and around the city of **Sialkot**. The sector manufactures a wide range of medical, surgical and veterinary instruments exporting 80-90 % of its production. This industry is suffering badly in international market. In spite of the fact that this industry has the potential to earn sizeable foreign exchange but it needs to be fully explored. The purpose of this report is to take an insight into the industry structure, identifying the major issues and problems affecting the industry, uncover the constraints of the industry and put forward some suggestions to overcome the existing problems.

Introduction:

Chronologically manufacturing of surgical instruments started in the regions that were traditionally involved in forging of metals, particularly for knives and swords etc. at the end of the 19th century surgical instruments manufacturing started in this region, when the American Mission hospital in **Sialkot** for the first time got its scalpels and other instruments repaired from the local artisan community of blacksmiths. These craftsmen successfully replicated these imported instruments, which were being used by the hospital.

Sialkot surgical industry started exporting surgical instruments to the foreign market in 1930s. To institutionalize the local expertise of manufacturing surgical instruments and provide common facilities to the manufacturers, the British Government established the Metal Industries Development Centre (MIDC) in 1941. This helped the industry to shift from manufacturing of basic metal products to precision surgical instruments. After

Independence in 1947, Pakistan inherited 17 registered surgical instruments manufacturers in **Sialkot**.

In 1958 the Surgical Instrument Manufacturing Association of Pakistan was incorporated which safe guarded the interests of the industry. The Surgical Association since then is regularly playing a central role in addressing issues at the Government level, nominating trade delegations and participants for trade fairs and exhibitions, handling inter-industry issues and representing the industry at various local and international forums. The value of exports of surgical instruments for the financial year 2013-2014 is USD 335 Million¹.

Overview of Surgical Equipment Manufacturing Industry Sialkot Pakistan

Sialkot is the hub of manufacturing dental and surgical equipment or instruments in addition to sports goods and cutlery. The Sialkot based industry is not catering for the supply of surgical equipment to local market but it is also generating a handsome foreign exchange through exports. We need to encourage and promote this industry and try to expand its scope by incorporating electro medical equipment into it. For this we need to bring Gujranwala and Gujarat based industry which has some experience in the electrical and electronics manufacturing.

Major facts and figures of the sector:

Over 99% of the Pakistan's surgical instruments production is centered at **Sialkot**. The sector comprises over 2500 companies with the labor force ranging from (15-450) per unit, of which around 30 can be considered large and the remainder can be split as 150 units of medium sized and remaining as small. The industry produces on average over 150 million pieces a

¹ Surgical Instruments Manufacturing Association of Pakistan (SIMAP)

year with an estimated value of around Rs. 22 billion. Out of the total production, approximately over 95% is exported, which includes 60% of disposable and 40% of reusable surgical instruments, i.e. 100 million instruments annually.

The industry belongs to the light engineering industry category, and is one that has specialized in skill and stable export market share. **Sialkot's** surgical goods industry is responsible for 75 percent of Pakistan's engineering exports. It produces over 2000 different instruments, mostly made from imported stainless steel. With a 20 percent share of the total world surgical goods exports, surgical instruments made in **Sialkot** are used by surgeons, dentists, and veterinarians throughout the world and are considered second in quality only to Germany, the global leader in this field.

SCCI's² active members are 8500 and list of members registered as surgical instruments manufacturers includes 2,400 (commercial and associated) firms that employ roughly 80,000 workers and exported US\$278 million worth of merchandise in 2009. Surgical goods and medical instruments worth US\$ 23.7 million were exported during the month of July 2011 as compared to US\$ 20 million in the month of July 2010. According to the data of Federal Bureau of Statistics (FBS), the surgical and medical instruments export was recorded at US\$ 24.5 million during the month of June 2011³.

Following Countries are the Top Ten buyers of our instruments:

United States	24%
Germany	15%
United Kingdom	10%
France	4.82%
Italy	4.45%
UAE	3.60%
Japan	2.35%
Brazil	2.24%
Mexico	2.22%
Russian Federation	1.90%

Export trend of Pakistan Surgical Industry:

Year	2009	2010	2011	2012	2013
Exports USD Million	322	354	398	412	485

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Industry Structure:

The production of the industry can be broadly classified into two categories, i.e. disposable instruments and the reusable instruments (OR instruments). The largest market for Pakistani disposable instruments is USA. Majority of the reusable instruments, manufactured in Sialkot, are exported to the European countries.

Industry at a Glance:

Total number of units	Approx. 2400
Installed Capacity	200 Million Pieces/annum
Total Capital Investment	Rs. 12.0 billion
No. of worker	100,000-150,000
No. of people involved (Direct/indirect)	350,000-450,000
Export	US \$ 156 Million
World market of surgical instrument	US \$ 30 billion
Production	100 million Nos.
Source of Machinery	Germany, UK, USA, China

RANGE OF INSTRUMENTS BEING MANUFACTURED

The surgical industry has a flexible manufacturing processes resulting in production of wide range of products. Production can be made in accordance with British, German, American or any international standards/specification. The advanced countries of Europe and America are the leading buyers of Pakistan's surgical instruments.

A broad range of surgical instruments are being manufactured:

- Diagnostic
- Anesthesia
- Vaccination
- General

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http://www.trademap.org/Country_SelProductCountry_TS.aspx

² Sialkot Chamber of Commerce & Industry

³ <http://www.pbs.gov.pk/trade-detail>

- Instruments
- Plaster
- Neurology
- Cardiovascular
- Dermatology
- Otolaryngology
- Oral Instruments
- Sterilization
- Gynecology
- Intestinal & Stomach Rectum
- Suture
- Bone Surgery
- Tracheotomy
- Lung Surgery
- Ophthalmology
- Rhinology
- Tonsil
- Urology
- Obstetrics

Manufacturing Standards:

Surgical industry is the sector where quality is major issue of concern. Recently its importance has increased manifold given the increasing global competition and new regulations being enforced by the developed countries. These regulations require the exporters of the developing countries to introduce systems focusing on the improvement of management, labor, technology, and all the other fields which in any way affect the firm.

The surgical instrument standards must be in conformance with WTO standards. Over 300 Companies have ISO-9002 Certification and about 250 have Certification of Good Manufacturing Practices⁵.

Sialkot Material Testing Laboratory (SIMTEL)

A UNIDO assisted material testing laboratory has been set up in **Sialkot** in the year 2000 comprising of three laboratories:

- ◆ Spectro Lab
- ◆ Metallographic Lab
- ◆ Chemical Testing Lab

Production Process (Value Chain):

In order to develop detailed understanding of the issues and problems faced by a particular industry, it is of prime importance that an in depth analysis of the value chain is carried out. During the process of production, value is being added at each stage of the production, from the first stage of raw material to the final stage of finished product, a product undergoes a series of processes until it attains its final shape.

Manufacture and Supply in Sialkot:

Manufacturers of surgical instruments in **Sialkot** need to minimize costs to remain competitive. To

reduce overheads, most firms subcontract the initial production of instruments to workers employed in a small workshop or their own home, with finishing and quality checking of the product in house before export, quality is checked against European Union or US standards. Manufacturing firms in Pakistan, however, rarely have the infrastructure or marketing presence to allow direct trade with the end users in the destination countries. Most therefore sell to suppliers and retailers in the developed world with only a small profit margin. These “middle men” (mostly in Tuttligen) then trade with end users, predominantly in the US or Western Europe, usually after a considerable mark up. For example, a pair of fine surgical scissors will cost \$1.00 to produce, will be exported from Pakistan to Germany at a price of \$1.25 (personal communication), and will probably be sold to a hospital for nearer \$80.00. In 1999, instruments costing a total of \$27.5 million were exported in this way from **Sialkot**.

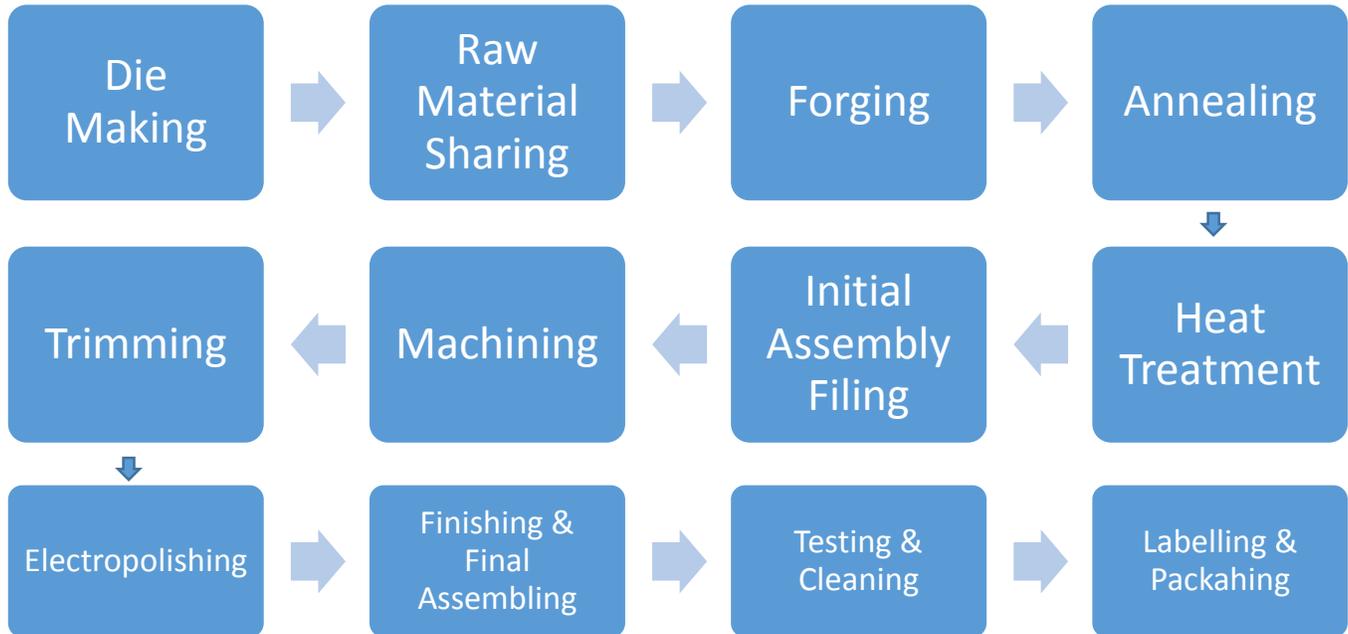
Labor Conditions in the Surgical Instrument Manufacture Sector, Sialkot:

The initial manufacture of surgical instruments involves die making, forging, filing, grinding, machining, electroplating, and heat treatment. Most of these processes are subcontracted to countless small process specific workshops, with the final finishing (chemical cleaning and polishing) and quality checking by the final producers. The use of subcontractors became common in the mid-1970s after a period of labor unrest and strikes. Subcontracting minimizes company overheads and lowers costs, but, because subcontractors are not employees of the company and competition is aggressive, it drives down wages and health and safety standards. Subcontracted manual laborers are paid per instrument, and the average worker earns around \$2 a day (personal communication). They have no job security or guarantee of income and no medical insurance or provision of education for their children. Nearly all subcontractors are forced to seek wages in advance from the firms that employ them, further disadvantaging these workers' position in arguing for a fair wage.

⁵ BOI Pakistan

a unique position and competitive advantage over other countries. In the surgical instrument cluster a manufacturer executing various

Manufacturing Process:



SWOT Analysis:

Strengths of Surgical Instrument Industry

- **Geographical Concentration**

The surgical instrument industry of Pakistan is concentrated in the city of **Sialkot** and its periphery. With the passage of time industry grew in the region surrounding **Sialkot**, within the area of some twenty-five kilometers, also became an essential part of the surgical instrument industry structure. Concentration of surgical instrument manufacturers and sub-contractors within a particular region is the biggest strength of the industry, which is depicted by the collective efficiency of the overall industry.

- **Economies of Scale**

As the number of instruments manufactured each year is more than 100 million units. Such large volumes in the presence of specialized sub-contractors have given Pakistan surgical industry

processes might not be able to collect the benefits of economies of scale. But wide scale process sub-contracting definitely generates economies of scale through processing of instruments in large volumes.

- **Availability of Inputs**

Availability of raw material is an essential element for any manufacturing industry. In case of Pakistan surgical industry, besides having large number of process sub-contractors also includes the suppliers, importers and traders of inputs such as stainless steel, chemicals and other raw materials. The presence of such input suppliers guarantee the availability of raw materials therefore saving a lot of hassle for the manufacturers, which in absence of such suppliers have to import raw materials individually. This not only provides inputs at lower costs due to competition but also saves transportation and pre-operating costs.

- **Skilled Labor Force**

Surgical industry of Pakistan is more labor intensive due to lack technology and it needs high level of skills and precision. The total workforce of surgical instrument industry is 45,000 - 50,000 which represents third or fourth generation of skilled workers. The art of manufacturing surgical instrument is transferred from one generation through another. A concentration of labor force, having the desired skill level, is strength of the industry. It is for this reason that the industry has grown only in and around **Sialkot**.

- **Concentration on Core Competencies**

Due to the industry norm of sub-contracting to process specialized vendors, the vendors carry out specific processes on large volumes of instruments therefore, developing their core competency in one or two processes. This has enabled the surgical instrument manufacturing to maintain homogenous quality of instruments to some extent along with economizing on capital as well as labor.

- **Wide Product Range**

Despite of limited resources and advance machines and equipment, the manufacturers are able to produce a diverse range of surgical and dental instruments. Without the use of sophisticated design and product development techniques the surgical instrument cluster has developed its capability of producing quality or instruments comprising of more than 10,000 different instruments.

Weakness of Surgical Instrument Industry

- **Minimal Involvement of Brand Names**

The buyers of Pakistani surgical instrument industry are international distributor or wholesalers and that is the reason brand involvement is very low. Only a few established, world- renowned brand names are among the buyers of the industry. Working with brand names not only means higher revenues but the brand names also assist the manufacturers in technological up- gradation, quality and management systems and skill development.

- **Branding**

One of the major problems with surgical industry of Pakistan is branding. The industry has a history of more than six decades and there are still no brand names. The absence of local brand names

deprives the industry of directly participating in tender business to cater to the end user in foreign markets and works adversely by giving the buyer greater bargaining power. Through development of local brand names the surgical instrument industry is likely to get access in the markets of less developed countries, which can ultimately prove to be a stepping stone to enter the markets of developed countries, with locally branded surgical instruments.

- **Marketing and Distribution**

Although the manufacturing quality of Pakistani surgical goods is comparable with other countries but in the absence of marketing and proper distribution industry is suffering badly in international market. Similarly the distribution of Pakistani instruments is carried out through international distributors and traders. No Pakistani company either has the resources or the expertise to set up a distribution network of its own. The international intermediaries involved in the distribution of surgical instruments operate on large spreads.

- **Management**

The management of surgical industry is one of the weaknesses. The surgical instrument manufacturing in Pakistan has been in the hands of two or three big players who are following the traditional ways of doing business. The authority is in the hands of owners and this has resulted in the centralization of authority.

- **Technical Personnel and New Product Development**

Surgical industry is technology based, but in Pakistan this industry has flourished without sophisticated technology. There is a lack of qualified and trained engineers in factories. The process supervision and operations management is done by non-technical personnel. The process of new product development is done by using reverse engineering, without following proper procedures such as preparing technical drawings. At this stage of development, to grow further the industry needs technical assistance in process improvement, operations management and also for new product development.

Opportunities for the Surgical Instrument Industry

- **Diversification**

As world is changing with changing trends and technologies but Pakistani surgical industry is still stuck with the traditional gadgets. Now it is a tremendous opportunity for surgical industry to gear up itself to take the development and production of instruments through latest materials such as plastics and other synthetics and also to explore the area of electro-medical and diagnostic instruments.

- **Manufacturing Flexibility**

The manufacturing process of surgical industry can be modified by incurring very small expenditures. This flexibility provides an opportunity for industry to manufacture wide range of products. There are still certain high value added surgical instruments which, can be easily manufactured locally.

- **Unexplored Markets**

Initially Pakistani surgical instrument industry exported major portion of its products to USA & Europe. However, there are potential markets like Japan, Eastern Europe untapped. Japan, when observed in the broader category, is the fourth largest importer of surgical, medical and dental instruments in the world.

PRODUCTS	Pak Exports to Japan			Japan Imports from World		
	2011	2012	2013	2011	2012	2013
Surgical Industries	6	6	8	4130	4854	4638

- **Information technology**

The use latest interactive computer tools such as discussion groups, news groups, etc. because it is the only source of marketing that provides in depth and penetration, which an organization really need. Almost all the big brand names in the field of medical and surgical appliances have their web sites which provide information about the organization, the product range and prices and their area of specialization.

- **Joint Ventures**

The surgical instrument cluster of **Sialkot** has established its reputation as a center of excellence in the South Asian region. Considering a long history of instrument manufacturing and the growth in exports, the state of technology does

not seem to be consistent with the industry growth. For under-developed countries collaboration with multi-national companies in a way facilitates the transfer of technology. This is also true for the surgical instrument cluster where the joint ventures with foreign companies have enabled the local partner to considerably upgrade technology. Currently there are only a couple of joint ventures in the industry. This is one area, which needs to be exploited to its full potential.

Threats to the Surgical Instrument Industry

- **Upcoming Competition**

Since beginning Pakistan has the advantage of cheap labor. But now with in past few years, China, Mexico and some other countries have also appearing as our competitor in global market having cheap labor. These countries, besides having the advantage of cheap labor, are technologically superior in innovation and use of modern materials in manufacturing as compared to Pakistan.

- **Quality Systems**

Quality is something that is mandatory in surgical instrument sector. 95% of the production of surgical industry is being exported. But this export is affected by the quality standard issues in the international market. Although the surgical instrument industry, as a single sector, has the largest number of ISO and CGMPs⁶ certified companies, but still there are some companies who need to have ISO certification.

- **Latest Developments**

Latest developments in the industry are threat to the industry as well as an excellent opportunity at the same time. It all depends on the availability or resources. The Pakistani surgical instrument industry, in order to develop on sustainable basis needs to have a strong research and development base which facilitates the introduction of new materials and latest processing techniques.

Major Constraints in Pakistan Surgical Industry⁷:

- **Technology Constraint**

⁶ Current Good Manufacturing Practices

⁷“Diagnostic Study on Surgical Instruments Cluster” executed under Cluster Development Program of TDAP, SCCI & UNIDO

In today's dynamic world technology plays vital role in the development of any field. Keeping in view the surgical industry of Pakistan, in beginning the instruments manufactured in Pakistani surgical industry was handmade; but with the passage of time, the industry adopted to change but this change is so gradual that we are still lagging behind in the field of technology.

These days' new technologies are taking place of the old ones, for example:

- CNC Machines (Computer Numeric Control)
- MIS (Medical Invasive Surgery) Instruments

These technologies are adopted by Germany but not here in **Sialkot** yet. Its reasons are:

- Unawareness of industrialists about these technologies
- These are very expensive and our people are unable to adopt these technologies
- There are no trained people to work according to these technologies.

- **Marketing Constraint**

One of the basic elements for the growth of any business is marketing. Unfortunately, Pakistani surgical industry is far behind in this field. There is no strategy to deal with the local market. Major portion of the production is sold to the international wholesalers and distributors, who sell these products under their own brand name. When we talk about the exports, there is bad luck for the cluster that it has a deep history but it has no own "Brand" developed yet. We are working as vendors for the other exporting countries. However, some entrepreneurs are aware of this problem and they are trying to develop their own brand.

- **Research & Development Constraint:**

Research & Development is the need of today's business for its survival. Non-adoption of research and development by manufacturers and exporters is also a major problem of surgical industry of Pakistan. No attention is given on development and betterment of medical instruments. There is an urgent need that businesses establish research and development cells in their premises and allocate a certain percentage of their profits precisely on research and development.

- **Human Resources Constraint:**

Organizations are made up of people, who are the building block of that organization. But the human resources of our surgical industry are not

properly managed because people are not well aware of the resource management.

The entrepreneurs themselves execute every function of HR. They consider placement of a professional or business graduate as a waste of money; moreover, the professionals are misconceived as another exploitation tool that might steal their business secrets.

There is an emergent need of a surgical training institute/centre, where current labor force could be trained for enhancement of their manufacturing skills and new entrants could also be trained in this institute.

Financial Constraint:

Finance is another issue of the cluster, especially for small enterprises. There is a big number of financial institutes and leasing companies present in **Sialkot** which are providing financial services. Majority of the manufacturers consist of vendors, who have small setup. Most of them have no reach to the banks. They are unaware of how to avail the loan facility. However, large firms have good relation with the financial institutes and leasing companies.

Recommendations:

Out of the total production surgical instruments in Sialkot, approximately over 95% is exported, approximately 100 million instruments annually. It shows the importance of our surgical goods, it has the grand contribution in our export and foreign exchange earnings. But still it has been a big scope for more contribution and development in this field;

- The burning issue of this industry is "skilled labor" availability and this problem can be resolved by the mutual efforts of government and businessmen by providing technical courses, on job training courses and machinery handling courses etc. related to this field because there is a threat of losing the skilled labor due to no proper transfer of skills to the next generation. Fix a particular wage rate for labor and labor contracts must be focused by the businessmen and govt.

- Sialkot is the hub of surgical industry so govt. must establish the new training and

vocational centers under TEVTA and other boards in Sialkot and its nearby areas e.g. Narowal, Pasroor etc. to attracting the labor and new comers in the field and provide them the up to date knowledge to enhance their skills. And recognize the importance of the degrees of TEVTA and other such institutions to realize the labor their worth. With such efforts, deficiency of skilled labor can be controlled in coming years.

- In surgical field, the production procedure comprises of series of processes, and it involves the use of latest and expensive technology therefore the need is to establish “Common Facility Center” in Sialkot to facilitate the export of surgical items. Govt. should realize this need and start a project of “Common Facility Center” with the help of businessmen. It will reduce the cost of production, enhance profit margins and prove fruitful for boosting export.
- In surgical field, there is a crucial need for developing “R & D Department” to work for the betterment of the production process as well as for the product development. On the other hand, R&D departments must establish to explore new markets for boosting the export of our surgical instruments because our major customers are USA & Europe but still there is a large scope for us e.g. Iran and Japan is the potential market but our share of export in these markets are only 0.1%.
- With the vital need of “Human Resource” in surgical industry, there is also a crucial need of “Financial Resources”. In Sialkot, most businesses are related to cottage industry so, finance is the basic need but SME’s faces a lot of problems and issues at the time of getting finance (loans) from financial institutions. And there must be taken strong steps by the government for the establishment of “Exim banks” for promoting international business.
- For promoting our global business of surgical items, we must have complete awareness about quality standards e.g. ISO and CGMPs etc. and must try to implement them fully to build up the trust on our

foreign customers to sustain in such a competitive world.

- In surgical industry, businessmen must focus on new methodologies of production and must try to adopt the latest technology (e.g. CNC machines and MIS etc.) in different sections of manufacturing process. They can do this by maintaining the reserves for this purpose from their profits.
- Despite the fact that we produce an immense quantity of surgical items but still we are far behind in case of “Marketing” of our products to increase the trade round the globe. There is lack of presentation in our products in every aspect. Especially, in trade fairs and exhibitions, TDAP must facilitate our Pakistani traders to present their products in attractive way to retain the customers.
- There is no material testing lab in Sialkot to facilitate manufacturer of surgical items, PCSIR must establish its office in Sialkot under the governance of government.
- Exporters of **Sialkot** are the foreign exchange earner for the country, so the concerned authorities must take steps to communicate with government to reduce the anxiety of the traders related to tax issues.
- In **Sialkot** surgical industry, SME’s have lack of proper management hierarchy. In such firms, there must be some proper advisory and supervisory authorities to handle the different production departments. In this way, there is more chance of efficiency in all departments.
- Infrastructure Development:
Transportation is the backbone of export and industrial sector as a heavy portion of the product cost of an exporters include the transportation expenses and cargo charges. This issue must be resolved through;
 - 1) Roads linked with rural areas and main cities must be properly constructed for better approach and smoothing the

internal trade directly and export indirectly.

- 2) Check & balance of dry port and airport fair system for controlling the cost and improving the quality of products.
 - 3) Government must invest heavily in the improvement of physical and financial structure including shipment, clearance, cargo system, handling at the ports and airports for smooth flow of export.
 - 4) Establishment of material testing laboratories to facilitate product development. This would help in cost optimization of the product with enhanced quality. It will enable the surgical industry to move into a higher technological ambit.
 - 5) To acquire affordable and quality technical assistance at home, an excellent engineering university should be established in Sialkot to give boost to the trade.
- Today, China and other competitive countries are entertaining with long term trade deals at reasonably low rates to sustain their customer for long-run. But Pakistani exporters fails to adopt such strategies because of constant fluctuation in prices of oil, gas, electricity, material's cost etc. Therefore our exporters could not reach out to their real potential. In this regard Govt. and other trade related bodies must perform their role by framing some long term projects on the extraction and usage of natural resources as well as electricity plants.
So we can bring a revolution in our industry, because many issues are linked with this problem "deficiency of power resources".
 - Surgical instruments can be generally divided into six classes by function. These classes are:

- 1) Cutting instruments
- 2) Grasping or holding instruments
- 3) Haemostatic forceps (instruments used to stop blood flow)
- 4) Retractors
- 5) Clamps and distractors
- 6) Accessories and implants

So, there is a need of product diversification in the international market time to time in order to capture the new foreign markets.

- We cannot ignore that our 80% surgical export is depending on single-use products. But we should focus on the pricing of them collectively to make the strength of our products in international market. There is need to reconsider our pricing strategies of re-useable products and single-use products.
- The leading manufacturers and exporters of surgical items should be encouraged to develop their own brands and labels for their products. The highest level of value addition occurs when products are sold under a brand name. Sialkot is the major export oriented city in Pakistan. Sialkot based export goods are highly appreciated in International markets. It's high time for Pakistan to use the opportunities available at international level. Govt. should encourage and support the leading manufacturers and exporters of surgical instruments to develop their own brands and labels for their products. Such steps will ultimately flourish our trade.
- Internal manufacturing processes should be rationalized by implementing "**Lean manufacturing technique**", thereby reducing the Non-Value Added Processes which confine to the limited scope of production. The strategy so proposed would help a long way reducing the lead time and increase the dedicated

capacity/order fulfillment rate of the organization.

Conclusion:

“There is a cake of 34 billion US Dollar in the world’s market of surgical products; we should start the sincere collective efforts to eat this cake with the jam-packed support of Government”

Pakistan has great potential to exploit the international market of surgical instruments as it has great workforce, talent, skills, resources, strengths and opportunities to make the way to success. Moreover, there is large scope of triumph in this market. But, need of the time is to enhance the motivation level by the government to support this industry as well as by all the big players of surgical industry.