TECHNOLOGY TRANSFER: A STUDY OF EXPORT MARKETING OF SANGANER PRINTING APPARELS

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Abstract:

The National Strategy for Manufacturing prepared by the National Manufacturing Competitiveness Council (NMCC) has indicated that the decade 2006-2015 will be the decade of Manufacturing for India, with the aim of an average growth rate of 12 – 14 percent in manufacturing. It has also been suggested that the policies of Government should focus on the growth of labour intensive sectors (like Handicrafts), which also enjoy a competitive advantage. To provide an impetus to the growth of this industry, there is need for substantial augmentation in the overall Plan allocations for the Handicrafts sector, based on the felt needs of different segments of the sector. Block printing is the finest art of Rajasthan which has international demand since many years. Many exporters and manufacturing units and employment is depends on this sector, slowly and gradually technology is taking place in this sector. The joint ventures and innovation is also coming much faster. The study is analyzing the sector performance from year 2005 to 2010 including the effect of financial crisis. This study is important to investigate the growth and the contribution of sanganer printing apparel industry by introducing new technologies and advancement. The inferences will be taken through ANOVA. This study also the future perspective and growth path of this sector that how the demand is affected with these indicators of strategies.

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As suggested by A.K.Singh, chairman of working group and secretary, ministry of textiles (Report of working group from planning commission, December 1, 2006) Indian traditional apparel and handloom sector need a prior attention to focus on innovation, research and development to enhance exports at the international level because this sector has a bright future opportunity and this plays an important role in overall income and employment generation of the country.

Keywords—Sanganer, Printing Apparels, ANOVA, paired sample t-test, Global Financial crisis.

I. INTRODUCTION:

Printing sector of India includes various places like Bagru, Sanganer, Barmer, Ajmer, Kota, Jodhpur, Udaipur in Rajasthan, Bhuj, Jamnagar, Ahmedabad in Gujarat, Indore, Mandsore, Neemach in Madhya Pradesh, Kumbarnam, Tanjore, Tuni, Kodalikaruppur, Chennai in Tamilnadu and Bastar in Chhatisgarh.

This sector has a vital role increasing the growth rate of India, but facing the competition of China, Pakistan,Bangladesh and Israel in the international market. The biggest threat of this sector is the pricing which is higher than other apparels of India as well as other countries. But this sector has special features to attract the international buyers and has lot of opportunities to increase the share with new markets like Caribbean Sea, South Africa and Latin American countries. Total share of the India in the apparel exports is only 3.75% whereas Rajasthan, specifically Jaipur has 0.75% contribution in this where majority of exports is involved from printing apparels.

This sector decorates the clothes with traditional designs of art and culture of Rajasthan. Hand block printing is a reputed art of Rajasthan. Screen printing is a cost effective technique of printing sector.

Each region has different style of printing method like direct style, discharge style, resists style,block , inkjet, tie and die, spray, Batik and kalmkari etc. Rajasthan printing is famous for hand block, resist and kalmkari style of printing. Some of the region use material which is locally

available. Gujarat and Rajasthan style of printing is quite similar because these are the neighbour states.

Sanganer printing sector is started printing with machineries while Bagru is still manufacturing these printing apparels through handmade process. Screen printing, hand block printing and inkjet printings are such type of printing apparels.

II. CURRENT STATUS OF TECHNOLOGY IN PRINTING APPAREL INDUSTRY OF RAJASTHAN:

A. CAD

CAD technology is used in the field of apparel and clothing industry. This technology born in the early 80s. Apparel CAD is based on the introduction and assimilation of the development, ARISA, tink, Sunrise, AGCO, Woodman, Hua Yi etc. this includes pattern design system, fitting system, design system, Grading and marker systems, and automatic spreaders cutting. This CAD technology have the application capabilities to the heavy manual labor simple, simplifies the design of artwork by the fabric to the actual conversion process, labor saving and practical space saving and can be modified, to simplify archived save file space, reduction of the cost of garment processing, enhance corporate image, very effective in international market, facilitate the international data transmission, reduce administrative work, effective data management and data search, improving efficiency, improve rapid response capabilities and economic benefits.

With the use of the CAD technology company gains 90% of the users improve the accuracy of product design, 76% the user to shorten the product development cycle, 78% of users to reduce the product design and processing errors, 75% of users to increase productivity; 70% of the users to lower the production cost.

The current apparel CAD is the most mature technology Grading, nesting functions, the most used clothing business is also this part of the feature, which effectively shorten the design cycle, greatly reduce the workload of the designer.

Gerber Technology offers widespread line of assimilated computer hardware and software systems to the sewn-goods and flexible goods industries. These systems significantly improve the effectiveness of information management, product and pattern design, grading and marker making/nesting, material spreading and cutting processes. The company offers automation solutions to a variety of industries including apparel, transportation, furniture, composites and industrial fabrics.

Graphics (Germany) is a software for pattern construction, grading and layplanning running on standard Personal Computers under Windows95 and above. It comprises an extensive range of functions for pattern cutting and modification and is available at a very competitive price. Therefore, GRAFIS is in use in industry as well as in trade and education.

Infomax Corporation has established itself as a reliable applied technology provider, specializing in solving design and pre-production problems for Garment Center businesses.

INVESTRONICA SISTEMAS is a Spanish company created in 1980, specializing in the development of CAD design tools (Computer Assisted Design), CAM systems (Computer Assisted Manufacturing) and CIM projects (Computer Integrated Manufacturing) for the apparel and upholstery industries, as well as for others such as automobile, aeronautics, etc. INVESTRONICA SISTEMAS belongs to the INDUYCO Group, one of the largest apparel companies in Europe. Its 1999 production capacity was in excess of 12,500,000 garments. INDUYCO is the main supplier to its own major shareholder, EL CORTE INGLES, one of the biggest distribution holding groups in Europe.

Lectra is a world leader in the design, manufacturing and distribution of software and hardware dedicated to the major industrial users of textiles, leather and other soft materials, supplying a complete range of associated services for the development of complete solutions, from product design to manufacture to retailing. Lectra, a foremost technology provider to the fashion industry offers a wide range of software, automated cutting systems and high value-added services covering the entire value chain, from design through manufacturing to retailing.

Lectra Fashion PLM (Product Lifecycle Management), specifically designed for fashion companies, integrates process optimization with collections lifecycle management and includes modules for line planning, creative collection development, product data management, product

engineering, and workflow management. LectraKaledo Collection, which shares a common database platform within PLM, encourages artistic creativity while structuring the collection creation process and facilitating the exchange of information internal and external to the design environment. LectraKaledo Textile is a suite of software for the textile designing processes of Print, Knit and Weave that further facilitates the exchange of information internal and external to the design environment. Lectra serves over 20,000 customers in more than 100 countries.

B. Patternmaking Software

Garment details, such as grading patterns, are created on computerized patternmaking software. The patternmaker needs garment specifications to plug into the software; the computer then draws the pattern according to these dimensions. Grading, which refers to patterns being increased or decreased to a different size, is also included in this type of software. Using this software, the patternmaker avoids having to make each graded pattern manually. It saves the designer the grading expense, and it also saves the manufacturer and factory valuable production time.

C. Computerized Design Images

Designers use computerized software to create images and silhouettes. Apparel design software offers different features (known as drawing tools), including linear and shaped drawing, color, fabric textures, pattern repeats and stitching detail. These tools save the designer time since she doesn't have to manually create technical sketches (also known as flats or black-and-white sketches). Computerized design software also ensures a clear outline and definition of each image, showing exact garment production detailing. These flats are attached to production packages, which are submitted to the factory for garment production.

D. Graphics

Screen-printed images can't be developed without a graphic design. Computerized graphics programs enable artists to add different textures and finishes. These tools save the artist manual

labor as well as time. Outlines, colors and sizing are precise and clearly defined for the screen-printer; the color selection is also generated by specific codes, which a screen-printer needs to mix colors for the screen.

E. Screen-printing

Once the designer selects the graphics to produce, screen-printers have computerized programs that separate the graphics by color. Each facility uses different programs, machines and materials (e.g., film or color palettes) forproduction. These separate screens are generally permanent for an unlimited amount of screen-printing. Designers and their sales teams are able to repeat graphics and save screen development charges once the screen has already been made. Generally, screen-printers save the already-made screens at their facility for future printing, referred to as reorders.

F. Die-Cuts

The designer incorporates a special design feature into each sketch; each design feature requires a different type of technological program and machine to produce. For example, adding special design features such as embossing, flocking or foil requires the use of die-cut machines. The die-cut pattern is designed in the apparel design software and transferred to the die-cut facility with the specified finish.The design is then precut and applied onto the garment with precision cutting; the garment comes out exactly the same each time it's produced.

G. Ozonorum

Dr.Aykani, The turkey-based company with its vast array of expertise in garment washing and processing was in the fair to promote its ozonorum 150 and to find a good representative agency to distribute its product in India. He further said that till now they were washing with water and chemicals but ozone gives them the technology to use only gas. The understanding and acceptance for this technology is on the rise but it still needs to be advocated more in the Industry. Since the industry is moving towards green and sustainable business, energy-efficient, low-water and chemical consuming technologies are needed.

H. Sunstar Belt Loop Attachment

Sunstar offers more stable motor installation structure which reduces noise and vibration. The accurate operation stoppage and smooth responsiveness of the machine improves productivity. With a sewing speed of 2800 SPM, the loop feeding and sewing process takes only 1.2 seconds offering the best productivity in the industry. The direct drive, electronically controlled, 2 needles machine is deployed around the world satisfying customers with its high quality products and low price. For user convenience in adjusting or setting activities of sewing machine, the parts subject to adjustment are carved with punched marks. The newly developed full close pulse based 0.05 mm motor controls and X-Y feed system guarantees best sewing quality at high speed.

Sunstar's price is less by 10% compared to the other brands but its quality is as good as any other top brand machine. Nowadays the indian market situation is improving and Sunstar will do its best to expand its sales activity at this time of rising.

Myung-Kyu-Kimii, said that they are coming up with new automated machines like this so that they can increase the volume of sales for apparel firms.

I. MD-COP

Striving for a high quality, complete solution for the cutting room, Morgan Dynamics presented its cut order planning software known as MD COP. It is a powerful integrated tool to optimize fabric utilization, cutting room process, timing and man power by allowing the operator to choose the appropriate, balanced decision as per the order quantity, fabric availability and other specifications of the cutting room. The integration starts with fabric roll management, order management, market management and interface with auto spreaders, auto cutters, auto labeler, bar code system, and ERP system for error free instructions and data management across departments. The costing module of MD COP helps to find out the optimized cost of cutting process and material before starting the production of a cut order. Dr.Anand Kumar said that MD COP works for customer satisfaction and play a big role in implementation.

J. SAN 6 GEBEDUR

This is specially developed for sewing of denim clothing. It has received a positive feedback from the industry as it helps in avoiding needle breakage, *skip stitches and thread breakage. The*

titanium nitride coating on the needle protects the fabric from damages and the special shape of the RG point further helps in this regard. The conical blade and the newly designed scarf cross section gives the needle a higher blending resistance of 20-40% in comparison to the standard needle. The needle has a lateral looper chamfer at the scarf which protects the looper point from damages. Because of all these changes in the geometry and design of the needle, it provides a number of advantages for sewing jeans over the standard needles. Starting with the benefit of high productivity due to less machine downtime, reduced production costs, high security against skip, stitches, less needle consumption, reduced machine load to the advantage of high protection against wear.

Since 15 years India is captured as large market and still customers for these markets is expanding. There is a segment in India which is still using very low price needles, but they need to compare the price with the operating cost and they will realize that GrozBeckert is not only cost-effective but also gives quality said by Rakesh P Lunia, Rajesh Bihani and S. Kanwal.

K. *Usha International*

The garment industry particularly owes a lot to this brand of machines as since its inception in the industrial sewing machines product line, Usha has been delivering excellence both in terms of quality and productivity. The single needle chain stitch machine Usha 8100, one of Usha's most popular products at the exhibition is equipped with numerous operator friendly and productivity enhancing features like the needle feed availability in the machine to avoid ply shift, easy stitch, length regulation, suitability for all types of medium weight fabrics and direct thread stand. Another product that was a crowd puller was the overlockdirect drive machine Usha 2700 D. With a machine speed of 8000 SPM and a power saving motor, this machine is available in three, four, five and six thread options.

KetanAnand said that Usha international is getting good response from the market.

L. *Green Hanger*

The Worcester-based British company Hanger4life has become the first to launch a green hanger with zero carbon footprints in a step that could revolutionize the apparel industry. The eco

hangers, the world's first eco-friendly clothes hanger with no higher cost, provide a groundbreaking solution to the millions of wasted hangers sent to landfill each year. The hangers fit into every size and shape garment through extendable arms, clips, and a trouser bar.

Nick-Lewis, MD of HANGER4LIFE said that clothes hangers have presented a huge challenge to retailers' eco-credentials as well as creating supply and disposable problems –and shoppers benefit too.

M. Distance Learning Programmes

NITRA Launches distance learning programmes for executives and offers the programmes of Garment Manufacturing Technology; Apparel Merchandising, Quality Assurance and Textile Technology. Over 500 executives have already undergone this curriculum fulfilling their dreams successfully in the industry. Offering excellent opportunity for executives to interact with highly qualified and industry experienced faculty having hands on knowledge on practical problems of the industry, NITRA DLPs are conducted on 2nd and 4th Sundays. The students are exposed to the modern facilities such as pattern making softwares from Gerber and Lectra, besides embroidery machines, garment finishing machines, computerized industrial sewing machines, fibre to fabric manufacturing machines and quality evolution equipment.

ATDC Jaipur has recently started a training programme for rural youth in sewing machine operations and needle work. Ashok Gehlot,thehon'ble Chief Minister of Rajsthan, took keen interest at the state sponsored 1st Adarsh Gram under the central Government Scheme.

The Okhla Garment & Textile Cluster (OGTC) has come a long way from its inception and in the process has supported by many initiatives for improving working practices and working culture of its ever increasing members. OGTC is working for building competitiveness while simultaneously being a responsible business through implementation of various concepts like Lean, PIP, QIP, HR-change management, innovative financing, common sourcing, etc. In its commitment to focus on skill development, OGTC in association with IL&FS has set up a training centre with a target to train 3000 sewing operators per year. This is in addition to the regular development and training projects being undertaken to improve the productivity of member companies. OGTC president PMS Uppal said that Garment industry is a growing industry and needs trained manpower at every level and more so at the grassroots level.

N. Yunique PLM of Gerber Technology

The web based software system promises to improve accuracy and free up time that can be shifted to higher value activities by providing easy access to centralized product information and process calendars. YuniquePLM is the best choice for connecting all the dots in our design, merchandising, sourcing, and packaging process. This save time and improve accuracy.

O. Incentive Schemes

The Dynamic and young entrepreneur and Director of orient clothing, SidhantDhungra, has introduced a new incentive scheme for its workers who are earning while enjoying their work. The incentive scheme is customized to each department of the organization. For the quality team , there is an incentive for rejection control and first time audit clearance. While the production team gets incentivefor 'highest FOB and lowest salary." Out of the highest FOB earners, I deduct the air freight and then calculate incentive, provided they have met their targets". To motivate the line in charge offinishing and production the company has introduced a daily scheme wherein if they achieved their target for the day, they get Rs. 500 as incentive, but if they achieved less than 75%, then they give Rs. 500 to the company as compensation.

Some other interesting schemes includes best cutting efficiency incentive on best performer of the month, PD merchants and designer incentives on order to conversation ratios and in sampling the fit cycle is mapped and their per piece cost is worked out based on which they get a monthly incentive.

P. Dye Star and A.T.E

Dye Star India the supplier and manufacturer of products that includes dyes, acrylics, polyamide, wool & silk, polyester, textile printing, auxiliaries and A.T.E. Enterprises, a group of engineering companies, specializing in yarn spinning, textile knitting, weaving and printing, jointly conducted a seminar on "Best Practices in Yarn Dyeing" in Ludhiana in August 2010. The seminar emphasized the need for reducing the dyeing cost so as to compensate the yarn price

fluctuations. Other issues discussed included exploration of green technology from Dye star and A.T.E. and further reduction of the load on ETPs and its related cost.

Q. Double Colour Technology

Double Colour Technology which makes it possible to stitch with two different colour threads, stitch lengths and thread thickness in one shot. This technology is available on the DCT (double colour) pocket setter model 2516V4, renowned as a flexible working station, easy to be handled by the technicians and with the jigs directly at the factory workshop, saving a lot of money and time.

R. Form Finisher

Macpi Group had on display its most popular finishing machine in india the form finisher for casual trousers, flat front without the crease. The machine comes in 3 models-the first is the basic *machine, the second is with pocket* pressing where the pocket area will be perfectly clean and the third one is the carousel with 4 head.

S. Fucen's Multi-needle technology

Fucen's Multi-needle sewing machine series was well received at the fair with numerous visitors showing interest in these machines. The multi-needle machines are available in a number of series each for a specific application. The 1300 series is a flabted, 2 needles, double chainstitch machine for achieving wishful design. It performs zigzagging and a wide variety of decorative stitch patterns are possible through this machine using picot and fagotting. Another largely popular 1500 series is a flatbed, multi needle (1-4 needles), double chainstitch machine with horizontal looper movement mechanism. It is used for lap seaming, attaching wairstbands and line tapes, and inserting elastic on mid heavy and heavy weight fabbrics. Similarly the 1700 series is for ultra heavy fabrics and the 1400 series is for underwear, sportswear, etc. The 4400 series offers a wide range of guage sizes (4-12 needles), cylinder bed (420 mm in circumference), elastic guide roller and kensai special's unique rear puller mechanism.

T. Wrapping Machine S-10

Lovia displayed itswell known button wrapping machine ST-10 which is used for knotting and wrapping of buttons after providing looseness in a button stitch machine. This process provides a strengthened stem of button and in the process helps button hole placket fit easiliy into the button placket. Also after fixing the button there is no expending view of the button hole. With the maximum sewing speed of 3000 SPM, this sewing machine delivers high productivity. Using fully programmable LCD operation panel in the machine, it is possible to select the button type, button height and wrapping & knotting frequency. Despite its many advanced features, the machine is very easy to operate, because the dynamic design of the machine allows a single operator to handle two machines at a time. Operator has to just feed the button into the slot and push the start button and on the completion of the cycle time, machine stops automatically and the thread gets trimmed.

U. ST-12

The recently launched button feeder was another crowd puller at the fair. The patented ST-12 is a button feeder attachment in which a robot mechanism device is used to feed the buttons to the button champ of the button sewing machine.

V. TS3-1600

The high speed dye sublimation printers from mimaki provide outstanding productivity and cost performance. The TS3-1600 model comes with a number of features consisting of head height adjustment, continuous printing with UISS (Uninterrupted Ink Supply System) and new ink with brilliant density and brilliant sublimation transfers. A newly developed high speed printhead containing 180 nozzles x 8 lines delivers high speed prints keeping high print quality. Print quality in 4-colours bidirectional mode is also improved using a “symmetric ink arrangement’. The machine has a provision to load two colour cartridges and when one cartridge is used up, the machine automatically switches to the other cartridge of the same colour. Ink cartridge can be replaced ‘on the fly’. This enables continuous unattended overnight printing. The bulk ink system using ink packs of aluminum achieves stable and reliable ink ejection. It is possible to use both 2-litre ink packs in combination with regular 220/440 cc cartridges for colors that are not so

often used. Also available is in-enddetection function to prevent misprints. The bulk ink system is an eco-friendly ink system that produces less waste while achieving continuous printing.

w. TS3-1600AMF

This model is made for immediate delivery and high volume production without compromising the print quality. The printer can reach an ultra high speed *of 40m square while* maintaining high print quality. It also has an automatic nozzle failure detection that monitors the ink-discharging state from the print head and detects and cleans clogged nozzles.

x. Alpha 8

According to NiravUdani, Sr. Marketing Manager DCC that DCC displayed the oval screen printing machine Alpha 8 from M&R's stable at the show. It is modular and expandable and can be configured for almost any production requirement. M&R's Plug & Print modular design provides for virtually limitless expansion in six-station increments. Other than end stations, there are no restrictions on print head placement. All other stations can support print heads-and any station can be left open. The oval shape makes more efficient use of available production area. This also allows the Alpha 8 to fit into spots where no carousel press could.

III. EFFECT OF TECHNOLOGY IN PRINTING APPAREL INDUSTRY:

Block Printing in the Sanganer, Bagru, and Bandhani sector is very important area to enhance the growth in international market as we know this product has demand in international market. But this should be worked out in the right direction by using effective technology. Sanganer printing apparels is now looking forward for new technology as it is involved in screen printing, dying, cutting, and other modes of printing. The latest technology of screen printing, dying and cutting is more cost effective, more qualitative and more finishing. They can use computer graphics by using patternmaking software and CAD technology for more modern and effective designs. Bagru sector is facing lots of problems of higher manufacturing cost and that's why the final product of this sector sells at high price in international market which ultimately affects the demand. To raise the demand for this sector should enter in the new technology word. As we know that Bagru is very unique to produce eco-friendly products, nowadays some of the renowned companies have introduced eco-friendly machineries like green hanger and TS3-1600

etc. can be used in cost effective tools.Bandhani sector is also involved in the production of printing textiles. This sector uses handmade printing process like Bagru sector .Hydro machine and sewing machines they are already using but this sector is not acquainted with the new technology of sewing, multi needle technologies like MD Cop, SAN 6 GEBEDUR, wrapping machines, Alpha 8, ozonorum, and Usha international. This sector should be promoted for the training programmes offered by NITRA, ATDC, and OGTC so that this product could be cheaper at the international market. By using effective technology this sector will able to enhance its demand.The use of technology in the apparel industry will lead to the result of cost-effectiveness, innovation, time-saving, higher productivity, higher efficiency, accuracy, and environment protective.

IV. FUTURE OF TECHNOLOGY TRANSFER IN PRINTING APPAREL INDUSTRY IN RAJASTHAN:

Rajasthan is the hub of printing apparels and largely involved in the production of printing textiles. This sector has demand in international market but because of high prices this is not growing as compared to other sectors. Contribution of Rajasthan apparel exports is only 0.75% in overall apparel exports of India. Dye star and ATE are involved in dying and block printing technologies in Rajasthan and other technologies are also establishing the market here gradually. If printing textiles will move for new technologies will have tremendous advantage in future market and demand. Foremost this sector can reduce its cost which is the main drawback of this sector. With the lower prices this can increase the demand. Second most this sector offers eco-friendly product like Bandhani and Bagru creates a good impact in international market, such new ecofriendly technologies can make them more effective among buyers and international competition. China is the biggest competitor of us and offers the product at very lower prices but we offer quality and we can be able to reduce our cost too by using the these technologies. Yes it's true we have specialty that we produce handmade product, but still for apparels we need sewing technology, cutting process, hydro machines, ozonorum, multi needle and CAD technology.

V. REVIEW OF LITERATURE:

Sujit Bhattacharya and PradoshNath (Using Patent Statistics as a measure of "Technological Asseriveness': A China-India comparison, 10 July 2002), discussed about the technological assertiveness of India and China by using patenting as a strategic act for protection of respective trading interest. Patenting activities (in the US) of both these countries in the pre- and post-WTO period have been analysed for this purpose. The analysis suggests that India, although has covered much ground vis-à-vis China in patent-related activities, is yet to activate the process of utilization of the patented technology for economic benefit. They further said that India needs a long-run trade-related technology strategy for creation of economic wealth from patent. They further reveal that the technology based economic growth has been one of the prime factors in creating wealth of nations. Present study is also focused on the technological transfer and impact analysis of technology on the growth of printing apparels. The study reveals the patent effects on the growth of printing apparels.

Danish A. Hashim(COST & PRODUCTIVITY IN INDIAN TEXTILES:POST MFA IMPLICATIONS,November 2004) revealed about pricing, technological change to analysing productivity of textile marketing. Present study is involved to assess the export performance of printing apparels by taking the indicators of pricing and technological change.

VI. RESEARCH METHODOLOGY:

A. *Research Design*

Causative and experimental research design has been taken for analyzing data.

B. *Hypothesis*

H0: There is no relation between Technology and growth of Export market of Sanganeri Printing Apparels in Jaipur.

H1: Growth of Export Market is significantly affected factor of Technology in Sanganeri Printing Apparels in Jaipur.

H0: There is no relation between Financial Crisis and Technology of Export market of Sanagner Printing Apparels in Jaipur.

H1: Technology of Export Market is significantly affected factor of Financial Crisis in Sanganer Printing Apparels in Jaipur.

C. *Sample Size*

100 Export Companies were taken from Jaipur who deals with exporting of printing apparels

D. *Data Collection*

Data collection has made with sample survey through questionnaire. The questionnaire is based on open and close ended questionnaire.

E. *Study Period*

Study has chosen the study period from year 2005 to year 2010.

VII. ANALYSIS:

Descriptive Analysis

Table I. Exportvolume2005

	Frequency	Percent	Valid Percent	Cumulative Percent
Low	67	67	67	67
Middle	28	28	28	95
High	5	5	5	100
Total	100	100	100	

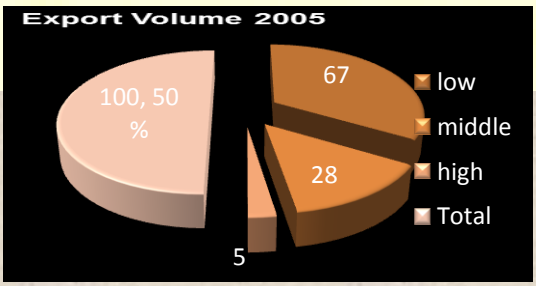


Figure 1

Table and Figure shows Export volume 2005. This reveals that out of 100 companies 67 % were involved in the low category of export whereas only 5% were doing higher level of export.

Table II. Exportvolume2006

	Frequency	Percent	Valid Percent	Cumulative Percent
low	20	20	20	20
middle	50	50	50	70
high	30	30	30	100
Total	100	100	100	

Table and Figure shows the Export volume 2006. The percentage of export companies increased in the category of higher export with 30% whereas only 20% were involved in the low category of export volume.

Table III. Exportvolume2007

	Frequency	Percent	Valid Percent	Cumulative Percent
low	63	63	63	63
middle	31	31	31	94
high	6	6	6	100
Total	100	100	100	

Table and Figure shows that 63% companies were found that they were doing low level of export in year 2007 whereas only 6 % were able to do high export. This has happened because of the impact of financial crisis on the international business of India.

Table IV. Exportvolume2008

	Frequency	Percent	Valid Percent	Cumulative Percent
low	84	84	84	84
middle	10	10	10	94
high	6	6	6	100
Total	100	100	100	

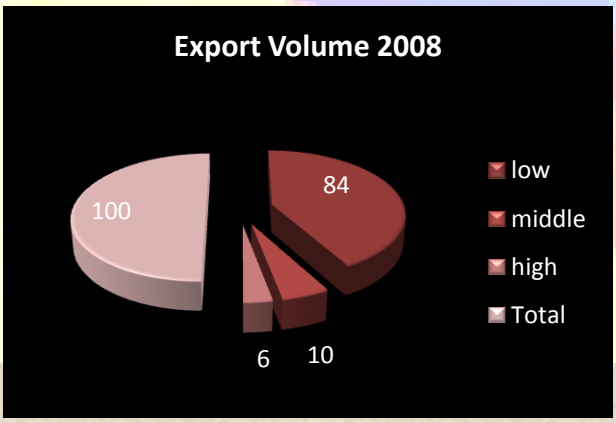


Table and Figure reveals that more companies were listed in the low level of exports and 6% were able to do higher level of exports.

Table V. Exportvolume2009

	Frequency	Percent	Valid Percent	Cumulative Percent
low	3	3	3	3
middle	14	14	14	17
high	83	83	83	100
Total	100	100	100	

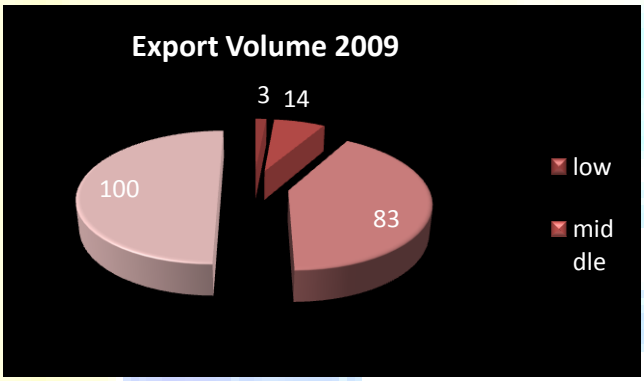


Table and Figure shows that in year 2009, the condition has been improved. Due to the innovation and technology progression 83% of companies were able to do higher level of exports.

Table VI. Exportvolume2010

	Frequency	Percent	Valid Percent	Cumulative Percent
low	2	2	2	2
middle	18	18	18	20
high	80	80	80	100
Total	100	100	100	

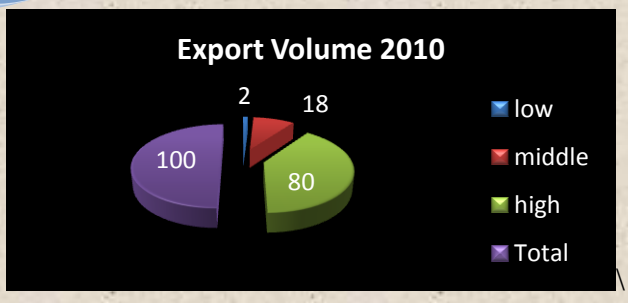


Table and Figure reveals that now we are out the impact of financial crisis and export volume has been increased in the category of higher exports. Only 2% companies were doing low level of exports. This tremendous change has been recorded due to technology, innovation, and new markets which has been discovered instead of USA and European Union.

Table VII. Useof Technology2005

	Frequency	Percent	Valid Percent	Cumulative Percent
low	88	88	88	88
middle	4	4	4	92
high	8	8	8	100
Total	100	100	100	

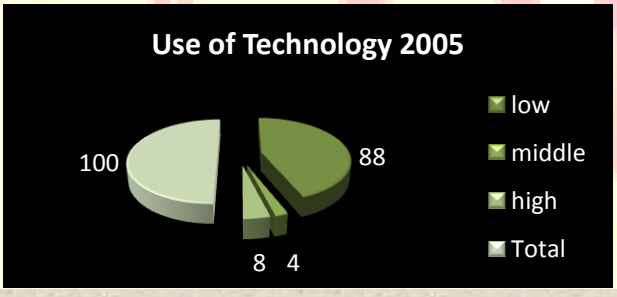


Table and Figure shows that 88% companies were using less of technology in the manufacturing process in sanganeri printing apparels whereas still 8% were using technology more.

Table VIII. Useof Technology2006

	Frequency	Percent	Valid Percent	Cumulative Percent
low	7	7	7	7
middle	82	82	82	89
high	11	11	11	100
Total	100	100	100	

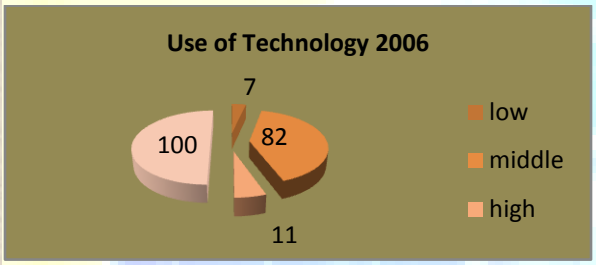


Table and Figure reveals that only now more of the companies of printing sector is involved in the use of technology but still not the much advanced technology.

Table and Figure shows that 82% companies were using the technology but in the middle level mean they were using very simple technology like hydro machines, and sewing

Table IX. Useof Technology2007

	Frequency	Percent	Valid Percent	Cumulative Percent
low	30	30	30	30
middle	52	52	52	82
high	18	18	18	100
Total	100	100	100	

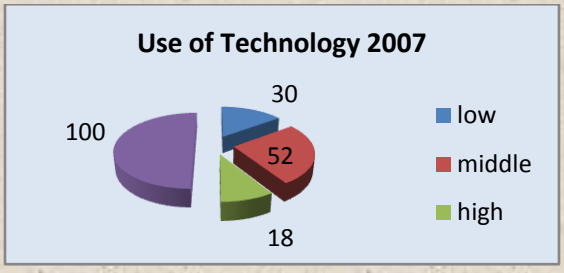


Table and Figure shows that in year 2007 30% were companies using low level of technology whereas only 18% were using high level of technology. Only 11% companies were using high and advanced technologies in their production process.

Table X. Useof Technology2008

	Frequency	Percent	Valid Percent	Cumulative Percent
low	29	29	29	29
middle	56	56	56	85
high	15	15	15	100
Total	100	100	100	

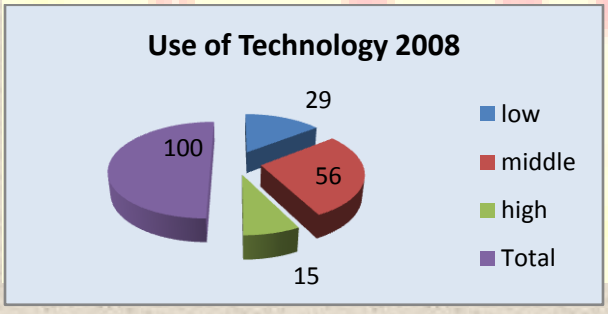


Table and Figure reveals that in year 2008 due to the financial crisis 29 % companies were using old technologies even using only handmade and old technique of production whereas only 15% were using high and advanced technology.

Table XI. useoftechnology2009

	Frequency	Percent	Valid Percent	Cumulative Percent
low	2	2	2	2
middle	38	38	38	40
high	60	60	60	100
Total	100	100	100	

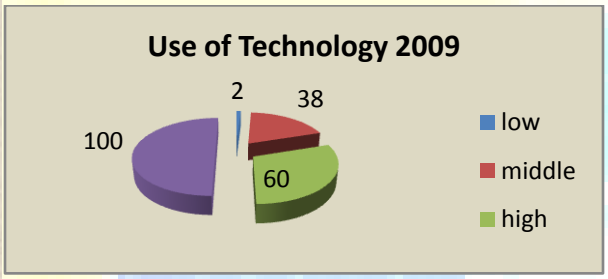


Table and Figure reveals that in year 2009 all the companies realized to increase the use of technology to increase the volume of exports as the result of this 60% of the companies were using now more advancement of technology

Table XII. useoftechnology2010

	Frequency	Percent	Valid Percent	Cumulative Percent
low	2	2	2	2
middle	17	17	17	19
high	81	81	81	100
Total	100	100	100	

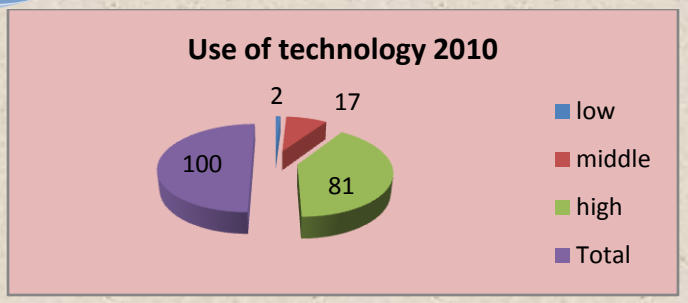


Table and Figure reveals that in year 2010 the volume of exports has been increased due to the boom and use of higher technology. Now 81% companies were using high technology in their manufacturing of goods.

Statistical Analysis

ANOVA

Exportvolume2005

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	6.912	2	3.456	12.581	.000
Within Groups	26.648	97	.275		
Total	33.560	99			

The table above shows high significant result between export volume 2005 of sanganeri printing apparels and use of technology. This shows that export volume of these companies were high in those companies where use of technology was more and advanced.

Exportvolume2006

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	10.192	2	5.096	12.737	.000
Within Groups	38.808	97	.400		

Exportvolume2006

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	10.192	2	5.096	12.737	.000
Within Groups	38.808	97	.400		
Total	49.000	99			

The table above reveals the highly significant relation between export volume of 2006 and use of technology in that year. This shows that export volume of these companies were high in those companies where use of technology was more and advanced.

Exportvolume2007

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1.925	2	.962	2.699	.072
Within Groups	34.585	97	.357		
Total	36.510	99			

The table above shows the less significant result between export volume 2007 and use of technology because of the financial crisis. Due to the crisis effect there was lack of the demand in the market, technology was least affecting the export volume.

Exportvolume2008

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	3.521	2	1.761	6.661	.002
Within Groups	25.639	97	.264		
Total	29.160	99			

The table above shows the significant result at 955 level of confidence reveals that export volume 2008 and use of technology has significant relation. This further shows that in year 2008 increase in technology affects the level of exports more. But still this sector needs some innovations.

exportvolume2009

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	2.001	2	1.000	4.852	.010
Within Groups	19.999	97	.206		
Total	22.000	99			

The table above reveals the non-significant relation between export volume 2009 and use of technology in that year. This shows that this sector was using same level of technology and increasing the volume of exports. There could be other reasons of it like government policies, export promotion programmes, trade fairs, and new markets like Caribbean Sea countries and Latin America.

Exportvolume2010

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	12.075	2	6.038	64.462	.000
Within Groups	9.085	97	.094		
Total	21.160	99			

Table and Figure reveals that Export volume and use of technology in year 2010 has high significant relationship. This shows that those companies who are using high and advanced technologies are able to increase more export volumes in the international market.

Paired Samples Statistics

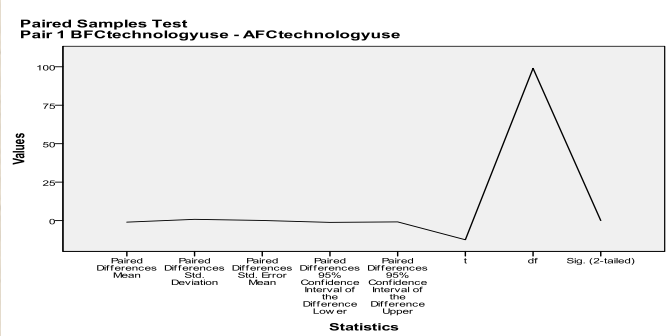
		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	BFCtechnologyuse	1.6600	100	.63913	.06391
	AFCtechnologyuse	2.6700	100	.53286	.05329

Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	BFCtechnologyuse&AFCtechnologyuse	100	.053	.602

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	BFCtechnologyuse - AFCtechnologyuse	-1.01000	.81023	.08102	-1.17077	-.84923	-12.466	99	.000



The result of paired sample t-test shows the highly significant relation at 99% level confidence. This further shows that before financial crisis the use of technology was less and after financial crisis the use of technology was more to increase the competitiveness, higher productivity and to do innovations and attract new buyers.

VIII. INFERENCES:

The use of technology plays a vital role to increase export volume as well as increase in demand. The study has shown the duration of 2005 to 2010. In year 2005 after elimination of quota system that was the challenge to these companies to get the revenue from international market. From year 2005 to 2006 the result of ANOVA shows significant relationship between use of technology and the export volume of these companies where as in year 2007 the result was less significant because of the effect global financial crisis. The impact of it was huge in year 2008 but some of the companies have started their production with the help of new technology and they speed up gradually their volume of export. But in year 2009 the result was not significant due to the changed dimension to increase the export volume. The new era of export marketing was new markets, innovations, government supports, joint ventures and trade fairs through export promotion cousils. The role of technology was least in overall growth due to the period of expansion.In year 2010 this sector has started with the growth and started to use new technology with joint ventures.

The result of paired sample t test focuses the level of use of technology before the financial and after financial crisis. This shows that before crisis the use of technology in sanganer printing apparels was lesser as compared to the after financial crisis. As the volume of exports are also more in year 2009-10 as compared to 2005-07. The use of technology also was more in year

2009 to 2010 as compared to the previous years. This shows as use of technology increases the level of export volume increases. The effect of crisis stimulates the use of technology and more advancement in the product with the joint ventures and the trade fairs in this sector.

CONCLUSION:

This sector has a vital role increasing the growth rate of India, but facing the competition of China, Pakistan, Bangladesh and Israel in the international market. The biggest threat of this sector is the pricing which is higher than other apparels of India as well as other countries. By adopting the technology and innovation this sector can reduce the level of cost and can decrease the prices in international market.

But this sector has special features to attract the international buyers and has lot of opportunities to increase the share with new markets like Caribbean Sea and Latin American countries. Now government is also moved to arrange trade fairs and promotion to this sector at the lower duty draw backs. Sanganer printing is an art of Rajasthan and one of the important sources of growth of the state. This should be kept carefully by following some favorable policies for artisans, technologies, innovation and financial support by the government so that this sector can grow completely at the international platform. Technology transfer becomes the important issue for this sector to enhance their efficiency in international trade. New technology and machineries can increase the productivity as well as quality. Slowly and gradually this sector is adopting new sewing machines, computer technology and graphics, ozonorum etc.

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