Advances in Consumer Research
https://acr-journal.com/
Volume-2 | Issue-4 | September 2025
Original Researcher Article

Role of Upskilling in Apparel Manufacturing Sector: A Pilot Study

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Received: 20-08-25
Revised: 25-08-25
Accepted: 09-09-25
Published: 20-09-25

ABSTRACT
Upskilling refers to enhancing the skills and knowledge of the workforce to meet current and future demands. In the apparel industry, upskilling is crucial for both individuals and organizations to thrive. By keeping the employees upskilled, the employees will have increased job security and career growth, enhanced confidence in adapting to new roles and technologies, higher earning potential. On the other side for corporates / employers they will have an improved productivity and quality, reduced turnover and higher employee satisfaction, stronger market position due to innovation and adaptability. Upskilling empowers the workforce to harness the potential of emerging technologies and sustainable practices, ensuring long-term success. For companies, investing in upskilling is not just a strategy but a necessity to remain relevant and competitive in a fast-evolving global market. Because of the trends in upskilling, future-ready workforce has gained prominence, emphasizing the importance of equipping employees with advanced technical, digital, and soft skills to navigate an increasingly automated and technology-driven manufacturing landscape. This study examines the critical role of upskilling in preparing the workforce within the South Indian apparel manufacturing sector. This paper highlights the economic implications of upskilling, including increased employability, higher wages, and improved working conditions to bridge the skill gap and align workforce capabilities with the demands of Industry 4.0, ensuring sustainable growth for South India's apparel manufacturing sector in the global market.

Keywords: Industry 4.0, upskilling, apparel manufacturing

INTRODUCTION

As the global economy evolves, the demand for a future-ready workforce capable of adapting to technological advancements and industry disruptions has become critical. India, with its demographic dividend of over 900 million working-age individuals as of 2023, is uniquely positioned to harness its human capital for economic growth. However, the World Economic Forum (2020) estimates that by 2030, over 120 million workers globally may need reskilling due to the impact of automation and artificial intelligence. According to a Mckinsey report (2022), nearly 60% of manufacturing jobs in India could witness significant changes in required skill sets by 2035 due to automation. Upskilling has emerged as a critical strategy to equip the workforce for these challenges. A NASSCOM report (2021) indicates that only 48% of India's workforce possesses employable skills, highlighting the pressing need for structured training programs.

For India, the urgency to bridge skill gaps is particularly pronounced, given its aspirations to emerge as a global manufacturing hub. India is the world's second-largest producer of textiles and garments. It is also the fifth-largest exporter of textiles spanning apparel, home, and technical products. The textiles and apparel industry contribute 2.3% to the country's GDP, 13% to industrial production and 10.5% to exports. The textile industry in India is predicted to double its contribution to the GDP, rising from 2.3% to approximately 5% by the end of this

decade (Report of Indian Brand Equity Foundation – November 2024) around 45 million people are working in the textile business, including 3.5 million people who work on handlooms.

The apparel manufacturing industry in India, especially in South India, plays a pivotal role in the country's economy. In South India the key apparel manufacturing hubs are Tirupur, Chennai, Bangalore and Mumbai. Despite its labor-intensive nature, this sector is not immune to the pressures of digital transformation and sustainability mandates. The focus of the apparel manufacturing has started to shift towards integrating advanced manufacturing technologies, sustainable practices, and digital tools, ensuring that workers remain competitive in a globalized market.

The apparel industry is a dynamic and ever-evolving sector that requires constant adaptation to changing trends, technologies, and consumer demands. For keeping the existing workforce into future ready workforce, the concept of upskilling plays a pivotal role in ensuring that employees in this industry remain competitive, innovative, and productive. This industry relies heavily on human labour, especially in areas like stitching, designing, and quality control, fast-paced growing trends. Since fashion trends change rapidly which always demand quick turnarounds in design and production and global supply chain. The Apparel production involves sourcing raw materials from one region, manufacturing in another, and selling worldwide. Technological Integration - Advancements such as AI-driven design, 3D modelling, and automated sewing machines are reshaping the industry. Hence the organizations, employees and the Government bodies need to embrace themselves with the anticipated changes to keep the workforce ready for future requirements.

UPSKILLING REQUIREMENTS IN THE APPAREL INDUSTRY FOR FUTURE WORKFORCE

In the apparel manufacturing industry, several jobs will require upskilling due to advancements in technology, automation, sustainability practices, and changing consumer demands. Here are some key roles that are likely to require upskilling:

1. Pattern makers requires to be mastery of 3D software, digital pattern making, and advanced CAD (Computer-Aided Design) tools as the traditional pattern making is increasingly being replaced or augmented by digital tools, and there is a growing demand for skills in 3D modelling and virtual sampling to improve accuracy and reduce waste.
2. Sewing machine operators require to upgrade themselves in operating automated and robotic sewing machines, as well as familiarity with smart manufacturing processes as the automation and robotics are transforming production lines.
3. Production managers need to be upskilled in the stream of Data analytics, AI for predictive maintenance, and understanding of Industry 4.0 concepts (iot, AI, and machine learning) as the system is becoming more data-driven which demands the managers to use advanced tools to optimize workflows, reduce waste, and manage real-time production insights.
4. Quality Control inspectors to have familiarity with AI-driven quality control systems, automated defect detection tools, and data analysis software.
5. Supply Chain and Logistics managers need to have knowledge of digital supply chain technologies (e.g., block chain, RFID), data analytics, and sustainable sourcing because as the industry moves towards more transparent and sustainable supply chains, these managers must adapt to new tools and practices to ensure efficient and sustainable operations.
6. Designers requires to be masters of 3D design tools, Computer-Aided Design (CAD), Virtual Reality (VR) tools, and sustainable design practices. Because designers must adapt to digital fashion creation, virtual prototyping, and sustainability-focused design, where eco-conscious material sourcing and production methods are a priority.

Apart from the above designations, there are several other designations in garment industry such as garment checkers, fabric checkers, cutting layers, fusing operators, printing M/C operator, edge seaming, Pressing, interlining operators etc. Majority of the apparel manufacturing process depends on the sewing machine operators. The Attrition rate of the technical designations such as sewing machine operators, garment checkers etc stands to be 12%-23% highest when compared to any other designation in any other industries. Hence upskilling is understood as one of the important options to keep them retained in the current business scenario.

There are various methodologies being followed for upskilling by participating or conducting workshops and seminars which gives them focused training on specific skills, online courses which provides them flexible learning options through platforms like Coursera or linkedin learning. On-the-Job training by practical exposure to new tools and processes, partnerships with educational institutions to have collaborations and creating specialized training programs. Mentorship programs by leveraging experienced professionals to guide newer employees. Industry 4.0 is revolutionizing the entire manufacturing processes which has a powerful impact on globalization by changing the workforce and increasing access to new skills and knowledge.

Samarth (Scheme for Capacity Building In Textile Sector) by Ministry of Textiles

Samarth is a flagship skill development scheme (Executed by Ministry of Textiles) approved in continuation to the Integrated Skill Development Scheme for 12th Financial Year Plan by Cabinet Committee of Economic Affairs. The industry as discussed above is facing a massive shortage of skilled workers. To address the issue, Central government of India has launched Scheme for Capacity Building in

Textile Sector (SCBTS) and named it SAMARTH Scheme. The objectives of the scheme are to provide demand-driven, placement oriented skilling programme to incentivize the efforts of the industry in creating jobs in the organized textile and related sectors to promote skilling and skill up-gradation in the traditional sectors through respective sectoral divisions/organizations of Ministry of Textile; and to provide livelihood to all sections of the society across the country. The Scheme would target to train 10 lakh persons (9 lakhs in organized & 1 lakh in traditional sector) over a period of 3 years (2017-25) with an estimated budget of 1300 crore.

Recognitions of Prior Learning (RPL) by ATDC (Under Ministry of Textiles) – PMKVY:

The RPL project of ATDC is helping human resources of the Apparel Sector who could not acquire formal training or education but have attained a skill for the particular job through their work experience only. RPL is fulfilling the shortage of skilled manpower by mapping the skill sets of these unrecognized workers in a particular job. In absence of formal training & formal Degree or Diploma, the people working in apparel sector even though skilled are not considered for related status. Due to the absence of formalized training; these workers may have many skill gaps for the Jobs they are performing. Also, the existing skill strength has not been utilized to its full potential due to this unrecognized status and unknown skill level. RPL helps them to get the Skills gap filled and map their skills with NSQF standards and provide them with AMHSSC-NSDC, MSDE certificate which has global recognition. RPL Supports the Employees / Employers by helping to fill up the skill gaps required for the workforce, assesses the skill level of the workers thereby helping the industry in getting the skill matrix of their workforce thereby helping them in the effective allocation of work to these workers, workers have imparted life skills through the Soft Skill modules integrated into the orientation & training and finally the major components is upskilling of workers, which help the workers to adopt the use of new process, methods and technology.

Skill India Programs (Under Ministry of Skill Development & Entrepreneurship)

The Central Government launched the Skill India Mission in 2015 to prepare Indian youth from rural and urban areas for employment. It aims to empower India's youth by providing them with the necessary skills and training to increase their chances of finding work in various sectors. This also increases a person's productivity and knowledge. The initiative aims to educate over 40 million people and create a workforce by 2022. It accomplishes this by providing free courses and classes. The National Skill Development Mission considers the proceedings through a result-oriented structure that connects with modern business requirements. Technically, this scheme addresses convergence, institutional training, overseas employment, public infrastructure leveraging, and sustainable livelihoods

Apart from the above Programs there are Many Other Programs launched by the Government to Promote Skilling, Upskilling and Reskilling such as Deen Dayal Upadhyaya Grameen Kaushalya Yojana (DDU-GKY) initiative of the Ministry of Rural Development (MoRD), Naan Mudhalvan scheme by the State of Tamilnadu, Mahaswayam Portal by the State of Maharstra, TASK (Telangana Academy for Skill and Knowledge) is a not-for-profit organization that works with the primary aim of skilling youth and making them more employable and hence, curbing the unemployment rate in the State of Telangana, APSCHE (Andra Pradesh State Council for Higher Education) is diligently revolves around the convergence of Education, Skill, and Attitude, aimed at yielding not only promising employment prospects but also nurturing a burgeoning cohort of entrepreneurial talent. Additional Skill Acquisition Programme (ASAP) a Wing of the Department of Higher Education, Government of Kerala that focuses on skilling students and the general community to enhance their employability. All these indicate that the southern states are taking ample steps to keep their workforce as a ready for the future.

LITERATURE REVIEW

Rupam Jyoti Deka and Bhavika Batra (2016) "The scope of skill development, employability of Indian workforce in context of make in India: A Study" through secondary data the paper attempt to find out the effect of Make in India on employability and scope of skill development. The paper has discussed about ways of generating employment through make in India initiatives, relevance of skilled labour in manufacturing sector, various initiatives by Central & State Government on skill development, National skill development policy, and challenges relevant to skill development initiative. It concluded that to male make in India mission is successful by fulfilling the needs through formal education, vocational and technical training

Dr Reshma Sultana Ph (2022) "Post to the Covid,19 there are several calls for new skills to be developed which cannot be ignored and are likely to put the economy in peril, in form of loss of output, GDP, unemployment and the like. It therefore becomes imperative to explore the various aspects of up skilling and re-skilling which are likely required. Re-skilling and up-skilling will have to be done. That would take in our journey to make the economic development more sustainable and beneficial to various sectors of industry and also for maintaining sustainable living possible.

Santhosh Kumar Pandey & Shiv Sagar Vishwakarma (2024) The study critically examines reskilling and upskilling initiatives within the Indian industrial sector, focusing on their effectiveness, key determinants, and impact on workforce adaptability. Employing a case study methodology, the research evaluates government-led skill development programs, industry-academia collaborations, and private sector

initiatives. By identifying critical skills in demand across diverse industrial domains, the study sheds light on the dynamic skill landscape shaped by digital transformation

RESEARCH OBJECTIVES

- ❖ To understand the training needs for the skilled employees in the apparel manufacturing sector.
- ❖ To explore factors influencing upskilling.
- ❖ To examine the relationship between skilling initiatives and improvements in worker

LIMITATIONS OF THE STUDY

Results of the study are limited to the employees taken for the pilot study the recommendations may not be extended to others in the population.

DATA COLLECTION AND RESEARCH INSTRUMENT

This descriptive pilot study was conducted among the employees working in Apparel manufacturing industry of southern states Tamilnadu, Kerala, Andra Pradesh, Karnataka & Telangana. Eighty samples were taken on a convenient basis to collect the data on the questionnaire. The research questionnaire consisting of a series of 31 questions focusing the demography details and the experience of the employees on various upskilling programs. The questionnaire has been designed in 5 Parts, Part I to collect the demographic details of the respondents, part II consists of questions related to their previous work & training experiences on skilling / upskilling, part III to understand the monetary impact and personal perceptions of the respondents post to their trainings on upskilling, part IV to have their ratings on the training methods and their feedbacks and part V focusing on the necessary improvements if any is required.

ANALYSIS

Table 1 : Demographic details of the respondents

S. No	Variable		Frequency	Percentage (%)
1	Age	18 – 25	46	57.50%
		>25 Years	34	42.50%
2	Gender	Male	15	18.50%
		Female	65	81.50%
3	Education	No Education	7	8.75%
		Below SSLC	48	60.00%
		HSC	23	28.75%
		Graduate	2	2.50%
		Post Graduate	0	0.00%
4	State of Origin	Assam	14	17.50%
		West Bengal	26	32.50%
		Odisha	11	13.75%
		Jharkhand	8	10.00%
		Tamilnadu	12	15.00%
		Maharashtra	9	11.25%
5	Language	Bengali	26	32.5 %
		Assam & Odhia	25	31.25 %
		English	15	18.75 %
		Tamil	12	15.00 %
		Hindi	2	2.50 %
6	Job Roles Performed	Sewing	28	35.00 %
		Cutting	7	8.75 %
		Fabric	3	3.75 %
		Quality Checking	35	43.75 %
		Sampling	5	6.25 %
		Others	2	2.5 %
Source - Research Survey				

Table 1 indicates that majority of the respondents are in the age group of 18-25 (57.50%) and females are more in number (81.50%). Majority of the respondents have completed their higher secondary school education (97.50%) which means no under graduate education has been taken by the respondents citing various issues from their personal factors. 50% of

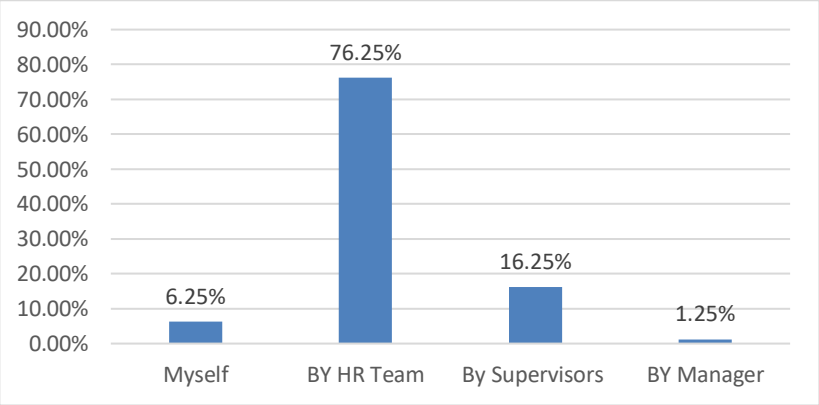
the respondents are from North East India and among them 63.75% of them speak Bengali / Assame / Odisha. Among these higher secondary school educated respondents more number of respondents are working in quality checking (43.75%) followed by sewing section by (35.00 %).

Table 2: Respondents working experience

S.No	Period	Previous Work Experience	How Long the Candidate is Currently Working in this Concern
1	< 1 year	46.25%	42.50%
2	1 - 3 years	42.5%	46.25%
3	3 - 5 years	10.00%	10.00%
4	>5 Years	1.25%	1.25%

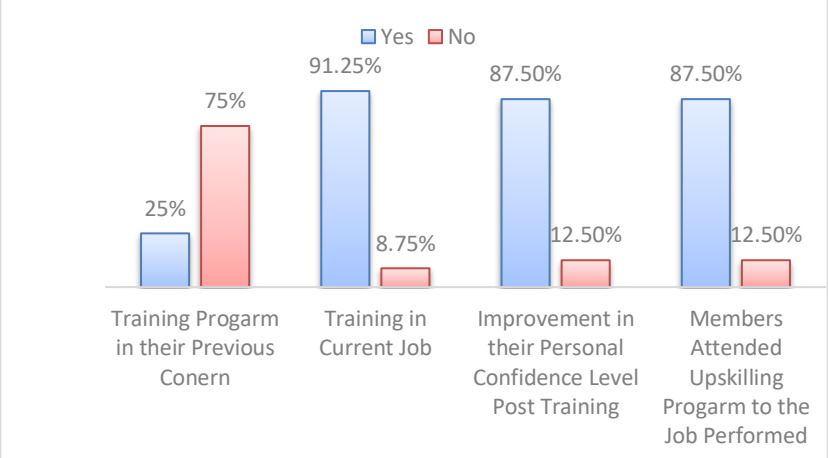
Table 2 exhibits that majority of the respondents (46.25%) have work experience about less than 1 year followed by 1 - 3 years (42.50%), 3 - 5 years (10.00%) and above 5 years (1.25%). Considering the experience in the present working organizations majority of the respondents (46.25%) have 1-3 years of experience followed by 42.50% of the respondents with less than 1 year, 10% of the respondents have 3-5 years of experience and above only 1.25% have more than 5 years of experience. This indicates the requirement for continuous training program for the employees to meet out the production requirement in terms of quality and quantity.

Figure: 1 Selection of training programs



The above figure depicts that majority (76.25%) of the respondents said that the training programs are selected majorly by HR Team. 16.25% of the respondents have taken this training because of their supervisors .1.25% of the employees were allocated for the training by their managers. 6.25% respondents have volunteered for such training programs and though it is small in number the mind set to train themselves is much appreciable one.

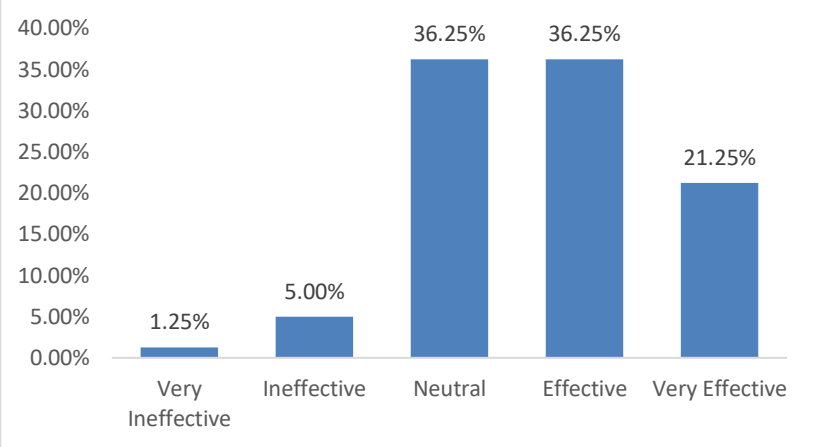
Figure 2: Training in their previous job & current job and results



From the above Figure it is inferred that majority of the respondents (75.00%) have not undergone training in their previous concern. 91.25% of the respondents has stated that they have attended training in their current organization.

87.50 % of the respondents said that the training has improved their work experience and their personal confidence level. 87.5 % of the respondents have communicated that they have attended upskilling programs related to their current Job.

Figure 3: Improvement in the skill set



The above Figure shows that majority of the respondents (57.50%) opined that they have improved their skill set which is resulting in speed & quantity of the work execution

The above table indicates that post to the upskilling training, improvements has been felt in majorly on higher salary aspect, more job offers, more financial security and finally it comes to improved working conditions.

Table 3: Respondents opinion on the benefit of upskilling

S. No	Monetary benefits post to upskilling	Very Relevant	Relevant	Neutral	Irrelevant	More Irrelevant
1	Higher Salary	23	25	24	27	0
2	More Job Offers	27	26	32	24	0
3	More Financial Security	15	8	7	22	0
4	Improved Working Conditions	15	21	17	7	0

Figure 4: Responses on job performance before and after upskilling

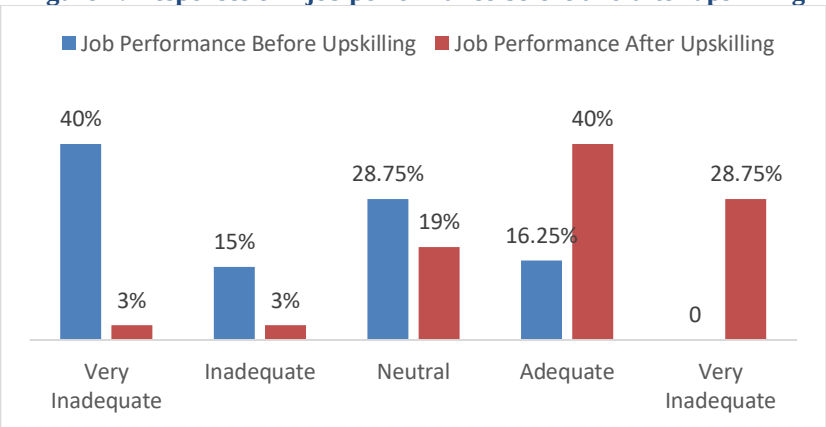
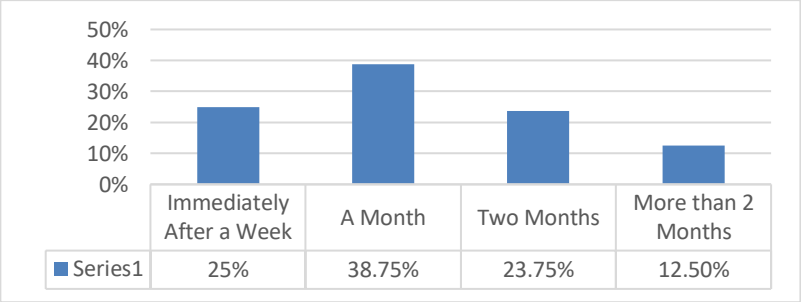


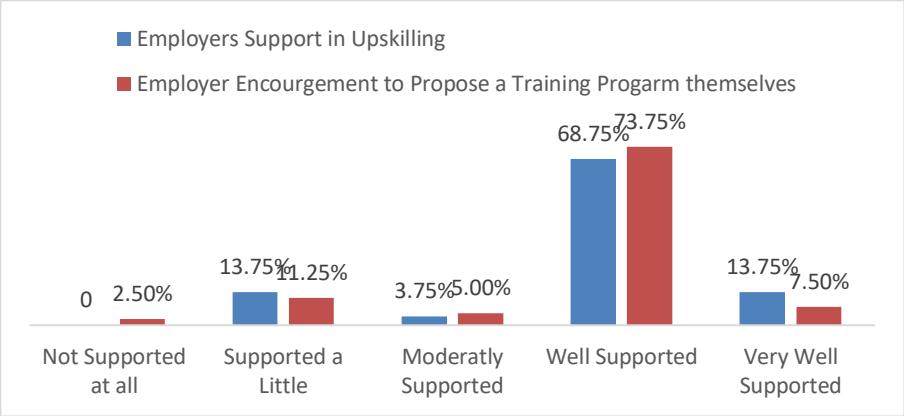
Figure 4 indicates that before upskilling 65% respondent's performance was very inadequate, and only 16.25% of them were able to perform adequately. 28.75% of the respondents were neutral in their opinion on performance before training. 28.75% of the respondents opined their performance improved after training 40% of them were able to perform adequately.

Figure 5: Time taken to increase productivity



Respondents around 25% respondents improved their productivity within a week time, 38.75 % of them in a month and 23.75 % respondents have taken two months to improve the productivity. A portion of respondents 12.50 % of have taken more than 2 months to exhibit the results.

Figure 6: Employer support and encouragement for developing the training program



The figure indicates that 68.75% respondents perceive that their employers are supporting the upskilling activities. 73.75 % of the respondents said that their employers encourage them to proposes training activity. 71.25% of the respondents are aware that Government schemes support the upskilling training.

Figure: 7 –Sharing upskilling training program feedback with colleagues

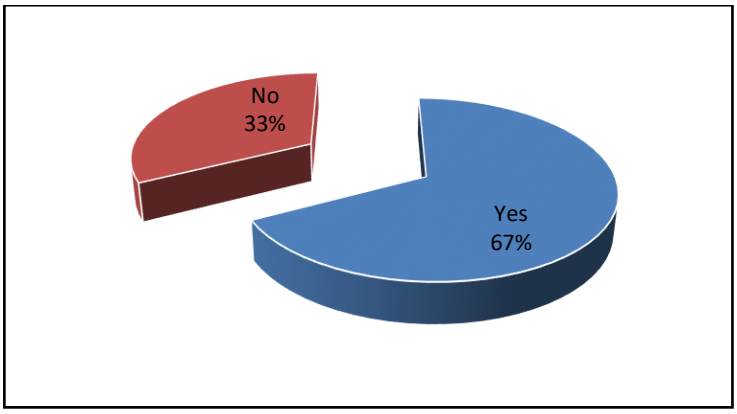
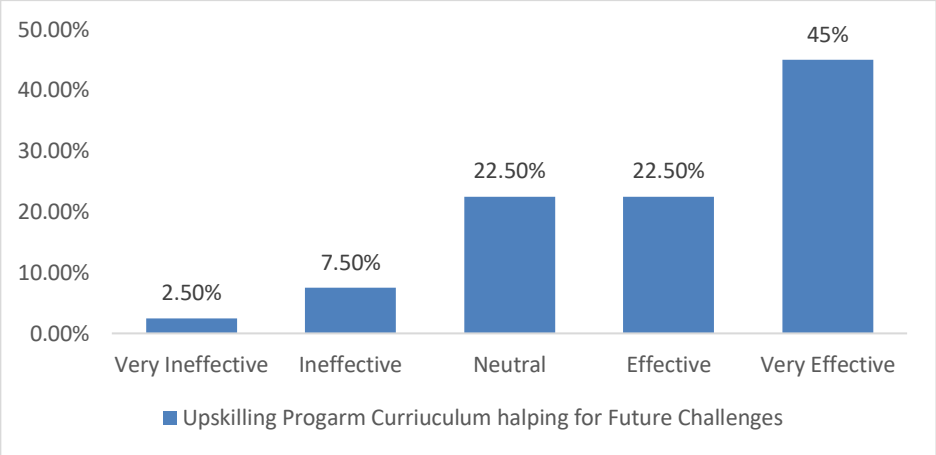


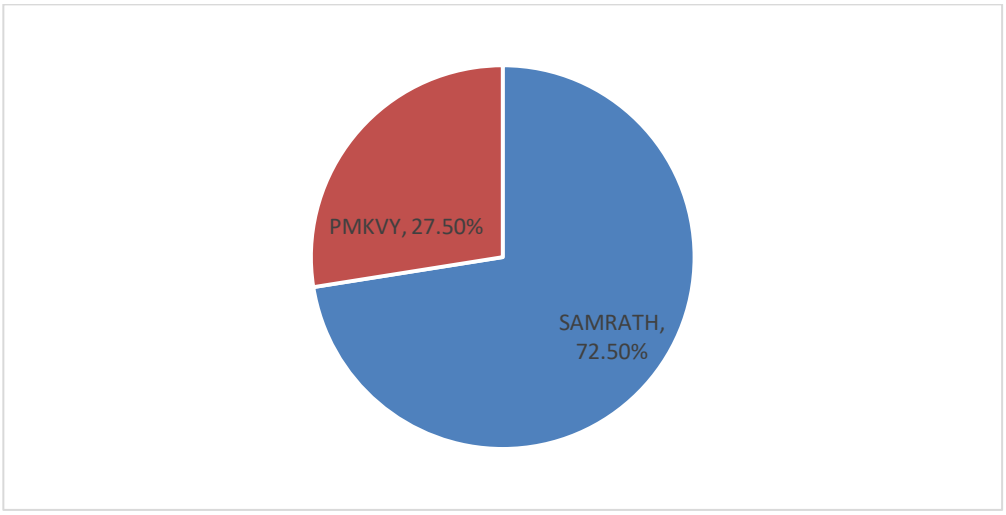
Figure 7 indicates that on post completion of training 67.50 % of the respondents says that the they have shared the training feedback to the colleagues / friends.

Figure 8 : Program curriculum towards future challenges



Majority of the respondents 45% have opined that the upskilling program curriculum helps them to prepare for future challenges.

Figure 9: Enrolment in upskilling programs introduced by Government of India



72.50 % of the respondents have been trained under SAMRATH Scheme and balance 27.50% respondents have been trained under various others schemes such as Skill India, PMKVY, NSDC, DDUGKY etc.

Table 4: Analysis of Variances job performance based on age, gender and education after upskilling program.

Hypothesis 1: There is no significant difference in the job performance after the upskilling programs among the respondents based on gender, age and education

		Sum of Squares	df	Mean Square	F	Sig.
Gender of the Respondents	Between Groups	9.717	4	2.429	73.744	<.001
	Within Groups	2.471	75	.033		
	Total	12.188	79			
Age of the Respondents	Between Groups	10.284	4	2.571	20.811	<.001
	Within Groups	9.266	75	.124		
	Total	19.550	79			
Education Level	Between Groups	45.317	4	11.329	24.534	<.001
	Within Groups	34.633	75	.462		
	Total	79.950	79			

The ANOVA results indicate that respondents differ in their job performance based on their gender, age and educational level. However, there is no significant difference among the respondents based on age and gender. The job performance significantly varies based on the education level of employees. This indicates that education help the respondents in understanding and developing the skills.

Table 5: Analysis of Variances on productivity after upskilling among the respondents based on age, gender and education.

Hypothesis 2: There is no significant difference in the productivity based on gender, age and education after upskilling.

		Sum of Squares	df	Mean Square	F	Sig.
Gender of the Respondents	Between Groups	6.448	4	1.612	21.067	<.001
	Within Groups	5.739	75	.077		
	Total	12.188	79			
Age of the Respondents	Between Groups	11.825	4	2.956	28.699	<.001
	Within Groups	7.725	75	.103		
	Total	19.550	79			
Education Level	Between Groups	33.439	4	8.360	13.480	<.001
	Within Groups	46.511	75	.620		
	Total	79.950	79			

There is difference in productivity post to the upskilling based on gender and age of the respondents. The table indicates there is a notable difference in the productivity based on the education level. Therefore, the hypothesis is rejected and it is inferred that though the training are related to improve the skills the education has its own impact on acquiring skills required to perform the job.

FINDINGS

Majority of the respondents are in the age group of 18-25 and females are more in number Majority of the respondents have completed their higher secondary school education which means no under graduate education has been taken by the respondents citing various issues from their personal factors. 50% of the respondents are from North East India and they speak Bengali / Assame / Odisha. Higher secondary school educated respondents are employed more in quality checking followed by sewing section.

Majority of the respondents have work experience about less than 1 year followed by 1 - 3 years which indicates the requirement for continuous training program for the employees to meet out the production requirement in terms of quality and quantity

The training programs are selected majorly by HR team and a small portion of the respondents have taken this training because of their supervisors. There is a scenario of respondents have volunteered for such training programs and though it is small in number the mind set to train themselves is much appreciable one.

The respondents who have less work experience are under upskilling as it is mandate to perform the job. Such upskilling activities are increasing their work experience and their personal confidence level. Almost all of them have attended upskilling programs related to their current Job. Post to the upskilling training, improvements has been felt in majorly on higher salary aspect, more job offers, more financial security and finally it comes to improved working conditions. There are respondents who have improved their productivity within a week time and rest of them have taken a month and two months to improve the productivity. Respondents perceive that their employers are supporting the upskilling activities encourage them to proposes training activities. The respondents have been trained majorly under SAMRATH Scheme others schemes such as Skill India, PMKVY, NSDC, DDUGKY etc. Though the respondents differ in their job performance based on their gender, age and educational level, it varies significantly based on the education level of employees. This indicates that education help the respondents in understanding and developing the skills effectively.There is a notable difference in the productivity based on the education level and it is inferred that though the training is related to improve the skills the education has its own impact on acquiring skills required to perform the job.

CONCLUSION

The study concludes that the majority of the respondents have participated in the upskilling training programs have shown predominant improvements in the productivity post to the training activity which is resulting in the improvement in economic conditions alongside with improvements in their job security, and improvements to the working environment. The Indian government has shown various initiatives for promoting skilling, reskilling and upskilling for the past several years through various ministry's such as MoT, MORD, etc. Due to this the employees are getting accessed to more employability skills and enhancing the productivity skills. The results of the study states that the curriculum of the upskilling is found to be very effective in enhancing the skill sets of the employees. Not only that the encouragement of the employers to employees in participating the upskilling which is a welcoming practice where the employers used to resist the employees to take part in the training programs.

Apparel manufacturing sector is very niche market predominantly have the manpower issues on the availability of talent pool and the skilling level of the available & existing talent pool. To improve or to address this issue, central and state governments has launched various scheme to get rid of the issues for the past couple of years. On the employer's side the level of retention of employee, loss of skilled manpower, reduction of output, loss due to delay in the order execution etc are considered as major reason for focussing on continuous upskilling activities on various jobs. Employees who take up their careers in apparel manufacturing sector are required to upskill or reskill themselves continuously due to impact of AI / IoT systems. The impactful initiatives by the Central Government and

Employers on training and upskilling are helping the considerable amount population who take up their career in apparel manufacturing sector in their livelihood in long term. And it is evident that such programs are evolving as learning and development where the responsibility of learner is in higher side than of training and development which is perceived as employer's need.

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