

The Impact of Employee Engagement on Sewing Automation Success in Apparel Manufacturing in Sri Lanka

Employee
Engagement

Received 19 April 2021
Revised 10 February 2022
Accepted 13 May 2022

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Abstract

Most significantly, in apparel manufacturing, the introduction of sewing automation with strategic intention has improved productivity largely. Automation in apparel manufacturing was primarily considered as critical productivity enhancement approach and it can be argued that success of sewing automation may depend on astute employee engagement. Therefore, this paper intends to outline how employee engagement benefits sewing operation automation in the apparel industry to realize its successful outcomes. Thus, to conduct the research study on this topic, the researchers considered manual sewing operation at ABC Company, which was selected due to its low productivity and high rework leading to high costs. The outcomes of the research study are generalizable towards the apparel industry in Sri Lanka. Having conducted a comprehensive review of the literature and empirical studies; Employee Engagement, Employee Competency, Employee Motivation and Top Management Commitment have been selected as the independent variables and Sewing Automation Success is presented as the dependent variable. Results show that, developed conceptual model is accepted and a strong positive relationship between all the independent variables and the dependent variable (Sewing Automation Success) is established. The researchers used quantitative method and data collection by deploying a questionnaire to 196 operators, the result has been analyzed using SPSS version 27. The findings suggest a significant impact of employee engagement towards sewing automation. Recommendations stress that top management should focus on employee engagement providing career prospects to optimize their potential.

Keywords: Employee engagement, Apparel manufacturing, Automation, Motivation, Employee competency and Ready-made garments.



Sri Lanka Journal of Management
Studies

Vol. 3 – Issue II, 2021

pp, 53 – 69

ISSN (Online): 2792-1093

DOI: <http://doi.org/10.4038/sljms.v3i2.76>

Introduction

Manufacturing of ready-made garments enhanced enormous opportunities towards the global apparel market. Undoubtedly, to be competitive and explore more opportunities globally there are fewer alternatives in apparel industries to optimize productivity. Scholars define productivity as a relationship between labour input and output of industry (Rahman & Amin, 2016) and as a connection with innovation input versus industry output. According to Mairesse et al., (2012) R&D, innovation and new knowledge are strongly aligned with an industry's productivity.

Undoubtedly, considering many repetitive tasks typical of the apparel manufacturing operations, adoption of automation of some processes can improve productivity and quality. Thus, the modern apparel sector is steadily moving towards automation by gradually adopting state-of-the-art manufacturing techniques. According to Bheda (2002), technological adaptation in Asia region compared to western hemisphere is low, indicating great potential to optimize performance by employing latest technology. As per Papoutsidakis et al., (2019), automation improves productivity whilst optimizing total operational efficiency, giving companies an advantage over competitors (Mastamet-Mason and Ogembo-Kachienga (2012). Samarasinghe et al., (2015), argued that apparel sector must focus on competitive advantages in order to meet the expectations in the global apparel market.

A research study by Molfino et al., (2009), stressed on real life gap which arise due to many changes when dealing with materials handling, creating stitching defects like puckering and length variation whilst presenting solutions for practical difficulties with technical advancements. Undoubtedly, the findings of this case study directly contribute and exert influence on decision makers on manufacturing processes like toys, apparels, and similar operations to define appropriate level of automation. The criticality of automation was again iterated by the challenges forced upon many industries including the fashion and apparel market by the global Covid-19 pandemic due to lack of workforce.

As per the reviewed extant literature, employee engagement can be influenced by many factors. The focal point of this study is to assess the impact of employee engagement on sewing automation success. Literature review identifies elements like employee competency, motivation and top management commitment as independent variables, which are discussed in detail in the next chapter. The significance and expected knowledge contribution of this study will veer into three aspects; 1) in general, this study will draw attention to the employee's engagement as an important phenomenon for researching different contexts for analyzing sewing automation success 2) it will also aim at providing suggestions for further researchers as well. In the theoretical perspective it will contribute to developing a comprehensive understanding and application of previous research findings to correlate those phenomena and 3) in the practical aspect, this study will aim to provide guidelines to managers of manufacturing companies to identify possibilities to achieve the success of sewing automation by improving employee engagement. In this article, the first chapter will introduce the study where the background, purpose, objectives and significance are discussed. In the next chapter, a critical analysis of the literature is carried out based, on which the conceptual framework and the hypotheses have been

developed. Preceding chapters will discuss the methodology deployed, will present the results and future research direction before conclusion.

Literature Review

Employee Engagement – (EE)

Employee engagement can be expressed as constructive, energetic, and positive job-related frame of mind engaged by maintaining power of local and emotional energy (Shuck et al., 2017). Coupling of employees of an organization to the identity of the employee can accomplish establishment of job roles. According to the investigation by Gupta & Sharma (2016) an organizations' performance is correlated to and dependent on the degree of engagement of employees. According to Shrotryia and Dhanda (2020), the key success factors of high performing organizations are the creating of supportable culture of proper engagement and engagement strategies at workplace. According to Truss et al., (2013), work engagement experience determines the behavior of employees, which need to align with long-term company goals & expectations whilst improving performance and productivity of individual employee as well.

Philips (2016) revealed that employee engagement will be a strong backbone, which can bring tremendous advantages like increasing profits, better work environment, better product & services and high retention. As per Albrecht (2010), EE can vary from time to time depending on different driving factors such as, divers of engagement, personal disposition, motivation, engagement-driving behaviors that impact on personal outcome. According to Arrowsmith & Parker (2013) EE is an essential part of HRM, a commonly used ingredient in a cookbook of HRM. Employee Engagement is the outcome of a combination of practicability and co-constructional, moving away from a dual understanding of primary engagement and uniquely positioned to experience engagement with potential better communication. As per Lemon (2019) and Macey et al., (2011), EE leads to motivate each person to pay more attention, dedicate, and put more strength in the workplace.

Employee Competency (EC)

Asame and Wakrim (2018) say individual features such as knowledge, skill and attitude that humans obtain need to display a special performance level. According to Salman et al., (2020), ability and attitude can be identified as inflows and outstanding job performance, extraordinary outcome are the generic components of competency which establish that a positive relationship between employee competency and firm's performance exists Elbaz et. al., (2018). HRM can provide remarkable support towards company success with employee's competency (Otoo and Mishra., 2018). Meyer et al., (2015) asserts that organizations must focus on the essential areas of complicated entanglements, advance high-tech innovations and flexibility to intensify competitiveness at every time while Palacios et al., (2020) posits that, the relationship between customer satisfaction and employee competency can bring performance excellence.

Employee competency is one of the strongest device, which can drive towards the success of an organization (Bednárová, at al., 2015). Hence, building up the competency level of workers on different levels at the workplace is an essential requirement, as it can help attend positively on industrial issues with solutions to embrace the evolving global market conditions (Tisch et al., 2015). Competency in individuals is the most vital factor for better outcomes of any employee and therefore with the technological and innovation in various degree of automations, employee competency should be aligned to the different requirement levels (Staškeviča, 2019).

Employee Motivation (EM)

According to Bozovic and Bozovic (2019) identifying and understanding needs of employees while combining financial and non-financial incentives can influence people to work optimally. Essential and inseparable are personal motivation factors such as encouragement towards the job role and professional skill development, persuading pride towards the workplace (Kreye, 2016). However, Milne (2007) expressed that t incentive plans can be effective motivators to achieve the expected job outcome of any firm especially in manufacturing and collective bonus or incentives scheme may motivate and stimulate towards the intended outcome, and it will help organizations to perform a critical analysis of various levels of needs and expectations by collecting appropriate details of workers that need to be stimulated for better performance (Dobre, 2013). The case study of Cadbury Nigeria presented by Solomon et al., (2012) shows the connection between and the influence with incentive schemes and worker motivation in.

Employee motivation, money or rewards is not the only way to stimulate workers at work floor and thus, consideration is drawn to various other factors such as employee caring, personnel respect, providing opportunities to grow and work flexibility (Guillén, et, al., 2014) as well as individual attention and attraction in order to be successful and gain advantages of a changing management (Appelbaum, et al., 2018).

Top Management Commitment (TMC)

Top Management commitment, is the live or direct participation by the topmost management levels in different levels of organization towards its goals, objectives vision, mission, and values and the, management's commitment to implementation and evaluation of the same in a timely manner (Williams et al., 2014). As per Rodríguez et al., (2008) lack of commitment and involvement of the management on organizational goals and objectives especially the innovation process may not lead to success as workflow employees typically resist to engage and hence strong management commitment is required to keep the inter-departmental communication and to uphold and keep the firms' vision and mission. Leksono, et al., (2020) pinpointed that the TMC on implementation of supply chain activities ensure the required quality to meet the demand in time. Simrat and Parul, (2009) claim that, top management commitment provides an essential role in the process of embracing advance technology and information systems in the banking industry so that enhanced customer service can be provided effectively. Top management dedication and participation also contributes to effective product development resulting in high level of performance whilst ensuring quality and best practices (Mokhtar and Yusof, 2010).

Top management commitment can be varied in different cultural contexts (Wanninayake & Miloslava, 2012). Strong and high level of commitment derives humongous potential towards the success and insignificant commitment from the organizational top management leads only to minor developments (Rodgers et al., 1993). Daellenbach et al., (1999) TMC shows a significant role for enhancement of desired goals and objectives of the firms (Bashar and Hasin, 2017) and influences immensely towards both firm outcomes and worker engagement (Nasomboon, 2014).

Automation

Automation in Manufacturing is expressed as an assembly of technologies that empower automated manufacturing of multitudes of quality products (Viswanadham and Narahari, 2015). Automation has often been identified as the captive who attack on process of manufacturing, minimum attractiveness, yet can impact on world economy humongous. (Goldberg, 2012). Automation improves productivity whilst enhancing the product quality by reducing human errors and potential operational oriented mistakes during the process. (Suh, 2019). Automation can be described as acquiring the required production speed and accuracy at extreme high levels (Baker and Halim, 2007). According to Vashisht (2020) the process improvements with advance technology will affect labour productivity and result to minimize the cost allowing affordable prices (Nayak & Padhye, 2017). Sewing automation mainly contributes to two main aspects such as feeding and pick up of fabric as identical to human interaction on a sewing operation (Kudo, et. al., 2000). Automation helps to eliminate disturbances such as errors and enhance productivity, which impact positively towards the clothing industries (Santos, et. al., 2021). Automated assemblies and manufacturing are highly useful on the manufacture of tangible products, which required higher labour force and entail a sequence of processes such as materials inspection, materials handling, assembly lines and much more (Nayak and Padhye, 2018).

Association of Automation Success and Employee Engagement

Automation focusses on the process, not just the replacement of the human; it helps improve effectiveness and efficiency in order to deliver better performance. Both employees and machines need to interact as a team to accomplish greater expectations (Kavya & Saraswathi, 2018). Selection of which processes to automate is itself a cumbersome and lengthy process but the success of automation relies on clear definition of goals and engaged staff on the process. (Yu and Wilkerson, 2017). Further, Chin et al., (2019) argues that, automation and technological adaptations will not take over or replace workforces every time, as analytical results demonstrate negative results against effective automation and decrease labour demand due justification of high productivity and competitive advantages. Burnett and Lisk (2019) states that, proper people engagement leads to high performance from each individual and team. Therefore, the firm must evaluate and analyze employee feedback to understand the employee readiness change and automation. Automation systems redefined the existing job roles at workplace while removing non-productive tasks and integrating employees and creating new opportunities (Braganza, et al., 2021).

Based on the extensive literature review the author has identified several essential factors, which influence employee engagement in relation to sewing automation success and below conceptual framework was developed to measure and understand the significance of the individual independent variables against the dependent variable.

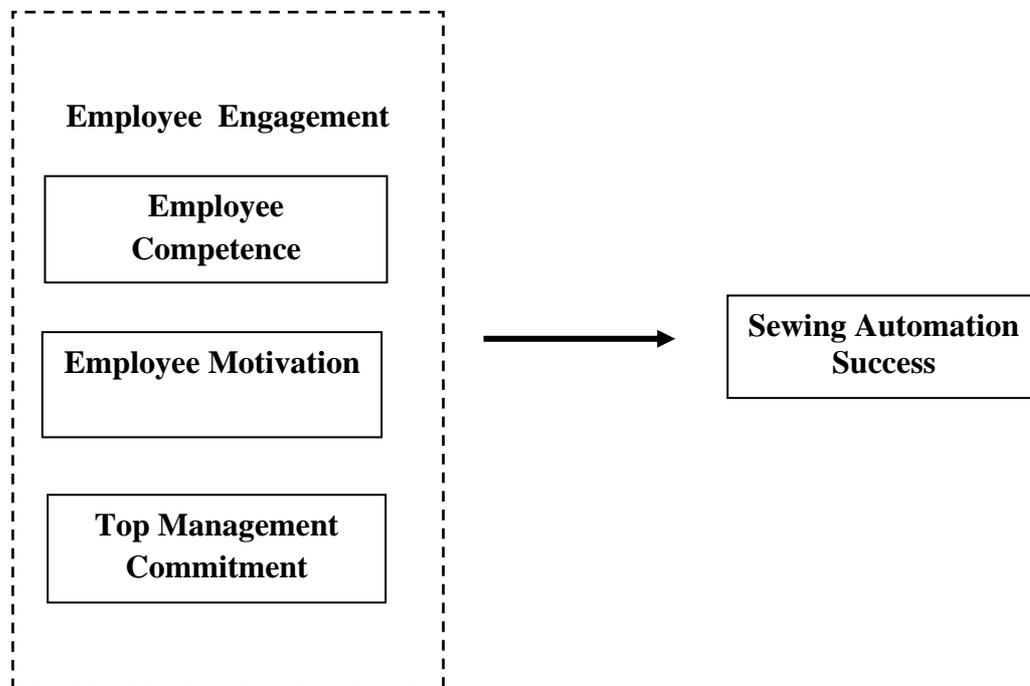


Figure 01. Conceptual Framework

Hypothesis

Chin et al., (2019) expressed negative results against effective automation in contrast to Vashisht and Rani, (2020) who are of the view that automation works as labour saving from automation utilized in productive approach. Accordingly, Braganza, et al., (2021) automation eliminates non-productive tasks and rest is integrated by creating new opportunities. Shrotryia and Dhanda (2020) state that, supportive culture of proper employee engagement is the key to the success of an organization, which will act as strong a backbone to the organization (Philips, 2016).

H1_a: There is a positive impact of employee engagement on sewing automation success in apparel manufacturing in Sri Lanka.

At varying degrees of automation different employee competency levels would be required (Staškeviča, 2019). Elbaz, et al., (2018) demonstrated a positive relationship between employee competency and firm's performance. RM activities to develop employee's competency is connected with the company success (Otoo and Mishra, 2018) and it is the strongest device that paves the way towards the success of an organization (Bednárová, et al., 2015).

H2_a: There is a positive impact of employee competency on sewing automation success in apparel manufacturing in Sri Lanka.

Bozovic and Bozovic, (2019) identified that, combining financial and non-financial incentives influence people at work.

H3_a: There is a positive impact of employee motivation and sewing automation success in apparel manufacturing in Sri Lanka.

Kreye, (2016) posits that high motivation encourages employees towards professional and skill development with direct impact on performance.

H4_a: There is a positive impact of top management commitment on sewing automation success in apparel manufacturing in Sri Lanka.

According to Nasomboon (2014), top management commitment influences the firm's outcome. Rodríguez, et. al., (2008) states that lack of management commitment and involvement in organizational goals and objectives especially may not succeed as people may resist engaging in the workflow. Top management's dedication resulted in high level of performance (Mokhtar and Yusof, 2010).

Methodology

The purpose of the study was to identify the relationship between employee engagements towards sewing automation in apparel industries whilst considering its consequences. Therefore, the author selected an apparel-manufacturing organization, which focused on sewing operations. The survey method examines the sampling of individual units from the large population and the necessary data collection is done by using an appropriate questionnaire with survey techniques. Considering the nature of the study, the developed operationalization model and quantifiable measurements were the desired output where descriptive research study was seen as the most appropriate.

The research deployed personally administered questionnaires to collect data in order to process appropriate analysis. The questionnaire consisted of three parts, 1) first part held six questions to collect general information of the respondents 2) second part comprised of 21 close-ended questions, which were constructed on a 5point Likert scale to measure responses to independent, and dependent variables 3) third part consisted of questions to collect demographic factors of the participants. The target population for this research study was sewing operational level employees of an apparel manufacturing sector in Sri Lanka. Accordingly, 384 employees were selected to the sample based on Morgan's sample calculation. Hardcopies of the questionnaire was distributed among the selected sample in the random basis and 196 completed questionnaires were received.

Findings and Discussions

The data analysis of this study consisted of three steps 1) a liability test was conducted initially where the questionnaire was administrated among 30 employees at a selected few companies to collect data and Cronbach's Alpha coefficient technics was used to validate the

questionnaire 2) evaluating the accuracy of measurements 3) analysis to determine the influence and impacts between variables and univariate, correlation, coefficient, regression, and multiple regression analysis performed using SPSS.

Reliability and Validity

To ensure reliability and internal accuracy of the research questionnaire, Cronbach's alpha was performed with SPSS. Table 01 below explains the values of Cronbach's alpha for two instruments, which presents internal consistency of each variable at a satisfactory level.

Table 01. Reliability Statistics (Cronbach's Alpha)

Construct	Dimensions	Cronbach's Alpha	Nos of items
Employee Engagement	Employee Competency	0.822	30
	Employee Motivation	0.850	30
	Management Commitment	0.806	30
	Employee Engagement	0.812	30
Sewing Automation Success	Sewing Automation Success	0.808	30

Source: Survey Date 2022

The results indicate that the Cronbach alpha coefficient for the variable employee competency is 0.822, employee motivation presents 0.850, top management commitment is 0.806, employee engagement shows 0.812 and automation success demonstrate 0.808. Thus, the questionnaire is accepted to direct the research questions.

Validity Test

Researcher deployed a validity test to measure the accuracy of the questionnaire by using average variance extracted and composite reliability, which are accompanied with quality of measurement.

Table 02. Validation Statistics

8	8²	γ	N	3
0.762	0.581	0.419	Average Variance Extracted	0.548895
0.864	0.746	0.254	Composite Reliability	0.780157
0.566	0.320	0.680		
2.191	1.647	1.353		

Source: Survey Data 2022

Researchers conducted validity test and obtained the above figure in Average Variance extracted and Composite Reliability at a satisfactory level.

Employee Engagement

Univariate analysis was performed in order to understand how significantly each independent variable interacts with each indicator by computing mean value and standard deviation.

Table 03. Univariate Analysis of Employee Engagement

Variable	Indicator	Strongly Disagree	Disagree	Average	Agree	Strongly Agree	Mean Value	Standard Deviation
Employee Competency	Technical ability	3%	19%	30%	31%	17%	3.40	1.07
	Communication Skill	1%	13%	27%	40%	19%	3.64	0.96
	Openness to change	2%	13%	34%	43%	8%	3.42	0.88
	Ability to learn	1%	15%	32%	41%	11%	3.46	0.90
Employee Motivation	Financial incentives	1%	12%	45%	45%	7%	3.45	0.84
	Skill development	1%	5%	31%	53%	11%	3.68	0.75
	Supervisor	0%	6%	32%	52%	11%	3.67	0.74
	Colleague	1%	6%	37%	42%	15%	3.65	0.82
Top Management Commitment	Cooperation	7%	26%	35%	28%	5%	2.98	0.99
	Trust	1%	27%	40%	31%	2%	3.07	0.82
	Communication	3%	21%	45%	29%	2%	3.06	0.84
	Funding and Provide infrastructure	2%	23%	33%	37%	5%	3.20	0.91
	Vision & Mission Statement	3%	21%	42%	28%	7%	3.14	0.92
Employee Engagement	Recognition	0%	2%	13%	54%	32%	4.15	0.70
	Career Opportunities	0%	1%	22%	44%	32%	4.08	0.76
	Pay	0%	2%	17%	54%	28%	4.07	0.72
	Internal communication	0%	0%	13%	48%	39%	4.27	0.67

Source: Survey Data 2022

Results demonstrate that employee engagement in the studied organization is at high level as the mean value is recorded above four for all indicators whilst the other indicators show a

medium level. Further, the standard deviation shows a high side in which majority of respondents answered the questionnaire positively.

Automation

To understand the significance between sewing automation success and its different indicators the below univariate analysis was deployed. Table 04 demonstrates statistically that each component of sewing automation is significant on its own right.

Table 4. Univariate Analysis of Automation

Variable	Indicator	Strongly Disagree	Disagree	Average	Agree	Strongly Agree	Mean Value	Standard Deviation
Sewing Automation Success	Productivity	0%	1%	14%	41%	44%	4.29	0.72
	Labour Cost	0%	2%	16%	35%	47%	4.28	0.80
	Quality enhancement	0%	1%	8%	39%	52%	4.43	0.66
	Time to market	0%	0%	13%	42%	45%	4.32	0.69

Source: Survey Data 2022

As per the descriptive analysis over the dependent variable it presents a high level mean value and standard deviation. This means that, most respondents answered the questionnaire positively.

Correlation Metrix

Correlation analysis can be deployed to measure the strength and relationships between two or more variables. Thus, authors employed the same to identify the possible connections and behaviors of employee engagement and sewing automation. Similarly, each element such as employee competence, employee motivation and top management commitment were considered against sewing automation to measure the strength and their relations. Table 05; provide the appropriate statistics against each individual factor for better understanding.

Table 5. Summary of Correlation Results

Employee Engagement and its elements examine for Sewing Automation	Pearson Correlation	Sig. (2-Tailed)	Strength of the Relationship to Sewing Automation
Employee Engagement	0.642 **	0.000	Very strong
Employee Competency	0.679 **	0.000	Very strong
Employee Motivation	0.607 **	0.000	Very strong
Top Management Commitment	0.646 **	0.000	Very strong

** . Correlation is significant at the 0.01 level (2-tailed).

Source: Survey Data 2022

According to table 05, correlation coefficient values between given two variables and accordingly employee engagement shows the “R” value is 0.642, which demonstrate there is a strong positive relationship between the said variables. Similarly, correlation coefficient values between employee competences and automation success presents “R” value of 0.679, which demonstrates a strong positive relationship between the said variables. Considering the correlation coefficient value “R” is 0.607 between employee Motivation and Automation Success which again expresses a strong positive relationship between the said variables. In connection with top Management commitment and automation success, the “R” value shows 0.646, which demonstrates a strong positive relationship between the said variables? Undoubtedly, considering each p values of each comment demonstrate 0.000, which is significantly lower than the alpha value of 0.5 whilst accepting the entire alternative hypothesis.

Regression Analysis

The author employed regression analysis to understand and identify the significance of the impact of the components towards sewing automation. Thus, below tables expresses the influencing factors on each other such as R square value, ANOVA and coefficient.

Table 06. Regression Analysis of Employee Engagement and Sewing Automation

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.814	0.662	0.655	0.30806

Note: Predictors: (Constant), Top Management Commitment, Employee Motivation, Employee Competency, Employee Engagement

Source: Survey Data 2022

Table 07. ANOVA Model

Model	Sum of Squars	df	Mean Square	F	Sig.	
1	Regression	35.535	4	8.884	93.608	.000 ^b
	Residual	18.126	191	0.095		
	Total	53.661	195			

a. Dependent Variable: Aotomation Success. b. Predicators. (Constant), Top Management Commitment, Employee Motivation, Employee Competency.

Source: Survey Data 2022

Table 08. Regression Model

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	
	B	Std. Error	Beta			
1	(Constant)	0.347	0.222	1.566	0.119	
	Employee Engagement	0.342	0.056	0.310	6.056	0.000

Employee Competency	0.252	0.046	0.252	5.485	0.000
Employee Motivation	0.250	0.041	0.302	6.079	0.000
Top Management Commitment	0.204	0.034	0.277	6.018	0.000

a. Dependent Variable: Automation Success

Source: Survey Data 2022

According to the above regression analysis table 6, it presents that R^2 value as 0.662 (66%). This means that, employee engagement has a strong positive impact or rather an influence on automation success. The model displays 66% of variance in employee engagement, whilst the rest of 34% variance on automation success could have been impacted by other factors. As per the ANOVA model which indicate the F value as 93.608 with the significant value of 0.000, which is less than 0.01.

Further, table 08, pointed out with coefficient model with β_0 (Constant) as 0.347 and β_1 (Employee Engagement) as 0.342 and the significant value as 0.000, β_2 (Employee Competency) as 0.252 with a significant value of 0.000, β_3 (Employee Motivation) as 0.250 and the significant value shows 0.000, β_4 (Top Management Commitment) shows 0.204 whilst presenting 0.000 as a significant value. Therefore, Automation Success = 0.347 + 0.342 (Employee Engagement) + 0.252 (Employee Competency) + 0.250 (Employee Motivation) + 0.230 (Top Management Commitment)

The constant value displayed as 0.347 tells that if the employee engagement indicators are assumed to be constant or zero, 0.347 increases the automation success. Moreover, the regression equation presents that there was a positive relationship among employee engagement factors and automation success.

Conclusions and Recommendations

The aim of this research study was to empirically observe the impact of sewing automation success on employee engagement of operational level employees in the apparel sector. As per the outcome of the study, it is proven that there is strong positive correlation between automation success and employee engagement. Further, independent variables could stress 41% of the variation on sewing automation success whilst 59% of the variation was not addressed by the variables as per this study. Moreover, rest of the variables, which were not considered for this study, can be considered as unknown variables in sewing automation success. This study disclosed that absence of employee competency, employee engagement and employee motivation have direct influence on sewing automation success, which can drastically impact meeting the expectation of the company's short and long-term objectives leading to high reworks, drop in productivity and demotivation. Top management commitment was less visible which highly impacted cooperation, vision, mission, and communication. Thus, the decision makers of the company should consider on these salient points to enrich employee engagement

whilst providing a supportive culture to achieve the objectives. Therefore, the research study concludes that employee engagement has an impact on sewing automation success.

According to the outcome, this empirical study satisfies the Hypothesis where the top management should focus on employee engagement whilst enhancing career opportunities to optimize their potentials. Gupta & Sharma (2016) argued on worker engagement towards outstanding industrial performance and business success. In addition, organizations should consider building up employee competency level, which impact positively on operational success. Since competency requirement level is aligned with, technology, innovation, and different levels of automations, Staškeviča (2019) state that decision makers should focus on effective training which provide high level of competency to their employees. Further, the management should focus on motivation as it provides positive impact on sewing automation success. In addition, the top management should commit up front whilst providing better two-way communication and healthy awareness on organizational vision and mission statement. Thus, provide common platform to escalate gaps, devotions and draw backs to attend on time, which obviously enhance employee engagement and better performance towards sewing automation success.

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