The Impact of Technology on Work Life Balances with Reference to Female Workers, Especially Team Leaders from Selected Garments in Ampara District

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ABSTRACT

In today's digital age, technology plays an essential role in work practices and employee well-being, especially in dynamic and stressful industries such as the apparel sector. This research examines the impact of new technologies—the Internet of Things (IoT), cloud computing, 3D printing, automation facilities, and big data analytics—on work-life balance (WLB) of female team leaders from selected garment factories in Ampara District, Sri Lanka. Sample size 86 was selected from the population through random sampling. The data was collected through structured questionnaires and analyzed using SPSS using reliability tests, descriptive statistics and regression analysis. Results showed that IoT, cloud computing, automation facilities, and big data analytics positively and significantly affected work-life balance, whereas 3D printing was the only technology not positively and significantly related in this case. Regression analysis showed that new technologies explained 61.9% of the variance accounted for WLB with IoT being the strongest predictor. In summary, these results highlight the importance of increased use of advanced technologies in the apparel sector which can enhance flexibility, provide support to stress, and enhance well-being. 3D printing cannot negatively affect WLB, however, as the use of 3D printing is not sufficiently utilized in operations. The study is an important contribution to the knowledge gaps regarding technology's contribution to maintaining a work life balance, specifically female workers in Sri Lanka's apparel industry. The study recommends that organizations focus on IoT, cloud computing, automation, big data analytics, and in the future: 3D printing as means of enhancing retention and satisfaction.

Keywords: Apparel sector, Technology, and work life balance

INTRODUCTION

In the fast-changing digital environment of today, technology has become a vital aspect of human life, altering the way we work, communicate, and engage socially. Technology's influence on work-life integration is one of its most significant effects. Work-life balance is raising concern among employees and employers in the apparel industry, ultimately for three reasons: women's involvement in the workplace, nuclear families, and the dual-working concept, all contributing to an imbalance in work and family obligations due to dynamic work-culture and lifestyle changes. Work-life balance has become a strategic concern for HR management and a significant underpinning of employee retention strategy.

This research paper looks at the relationship between technology, which encompasses personal computers, mobile phones, and other elements of information and communication technology (ICT) on employees work-life balance. Although many different policies and flexible scheduling were introduced, an increased workload, and work performance, which demands much of their job led to work-life imbalance. Therefore, advancement

in technologies can provide support to the employees to have a healthy workplace but it can also discourage employees from taking advantage of those options offered. (Coggin, 2012) concluded that the researcher evidenced greater use of technological applications in the apparel industries which also facilitate them to work at home, and not just the opportunity to work at home. Most of the organizations in the apparel sector in Sri Lanka were able to work from home during the uprising of COVID-19 pandemic as they have been advancing their technology. However, the current discovery contradicts some previous research that indicated a weak relationship proposed between Work-related technologies and WLB.

Problem Statement

Information and communication technology has become a key ingredient in many countries? Science and technology development and, as a result, there is a greater demand for them globally. Major industry players are finding it increasingly difficult to keep pace with the worldwide demand and technology. This opens up Sri Lanka to become a world ICT destination of choice, being able to cope with this growing worldwide demand. Therefore, Lakshani, (2020) concluded that a strong positive relationship exists between Work-related technology usage on WLB by generation y employees: evidences from executive level employees in the Sri Lankan apparel industry. Stokes (2019) also indicated a statistically significant relationship between technology tools used for work and life tasks, and technology-assisted supplemental work during the workday. The findings presented in this paper, indicate some inconsistency with some previously published findings that point to a weak relationship between technologies and WLB (Coggin, 2012).

In addition to this, (Hubbard, 2016) stated that Fifty-seven percent of participants indicated that they perceive an imbalance between work and life due to ICTs while 61% indicated that they believe ICTs help to facilitate the work-life balance. These percentages came from the descriptive statistics of the composite score which was developed from the survey items asking about work-life balance and also instructional faculty perceptions of work-life balance were approximately normally distributed with a slight negative skew. The slight negative skew of instructional faculty perceptions toward work life balance, as indicated in the research, might have a couple underlying reasons. Research performed by (Postman, 1982) has indicated that in the contemporary age technology plays a significant role in obtaining a work-life balance. In this Apparel industry that is providing direct employment to over 300,000 workers in Sri Lanka (Export Development Board, 2021). As indicated by Rajapakshe (2018), the apparel industry employs about 15% of the workforce and female workers account for 85% of the workforce. Even though apparel has a lot of advantages, the industry faces many challenges; one of these is dealing with the problem of high employee turnover.

In addition, most of the studies divulged possible reasons for the identified factors that affect work-life balance without reference to gender. Meanwhile, Sri Lankan apparel sector, usually cited for WLB inconsistencies (Embuldeniya, 2015; Dissanayake & Ali, 2013) was considered an appropriate context to explore the identified research gap. Research outcomes would shed some light on the influences of technology on work life balance with reference to women workers, specifically team leaders from selected garments in the Ampara District.

Research Questions

1. What is the effect of internet of things (IoT) on work life balance?
2. What is the effect of cloud computing on work life balance?
3. What is the effect of 3D printing on work life balance?
4. What is the effect of automation tools on work life balance?
5. What is the effect of big data analytics on work life balance?

Research Objectives

The main objective is based on the impact of technology on work life balance with reference to female workers, especially team leaders from selected garments in Ampara District.

1. To study the level of technology and work life balance in apparel sector?
2. Identify the relationship and effect of the technology on work life balance in the apparel sector.

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LITERATURE REVIEW

Work Life Balance

Work-life balance is defined as "the degree to which an individual is engaged in - and satisfied with - his or her work role and family role, both of which are equally important" (Greenhaus, Collins, & Shaw, 2003). Work-life conflict occurs when work and life are incompatible, such that work-related behaviours impede time with family and time with the family interferes with work (Harris, Harris, and Marrett, 2011). There are various forms of the term, such as work-family conflict and work-family balance that more specifically refer to how an individual' family and work lives interact. Overall, the focus of this work is to study the personal lives of employees in general.

Internet of things (IoT)

The application of IoT technology in the industrial value chain sets the stage for Industry 4.0. IoT is a comprehensive ecosystem of tools and services that must work cooperatively to provide a complete proposition. IoT has much potential and possible benefits in the textile and fashion retail industry; it allows more insights into customer needs and wants, better product assortment choices, better recommendations, better design (patterns, shapes, etc.), innovation, and more, which leads to new business risks and opportunities that need to be managed and governed appropriately (Chen, 2021).

Cloud Computing

Cloud computing has the potential to reduce IT operations and management costs (Damodaram, 2010). Cloud computing is a relatively new kind of internet technology that uses remote servers for data storage and computing. It offers resources, software products, and information on-demand to different devices and optimizes energy consumption (Ionescu, 2015).

3D Printing

3D printing is a process of producing three-dimensional objects created by laying down successive layers of material according to a computer-generated design. In garment factories, this will be used to build up layers of materials to create a three-dimensional part of a garment. When 3D printing is used in garment production, you can test the quality and performance measure of the product before committing to mass production which saves excess expense and waste (Percival, 2010). 3D printing is a capital and technology-intensive process which relies on little low-skilled labour, so for the future of apparel production, developed economies may have a productive advantage (Vanderploeg, 2017).

Automation

The current applications of this technology is in stitching automotive interiors, but it can subsequently be incorporated into clothing and other fabric products to produce higher quality products, gain a competitive edge, and decrease labour expenses (Chowdhury, 2020). In several aspects, the automation technologies are superior to human operators in efficiency, accuracy, affordability, and trustworthiness, and remains to be seen whether they take away the majority of human operators. Automation has fully exchanged human operators in some systems and partially in others, however the terminologies of completely exchanging with a human operator are at odds with appearances for number operating level and additional value level in garment factories (Akhtar, 2022).

Big data analytics

Big data analytics is a technology that allows the collection, manipulation, and analysis of vast amounts of varied data over the supply chain to produce knowledge and information (Rad, Oghazi, Palmié, Pashkevich, Patel, & Sattari, 2022). In daily operations, the apparel industry predominantly uses big data analytics to make important corporate decisions with customers, clients, and leaders (Nithya, Kusuma, & Muragaiah, 2022).

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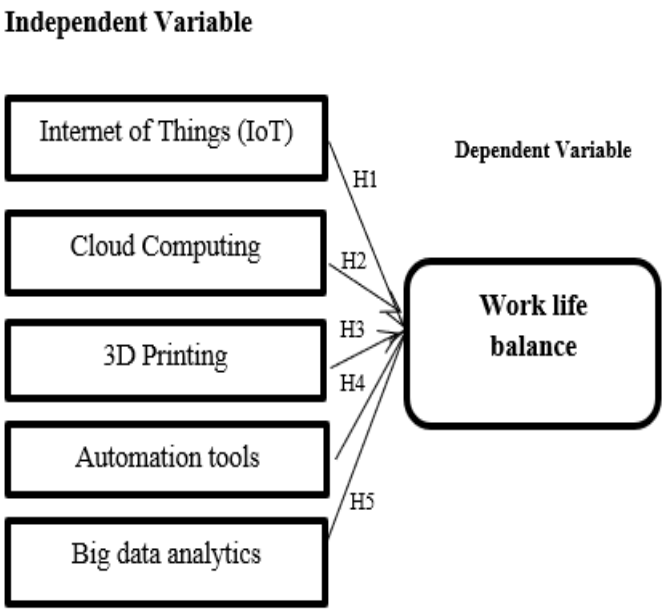
METHODOLOGY

The study's goal is to evaluate the influence of technology on work life balance regarding female workers, mostly team leaders from selected garments in the Ampara district. The researcher carefully selected a sample of 86 female team leaders from a population of 104 in the selected garments in Ampara district, Sri Lanka. The samples were randomly selected and the sample size was determined by using Krejcie and Morgan table. The respondents had a good grasp of the study's purpose and were asked to respond to qualitative questions to collect data. In summary, the study aims to examine technology impacts on work life balance. The results of this study provide many valuable insights to support work life balance in working environment.

CONCEPTUAL FRAMEWORK

Starting point of the survey altogether 92 questionnaires was given among that only 86 was properly filled and returned. This study therefore, intends to focus on 86 different age groups. The self-administered questionnaire each respondent examined included closed-ended questions using a Likert scale from zero to one. We asked each research planner potential subject to statistically analyze our data using SPSS. A literature reviewed based on hypothetico-deductive method resulted in following alternative hypotheses being operationalized, like Cohen (2013) regression analysis.

Figure 1: Conceptual Model



H1a: There is an impact between internet of things (IoT) and work life balance.

H2a: There is an impact between cloud computing and work life balance.

H3a: There is an impact between 3D Printing and work life balance.

H4a: There is an impact between automation tools and work life balance.

H5a: There is an impact between big data analytics and work life balance.

Data Analysis and Results

Reliability Analysis

Table I: Reliability Analysis

Variables		Cronbach's Alpha	Items
	internet of things (IoT)	0.765	4
	cloud computing	0.787	4
	3D Printing	0.783	5
	automation tools	0.781	4
	data analytics	0.767	5
	Work Life Balance	0.804	10

Cronbach's Alpha for technology rated high overall above 0.7, thus it is highly acceptable. As the obtained Cronbach's Alpha is considered high, permission to delete items is zero. In other words, the tool used by this study has achieved the acceptable internal consistency desired and stable for all statistical variables.

Sample Profile

Descriptive statistical analysis was run on respondents' demographic variables. The results are shown in the table.

Table Ii: Sample Profile

Demographic Variable		**frequency**	**(%)**
Marital Status	Married	32	37.2
	Unmarried	54	62.8
Age Group	Below 35	63	73.3
	35 and Above	23	26.7
Education	Ordinary level	33	38.4
	Advanced level	10	11.6
	Diploma	43	50.0
Experience	1 to 5 Years	67	77.9
	Less than 1Year	19	22.1

Among 86 respondents, everyone identified as female--the respondents had an entirely homogeneous demographic profile. With respect to marital status, while the majority of respondents were unmarried (54 respondents), there were also 32 who stated they were married. We note that 73.3% of respondents were less than 35 years old and 26.7% were at least 35 years old. In terms of education, 38.4% of respondents had completed education at the ordinary level, while only 50.0% of respondents had completed education at the diploma level, 11.6% of respondents had completed education at an advanced level. In terms of work experience, the highest number of respondents, which was 67 respondents, had 1 to 5 years of experience, with 19 respondents stating they had less than a year of experience.

Univariate Analyses

Table Iii: Univariate Analyses

Descriptive Statistics			
	N	Mean	Std. Deviation
Internet of Things	86	3.71	.749
Cloud Computing	86	3.60	.783
3D Printing	86	3.83	.712

Automation Tools	86	3.82	.794
Data Analytics	86	3.60	.783
Work Life Balance	86	3.77	.452
Valid N (listwise)	**86**		

This provides a summary of results of descriptive statistics of research variables, mean, standard deviation of dependent and independent variable. All of only research variables has been found high level mean value.

Regression Analysis

Regression analysis is a quantitative statistical analytical technique used to assess relationships between a dependent variable and one or more independent variables. In this study, the predictive variables were internet of things, cloud computing, 3D printing, automation tools, data analytics and the outcome variable was the work life balance.

Table Iv: Model Summary Of The Regression

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.787[a]	.619	.595	.287
a. Predictors: (Constant), Data Analytics, 3D Printing, Cloud Computing, Automation Tools, Internet of Things				
b. Dependent Variable: Work Life Balance				

The R value was 0.787, which means there is a strong positive relationship between the dependent variable and the independent variable. Additionally, the R-square value was 0.619, which means that 61.9% of the variation in Work Life Balance can be described by Internet of Things, Automation Tools, Cloud Computing, 3D printing, and Data Analytics.

Table V: Anova

The p-value from ANOVA table is less than 0.001, which means that at least one of the five variables depends

ANOVA[a]						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	10.731	5	2.146	26.011	.000[b]
	Residual	6.601	80	.083		
	Total	17.332	85			
a. Dependent Variable: Work Life Balance						
b. Predictors: (Constant), Data Analytics, Three D Printing, Cloud Computing, Automation Tools, Internet of Things						

on Work Life Balance.

Table Vi: Coefficient Regression

Coefficients[a]					
Model		Unstandardized Coefficients		t	Sig.
		B	Std. Error		
1	(Constant)	1.807	.187	9.647	.000

	Internet of Things	.493	.145	3.392	.001
	Cloud Computing	.343	.121	2.836	.004
	3D Printing	.116	.047	2.534	.015
	Automation Tools	.253	.064	3.977	.000
	Data Analytics	.129	.049	2.613	.000
a. Dependent Variable: Work Life Balance					

The equation: Work Life Balance = 1.807+ 0.493(Internet of Things) + 0.343(Cloud Computing) + 0.116(3D Printing) + 0.253(Automation Tools) + 0.129(Data Analytics)

Therefore, with every unit increase in the internet of things, the work life balance will increase by 0.493, with all the other variables held constant. For every unit increase in cloud computing, the work life balance increase will increase by 0.343, with all the other variables held constant. And for every unit increase in 3D printing, the work life balance will increase by 0.116, with all the other variables held constant. Similarly, for every unit increase in automation tools, the work life balance will increase by 0.253. And also for every unit increase in data analytics, the work life balance will increase by 0.129, with all the other variables held constant. In addition, the coefficient results shows that the Internet of Things, Cloud computing, Automation Tools, and Data Analytics are positive significant influence over the apparel sector females team leader work life balance in Ampara district. This is consistent with results from (Alcácer. & Cruz-Machado, 2019), and it shows automated systems that add value to the different stages of processes do so in a way to provide more flexible working and increase efficiency within the manufacturing sector. However, 3D printing is not significant in predicting the work life balance in Ampara district.

CONCLUSION

It has been found in this research that the collective factors all have a strong relationship to work life balance. The findings of this research could be used to improve the understanding of the relationship between the context of advanced technological tools and work-life balance - for female team leaders in the apparel sector in Ampara district in particular. All forms of advanced technological tools had a significant and positive effect on work-life balance; these included the Internet of Things (IoT), cloud computing, automation tools, and data analytics. The IoT was overall the most significant theoretically, which demonstrated to be a major contributor to effective and flexible workflows. Cloud computing and automation tools significantly enhance operations, efficiency and primarily reduce stress relating to work life balance.

Interestingly, the study found that 3D printing, although becoming an increasingly relevant technology in the industry, does not have a significant relationship with work-life balance in this sector. This indicates that its use may be limited or not fully utilized in the work processes of the apparel industry in the Ampara district. The findings suggest that the apparel industry should focus on developing strategic emerging technologies before considering the use of 3D printing to increase value; advancements in work-life balance will improve employee satisfaction, efficiency, and the overall well-being of employees. Additionally, to build value in the apparel sector, organizations should concentrate on using IoT, cloud computing, automation tools, and data analytics; whereas 3D printing can be explored as a possible way to add value to the overall industry after adopting these other technologies. However, the study only examines some of the technologies used by the industry, and it is also recommended that further studies investigate the use of other relevant technologies in the industry and the service sectors.

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