Indirect Effect of Information and Communication Technology on Business Performance in Small and Medium Manufacturing Industries in Tanzania

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ABSTRACT

This study investigated the indirect effects of information and communication technology (ICT) on business performance in Tanzania's small and medium manufacturing industries (SMMIs). This study was motivated by the poor research results that show the indirect application of ICT on product innovation and business performance in SMMIs in the country. Thus, the study was carried out to understand the extent to which the application of ICT enhances product innovation in SMMIs. The study was conducted in four regions namely; Dar es Salaam, Mwanza, Arusha, and Morogoro with a sample size of 474 SMMIs.. The data were analysed using IBM Amos version 26 and structural equation modelling (SEM). The analysed data showed that the relationship between ICT use and product innovation techniques in Tanzanian SMMIs was highly significant. In the same sample size, the intensity and direction of the association between product innovation and business performance were the same. During the discussion of the findings, it became clear that ICT use and product innovation had increased among Tanzanian SMMIs. The results showed that the indirect effect of ICT use on business performance, when mediated by product innovation, was moderately significant for SMMIs in Tanzania once they were linked. These outcomes are comparable to those of companies in Mexico, Spain, and Italy. According to the findings, SMMIs in Tanzania should increase the application of ICT with a product innovation mindset to improve business performance. This strategy would help SMMIs in Tanzania to achieve their organisational objectives.

Keywords: ICT, product innovation, business performance, small and medium manufacturing industry.

INTRODUCTION

Many firms recognize ICT's importance, use, and impact on SMEs. This has attracted researchers to study different aspects of ICT adoption. Yang et al. (2013) found out that manufacturing industries that use ICT are more innovative and more successful than manufacturing industries that do not. Their study reveals that more emphasis on ICT and innovation was put on human resources, design, production, sales, and marketing departments. Shin and Lee (2016) consider product innovation as a fundamental catalyst for the organisation's worldwide performance. According to Abrol and Abrol (2017), continued innovation adjustment leads to improved business performance and overall firm growth. Studies such as Cuevas-Vargas et al. (2016) regard ICT as an innovation enabler. Regarding business performance and the external environment, various studies such as those of Nyamanza (2016) and Isaga (2012) have shown that employment growth, sales turnover, and capital investment are common measurements of business performance. In the Tanzanian context, business performance depends on SMEs' ability to continuously innovate competitive products in the markets, which initially depends on the level of product innovations, marketing capabilities, and other external business environments (Nyamanza, 2016). In Tanzania, the manufacturing sector is one of the fastest-growing industries in the country (Kiyabo & Isaga 2019). As a result, their financial contributions have paved the way for ongoing research in the country (Buli, 2017). Regardless of these initiatives, the performance of SMMIs has not been satisfactory to change the situation (Mwang'onda et al.., 2018). In this sense, SMMIs need to rethink their business strategies, particularly in strategically using ICT to improve product innovation and raise business performance. Literature suggests that whenever ICT was used as a product innovation facilitator, it improved the organisation's competitiveness and business performance level, but that kind of suggestion might not be applicable in the Tanzanian environment unless research was done. Therefore, this study examined the effect of ICT on product innovation and business performance in SMMIs in Tanzania. Despite the inherited advantages of integrating ICT into innovation practice in

SMMIs, most empirical studies relating to ICT have been from large manufacturing industries in developed countries (Aguilera et al.., 2015). Furthermore, Cuevas-Vargas et al. (2016) and Kijek and Kijek (2018) indicate that most empirical studies are related to ICT and innovation, and others relate to innovation and business performance. Mwantimwa (2019) and Cirera et al. (2016) revealed that studies relating to ICT use and product innovation in SMMIs in Tanzania were few and did not consider ICT, innovation, and business performance as one system and studied them together at the same time. Therefore, this study determined the indirect relationship between ICT and business performance as mediated through product innovation in the SMMIs in Tanzania.

Literature Review

Relationship between ICT and Product Innovation in Firms

Incorporating new ICT systems has enabled businesses to perform better and execute business planning and production programs while stimulating product innovation. Table 1 summarizes the literature and shows that ICT has a significant impact on product innovation, as demonstrated by Spiezia (2011), Ferreras-Mendez and Arege (2014), and Cuevas-Vargas et al. (2016). Table 1 also shows that ICT negatively affected production innovation. A study by Spiezia (2011) confirms the existing contradictions among industries. Table 1 also provides the difference in sample size and methodology used to determine the relationship.

Table 13: Literature on Relationship between ICT and Business Performance

Author	Findings	Methods and sample size	Gap
Spiezia, (2011)	ICT use had a significant relationship to products innovation in some of the countries.	Econometric analysis and sample size 20670.	The study was done in OECD countries with secondary data collected between year 2004 to 2007
Spiezia (2011)	Asserted that ICT was negatively correlated to product innovation in Norway, particularly in firms that had no web facilities.	Econometric analysis and sample size 20670.	The study was done in OECD countries with secondary data collected between year 2004 to 2007
Ferreras-Mendez and Arege (2014)	The research showed that ICT had a direct and indirect effect on business performance.	SEM with sample size 186	Study was conducted in Spain and Italian firms
Cuevas-Vargas at el.., (2016)	The results indicate that ICT had an indirect effect on firm business performance as mediated by innovation.	EQS 6.1 Software – SEM with sample of 228	The study was done in Mexico

Product Innovation and Business Performance in Firms

Table 2 in this study shows the relationship between product innovation and business performance in different industries. For instance, studies by Aziz & Samad (2016), Rosli and Sidek (2013), Njogu (2014), Cirera et al. (2016), and Abdilahi, et al. (2017) show that product innovation has a positive impact on business performance. Such studies propose opposite results compared to those of Mensah & Acquah (2015), which took place in Ghana. Table 2 also provides the difference in sample size and methodology used to determine the relationship.

Table 14: Literature on Relationship between Product Innovation and Business Performance

Author	Findings	Methods and sample size	Gap
Aziz & Samad, (2016)	Research results revealed that innovation influenced food manufacturing of SMEs' competitive advantage.	SEM – Confirmatory Factor Analysis (CFA) with Amos version 21 with sample size 359	The study was carried out in Turkey with only one food manufacturing SMEs alone
Rosli and Sidek (2013)	The research findings showed that products influenced the performance of manufacturing SMEs.	Hierarchical Regression Analysis with sample size 284	The study was done in SMEs Manufacturing in Malaysia
Njogu (2014)	The study revealed that process, product, influenced on financial performance in Nairobi, Kenya.	Regression analysis with sample size of 180	The study determined the effect of product, process, and marketing innovation only to financial performance
Mensah & Acquah (2015)	The research findings showed that product innovation had no influence on firm performance.	PLS SEM with sample size 243 in Ghana	The study was done in Ghana and considered the effect of innovation on SME performance.

Author	Findings	Methods and sample size	Gap
Cirera et al., (2016)	According to the findings, product innovation has a significant impact on productivity.	Regression and Meta-analysis sample size 2938	Used secondary data for SMEs in manufacturing and services. This research was done in Ghana, Uganda, DRC, Kenya, Zambia, and Tanzania.
Abdilahi, at. Al., (2017)	Research results indicated that product innovation had a positive effect on business performance.	Descriptive and Regression Analysis	The study was conducted in Somalia
Nafula (2017)	The research showed that a product positively impacts a firm's competitiveness.	Multiple Linear regression analysis with sample size of 284	The study was done in Kenya on effect of innovations to competitiveness

From Table 1, it can be concluded that the relationship between ICT and product innovation in industries does not necessarily lead to the significance that propels all industries to use ICT for product innovation. The same proposal can be drawn from Table 2 that product innovation should be taken seriously leading to successful business performance. On reviewing empirical evidence on the impact of innovation on business performance in SMMIs in Tanzania, Jaensson (2017), Ndesaulwa, and Kikula (2016) found out that Tanzania lacked such evidence. The same argument was proposed by Mwantimwa (2019) and Cirera et al. (2016) about the scarcity of studies relating to ICT use and product innovation in SMMIs in Tanzania. This study attempted to determine the possible indirect relationship between ICT and business performance as mediated by product innovation. The study was done in Tanzania, which was different from most studies shown in the literature with a sample size of 474 SMMIs.

Conceptual Framework

A conceptual framework is a network or set of connections or planes linked together to form a particular concept, Karine (2020). The conceptual framework of this study was developed based on the definitions, and it demonstrated how the dependent variable was related to independent variables and mediated variables in the ICT, product innovation, and business performance relationships.

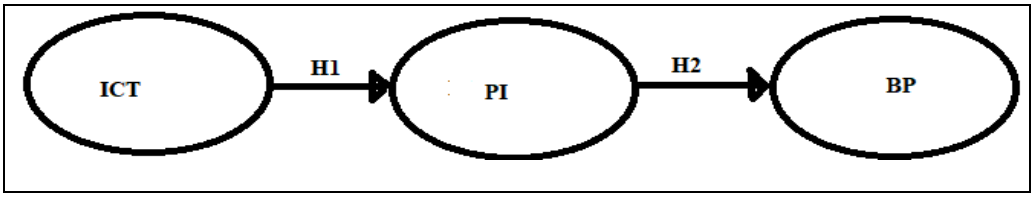

Figure 1: ICT, PI, AND BP Conceptual Framework

The relationships illustrated in Figure 1 were based on empirical literature and theoretical review. It was further hypothesized that ICT use is significantly connected to product innovation and business performance when mediated to product innovation in SMMIs in Tanzania. The conceptual framework in Figure 1 consisted of three (3) sets of variables: independent variables, mediated variables, and dependent variables. Indicators for each variable are indicated in Table 3.

Table 15: Study Variables

	Variable	Statements	Item	Authors
Independent Variable	ICT Use	Marketing products and services	ICT1	Msuya et al., (2017) and Hamad (2017)
		All accounting activities	ICT2	
		Business transactions	ICT3	
		Customers' and suppliers' communication	ICT4	
		Product design	ICT5	
		Software development	ICT6	
Mediating Variable	Product Innovation	New products with technical specifications and functionalities	PI_1	Cuevas-Vargas at al., (2016) and Hsu (2013) Kim-Soon et al., (2017)
		Products are user friendly to customers	PI_2	
		Quality products.	PI_3	
		Products have no environmental impacts	PI_4	
		New products with components and materials	PI_5	
		Decreases cost of products.	PI_6	
Dependent Variable	Business Performance	Increased Sales	BP1	Nafula (2017), Likar et al., (2014), Nawaz et al., (2014) and Hassan et al., 2013.
		Increased Profit	BP2	
		Increased Customers satisfaction on products and services	BP3	
		Increased Employee's satisfaction	BP4	
		Increased Market share	BP5	

In Table 3, the study focused on testing ICT, Product Innovation and business performance items, which were also used in other research and considered easier to assess and use for improved performance of SMMIs.

Research Methodology

This study implemented the purposive survey research design approach Esuh et al., (2011). The study designated only those SMMIs that used ICT daily where product innovation activities are assumed and the resulting impact on business performance is determined periodically. Also, during data collection, closed-end questions were used in the questionnaires and data were subjected to statistical analysis to determine the output information because the study was quantitative in nature Creswell (2014). To enable the testing of the hypothesis and analyse the statistical significance of the model of this study, Structural Equation Modelling (SEM) was used. Blunch, (2017) proposes that SEM gives immediate care to evaluate the goodness of fit (GoF) on diminishing the discrepancy between the observed and estimated covariance matrix. Its application is based on estimating Confirmation of the theory used in the study. Furthermore, a mediation study was conducted to investigate the mediating influence of product innovation on the link between ICT and business performance, which would have been the independent variable. The requirements for mediation analysis were carried out in this study, as recommended by Baron and Kenny (1986).

Findings of the Study

Confirmatory Factor Analysis

According to scholars like Hooper et al. (2008), CFA should be used to determine the loading of measurements, covariance, and error variances. A measurement model was created to estimate measurement errors and correlation between latent variables in the study.
CFA was crucial to validating measurement theory before testing for SEM.M aximum modification indices (MI) were used to change the fit to the ideal indices if the model did not reach the suggested cut-offs for a good fit (Whittaker, 2012). For instance, ICT1 and ICT5 items were removed because they had MI greater than 11.

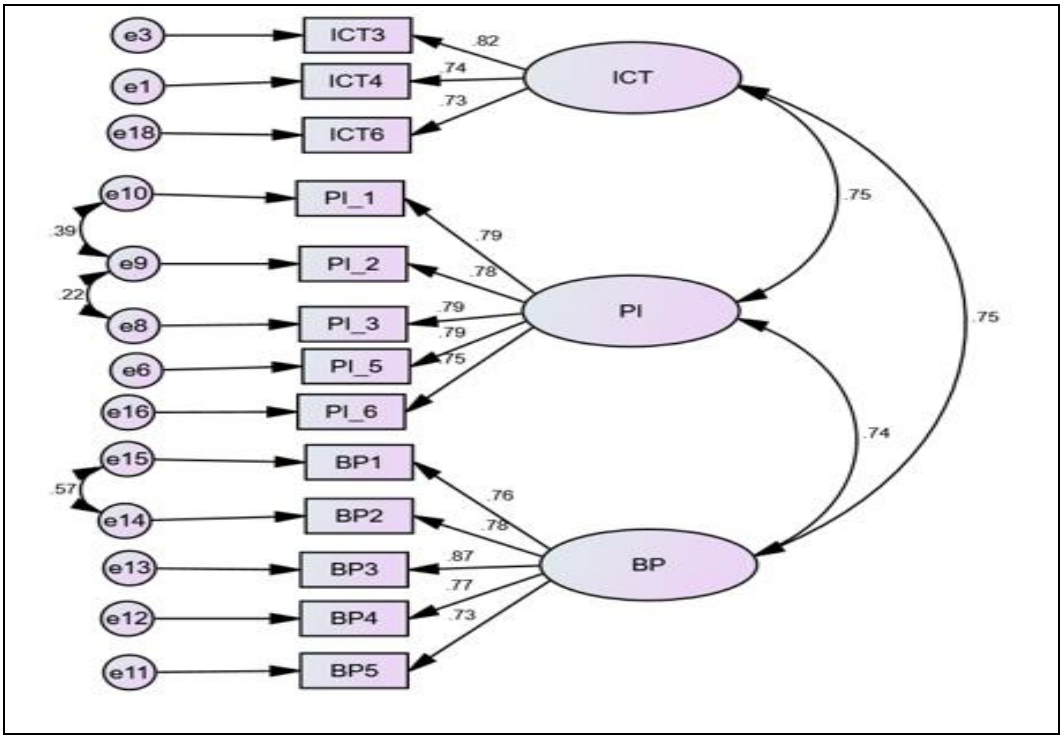

Figure 2: CFA for ICT, PI, and BP

Table 16: Fit Indices Used in the Study

Fit indices	**Type of Fit Index**	**Model points**	**Cutting off point**
Adjusted Goodness Fit indices (AGFI)	Parsimony Fit	0.908	≥0.80
Comparative Fit Index (CFI)	Incremental Fit	0.941	0.9 < CFI < 0.95
Root Mean Square Residual (RMR)	Absolute Fit	0.029	RMR< 0.08
Root Mean Square Error of Approximation (RMSEA)	Absolute fit	0.073	0.05 < RMSEA< 0.08

Source: Hooper at al.., (2008), Byrne (2013 and Hair et al.., (2010)

Results in Figure 2 which are presented in Table 4 show the measurement model of the study by estimating model fit. Initially, AGFI suggested that the model is at a good fit level (0.908) (Hooper at al.., (2008), Byrne (2013), also CFI verifies the model is a perfect fit (0.941) which is greater than (0.90). Moreover, the RMR is close to fit (0.029) which is less than (0.06) Hair et al.., (2010), and finally RMSEA was found to be (0.073) which was less (0.008) proposing the model to be fit Byrne (2013).

Convergence and Divergence Validity

Convergence and divergence validity were also verified in the model. According to Hair et al. (2010), convergent validity is the degree to which the theoretical notions under research should be related to the reality of existing occurrences. The Master Validity Tool was used to calculate convergence, divergence, and composite reliability (CR) results. ICT2 and PI_4 items were removed during computing to increase model fit to enable AVE to be greater than 0.5 (Whittaker, 2012). The AVE was at least 0.583, more significant than 0.5 if the CR was more prominent than 0.807, which was greater than 0.7, and MSV was less than 0.570, which was less than the AVE. According to Gaskin and Lim (2016), all the necessary conditions were met.

Structural Equation Modeling

The structural model of this study had relationships between ICT, product innovation, and business performance that were later analysed. The testing process of the hypothesis was done with a structural model using AMOS version 26 as software. Various coefficients and scores from the model analysis were obtained to define the model. The tested hypothesis showed the path coefficient's direction, strength, and significant level. In the path analysis of the model, an indirect relationship between ICT use and business performance was shown, mediated by product innovation. The model shown in Figure 2 was achieved with the cutting-off points specified in Table 4. Testing for the goodness of fits, RMR was equal to 0.041, CFI = 0.954, AGFI = 0.895, RMSEA = 0.08, which is within the cutting points indicated in Table 4. Furthermore, regression weights and standardized regression weights are shown in Tables 5 and 6 respectively.

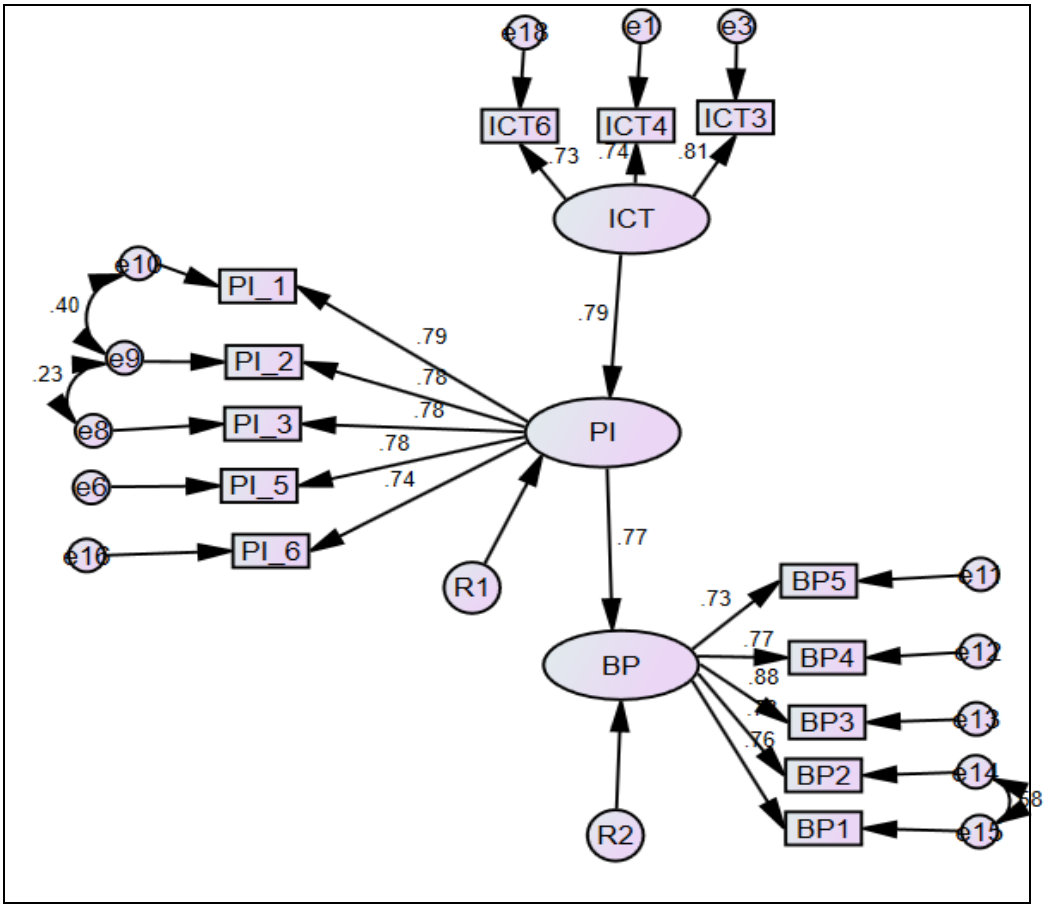

Figure 3: Path Analysis of ICT, PI, and BP

Table 17: Regression Weights

			Estimate	S.E.	C.R.	P	Label
PI	<---	ICT	.980	.075	13.115	***	par_14
BP	<---	PI	.661	.050	13.255	***	par_15
ICT4	<---	ICT	1.000				
ICT3	<---	ICT	1.124	.071	15.935	***	par_1
PI_5	<---	PI	1.000				
PI_3	<---	PI	.857	.049	17.544	***	par_2
PI_2	<---	PI	.905	.053	17.222	***	par_3
PI_1	<---	PI	.998	.057	17.605	***	par_4
BP5	<---	BP	1.000				
BP4	<---	BP	1.005	.062	16.131	***	par_5
BP3	<---	BP	1.065	.059	18.151	***	par_6
BP2	<---	BP	.913	.056	16.212	***	par_7
BP1	<---	BP	.948	.060	15.814	***	par_8
PI_6	<---	PI	.923	.056	16.563	***	par_9
ICT6	<---	ICT	1.088	.074	14.655	***	par_10

*** $p < 0.001$

Table 18: Standardized Regression Weights

			Estimate
PI	<---	ICT	.794
BP	<---	PI	.774
ICT4	<---	ICT	.742
ICT3	<---	ICT	.814
PI_5	<---	PI	.778
PI_3	<---	PI	.783
PI_2	<---	PI	.777
PI_1	<---	PI	.785
BP5	<---	BP	.728
BP4	<---	BP	.772
BP3	<---	BP	.876
BP2	<---	BP	.777
BP1	<---	BP	.759
PI_6	<---	PI	.743
ICT6	<---	ICT	.732

Statistical Significance of Relationship between ICT and Product Innovation in the SMMIs in Tanzania (HI)

This hypothesis was investigated with path analysis between ICT and PI, which formed the association. Results in Table 6 showed that ICT statistically correlates with product innovation in SMMIs in Tanzania. In addition, Table 6 specifies that the path coefficient was 0.794. The results in Table 5 were significant at 0.001, CR > 1.96, which confirms that the relationship was strongly correlated with Mukaka (2012).

Statistical Significance of Relationship between Product Innovation and Business Performance in the Smmis in Tanzania (H2)

Hypothesis Number two, termed (H2) was studied by applying path analysis between PI and BP, which formed the relationship. Results in Table 5 indicated that PI had a statistically significant relationship to business performance in SMMIs in Tanzania. Table 6 designates that the path coefficient between PI and business performance was 0.774, and based on the same Table 6, results were significant at 0.001, and in CR, it was found to be greater than 1.96, which indicated that the relationship was strong positive correlation correlated Mukaka (2012).

Indirect Effect of ICT on Business Performance as Mediated by Product (HI: H2)

Mediation Analysis

Before the analysis for mediation, it was essential to determine the conditions for mediation analysis if they could have been met. This study adopted Baron and Kenny's (1986) conditions since they are widely accepted by Mengi (2017). Since H1 and H2 are significantly correlating their respective variables refer Table 5 and 6, then they satisfy the condition by Baron and Kenny's (1986). Field (2018) and Zainudin (2012) propose that if an independent variable is linked towards the dependent variable only through a mediator variable, the independent variable has no direct effect on the dependent variable. From the Path analysis of ICT, PI and BP in Figure 3, the independent variable (ICT use) is linked towards the dependent variable (business performance) only through the mediator variable (product innovation) and there is no direct effect of the independent variable (ICT use)

towards the dependent variable (business performance). Therefore, the model is complete mediation.

Table 7: Mediation Analysis

Variable	Direct effect on Product Innovation	Direct effect on ICT	Direct effect on business performance	Indirect effect on business performance
ICT use	0.794	0	0	0.61456
Product Innovation	0	0.794	0.774	0

Source: Research Data (2020)

So, based on the results from Table 7, since all two conditions were met as proposed by Boron and Kenny (1986), results presented in Table 7 indicated the indirect relationship between ICT use and business performance variables as mediated by product innovation was 0.61456, which, according to Schober et al. (2018), was a moderate correlation.

Discussion of the Findings

Effect of ICT on Product Innovation in SMMIs in Tanzania

The research hypothesis states that ICT has a statistically significant relationship with product innovation in SMMIs in Tanzania. The research results showed a standardized regression weight of 0.794, which indicates a strong positive relationship between ICT and product innovation. This means that ICT had a strong positive relationship and a significant effect on product innovation. This means that ICT use for business transactions (ICT3), customers' and suppliers' communication (ICT4), and Software development (ICT6), their examining path towards product innovation is significant and fitting for discussion, as established in Table 6. Further, product innovation areas such as; new products with different technical specifications and functionalities than existing ones (PI_1), products that are user-friendly for customers (PI_2) and increasing product quality (PI_3). The ICT variable

was significantly related to new developments with components and materials (PI_5), and a reduction in product costs (PI_6). Chin (1998) postulated that, in any hypothesis, whenever the standardized path coefficient () is greater than 0.2, then the results qualify for discussion. Therefore, in this study, the standardized path coefficient of 0.794 was above the recommended cut-off point allowing for detailed discussion. Furthermore, the analysis of the significant effect of ICT on product innovation was done using CR values, and the results are shown in Table 5. The result indicated a CR of greater than 11.451 and $p < 0.001$. Bechger (2014) accepts that CR is significant in such results. The author argues that for the relationship to be substantial, the CR should be greater than 1.96, and the p-values should be less than 0.05. From that argument, the relationship between ICT and product innovation was significant.

The result of this study showed that ICT affects product innovation. This result concurs with findings similar to Ueki and Tsuja (2019) and Spiezia (2011), who found out that ICT had a strong positive correlation to product innovation. In their study, Ueki and Tsuja (2019) found out that ICT directly affected product innovation in Thailand and Vietnam. Spiezia (2011) showed that manufacturing industries with more web facilities (ICT) had a higher probability of product innovation than those with fewer web facilities. The results of this research concur with the studies by Abderrezzak et al. (2016) and Cirera et al. (2016), whose results showed that ICT influenced product innovation in firms. However, in the analysis of the effect of ICT on product innovation, Arvanites et al. (2011) concluded that the ability to drive product innovation varies depending upon the type of ICT tools, firm process, the current knowledge of ICT consulting firms, product innovation capabilities, etc. In line with that argument, these results contradict Spiezia (2011), who asserted that ICT negatively correlated to product innovation in Norway, particularly in firms with no web facilities. Also, Kijek and Kijek (2018) found out that the use of ICT did not affect product innovation due to the suggested reason that the samples selected made little use of ICT in product innovation or did not extensively deploy ICT use. The authors suggested that Polish manufacturing industries might have yet to apply ICT broadly due to a

lack of competencies and financial constraints. According to Kijek and Kijek (2018), the most likely reason for the difference in the effect of ICT use on product innovation is that lower technology industries usually apply incremental product innovation, which does not require significant adjustments to the production process.

Effect of Product Innovation on Business Performance in SMMIs in Tanzania

Based on hypothesis H2: results obtained in Table 5 and Table 6, product innovation had a statistically significant effect on business performance in SMMI in Tanzania. The path analysis test considered product innovation as an independent variable and business performance as the dependent variable. Results, shown in Table 6, indicated that product innovation was statistically significant to business performance in SMMIs in Tanzania. Therefore, it was accepted in this study that, product innovation had a substantial effect on business performance in SMMIs in Tanzania. The results of this study concurred with the study by Abdi and Sheikh (2013) which indicated innovation had a significant role in determining the business performance of the firms in Somalia. As the environment changes, innovation helps firms attain a competitive advantage. Also concurs with Rosli & Sidek (2013), Atalay et al. (2013), and Jayaram & Prajogo (2013). For instance, Rosli and Sidek (2013) results established that product innovation has a positive and significant impact on business performance in manufacturing industries in Malaysia. However, these results contradict Acquah and Mensah (2015) and Nafula (2017) studies that found product innovation has a no-significant effect on firms' business performance. Poor firm performance could have been attributed to a lack of physical infrastructure, inferior products compared to competitors, inadequate technology, a lack of skills, and so on. Juma and Said (2019). Lack of access to or links to international marketing information and related constraints, such as financial constraints, might have been the reason for poor performance (Lwesya, 2021). Finally, the lack of using licensed adequate technology from the owners who are foreigners, poor research and development practices might also cause poor performance of firms (Mkenda and Rand, 2020).

Indirect Effect of ICT on Business Performance as Mediated by Product Innovation

As it can be viewed in Table 7, the hypotheses were tested as to whether ICT has an indirect impact on business performance as mediated by product innovation in SMMIs in Tanzania. The results indicated that the indirect effect of ICT use on business performance when mediated by product innovation was moderately significant at 0.60741 (Schober et al., (2018). These results are comparable to those of Cuevas-Vargas et al. (2016) and Ferreras-Mendez and Arege (2014). The assessment of the indirect effects of ICT use on the business performance of SMMIs was shown. This indicated that ICT can increase performance by increasing product innovation practices in SMMIs. This study agrees with Coccobell et al. (2012), who argue that widespread ICT is necessary for economic activity for two reasons: first, ICT directly increases firm productivity and stimulates economic growth. Second, ICT indirectly increases firm productivity and stimulates economic growth. Second, generate complementary innovations such as product innovation that advance economies.

Based on the practical experience of this study, the results showed that using ICT helps to support and reinforce product innovation capabilities, hence increasing business performance. A survey by Fernandez-Mesa (2014) supports the current study that ICT indirectly affects firm performance as mediated through learning thus, proposing that SMMIs should pay attention to mediating factors, especially product innovation, to attain additional benefits from ICT. However, Fernandez-Mesa (2014)'s results contradict these results as the indirect effect of ICT was higher than the direct effect of ICT on business performance. The reason behind this is that ICT performance goes higher when mediated through learning (internal or external), unlike using it directly to affect dependent performance. Also, the indirect effect of ICT on business performance in manufacturing industries has been studied by Biag (2013) in the United States of America. Research results indicated that ICT is an enabler for product innovation and assisted in business performance growth. This study provides more explicit evidence on the indirect effect of ICT on business performance in firms, contrary to Kijek and Kijek (2018), who argued that there is no clear evidence on the indirect

benefits gained from business performance using ICT in firms. The authors insisted that most studies refer to the direct relationships between ICT and business performance, ignoring the indirect effects caused by ICT.

Conclusion and Recommendation

Conclusion

The current research investigated the indirect effect of ICT on product innovation and the business performance of the manufacturing industries in Tanzania. The approach used in this study acknowledged the mediating effect of product innovation on the causal relationship between ICT use and business performance. This study observed that there was an indirect effect of ICT use that worked well through product innovation. For that matter, analysis suggests that a proper path of ICT use contributes to product innovation and hence to the business performance of SMMIs in Tanzania. So, the use of ICT when used innovatively through products will have an impact on business performance.

Recommendation

The renovation effect of ICT investment and use on businesses' performance becomes more evident when concurrently engaged in product innovation. By developing and testing SEM with observed variables and error measurements, this research confirms ICT and product innovation as the sources of business performance in a specified group of SMMIs. This study assigns significant responsibilities to managers; as a result, they should not focus solely on utilizing the direct effect of ICT, but rather seek other ways to improve its utilization to strengthen its business performance. Despite the significance of current results, this study still provides a way forward for further research. For example, since this study adopted purposive sampling of SMMIs in Tanzania, a new study can be conducted using a random sampling approach, where the results will be generalized across Tanzania. In addition, while the course of this study focused on ICT use, product innovation, and business performance using a cross-sectional approach, it is possible to use a longitudinal method to determine the growth effect of ICT use on product innovation and business performance over some time with possible training and sensitization. This study also investigated the impact of ICT on product

innovation and the business performance of the manufacturing industry. It is also possible to determine the potential impact of business performance on ICT investments and product innovations in Tanzania's service or large manufacturing industries.

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