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# The Impact of Technical Competency, Experience and Communication Skills on the Level of ICT Innovation in Tanzania

Edison Wazoel Lubua
Department of Informatics
Institute of Accountancy Arusha
Email: elubua@iaa.ac.tz

**Abstract**

This study determined the impact of the technical competency, communication skills, and the experience of experts on the level of ICT innovation in an organisation. The study is relevant to Tanzania because the country depends on imported technological business solutions, which could be developed in the country. The study used the survey strategy, with 116 respondents representing different organisations within Tanzania. The study used the structured questionnaire as a tool for data collection. Additionally, the study conducted an analysis using inferential statistics to test hypotheses. The findings of the study concluded that the technical competency of experts, the level of communication skills and the experience of experts in dealing with complex projects significantly impacted the level of ICT innovations within Tanzania. This study recommends the improvement of the experts' technical skills, ability to deal with complex projects, and ability to communicate their innovation needs. This improvement will contribute to the increase of innovative products among local organisations.

**Keywords:** ICT, information systems, innovation, Tanzania, Africa
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## Introduction

The use of Information and Communication Technologies (ICTs) across the world defines the current state of affairs in all spheres of life. From the social perspective, people interact, regardless of their locations, as long as they are connected to telecommunication signals (Roztocki *et al*., 2019). People are closer to each other through virtual communications and established online communities (Lubua *et al*., 2017). In academics, the use of ICTs brought transformation to the academic industry. Meanwhile, there are many learning institutions offering training through online platforms (Kotoua *et al*., 2015). In military and civil services, the use of ICTs is equally embraced. Cyber security has become an important component of national security (Egbetokun *et al*., 2016). Generally, in modern day, most entities use ICTs to provide their services. Therefore, the economy of the world is fully integrated with ICTs. In this regard, countries in the African continent are not safe, if they fail to fully embrace the use of ICTs. Innovative minds are needed to redesign existing processes and new products to support economic growth in Africa (Karakara & Osabuohien, 2020).

The study by Asongu and Le Roux (2017) underscores the importance of innovation in technology. It asserts that innovation is important to improve productivity and decrease the cost associated with products (Eboagu & Adeleye, 2019). Accordingly, the study by Egbetokun et al. (2016) suggested that innovation shapes the brand of a business company, and opens doors for

collaboration. In addition, the study by Barasa *et al*. (2017) recognise that innovation impacts the growth of the economy and opens new opportunities for employment. Apparently, there are several factors observed to define the level of technological innovation attained by a corporation and a nation in general. For example, the study by Karakara and Osabuohien (2020) suggests that a good innovative culture is important for the progress of an organisation. It is the responsibility of a business company to create and support continuous innovation. This culture harnesses the technical competency of ICT experts in dealing with challenges arising from hyper-competition (Egbetokun *et al*., 2016).

In the study by Ezeanya-Esiobu (2019), it was further observed that the culture suitable for ICT innovation will enhance the experience of technical experts on how to deal with complex projects. In addition, the experience of experts with complex projects helps business companies in avoiding the tendency of importing technological services from foreign companies, which costs a lot of money (Asongu & Le Roux, 2017; Ezeanya-Esiobu, 2019). Arguably, technical experts in African countries (and Tanzanian in particular) have the potential for innovation like those in developed countries. However, the study by Jauhiainen and Hooli (2017) identifies the lack of fund, and individual resilience to affect the progress of many experts in developing countries; this includes Africa. One reason for the limited innovation fund could be the lack of competency needed to communicate with potential sources of funding (Karakara & Osabuohien, 2020). Knowing that ICT innovation is important for the welfare of communities in developing countries, the current study determined the impact of different factors on the perceived level of ICT innovation in Tanzania.

**Research Problem**

Worldwide, there are many innovative projects, where over 26.4 million developers are engaged to release innovative programs on a daily basis, to support the provision of different services (Daxx Software Company, 2020). Geographically, a large part of the world is enjoying the benefits of localised innovations in ICT; however, in Africa (and Tanzanian in particular) localised innovations are still low (Mwantimwa, 2019).A large number of locally used ICT solutions come from other countries. In a report by the World Intellectual Property Organisation (2020), Tanzania is ranked number 88, with 25.57% score, in the Global Innovation Index. Overall, South Africa is the only African country with 32.67% score; it is ranked as number 60 globally. Therefore, innovation is a challenge to the African continent.

Meanwhile, studies by Muriithi et al. (2016), and Eboagu and Adeleye (2019) recognise limited funds as a key factor for slow innovation in developing countries. This is the fund to support research activities suitable for developing local solutions for business. In addition, technical skills are also acknowledged as the reason for the lack of new ideas for process re-engineering. Process re-engineering would enable organisations to analyse and design their processes in a way that would improve performance (Mwantimwa, 2019). Eventually, the lack of technical skills necessary in innovation costs organisations a lot of money in seeking services from multinational experts and companies (Osakwe & Moussa, 2017).With this background, it is unclear why the level of ICT innovation remains low, in Tanzania. This paper responds to this question by determining the impact of factors such as the competency of ICT staff, the communication ability of staff and the experience of ICT staff in dealing with complex projects on the level of ICT innovation**.**

## Literature

This section explores the literature in the area of ICT innovation and its determinants. The term innovation has been defined differently by scholars from different disciplines. Some define innovation as a new or improved product or process made available to users (OECD, 2018; Eboagu & Adeleye, 2019). According to Eboagu and Adeleye (2019), innovation is at the heart of science. In this regard, any technology requires innovative minds among key players; this includes developments in Information Technologies (Muriithi *et al*., 2016). According to the study by Thakur-Wernz and Samant (2017), innovation in ICT must focus on improving how things are done in a given area. The literature of this section presents theories relevant to technological innovation in ICT. In addition, it presents experts based factors for ICT innovation.

### *A lesson from theories of technological innovation*

Disruptive Innovation Theory is one of the famous theories of innovation. The theory focuses on bringing innovation to already existing market, with the purpose of creating a new market (Arun *et al*., 2018). The focus is to overcome existing market huddles through bringing technological products at a lower price and outstanding quality (Christensen *et al*., 2018). This is accomplished through understanding the real job of a consumer, and what a consumer is trying to achieve through existing technologies (Arun *et al*., 2018). Another theory related to innovation is known as Design Thinking Theory (Naiman, 2019). The main assumption of the theory is that a company will create value through ensuring that the design of a given product focuses on customers' needs, and developing the required user experience. Nardelli (2012) commented that the design view of the technology driven businesses sensitively meet what people needs. The two theories are important to this study, because they emphasis on making successful innovative projects. Based on the two theories, it is evident that an investment in research and development activities is mandatory. Furthermore, the theories are easily applicable in established companies (Christensen *et al*., 2018). These companies are a reflection of our sample. The study by Malima (2020) exposes that most business companies in Tanzania are in the start-up or the small business category. These companies are financially limited; therefore, they require an alternative approach to enhance the innovation ability of their people. The current study determines ICT experts based factors for innovation in Tanzania.

### *Factors for innovation*

The literature identifies different factors for successive innovation in Information and Communication Technologies. The factors may be based on experts, the management, consumers and even the technology addressed (Cunningham *et al*., 2016). This study focused on experts, because regardless of the nature of the organisation, experts are the ones to carry innovations. In particular, the section presents a discussion on experts' based factors hypothesised to determine the level of innovation in Tanzania.

*The competency of ICT technical experts*

Experts are expected to have different qualities to be able to be innovative. These qualities define their level of competency in innovation and other skills. As part of competency, ICT experts are expected to have the ability to analyse technical needs of the new innovation (OECD, 2018).The analysis assists in understanding critical requirements of the new innovation project. In addition, technical experts are to be imaginative enough to capture the needs of the new innovation (Catanio, 2006). This is the reason why the study by Lubua and Kyobe (2019) suggested that technical people need to have social links with their market to understand the nature of solutions anticipated to solve a given problem, associated with their clients. It is unarguable that no person will have all skills needed for the development of a high level innovative project cutting across multi-stakeholders. Therefore, it is necessary for a succeeding corporation to harness all critical skills through collaboration among key players of the innovation project (Nardelli, 2012; Roztocki *et al*., 2019).

Accordingly, the study by Majid *et al*. (2012), suggested that soft skills form an important part of the required competency of ICT experts when dealing with innovative projects. The soft skills make the interaction with others within a team easy (Patacsil & Tablatin, 2017). They enable innovators to capture and communicate expectations of their clients through their design (Nardelli, 2012; Mnkandla, 2013). Therefore, it is obvious that the competency of employees is necessary for experts to innovate. With this regard the study developed hypothesis one to know whether perceived technical competency of ICT experts impacts the perceived level of ICT innovation.

*Null hypothesis one*

*The technical competency of ICT experts does not impact the level of innovation to an organisation*

*The experience of ICT experts with complex projects*

Experience is an important element of project development, since the implementation of any project is surrounded by uncertainties, which are likely to have a negative impact to a project if they are not handled properly (Oeij, 2017). Evidence shows that experienced ICT experts are better suited in attaining various organizational goals, and even in showing their commitment to their projects (Ochieng *et al*., 2017). This is because, experience enhances the resilience of an expert, amid challenging circumstances. It is worth noting that experience enables experts to cope with setbacks and show commitment even within a dynamic environment (Lv *et al*., 2018). This is the reason why the study by Oeij (2017) defined resilience as the ability to respond in a way that reduce the impact of destruction caused by a drifting environment or even the complexity of the project.

In addition, the experience of an expert is more important where the team is working on a new innovative project, since it enables the team to avoid predictable setbacks before they occur. Apparently, one may say that the level of resilience of an individual increase with the increase of the experience of working with similar cases (Oeij, 2017). This is the reason why Naderpajouha *et al*. (2020) suggested that project team evolution is an important aspect of innovative projects, since it enhances the experience of the team with different circumstances;

also, it provides the team with opportunities to engage different solutions to emerging risks. Knowing that experience with innovative projects is an important element for the implementation of new projects, the present study tested its impact on the current level of ICT innovation in Tanzania. The study is guided by hypotheses two.

*Null hypothesis two*

*The experience of experts in dealing with complex projects does not impact the level of ICT innovation to an organisation.*

*Competency in using communication skills*

Basically, someone with proper communication skills is able to deliver a clear message on the business agenda (Mnkandla, 2013). In addition, a person with proper communication skills is able to comprehend the message from other people involved in the business. According to Zulch (2014), adequate communication skills play an important role in the learning process of an individual. In addition, quality communication skills are necessary to ICT experts whose learning process in on-going because of changes in technology and demands from other stakeholders (Naderpajouha *et al*., 2020). In addition, the study by Muriithi *et al*. (2016) suggested that proper communication skills are important when it is important to convince the other part of the importance of certain decisions. This is equally important in showing stakeholders the value of a given innovation. The study by Zulch (2014) suggested that proper communication is an essential part of developing an innovation, because the project manager (and the team) must work with different partners to implement project ideas. To build a powerful message that will bring different stakeholders on board through their conviction, it is necessary to communicate a well-planned message (Muriithi *et al*., 2016; Ochieng *et al*., 2017). Ultimately, a proper communication will help key stakeholders to indorse the new innovation project, because they understand the importance of the project to their prospect (Roztocki *et al*., 2019). Knowing the importance of communication in modern business, the current study formulated hypotheses to test its impact on the level of ICT innovation within local organisations.

*Null hypothesis three*

The level of communication skills possessed by experts does not determine the level of ICT innovation to an organisation

**Methodology**

This study is quantitative in nature. Under this approach the study adopted the causal research design. The design offers an explanation on the impact of independent variables to the dependent variable (Williams, 2007; Snyder, 2019). According, the design supports objectivism in its process (Ezeanya-Esiobu, 2019). Hence, it allows generalisations of the findings. Except for the perceived level of ICT innovation, the rest of the variables in Table 1 are independent variable.

*Study population and Sampling*

The general population of this study involved employees of business companies and public institutions based in Tanzania. Since it was difficult to access all companies and institutions in Tanzania, the study used the current electronic list of the Institute of Accountancy Arusha Alumni Association to establish the sampling frame. Between 10th and 20th of August, there were 201 members of the Alumni Association accessible through its "WhatsApp" group. So far, each one of them represented an organisation. The study requested all members of the WhatsApp group to respond to the questionnaire. However, only 116 respondents participated. Factors such as the lack of time, lack of data or even the lack of interest may have caused others not to participate (Ball, 2019). According to Bartlett *et al*. (2001), in the population of 300 units, the sum of 85 units can offer a good statistical representation. The current study used 116 units in the population of 201; therefore, it is suitable in drawing different conclusions about the population under study. This position is supported by the study by (Taherdoost, 2018), which is extensively used as the point of reference in statistical sampling.

*Data collection methods*

This study adopted data collection methods which are relevant to the quantitative research approach. The main data collection method for this study was the use of the structured survey questionnaire. The survey questionnaire is famous for its ability to facilitate the collection of many data, within a short time (Paradis *et al*., 2016). Moreover, the structured questionnaire allows the use of a set of answers to choose from; therefore, it limits outliers (Peersman, 2014). The structure of the questionnaire had four key areas: The first part showed selected characteristics of respondents. The characteristics included the nature of organisation represented (private or public), years of work experience, and the nature of profession (ICT or others). The second part of the questionnaire extracted information about determinants of ICT innovation; the following are variables: the technical competency of ICT experts, the experience of ICT experts in dealing with challenging assignments, ability of experts to use communication skills to convince the management of fund requirement, and the ability of ICT experts to show resilience when working on demanding technical projects. The third aspect of the questionnaire extracted the information on the perceived level of innovation to local organisations. Variables studied are those which are directly linked with ICT experts, and not the organisation. Table 1 presents the variables of the study.

**Table 1**: The list of variables and their scale

| *No.* | *Variable* | *Scale in use* |
|---|---|---|
| 1 | The nature of organisation | Nominal |
| 2 | Years of work experience | Likert |
| 3 | The nature of the profession | Nominal |
| 4 | The level of ICT innovation to an organisation | Likert scale |
| 5 | The technical competency of ICT staff | Likert scale |
| 6 | The perceived experience of ICT experts with complex projects | Likert scale |
| 8 | Perceived level of communication skills of technical staff | Likert scale |

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*Data analysis*

Data analysis is a very important part of any study. The main hypothetical position of this study is to identify ICT experts' related factors determining the perceived level of innovation in Tanzania. Therefore, the main method of analysis involved inferential statistics. Currently, the study used ordinal regression to understand the impact of technical competency, the level of resilience, experience with challenging projects, and communication skills on the perceived level of ICT innovation. The second relationship tests the causal impact of the communication ability of experts and the experience of experts on the perceived resilience of experts in demanding projects. The ordinal regression is used because the dependent variables are ordinal in nature (Kanyongoet *et al*., 2006). Further to this, the study used the One Way ANOVA to know the significance of the categorical relationship between dependent variables (that is, the nature of the organization, years of employment experience, and the nature of the profession) and the perceived level of innovation. The use of the One Way ANOVA is supported by Heiberger and Neuwirth (2009), who considered it as relevant in determining the categorical relationship between variables. In the analysis, the study used SPSS.

Moreover, the study ensured that it operated under acceptable procedures. This is the reason why the validity and reliability of the study were tested. First, the study used content validity methods to ensure the use of contents relevant to innovation. In this case, the study used contents based on the literature. Furthermore, the study used an expert in the area of ICT to verify the relevance of the content. In addition, the study used the Exploratory Factor Analysis (EFA) method to test the coherence of items of the questionnaire. This approach is supported by Williams (2007) in testing the validity of items in the questionnaire. The study observed the Kaiser-Meyyer-Olkin measure of sampling adequacy as 0.871. The approved minimum threshold is 0.6; therefore, the sample meets the validity requirement (Ball, 2019; Taherdoost, 2018). Furthermore, in the Component Matrix, each factor had a construct with at least 0.3 correlation level, which is the minimum threshold. The last test for validating the questionnaire tested for multicollinearity of variables used in the analysis. The study observed the highest VIF of 3.109, this suggests the absence of multicollinearity. The acceptable VIF value must be between 1 and 10 (Allen, 1997). Furthermore, the study tested the reliability level through the Cronbach Alpha, and in each case, the observed ratio was 0.891, which assures that tool is reliable.

**Results**

This section provides the results of the study. The section began by conducting a descriptive analysis of the variable known as the perceived level of ICT innovation. Results in Table 2 suggested that 56.9% of all respondents perceived their organisations as innovative in past five years. Organisations used staff to re-design processes and services relevant to their businesses. This percent is based on the perception of respondents.

**Table 2**: How do you rate your organization, as an innovative entity, in bringing internally initiated ICT based solutions in the last five years?

| Parameters for Measurement | Frequency | Percent |
|---|---|---|
| Highly innovative | 22 | 19.0 |
| Innovative | 44 | 37.9 |

| | | |
|---|---|---|
| Moderate | 40 | 34.5 |
| Not innovative | 9 | 7.8 |
| Highly not innovative | 1 | .9 |
| Total | 116 | 100.0 |

In addition, the study conducted the analysis to determine the significance of the categorical relationship between the perceived levels of ICT innovation, with different demographic information. The first demographic information was the nature of the organization affiliated to respondents; it is either a public or private organisation. The study used the One Way ANOVA, and results in Table 3 suggested the p-value as 0.320. This value is greater than the maximum threshold. Therefore, there is no significant categorical relationship between the perceived level of ICT innovation and the nature of the organization. Accordingly, the study conducted the same test between the perceived level of ICT innovation and years of employment experience. According to the results in Table 3, the observed p-value was 0.374, which suggested no significant categorical relationship between the two variables. Years of experience did not determine the perception of respondents. Lastly, the study analysed the categorical relationship between the nature of the profession of respondents and the perceived level of innovation. The One Way ANOVA p-value was 0.752. The observed p-value suggested an insignificant categorical relationship between the nature of the profession and the perceived level of ICT innovation. In all three demographic variables no significant categorical relationship was observed with the perceived level of ICT innovation.

**Table 3**: One Way ANOVA between the perceived level of innovation and other

| Variables | Parameters for measurement | Frequency | Mean | p-value |
|---|---|---|---|---|
| Nature of your organization | Public | 62 | 2.26 | |
| | Private | 54 | 2.43 | 0.320 |
| | *Total* | *116* | *2.34* | |
| | | | | |
| Years of employment experience | One year of below | 4 | 2.75 | 0.374 |
| | Between 2 and 5 years | 33 | 2.18 | |
| | 6 years or above | 79 | 2.38 | |
| | Total | 116 | 2.34 | |
| | | | | |
| Nature of profession | IT expert | 67 | 2.31 | 0.752 |
| | Not IT expert | 49 | 2.37 | |
| | Total | 116 | 2.34 | |

***The impact of the technical competency on the level of ICT innovation within an organisation***

This subsection study determined the categorical and causal relationship between the technical competency and the level of ICT innovation. First, the One Way ANOVA tested the significance of the categorical relationship between the technical competency of ICT experts and the perceived level of ICT innovation. Table 4 observed the One Way ANOVA p-value as 0.000.

This value suggested a significant categorical relationship between the technical competency of ICT experts and the level of ICT innovation. The mean value presented in Table 4 suggests that the increase of technical competency increased the perceived level of ICT innovation.

In addition, the study used ordinal regression to know the impact of the technical competency on the level of ICT innovation. Table 5 presented the model fitting information p-value as 0.000, and the Nagelkerke r-square value as 0.251. The information suggested the suitability of the model for analysing the relationship, and that the perceived level of competency impacted the perceived level of innovation by 25.1%. Overall, results rejected hypothesis suggesting that the perceived technical competency of ICT experts does not impact the perceived level of innovation in an organisation.

**Table 4**: One Way ANOVA between the level of communication skills and the technical competency of experts, against the perceived level of ICT innovation

| Variables | Parameters for measurement | Frequency | Mean | p-value |
|---|---|---|---|---|
| Expert's technical competency | Very high | 28 | 1.79 | 0.000 |
| | High | 40 | 2.20 | |
| | Moderate | 44 | 2.73 | |
| | Low | 4 | 3.25 | |
| | Total | 116 | 2.34 | |
| | | | | |
| The level of communication skills possessed by technical staff | Very high | 25 | 1.56 | 0.000 |
| | High | 52 | 2.31 | |
| | Moderate | 34 | 2.76 | |
| | Low | 5 | 3.40 | |
| | Total | 116 | 2.33 | |

***The impact of experts' communication skills on the level of innovation within the organisation***

This subsection determined the relationship between the perceived level of communication skills among technical staff and the level of innovation. The first part of analysis determined the categorical relationship between the two variables; the analysis used the One Way ANOVA model. Based on the results presented in Table 4, the p-value was 0.000, which suggested a significant categorical relationship between the two variables. Accordingly, the mean result presented in Table 4 suggested that the perceived innovation increases with the increase of the level of communication skills of technical staff.

Moreover, the study used ordinal regression to determine the causal impact of the perceived level of communication skills of technical staff on the perceived level of innovation of the organisation. Table 5 presented the model fitting information p-value as 0.000, suggesting that the proposed relationship fits in the ordinal regression equation. Furthermore, the Nagelkerke r-square value was 0.330, suggesting an impact of 33% on the perceived level of ICT innovation. With this information, the level of communication skills possessed by technical staff significantly impact the level of innovation of the organisation. The current analysis rejected the null hypothesis suggesting that the perceived level of communication skills of technical staff does not determine the perceived level of ICT innovation in an organisation.

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**Table 5**: Ordinal regression between the perceived level of innovation, and expert's technical competency and the level of communication skills possessed by technical staff projects

| *Dependent variable* | *Parameter estimates Parameter* | *p-value* | *Model Fitting information p-value* | *Nagelkerke r-square value* |
|---|---|---|---|---|
| Technical competency | Highly competent | 0.001 | 0.000 | 0.254 |
| | Competent | 0.020 | | |
| | Moderate | 0.220 | | |
| | Incompetent | Ref. value | | |
| | | | | |
| The level of communication skills possessed by technical staff | Very high | 0.000 | 0.000 | 0.330 |
| | High | 0.001 | | |
| | Moderate | 0.043 | | |
| | Low | Ref. value | | |

***The impact of experts' resilience with complex projects on the level of innovation within the organisation***

This part addressed the third objective of the study, which determined the impact of resilience in challenging projects on the perceived level of ICT innovation in organisations. The first part of analysis determined whether the perceived resilience of technical staff with complex projects impacted the level of ICT innovation in an organisation. First, the study used the One Way ANOVA to determine the significance of the categorical relationship between the two variables. Table 6 showed the One Way ANOVA p-value as 0.000, suggesting a significant categorical relationship between the perceived technical staff resilience and the level of ICT innovation in an organisation. In addition, the mean values shown in Table 6 confirm that the increase of resilience with complex projects increases the level of innovation.

**Table 6**: One Way ANOVA between the perceived resilience with complex ICT projects and the perceived level of innovation within an organisation

| Variables | Parameters for measurement | Frequency | Mean | p-value |
|---|---|---|---|---|
| Perceived resilience in complex projects | Very high | 25 | 1.68 | 0.000 |
| | High | 51 | 2.27 | |
| | Moderate | 32 | 2.69 | |
| | Low | 8 | 3.25 | |
| | Total | 116 | 2.33 | |

In additional, the study used ordinal regression to determine the impact of the perceived resilience of technical staff with complex projects on the perceived level of ICT innovation in an organisation. According to Table 7, the ordinal regression model fitting information was 0.000. With this information, the proposed relationship fitted to the ordinal regression model. Furthermore, the Nagelkerke r-square value was 0.261 suggesting an impact of 26.1% by the

perceived resilience on the perceived level of innovation. With this information, it is evident that the increase of the resilience with complex projects increased the level of innovation, and vice versa. Because of these findings, this study rejects the hypothesis which proposed that the resilience of ICT experts with complex projects does not impact the perceived level of ICT innovation in an organisation.

**Table 7**: Ordinal regression between the perceived level of innovation, and the perceived resilience and the ability to deal with challenging projects

| *Dependent variable* | *Parameter estimates Parameter* | *p-value* | *Model Fitting information p-value* | *Nagelkerke r-square value* |
|---|---|---|---|---|
| Perceived resilience in complex projects | Very high | 0.000 | 0.000 | 0.261 |
| | High | 0.002 | | |
| | Moderate | 0.072 | | |
| | Low | Ref. value | | |

***Discussion***

This section discusses results presented on the impact of technical competency, experts communication skills and experts' resilience with complex project on the perceived level of ICT innovation. The three subsections addressed objectives of the study as presented under the statement of the research problem. According to presented results, the technical competency of ICT staff has a significant impact on the perceived level of innovation in an organisation. The competency includes the amount of skills possessed and positive behaviours of ICT experts, related to their tasks. These are important in ensuring success and efficiency in ICT innovation as extant studies document (Zulch, 2014; Muriithi *et al*., 2016). In addition, the study by Osakwe and Moussa (2017) commented on the importance of technical competency by suggesting that it enables the organization to make savings and define its processes using its manpower. According to the study by Mnkandla (2013), the competency can be enhanced through trainings and experience in solving similar problems. Besides, the study by Cunningham *et al*. (2016) commented that the organisation can create innovative environment through allowing experts to work on different internal projects, instead of overly relying on externals. These inform that the competency of people who are involved with innovative projects increases as per their experience (Thakur-Wernz & Samant, 2017).

Regarding the experience of ICT experts, the results expose that the level of communication skills possessed by the technical staff impacted the level of innovation. This position is supported by Zulch (2014), and Eboagu and Adeleye (2019) who suggested that the competency of experts in communication skills impact the resilience and output of experts in a given project. In cementing the importance of communication skills, Mnkandla (2013) commented that in innovative projects, proper communication is used to inform stakeholders of the value of the project. It is difficult for people to support an innovation which promises less to the business (Liikamaa, 2015).Therefore, technical staff must have the ability to convey the right message. It is unarguable that people who are competent in communication skills can use such ability to communicate project needs in the process of developing a new innovation (Mnkandla, 2013; Majid *et al*., 2012). This is the reason why innovation requires the ability to communicate needs professionally.

Accordingly, results confirmed that the experience of experts in dealing with complex projects impacted the level of ICT innovation. This experience enables experts to develop the resilience required to learn new ways of doing things, in case the innovation is new (Ochieng, 2017). In addition, it allows experts to address challenges they face along the implementation process based on past experience (Naderpajouha *et al*., 2020). This is the reason why Lv *et al*., (2018) commented that experience with complex projects offers the capability to cope with uncertainties linked with innovative activities through integrating stability and adaptability, learned along the way. Furthermore, in line with the current study, Oeij (2017) found that resilience to challenging circumstances grows with the experience of an individual. Therefore, it is necessary to create an environment where individuals learn through their experience, to enhance their resilience in challenging circumstances. For a new organisation to take innovative steps, it is necessary to learn from those who are ahead (Lv *et al*., 2018; Ochieng, *et al*., 2017). This can be achieved mix of experienced experts with those with low experience in dealing with complex projects.

**Conclusion, recommendations and the implication of the study**

This section presents the conclusion, recommendation, area for further studies, and theoretical implication of the current study. The information is based on findings of this study.

***Conclusion***

The first objective determined the impact of technical competency on the level of innovation by the organisation. Based on the results presented in section 6.1, the current study concludes that the technical competency of ICT experts has a significant impact on the level of innovation. The second objective determined the impact of communication skills of experts on ICT innovation. Based on this objective, the current study concludes that the level of communication skills possessed by ICT experts determines the level of innovation. The last objective determined the impact of experts' experience with complex projects on the level of ICT innovation. In this objective, the current study concludes that the experience of experts with complex projects determines the level of innovation within the organisation.

***Recommendations to practice***

Based on the summary of findings provided above; this study makes the following recommendations which have a direct implication for the practices of ICT experts and their associated organisations. The study recommends:

i.) Organisations should deliberately improve the level of communication skills of their experts because they significantly impact their ability to gain support for their projects. Eventually, this impacts the level of performance of individuals in innovative projects.

ii.) Organisations should improve the ability of experts to deal with complex projects because it significantly impacts their resilience and innovativeness. This can be enhanced through engaging technical staff in different projects, including those supported by external experts, for the sake of learning.

iii.) Organisations should deliberately improve the technical competency of experts by allowing internal development of projects, and exposing them to an innovative environment, so as to improve innovation.

### *The implication and limitation of the study*

The findings of this study imply that the current low level of ICT innovation in Tanzania is significantly contributed by the low level of technical skills, poor communication skills and low experience with the implementation of ICT project. The main limitation is that the study focused on factors related to experts, not the organisation. In addition, the use of a qualitative approach may bring additional details.

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