

Professional's Opinion on the 4th Industrial Revolution Readiness in Tanzania

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Abstract- This study was conducted to find out the opinion of Tanzanian professionals on the fourth industrial revolution (4IR) readiness. It was pushed by the fact that the 4IR is seen to have great advantages in the world but the pace at which Tanzania is adopting its use and enjoying the benefits is seen to be very slow. This made the researcher question professionals on the countries readiness as they are on the front line in adopting the technology. The research design used was descriptive research design and both primary and secondary data was collected. A total of 170 professionals from 25 different professions responded to an online questionnaire which allowed descriptive analysis to be conducted on the collected data. Findings of the study indicated that majority of the professionals are aware of the fourth industrial revolution and they think Tanzania is ready for it. The study also revealed that the fourth industrial revolution technologies simplify processes and increase production hence it has more advantages than disadvantages. On the other hand, other findings indicated that new skills are required so as to enjoy the full benefits of the industrial revolution. Finally, the study recommends more awareness campaigns on the fourth industrial revolution and modifications on the education system so that it can accommodate these technologies. This should go in line with improvements in research and development as well as review of policies and regulations.

Index Terms- Fourth Industrial Revolution, 4IR, Professionals, Tanzania.

I. INTRODUCTION

Today's generation is witnessing massive changes in technology, changes that would have been imaginary in the past ten years (PwC, 2019). These changes bring up a new phase in human evolution as it has impact socially, economically, biologically and even spiritually (Clark, 2007). These changes are a continuation of historical changes that are commonly referred to as industrial revolutions. These revolutions are now in the fourth phase commonly referred to as the Fourth Industrial Revolution (4IR). According to Schwab (2016) the 4IR is a Technological revolution that is blurring the lines between the physical, digital and biological sphere. This revolution presents both opportunities and challenges to global leaders which conveys both hope and ambiguity (Deloitte, 2018).

Being the fourth in the Industrial revolutions (Dallal, 2019), the 4IR was presided by the first, second and third industrial revolutions (Oosthuizen, 2016). These revolutions are characterized by their ability to transform economies, jobs and even societies through the introduction of new technologies and processes (Sony, 2018). In the first industrial revolution steam engines were discovered (Mukwawayya et al 2018). Likewise, in the second industrial revolution electricity and assembly line made mass production possible which resulted into significant economic development. Finally, the third industrial revolution was enabled by advances in computing (Basl and Doucek, 2019).

More advancements in the third industrial revolution resulted into the birth of the 4IR (Arcane Research, 2020). Different from other industrial revolutions, the 4IR is characterized by the fusion between digital, physical and biological features impacting all disciplines, economies and industries (Cunningham, 2019). It is also seen as a transformation that does not change what we do but it changes human kind. Further, the third and the fourth industrial revolutions are seen to be similar but the main difference is the merging of technology and the human life seen in the 4IR (Schwab, 2016). Moreover, technological changes are happening faster than ever not leaving behind social, political and economic transformations. In addition, the 4IR has direct implications on value creation, business models, work organization and other supportive downstream processes. This means as much as the revolution affects the whole society creating new and future jobs, professionals are on the forefront (Maude, 2017).

Professionals are people who are engaged or qualified in a certain profession (Oxford Learners Dictionary, 2020). Whereas, a profession is a paid occupation, especially one that involves prolonged training and formal qualifications (Oxford Learners Dictionary, 2020). The 4IR has brought significant shift in many professions. This is because the revolution brings together human (social) and technological (technical) dimensions which has resulted into increased interaction and interconnectedness of man and machine (Basl and Doucek, 2019). With the connectedness various countries in the world are taking advantage of the 4IR to improve their social and economic wellbeing through the transformation towards smart societies (Mohanty, 2016). In one way or the other, Tanzania is one of the countries that has started taking advantage of the benefits of the 4IR. In a way, we witness the use of the term smart city in the reconstruction of big cities, Artificial Intelligence (AI) in popular in some areas and Internet

of Things (IoT) continue to spread in many application areas (Sahara Ventures, 2019 b).

Although this is the case the pace at which Tanzania is adopting the use of 4IR benefits is seen to be very slow. Most professionals are yet to see the benefits of the revolution to fully employ them in their day to day operational and production activities. This was the reason that motivated the study in finding out professionals' opinion on the 4IR readiness in Tanzania. In finding out professionals' opinion, the study looked into various areas that signify readiness. This included the professional's awareness of the 4IR revolution and professional's opinion on issues relevant towards the revolution's readiness in Tanzania.

II. LITERATURE REVIEW

The Fourth Industrial Revolution

Various researchers in the world have written on industrial revolutions. These revolutions are the ones bringing about transformations in economy, democracy and development in general (Homer and Sloan, 1982). In the previous revolutions much was seen but the revolutions did not touch all aspects of human lives (Schwab, 2016). Most of the revolutions affected production and economic aspects of life differing from to date where social life is affected along with the production and economic aspects (Oosthuizen, 2016). Technologies such as AI and IoT are widely spreading to the extent of affecting social life with examples of things like smart cities and self-driven cars (Mohanty, 2016). All these advancements in technology are collectively referred to as the fourth industrial revolution, which is a revolution that comes after the early three industrial revolutions (Maude, 2017). According to Clark, 2007 The first industrial revolution was seen in the 18th century with the advent of steam power and the invention of the power loom. This revolution focused on mechanization and radically changed how goods were manufactured (Delloite, 2018).

Thereafter come the second industrial revolution, this was seen in the 19th century. It was marked by electricity and assembly line which made mass production possible. On the other hand, the third industrial revolution was marked by introduction to computers which enabled programming of machines and networks (Davis, 2015). In this era digitization and the internet was introduced. This revolution paved way for the 4IR which is characterized by the fusion between digital, physical and biological features impacting all disciplines (Gasper and Juliao, 2019). Further, according to PwC (2019) the 4IR is the unfolding age of digitization- from digitally connected products and services we consume, to advancements in smart cities and factories and increasingly common automation of tasks and services in our homes and at work (Ersöz et al, 2018). This era of digital transformation ushers in new, real-time data gathering analysis and algorithmic decision and prediction making capabilities, thus creating a digital twin of our physical world. Similarly, according to Mukwawayaya et al (2018), the 4IR is used to describe the evolution of automated and computer-controlled manufacturing facility into a more advanced facility that gathers and analyses data to make intelligent decisions autonomously.

In addition to the autonomous nature of the fourth industrial revolution, according to Schwab (2016) the 4IR is characterized by the blending of physical, digital and biological spheres. It is a revolution that comes with a lot of changes in the way factories, businesses, products, customers and society at large perform their operations and lives (Gasper and Juliao, 2019). Besides that, according to the study conducted by Mukwawayaya et al (2018), the industrial work place will change in at least ten ways which have varying degrees of impact on the workplace and the extent to which new skills will be necessary to handle new task. New skills, tasks and future jobs will be a result of the various technologies that come in the package of the fourth Industrial revolution. These technologies have been mentioned and described by various industrial evolutions authors. For example, according to Cunningham, 2018 technologies promoted under the 4IR include AI, IoT, Virtual and augmented realities, additive manufacturing and blockchain.

Others according to Maude (2017) are distributed ledger technology, advanced materials and nanomaterials, energy capture, storage and transmission, new computing technologies, biotechnologies, geoengineering, neuro technology and space technologies. In addition, according to Ersöz et al (2018), technologies under the 4IR include cloud computing, data analytics and big data. These technologies are seen to present both benefits and challenges. Some of the challenges accompanying these technologies include invading of privacy, job and data security (PwC, 2017). Parallel to these challenges, it is evident that benefits outweigh challenges as these technologies collectively bring massive advantages to individuals and organizations (PwC, 2019). The advantages are such as time saving, improved productivity, personalized experience, increased production, efficiency, and quality in production processes. It also increases safety at work by reducing jobs in dangerous environments. With availability of data it increases decision making abilities which includes developing products that best suit customer needs. The benefits are for both government and private entities (Gasper and Juliao, 2019).

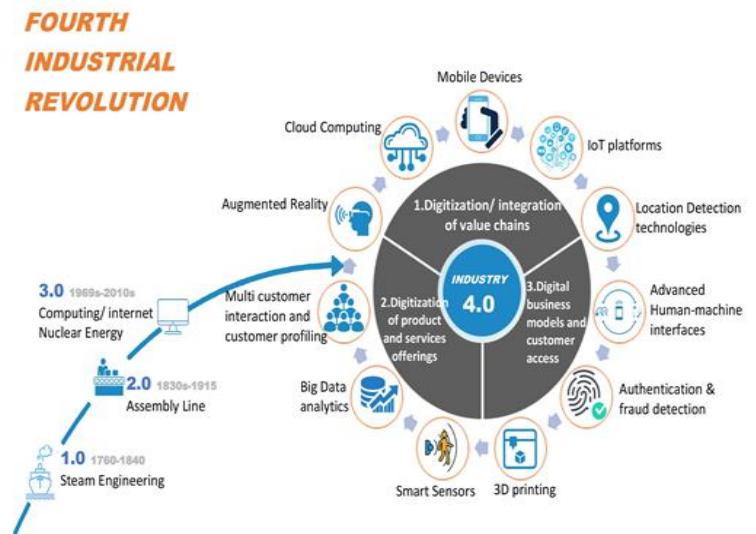


Figure 1: The Fourth Industrial Revolution (ICTWorks, 2019)

Many countries in the world including Tanzania, are yet to experience the full benefits of the 4IR (Delloitte, 2019). At individual level many are enjoying the benefits directly or indirectly through the use of personal items such as smart watches, 3D printings and Smart TVs while indirectly they enjoy benefits through water billing systems or online transactions that already use AI and IoT in simplifying their processes (Davic, 2015). For many organisations and business entities the use of the 4IR technologies is still low or not at all as there is a possibility that the level of awareness of the benefits is low or they are aware but are not ready for the change.

Fourth Industrial revolution in Tanzania

Tanzania just like other parts of the world is moving towards the fourth Industrial revolution. This revolution is preceded by the third industrial revolution that started back in the 50s (PwC, 2019). In Tanzania the third Industrial revolution started with the installation of the first computer back in 1965 (Esselaar & Adam 2013). Thereafter, the government and the society at large realised the benefits to be grasped from the use of that technology and a lot was done to make sure the country enjoys the revolution (URT, 2010). Some of the measures taken to facilitate the third industrial revolution was developing the ICT Infrastructure, developing the national ICT policy and offering ICT trainings (URT, 2003). Currently access to computers and smart phones is not an issue to the majority of Tanzanians. The internet, one of the revolutions in the third industrial revolution is also available to a great percent of the country (TCRA, 2020). The government made an effort to support this through putting in place the National ICT Broadband back bone and establishing the National Internet Data centre that has made hosting easy and cheap (URT, 2020).

All that was done during the third industrial revolution paved way for the fourth industrial revolution. So far little is seen of the revolution in Tanzania as majority of the professional in government and private institutions are not fully aware of these technologies to approve their full utilisation. For example, back in 2019 the Bank of Tanzania issued a public statement to discourage trading, marketing and use of virtual currencies (cryptocurrencies) to the general public. This was done because the national bank has not yet approved the use of virtual currency as an acceptable and used legal tender (BOT, 2019). This is similar to many African Countries such as Kenya, Ethiopia Nigeria, Cameroon and Ghana. Other African countries such as Namibia, Zambia, Zimbabwe and Swaziland have completely burned cryptocurrency and few like South Africa, Tunisia, Senegal and Seri Leon are on board with cryptocurrency and the blockchain technology (Arcane Research, 2020).

On the other hand, other technologies such as IoT and AI are well adopted specially at the individual level as many people are enjoying the use of smart watches, Smart Tv and other automated home appliances (Mohanty, 2016). Many start-ups are also trying to bring solutions using the 4IR technologies in areas such as agriculture, health and education (Sahara ventures, 2019 b). Few start-ups available are Agrobot that provides accurate agricultural information using AI and JAMVI a blockchain based platform that promotes access to capital for grass root farmers. Others are JEMBE that supports precise farming using drone's technology and data science, Dr. Elsa another AI powered medical assistant

while e-Shangazi is a knowledge sharing AI powered platform (Sahara, 2019 c).

As seen, most of the applications of the fourth Industrial revelation in Tanzania are either for individual cases or private start-ups. According to (WEF, 2017) in order for African countries to have economic shift they need to embrace the 4th Industrial revolution. In order to be ready for that, they need to overhaul their education system to prepare for these technological changes. The 4th industrial revolution heavily influence which skills are needed in the labour market around the world. Demand for software engineers, marketing specialists, writers and financial advisers is on the rise while demand for mechanical technicians, administrative assistants and accountants is on the fall. Furthermore, according to Cunningham, 2018 in order for governments to be ready for technological changes improvement efforts need to be focused on building awareness, establishing a financial plan, creating a robust legal framework, expand connectivity and data security, promote research and development and setting up new talent and education programs (Ersoz et al, 2018)).

Furthermore, according to Manda and Dhaou (2019) on their paper responding to the challenges and opportunities in the 4th industrial revolution for developing countries, several items are seen to be the drivers of the 4th industrial revolution. These items include Information and communication Infrastructure and emerging technologies, education and training, Innovation, policy innovation and responsive and context –specific strategies. Based on these studies, this study identified issues relevant towards the 4th Industrial revolution readiness in Tanzania.

Theoretical Background

Various theories on economic development and Industrial revolution have been written. These theories have been used by numerous scholars in explaining changes that include social, economic and other changes around democracy. However, this study focused on professional's opinion on the fourth industrial revolution. In understanding the industrial revolutions, the modernization theory was used.

Modernization theory

Various theories have been developed to explain several aspects including development and community transformations. Modernization theory according to Lipset (1959) is one of these theories that tries to explain the relationship between society development and democracy. This theory identified social variables that contribute to social progress and hence social evolution. Modernization theory concentrates not only on the process of change but also on the response to change. It also looks at internal dynamics while referring to social and cultural structures and the adaptation to new technologies. The theory suggests that traditional societies will develop as they adopt more modern practices. Further according to Lipsets study, first step to modernization is urbanization followed by media growth, literacy and industrial development. These industrial developments bring about new technologies that later become major sources of social change. Technology makes it possible for a more innovative society and broad social change. The changes that have taken place

through centuries has evolved socially, industrially and economically bringing about the different industrial revolutions.

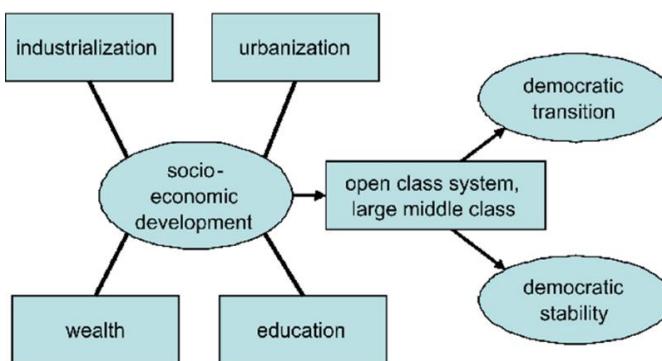


Figure 2: Modernization Theory (Lipset, 1959)

III. RESEARCH METHODOLOGY

In this study, Descriptive Research Design was used. This allowed the description of trends in the population as they exist, showing what is happening. This is as stated by Tromp and Kombo (2011) when emphasizing that descriptive design can be used when collecting information about people's attitudes, opinions, habits or any of the variety of education or social issues. The questionnaire distribution was in electronic form which allowed 179 professionals from different parts of Tanzania to respond. Simple Random Sampling a type of probability sampling was used to make sure every member of the population had an equal chance of being selected to be part of the sample (Kothari, 2004). Both qualitative and quantitative data were collected. Collected data was grouped and presented using frequency distribution statistical techniques. This enabled a thorough analysis of the data and hence provided visibility of what is available.

IV. FINDINGS AND DISCUSSION

Demographic characteristics of the respondents

Respondents of this study where 170 Tanzanian professionals who responded to an online questioner that was made available to the public through social media platforms mainly WhatsApp, face book and Instagram. Majority of these respondents, that is 65.9% were male and the remaining 34.1% were female. Respondents' age ranged from 18 to 60 years of which the majority that is 47.3% were within 29 and 39 years, 33.7% were within 18 and 28 years while 16.6% were within the age range of 40 and 50 and lastly 2.4% were in the age range of 51 to 60 years.

The respondents were also professionals from 25 different professions as see on table 1 below. A great percent of the respondents that is 21.2% was from the Information Technology (IT) and Computer science profession which brought together Computer Scientists, ICTOs, Cyber analysts, Information managers, IT specialists, Software developers, System Analysts, Web developers, MIS specialists and Network administrators. Apart from the IT and computing profession, 13.2% of the

respondents were from the accounting profession. This included general accountants, those in accounting and financial management, auditors, CPAs and ACPAs. In addition, the study had a respondent who is an accountant and a videographer.

Table 1: Respondents Professions

Sno	Profession	%	Sno	Profession	%
1	IT and Computer Science	21.2	14	Procurement	1.3
2	Accountants	13.2	15	Cosmetologists	1.3
3	Student	11.3	16	Nutritionist	0.7
4	Lecturer	9.9	17	Pharmacist	0.7
5	Business	7.9	18	Photographer	0.7
6	Engineering	7.3	19	Writer	0.7
7	Education	6.0	20	Food production	0.7
8	Lawyer	4.0	21	HR Manager	0.7
9	Economics	4.0	22	I.T technician and accountant	0.7
10	Management	2.0	23	Intellectual property management expert	0.7
11	Banking and finance	2.0	24	Journalist	0.7
12	Technician	1.3	25	Community development	0.7
13	Librarian	0.7			
Total		100			

Source: research data

Furthermore, 21.2% of the respondents were lecturers and students who did not specify what professional areas they lecture and for students what their professional area of study was. Apart from that, the study also had 7.3% of engineering profession respondents, it was composed of engineers in Automobile, Broadcasting, Computer, Mechanical and Telecommunications.

These professionals had different levels of education. A larger percent that is 49.4% hold bachelor degree, 28% hold master's degree, 7.7% certificate holders, 6% diploma holders, 6% PhD holders and 2.9 other levels.

Composition of the respondents was a true representation of professionals in Tanzania, distribution of the age ranges and the 25 professions was substantial to the results of the study.

Professional's awareness of the 4th Industrial Revolution

Based on the response from the respondents a larger percent that is 97.6% are aware of the fourth Industrial revolution. On the other hand, only 2.4% of the respondents were not aware. Respondents aware of the revolution were asked to indicate the technologies they are aware of in this industrial revolution and the response was as follows;

Table 2: Fourth Industrial Revolution Technologies Aware to Professionals

Sno	Technology	Frequency (%)
1	Internet of things (IoT)	82.3
2	Artificial Intelligence (AI)	53.7
3	Data Analytics	41.5
4	Big Data	32.3
5	Blockchain and Distributed Ledger	25
6	Bio Technologies	24.4
7	Virtual and Argumented Realities	16.5
8	Online Server Management	0.6
9	Software Engineering	0.6

Note: Respondents were allowed to choose more than one technology

Source: Research data

As seen on the table above, most respondents are aware of Internet of Things (IoT) technology followed by artificial intelligence (AI), data analytics, big data, block chain and bio technologies. These technologies that most respondents are aware of are applied in solutions that are closer to individual uses than in organisations. The application of IoT and AI has been common in things like smart watches, smart TVs and other items that are used in homes. Apart from this, most of the authors including Shawn (2018) in his report titled World economic forum and the 4IR in south Africa mention the above technologies as the most common technologies of the fourth industrial revolution. These technologies are also similar to those used by respondents in the study conducted by PwC, 2019.

Furthermore, out of the respondents 95.9% strongly agreed and agreed that the 4IR technologies will simplify processing and increase production while the remaining 4.1% remained neutral on the same. In addition to that, 75% of the respondents strongly agreed and agreed that the fourth industrial revelation has more advantages than disadvantages to their professions, 22.6% remained neutral while only 2.4% disagreed. This is similar to the general understanding of the 4IR as according to Manda and Dhaou (2019) the 4IR presents more opportunities than challenges. Further to this, according to Deloitte (2018) the revolution has the ability to change economies for example in banking the revolution allow banks to serve previously underserved communities. This means these technologies are meant to simplify existing processes aiming at increasing production and quality of the products.

On the other hand, 75.6% of the respondents strongly agreed and agreed that technologies in the 4IR will affect the way they perform their job. While 9.5 remained neutral and the remaining 14.9 disagreed and strongly disagreed that the technologies will affect the way they perform their jobs. The effect on how professionals perform their jobs is due to the overall nature of the 4IR technologies which integrates the fusion between digital, physical and biological features (Schwab, 2016). This has enabled variables that traditionally where not seen to be important in professional activities be included. These variables are such as

consumer behaviours in respect to sells and integrations of human behaviour in technologies such as AI (Sahara Sparks, 2019).

Table 3: Effect of Fourth Industrial Revolution Technologies

	Strongly Agreed	Agreed	Neutral	Disagreed	Strongly Disagreed
	Perc	Perc	Perc	Perc	Perc
4 th Industrial Revolution technologies Simplify processing and increase production	55.9	40	4.1	0	0
4 th Industrial Revolution technologies affect the way professionals perform their job	42.3	33.3	9.5	11.3	3.6
4 th Industrial Revolution technologies have more advantages than disadvantages	33.9	41.1	22.6	2.4	0

Fourth Industrial revolution readiness in Tanzania

Based on the respondent's response, 55.1% of the respondents strongly agreed and agreed that Tanzania is ready for the 4IR while 15.4% disagreed and strongly disagreed of the same and the remaining 29.6% remained neutral.

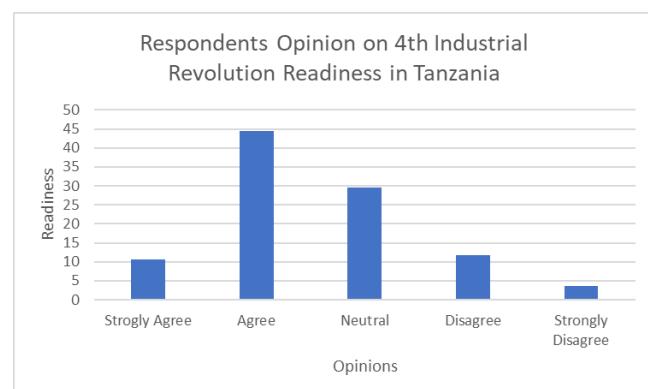


Figure 3: Respondents Opinion on 4th Industrial Revolution Readiness in Tanzania (source research data)

Putting together the professionals who remained neutral and those who disagreed and strongly disagreed on Tanzania being ready for the fourth industrial revolution, the study found that a significant number of respondents that is 44.9% are not sure or do not think

that the country is ready for the revolution. This is an alarming state although based on the percentage majority of the respondents agree that the country is ready. This is similar to the findings of the study conducted by Kopp and Basl (2017) that looked at readiness of Czech companies to the Industry 4.0. Findings of this study showed that some Industrial companies are already involved with Industry 4.0 technologies while others are not. Those that do not use these technologies showed that in order to go for fourth industrial technologies considerable investments need to be done. Furthermore, the study reveals that these investments should be supported by governments. In addition, the study indicated that those who were not ready for the revolution did not know much about it hence are not aware of the benefits that come along (PwC, 2017a).

Issues relevant towards the 4th Industrial revolution readiness in Tanzania.

SKILLS

According to various literatures and experiences from other countries, a countries readiness of the 4IR is measured by having the right skills that can manage the revolution technologies. In assessing Tanzania's readiness, respondents were asked their opinion on available skills in relation to the fourth industrial revolution. Out of the respondents 67.6% strongly agreed and agreed that the skills they possess are sufficient for the use of the 4IR technologies, while 13.5% disagreed and strongly disagreed on the same and the remaining 18.8% remained neutral.

Apart from the majority acknowledging that their skills are sufficient, 91.2% of the respondents strongly agreed and agreed that an addition of new skills is required to be able to enjoy full benefits of the 4IR technologies. Remaining 8.8% was distributed between those that are neutral which is 7.1% and those who strongly disagree and disagree on the same occupying 1.7%.

Furthermore, respondents were asked whether Tanzanian education system provides skills required for the use of technologies in the fourth industrial revolution. On this question majority of the respondents that is 42.4% strongly disagreed and disagreed that Tanzania's education system provides skills required for these technologies. Moreover, 29.4% of the respondents remained neutral and the remaining 28.2% agreed and strongly agreed.

Table 4: Respondents Opinion on Skills

	SA	A	N	D	SD
	Perc	Perc	Perc	Perc	Perc
Your skills are sufficient for the use of smart advanced technologies	22.9	44.7	18.8	12.9	0.6
Additional new skills are required for the use of Smart Advanced Technologies	52.7	38.5	7.1	1.2	0.6
Tanzanian education system provides skills required for the use of smart advanced technologies	9.4	18.8	29.4	32.4	10

The findings above demonstrates the confidence respondents have in the skills they possess. Majority of them agree that their skills are sufficient for the use of the 4IR although they also agreed to the need of required additional new skills. This is similar to the findings in the study conducted by Mukwawaya et al (2018) that revealed the need of new skills when looking into the readiness of South Africa for Industry 4.0. In addition, majority of the respondents remained neutral or disagreed on the chances that Tanzanian education system provided skills required for the use of 4IR technologies. This is similar to the recommendations in the study conducted by Deloitte (2018) which emphasised on the shift in education systems as a requirement for countries to be ready for the fourth industrial revolution.

Infrastructure

Professional gave their opinion on the available technology infrastructure assessing whether it supports the 4IR technologies. Firstly, professionals were asked if the technical infrastructure at their work place supports the fourth industrial revolution and the response was as follows. Out of the respondents 39.7% strongly agreed and agreed, 26.5% strongly disagreed and disagreed while the remaining 33.7% remained neutral.

Furthermore, since the internet is an important component in this revolution, respondents were asked if internet availability was sufficient for the fourth industrial revolution. From the response 53.2% strongly agreed and agreed that available internet was sufficient while 18.3% remained neutral and the remaining 28.4% disagreed and strongly disagreed.

Apart from their opinion on the current situation, majority of the respondents that is 93.5% suggested that technology infrastructure need to be improved to be able to fully enjoy benefits of the 4IR technologies.

Table 5: Respondents Opinion on Technological Infrastructure

	SA	A	N	D	SD
	Perc	Perc	Perc	Perc	Perc
The technical infrastructure at your work place is supportive of the 4IR technologies	9	30.7	33.7	22.3	4.2
Availability of the internet is sufficient for the 4IR technologies	20.1	33.1	18.3	22.5	5.9
To be able to use 4IR technologies, technical infrastructure needs to be improved	57.4	36.1	4.7	1.8	0

In the third industrial revolution, the government of Tanzania made significant efforts to improve technical infrastructure and access to the internet (Chogo, 2020). These improvements have paved way for the 4IR although based on the findings above majority of the respondents see that their work place infrastructure is not supportive of the 4IR technologies. On the other hand, improvements in internet access seems to be in favour of the 4IR

technologies as majority agree and strongly agree that the internet is sufficient for the revolution. The feeling is not mutual for a significant number of the respondents that is 46.8% who remain neutral and disagree on the same. Although this is not the majority but their response sends a signal that all is not well. For this case, according to Morsy, (2020) for African countries to be able to enjoy the full benefits of the fourth industrial revolution, significant improvements need to be made to the technical infrastructure.

Policies and regulations

Professionals were also asked for their opinion on favourableness of available policies and regulations towards the fourth industrial revolution. These policies and regulations are both at organisation and country level. The response was as follows; majority of the respondents that is 34.3% remained neutral while 33.1% of the respondents strongly agreed and agreed that the available policies and regulations are in favour of the industrial revolution. On the same, the remaining 32.6% of the respondents strongly disagreed and disagreed meaning that they think the available policies and regulations are not in favour of the fourth industrial revolution. This response on the policies and regulations is alarming but not surprising as the 4IR is new hence many organisations and the country at large are yet to review policies and regulations so as to align with the changes. This is emphasized by Ndung'u and Signe (2020), in the study the 4IR and digitization will transform Africa into a global powerhouse that sees the success of the revolution when aligned with relevant policies and regulations.

In relation to their response on the state of the available policies and regulations, majority of the respondents that is 86.4% strongly agreed and agreed that a thorough review of policies and regulations need to be done before implementation of the 4IR technologies.

Research and development

Respondents were also asked for their opinion on research and development in line with the use of the 4IR technologies. Majority of the respondents that is 91.1% advised that before the shift to the 4IR technologies, research and development need to be strengthened.

Table 6: Respondents Opinion on Policies, Regulations, Research and Development

	SA	A	N	D	SD
	Perc	Perc	Perc	Perc	Perc
Available policies and regulations are in favour of the 4IR technologies	7.1	26	34.3	29.6	3
A thorough review of policies and regulations need to be done before implementation of the 4IR technologies	39.1	47.3	11.2	1.2	1.2
Before the shift to the use of the 4IR technologies research and development needs to be strengthened	50.9	40.2	7.1	1.8	0

According to Waunde, (2017), for successful use of the 4IR in entrepreneurship and education in Africa research needs to be conducted so as to establish best models that work. This is similar to the findings of this study that emphasized on the importance of research and development.

V. CONCLUSION

The study focused on assessing Professional's Opinion on the Fourth Industrial Revolution Readiness in Tanzania. It focused on evaluating Tanzanian professionals' awareness of the 4IR and later looked into relevant issues towards 4th Industrial revolution readiness in Tanzania. Findings of the study indicated that professionals are aware of the 4IR and to their opinion Tanzania is ready for it. It also revealed that the most known technology in the 4IR is Internet of Things. Furthermore, the study revealed that the 4IR technologies simplify processes and increase production hence it has more advantages than disadvantages. On the other hand, professional's opinion on skills indicated that professionals have sufficient skills in their professional areas but new skills are required so as to enjoy the full benefits of the industrial revolution. They also think that Tanzania's education system does not provide sufficient skills to move with the revolution. The technical infrastructure is also seen to be supportive of the revolution but not at the best. Internet connection is available but not reliable while on the side of policies and regulations, professionals were not sure if they are supportive of the fourth industrial revolution. Lastly professionals thought that research and development need to be increased.

VI. RECOMMENDATIONS

Based on the findings and conclusion presented, the study is recommending the following:

More needs to be done to create more awareness and understanding of the revolution and its technologies to ensure full enjoyment of the benefits. Professionals need to be equipped with new skills required for the use of the 4IR technologies and also Tanzania's education system needs to be adjusted to move with the technology revolutions. Technical infrastructure needs to be improved and a thorough review of policies and regulations need to be done. Finally, organizations and the country at large need to invest in research and development so as to find the best model to adopting the 4IR and its technologies.

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