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ASSESING THE USE OF 5G IS ASSISTING BUSINESS GROWTH IN
HARARE, ZIMBABWE

BY

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**ASSESSING HOW THE USE OF 5G
CAN ASSIST BUSINESS GROWTH
IN HARARE, ZIMBABWE**

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Abstract

This research project aims to assess how the implementation of 5G technology may have in assisting business growth in Zimbabwe. This study specifically targets small to medium enterprises in Zimbabwe to determine how they can benefit from the new technology. The study will involve gathering data from people who are in business in Zimbabwe who have just started business or who have operated for a period of less than five years. The research project will also focus on identifying the challenges that small to medium enterprises face and how 5G can be used to address these issues. Additionally, the study will examine the potential benefits that businesses can expect to gain from 5G technology such as increased efficiency and productivity and enhanced communication capabilities.

The research project is divided into five chapters. The introduction chapter covers the background of the study that is being carried out as well as the statement of the problem in order to uncover what is known and what is not known with regards to the discussion topic at hand.

The second chapter will review the literature that is currently available. It will give information on the knowledge that is currently available with regards to the selected topic and it will also help to identify the gap in the existing knowledge that this research aims to fill. It will give a brief analysis of some of the research and studies that have been done on the topic at hand.

The third chapter is the research methodology. This will give more information on the study area, how data is going to be collected on the research, and how the data is going to be analyzed. It will also describe more on the population and sampling methods that will be used in this research.

Finally, the fourth and fifth chapter of the research project will be for data presentation on the research carried out, analyzing and interpreting the data then giving a summary, conclusion as well as recommendations for the research based on the findings. It will conclude by giving suggestions for further research on the topic.

The findings of this research will provide insights into the potential impact of 5G technology on business growth in Harare, and help inform policy makers and businesses on how to best leverage this technology to drive economic growth and development.

Declaration

I declare that this dissertation is my original work except where sources have been cited and acknowledged. The work has never been submitted, nor will it ever be submitted to another university for the award of a degree.

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Student's Full Name

Student's Signature (Date)

Main Supervisor's Full Name
(Date)

Main supervisor's Signature

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List of acronyms and abbreviations

SME Small to Medium Enterprise

5G 5th generation mobile network

IoT Internet of things

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Chapter One: Introduction and Background of study

Introduction

The introduction of 5G technology has the potential of revolutionizing business in Zimbabwe. This chapter will provide an overview of the 5G internet as well as address some common misconceptions about the next generation of internet that were raised during the COVID-19 pandemic. It will also identify the problem and help the reader understand why this discussion of 5G is relevant in this developing technological era. The chapter will also give the scope of the project, which aspects will be covered in the research and those that will not be covered, as well as the main this research objectives that we expect to get from this research.

Background to the study

In order to understand the topic, we need to be able to understand key areas including 5G Technology: This involves an understanding of what 5G technology is, how it works, its benefits, and its potential impact on businesses in Harare, Zimbabwe. It is also important to understand the technical aspects of 5G technology, including its speed, latency, and coverage. It is important to assess how the use of 5G can assist business growth in Harare, and to have an understanding of the key factors that drive business growth. This includes an understanding of the business environment in Harare for SMEs, and the potential opportunities that could be created by the use of 5G technology. We also need to understand the current State of Technology in Harare this includes an assessment of the current infrastructure for communication and internet access, as well as an

understanding of the existing technologies that businesses in Harare are currently using. Finally, we need to understand regulatory framework in Harare, including policies and regulations related to the use of 5G technology. This includes an understanding of the licensing requirements, spectrum allocation, and any other regulations that could impact the adoption of 5G technology by businesses in the region.

5G is the next generation of telecommunication standards and is going to be the successor to the current 4G network, which is used by most people around the world to connect to the internet using their mobile devices. Companies started deploying and testing the technology in 2019, with mobile carrier companies like AT&T and TMOBILE in America being some of the first companies to test the technology in public. Mobile phone companies have also started to release devices with 5G chips that can be used to connect to the network. Like the predecessor networks such as 4G, 5G also uses radio waves through local antennas that will be within the range of the device that will be trying to connect. The primary advantage that is being brought by the new standard for broadband networks is that they will have higher download and upload speeds. In most cases, it is 100% faster than the current speeds that we experience for upload and download, with networks getting to 15 gigabits per second from the previous MBPS experienced using 4G networks.

The main aspect that different companies are looking into is the application of 5G to enable the use of advanced technologies such as internet of things (IOT), artificial intelligence and machine learning. This will enable

companies to streamline their operations while reducing costs and enhancing their customers' experience. An example is smart lights that can be switched on and off over the internet and cars that can reverse themselves. The faster data transmission that is brought by 5G enables devices to communicate faster and more securely, making it possible for data to be transferred simultaneously. This in turn reduces the lag time that can be experienced when a computer is trying to process instructions over the internet.

The launch of 5G by companies around the world also triggered misinformation and controversy around the new network bandwidth. This was brought up by groups of people who believe that the use of wireless signals may be causing harm to the human body. In particular, these groups believed that non-ionizing radiation may have been the one that caused the COVID-19 pandemic, which quickly spread in most parts of the world. Non-ionizing radiation is caused by energies that are lower than UV light in the electromagnetic spectrum, such as microwaves and radio frequencies. The health concerns of 5G was started when a study written by Dr Bill Curry in 2000 started circulating on social media sites which showed that there was a direct relationship between radiation and the gray matter that is found in the human brain. This was then proven to be incorrect, with the errors being discovered in the study, but by the time that the errors in the study were shared on the internet, the debate had already started on whether 5G is going to be good or bad for humans.

During the COVID-19 period, a lot of people in Zimbabwe relied on social

media to get their information as people started to work more from home. The main disadvantage with social media is that it makes it difficult for one to differentiate a scientifically proven fact from an opinion. This then led to a lot of bias in information as there was no way of proving that the information that had been shared was authentic. Shared articles were written by Dr. Joseph Mercola, who used platforms like Facebook and Twitter to share misinformation about the origin of the virus as well as the use of vaccines. These articles were often shared in mainly WhatsApp groups in Zimbabwe, one of the most used social media networks in the country.

The main purpose of this topic is to point out the advantages that will be brought with the emergence of 5G in a country like Zimbabwe. The introduction of 5G technology has the potential to revolutionize business in Zimbabwe as they offer faster internet speeds and low latency as well as higher capacity as compared to the current 4G which we are using. This topic seeks to bring out how the use of 5G can benefit people in business in and the economy as a whole, as it can be used to provide growth in different sectors in a country. The main mobile network operators in Zimbabwe, NetOne and Econet, have started looking into investing in 5G internet, but there has not been a lot of discussion on how the Small to medium enterprises may also benefit from the introduction of 5G internet. This is what inspired me to look into the positives of 5G and the benefits from the new network band. It can also help to fill the knowledge gap as there have not been any further discussions about 5G since COVID-19 was at its peak.

Statement of the problem

Technology has brought a lot of ease in various economic sectors in different countries, such as automation, online learning, and interconnectivity. With discussions about cyber-attacks and cyber security becoming topics of discussion, there is a lot of fear that comes with the use of technology, especially from countries that still rely on a lot of analogue methods of recording, storing, and analyzing data. The rise in the spread of fake news during the COVID- 19 pandemic has led some individuals and organizations to draw conclusions about new and existing technology based on false information, which could be used to improve customer experience, create business efficiencies, and promote overall business growth in Zimbabwe. As the world is rapidly advancing towards the fifth generation (5G) of wireless technology, it becomes increasingly crucial to explore its potential implications for business growth in different regions. Harare, Zimbabwe's capital city, is witnessing significant economic and technological growth, and thus it is imperative to evaluate how the adoption and utilization of 5G technology can impact businesses in the region. Therefore, the main problem to be addressed is how the use of 5G can assist business growth in Harare, Zimbabwe.

Research Objectives

1. To outline how small to medium enterprises (SME's) can benefit from 5G technology.
2. To identify challenges that SME's face in Harare and how 5G

technology can help to address these challenges.

3. To advise on how the use of internet of things and 5G can make the lives of people in business easier in Zimbabwe.
4. To identify potential barriers to adoption by businesses in Zimbabwe.
5. To identify people that have successfully used 5G technology and analyses their key success factors and challenges.

Research Questions

1. What are specific challenges that SMEs in Harare face and how can 5G technology address these challenges.
2. What are the advantages that 5G technology can bring to businesses in Zimbabwe.
3. What are potential barriers that have hindered the adoption of 5G technology?
4. What are the potential benefits that SMEs in Harare can gain from implementing 5G technology?
5. What is the role of telecommunication companies and the government in supporting SMEs in Harare to adopt 5G technology and what are the potential areas of improvement.

Assumptions

- People that will take part in the research are either born or are residence of Zimbabwe.
- SMEs in Harare face specific challenges related to communication and connectivity which may be addressed by the adoption of 5G technology.
- People that are going to take part in the research have used the internet and they know how it works.
- Telecommunication companies in Harare are interested in supporting SMEs in the adoption of 5G technology.
- The regulatory environment in Harare supports the adoption of 5G technology and does not present significant barriers to implementation.
- There are existing 5G infrastructure and network available in Harare and people that are running SMEs have access to these networks.

Significance of the study

5G is going to be beneficial to our society as it is going to create more ways that we can benefit from the use of technology. One of the primary benefits that 5G is going to bring for businesses is improved communication. High quality video and audio calls will make

communication between businesses and customers, suppliers, and other stakeholders more efficient and seamless. It will make it easier and faster when collaborating different stakeholders in different parts of the world.

5G technology can contribute to economic development for SME's in Zimbabwe. SMEs are a significant contributor of economic development in Zimbabwe. According to the Zimbabwe National Statistics Agency (2020), "SMEs contribute around 60% of the country's GDP and employ over 5.7 million" people and the adoption of 5G technology has the potential to drive business growth, and increase competitiveness of these businesses in the local and global markets. According to a research by Chibwana in 2020, "SMEs often face a range of challenges such as limited access to finance, markets and technology which can hinder their growth and competitiveness".

Telecommunications companies play a very significant role in 5G technology because they provide the necessary infrastructure in order to start implementing the technology. This study can help to provide valuable insights into the role that telecommunication companies in supporting SMEs to adopt 5G technology and it can help to build policies and decisions that are related to the regulation and support of these companies.

The study can also contribute to the academic research on the adoption of emerging technologies in developing countries and this can provide practical insights into the challenges and opportunities of implementing 5G technology. This will be beneficial as it can be used to identify future

research, investment decisions and contribute to broader academic discussion on the role of technology in the growth of Zimbabwe and other countries.

This study is also significant because it can give practical recommendations for businesses, the government as well as telecommunication companies on how best to take advantage of 5G technology to drive business and economic growth in the development of Harare and Zimbabwe as a whole. It can help to create a roadmap by understanding more about the people in business and what they believe can help them to maximize and grow their businesses. Business growth is important for a country because it can create employment for the people in the country and can also strengthen the economy of the country, while at the same time increasing the quality of life of the people that stay in the country. I believe that leveraging on the advantages that 5G technology can bring can have a positive impact on the country as a whole.

This study can have significant implications for the economic development, government and telecommunication industry, academics on the topic of technologies in emerging economies and it can also contribute to future development of Harare and Zimbabwe as a whole, and this topic can provide valuable insights into the potential of 5G technology to drive business growth and economic development.

Delimitation of the study

This research will be based on the research questions and objectives that have been outlined in section 1.3 and 1.4 of this research. It will be centered on understanding the benefits that 5G will bring to businesses that operate in different sectors in the country as well as try to understand more about how people can get to benefit more from the use of 5G in Zimbabwe. Aspects that are not related to this topic will not be discussed in this research.

The study will only focus on small to medium enterprises in Harare and will not include businesses from other parts of the country. This is because Harare being the capital city of Zimbabwe, has a diverse economy and a significant number of SMEs as compared to other parts of Zimbabwe.

The study will also only focus on SMEs that are in specific industries, mainly retail and ecommerce and will not include SMEs in other industries. This is because these are the main sectors that rely on internet for their growth as they have to engage suppliers and customers from different parts of the country, therefore they have a high potential for growth with the adoption of 5G technology.

Due to limited resources, the research will only select a sample of SME's in Harare for data collection and will not include all SME's in Harare. This is because collecting data from all SMEs in Harare is not feasible as new businesses are emerging every day, therefore the sample size was selected based on an industry as well as how long the business has been operating

in order to make sure that it is representative of the SMEs in Harare.

The research project will also cover from the period when 5G was introduced to the present time and it will not look at future plans and development. This is because 5G is still a relatively new technology, and its impact on SME's is still being studied, therefore focusing on the current information can help is to understand how SMEs in Harare will currently benefit from 5G technology and its impact to future growth.

Limitation of the study

Limitations are factors and potential weaknesses that may affect this research that are not in our control. For this research this includes but is not limited to:

Lack of previous research into the topic: As 5G is still a new technology that is emerging, there are not many journals and research topics that have discussed the topic in detail and how the technology can be useful to people in SMEs is still being studies by experts in the topic. The data on the use of 5G in Harare may also be limited. This is because most SME's have not adopted 5G technology yet, therefore they may not be able to provide data on how it can have a positive impact on their business growth.

Time constraints: The research may limited by time constraints as well that may affect the research, as the research itself has to operate on a specific timeline. It may give us time be difficult to get access to local experts on the topic of discussion as they may not be willing to have the discussions due to other commitments or lack of time. This may limit the depth of the

data collected and it may not be able to capture of the information about the impact of SME growth in Harare.

Reliability of data: The data that has been collected may not be reliable due to factors such as desirability bias and response biases. Respondents to the research may choose to give answers that they believe are socially desirable which may lead to bias in the research results.

Sample size: The sample size selected for the research may not be representative for all the SMEs in Harare. This is because the study will be based on a certain criteria, in this case industry and how long a business has been operational, and this may not fully reflect the diversity of SMEs in Harare

Resource constraint: The research may also be limited by resources such as funding to conduct the research, time to do the research due to other commitments such as school work and assignments, as well as human resource and the research needs to be done by one person. This can limit the scope of the research and the extent to which data can be collected, analyzed and interpreted.

Economic factors: The study may not fully account for economic factors that could impact the adoption of 5G technology by SMEs in Harare, such as the cost of equipment and infrastructure, and the availability of skilled technicians.

Cultural factors: The study may not fully account for cultural factors that

could impact the adoption of 5G technology in Harare, such as the preferences of business owners and consumers for certain types of technology, or cultural attitudes towards new technology.

Chapter 2: Literature review

Introduction

5G internet has several roles that it can play in a country's economy. Some key concepts when looking at 5G include low latency, which is the time that it takes for a device to perform a task that it has been given. An example where this can be useful is in the development of mission critical applications such as the use of military drones that have no pilots that can be used in military exercises. Data is transmitted at gigabits per second, which means that information can be uploaded and downloaded faster, which can be an advantage as different ministries can improve workflow. For example, financials from the health ministry can be sent to the finance ministry to see if the budget that has been set for the year is adequate. According to research by PricewaterhouseCoopers (PWC), "The key functional drivers of 5G will unlock a broad range of opportunities, including the optimization of service delivery, decision-making, and end-user experience." This will result in \$13.2 trillion in global economic value by 2035, generating 22.3 million jobs in the 5G global value chain alone. "(PricewaterhouseCoopers, n.d.)

Theoretical Framework

The theoretical framework is used to support the research study on how the evolution of the internet from 1G to 5G has benefited business growth and it will show how 5G will be beneficial to the business sector. Theoretical framework plays a critical role in guiding and informing research design and data analysis. Theoretical frameworks are important

because they help researchers and practitioners can gain a deeper understanding of the factors that influence the adoption and utilization of 5G by businesses in Harare. It can also help in developing strategies that can be used to promote the use of 5G as a means of facilitating business growth which can be very beneficial to the people in Harare

This research is going to be based on the technology acceptance model (Davis, 1989). This theory is based on the theory of reasoned action (Fishbein & Ajzen, 1975) which stated that an individual's attitude and subjective norms towards an activity can influence their behavior towards it. The technology acceptance model was built on this foundation in order to find out why a group of people would use certain technology in a work context.

Theories that are going to be included in this research project include the technology adoption theory. This theory would be used to examine the factors that influence the adoption of new technology, such as 5G by SMEs in Harare. This theory would also help to identify the barriers to adoption and the factors that can encourage or discourage businesses from using 5G. The research will also look at the resource based view theory. This theory would focus on the resources that people as well as businesses need in order to adopt and utilize 5G technology. Resources that are necessary for businesses to acquire and utilize 5G may include financial resources to buy the routers and the smartphones as well as technological resources that may be required such as the 5G infrastructure. Innovation diffusion is also an important theory that we will use in this research. This theory can would

help us to examine and understand the process by which innovations, such as 5G, are adopted and diffused throughout a population and how willing the local people are to accept new innovations.■

The predecessors of the new 5G network had some benefits that they contributed to business growth and this is the foundation that was used by experts and researchers to build on the 5G network. As the internet evolved to the next generation from 1G internet, the main focus has been to make networks more secure, affordable and faster.

The first and second of wireless cellular technology had a significant contribution to business growth as it enabled communication to take place in an instant without people having to be present in one area. This opened new ways of trading. However, because these services were only offered by a few companies, it was expensive to be able to access these services and was only for a specific group of people. According to a research by Chan in 2018 on 1G communication technology around 1983, “Most phone initial models would weigh around 2- 4kgs and they were only meant for executive use, not personal use. The Motorola DynaTac was priced at USD\$3,995 for example” (Chan, 2018). The technology then evolved into 2G which moved from analogue to digital. This was a huge step for people who are in business as voice calls were more clear and more secure on 2G network as compared to the predecessor. This is also when text messages were introduced which was a game changer in telemarketing efforts. There was now improved security was used by banks as they could now discuss confidential matters with their customers

and this increased customer satisfaction and customer retention for banks.

As more and more people started accessing the internet, 2G was then superseded by 3G and 4G internet which brought faster internet connection than its predecessors. As mobile devices became cheaper as compared to the 1980's, more business efforts were now being pushed over the internet. The introduction of social media made it easier for business to grow and market themselves on an international scale and offer services outside their countries. Financial systems over the internet have also enabled customers make payments to shops all over the world. In an article by Jack Gordon, "Such apps provide a convenient shopping cart and payment method with direct access to your retail store." (Gordon, 2016). With the introduction of new knowledge in fields such as quantum computing, artificial intelligence and machine learning, low latency and more capacity was now very important in order to support new and upcoming services. According to the QUALCOMM's website, "While 4G LTE focused on delivering much faster mobile broadband services than 3G, 5G is designed to be a unified, more capable platform that not only elevates mobile broadband experiences, but also supports new services such as mission- critical communications and the massive IoT." (What Is 5G? n.d.)

Relevance of the theoretical frame to the study.

Theoretical framework is crucial when assessing how the use of 5G can assist business growth in Harare because it helps is to gain a conceptual foundation that can help us to understand the relationships between

different aspects and how they may impact business growth.

In this case, a theoretical framework can help to identify the key factors that can affect the adoption and use of 5G in Harare, such as the availability and accessibility of infrastructure, the cost of investment as well as the level of technological readiness of businesses in Harare. It can also help to identify the potential benefits of using 5G for businesses, such as improved connectivity, increased speed and efficiency, and access to new markets and customers. The theoretical framework is also relevant as we are using technology acceptance model (TAM) which will help us to understand more about why a group of people would be willing to use a certain technology. The two main measures that are used in TAM are the perceived usefulness and the ease of use of the technology by the users.

Furthermore, a theoretical framework can guide the selection of appropriate research methods and data collection techniques, such as surveys, interviews, and case studies, to collect relevant data that can be used to evaluate the impact of 5G on business growth in Harare. The theoretical framework would help to define and explain the key concepts and terms related to 5G technology. It can also help to analyze the data and draw conclusions about the relationship between 5G use and business growth. This would provide a clear understanding of the technology and its potential for business growth in Harare, ensuring that the study is focused and relevant to the research topic at hand. The theoretical framework is also important as it can help us to select an appropriate research methodology and data analysis techniques. This would ensure that

the research design is suitable for addressing the research questions and hypotheses.

Using a theoretical framework can help to identify potential gaps or areas for further research? For example, if the current study finds that the adoption of 5G is positively correlated with business growth, the theoretical framework can help to identify the underlying mechanisms that explain this relationship, which could in turn lead to new research questions and hypotheses that could be tested in future studies.

Though there is a lot of advancements that is happening in the research and application of 5G technology in countries in Europe, Asia and America, there is little to know research that is being carried out in African countries. A theoretical framework can provide a basis for comparing the results of studies conducted in different contexts or settings. For example, if researchers in other cities or countries have already investigated the relationship between 5G use and business growth, a theoretical framework can help to identify the similarities and differences between those studies and the current study in Harare.

Summary

A theoretical framework is essential for assessing how the use of 5G can assist business growth in Harare because it provides a systematic and structured approach to understanding the complex relationships between different variables and can help to guide the research process and data analysis. It can help to identify the key factors that can affect the adoption

and use of 5G in Harare such as the level of infrastructure availability and accessibility, the cost of investment, and the level of technological readiness of businesses. Moreover, a theoretical framework can guide the selection of appropriate research methods and data collection techniques, such as surveys, interviews, and case studies, to collect relevant data that can be used to evaluate the impact of 5G on business growth in Harare. It can also help to analyze the data and draw conclusions about the relationship between 5G use and business growth.

The theoretical framework will be relevant as it helps us to understand the complex relationships between different variables, guides the selection of appropriate research methods and data analysis techniques, and helps to identify areas for further research.

Chapter 3 Research design and methods

Introduction

This section shows how data was collected for this research. The data collected was used to understand how people can benefit from the use of 5G in Zimbabwe, how customer experience can be boosted and also how businesses as a whole can benefit from the use of 5G. It will also help the reader to assess the validity of the research.

Research design

This research comprises of information collected from primary research. The main advantage for this will be that the information collected can clearly meet the needs of the research question. There is not a lot of information with regards to how SMEs in Zimbabwe use the internet to grow their businesses, so this research can also help to fill the gap to understand how different businesses use the internet. Primary research can also help to fill the gap to understand more about how much people understand about 5G internet.

This will be a descriptive form of research which means that the research is aimed to understand more about how people in business are using the internet to help them to grow their businesses. It will help us to understand more about the trends in the business sector and it can help us to understand the relationships among different relationships such as how the use of internet in business may be more appealing to a certain age group more

than the other.

Qualitative and quantitative data were used during this research. This was done in order to collect statistical data that can be represented graphically and also get deeper understanding from the respondents on what they think about the new internet spectrum

Quantitative data is numerical data that can be represented on charts and bar graphs in order to assess trends. The methods that were used in this research include the use of questionnaires which will have multiple choice questions. The main aim of using quantitative research will be to measure the percentage of people that rely on the internet for their business. It will also test how much the participants are ready to embrace the use of 5G for their businesses. For this research, a questionnaire was used. The questionnaires was a digital one and was developed using Google Forms.

Qualitative data is a non-numerical attribute of an individual or object, where the researcher describes in detail and comprehensively the real findings in the field. The method that was used for this research were face to face interviews which were used to get a deeper understanding of the people's beliefs and experiences when using the internet for their day to day business. It also helped to generate new ideas on how the use of new and upcoming technologies such as 5G can be used and promoted among people in business.

Population and Sampling

This research was carried out in Harare. The main target were small to medium enterprises - people that are still growing their businesses or that have recently established their businesses. The main areas where the research was carried out were Eastgate mall and Kwame mall in Harare where there is a concentration of small businesses that have recently started and are aiming to reach out to as many potential customers as possible as they are located in the central business district of Harare.

The research used probability sampling. Probability sampling is randomly choosing people that can take part in a research. This means that the research did not select people who are offering a specific product or service but targeted anyone who is trying to make their business grow. The main advantages is that the findings from the research will be more accurate as the research will be targeting people who may use the internet for their businesses differently. It also removed bias which makes the research more neutral and covers wider range of people. It is less time consuming as you don't have to move around targeting people in a specific business type. There is an equal chance for anyone to be part of the research which means that the results obtained from the research will be more diverse.

Data collection instruments

For quantitative research, I used electronic questionnaires designed using Google Forms. This will be a list of eight multiple choice questions that will

be used to get information from the participants. The main advantage is that it is quick, so people can spare a few minutes to answer the questions. It is a cheap method of collecting information as compared to other methods of data collection such as printing physical questionnaires that will need to be filled in by participants. Electronic questionnaires automatically create graphs which we can use for statistical analysis in order to understand a trend more. They are also easy to use for the participant. The use of color and radio buttons on an electronic questionnaire make it easy for a participant to remain attentive as they are filling in the questionnaire. However, the main disadvantage that may be there is that it may be difficult for the participant to convey their emotions or to clearly mention explain why they chose a certain answer.

To help counter the disadvantage that are brought by the questionnaires, this research is also included face-to-face interviews in order to understand more of the views of the participants. These face to face interviews were done in Eastgate marketplace and Kwame mall shopping center as we are giving people a chance to fill in the electronic questionnaire. The main advantage of this qualitative approach to research is that we can get to understand from the participants why they choose to use or not to use the internet for growing their businesses. It can also help to better understand if the participants understand the benefits that can be brought by using 5G for their businesses.

Data collection procedure

The data collection was in two phases. The first is the quantitative analysis. The participants were asked a structured set of questions and they will need to select a radio button with an answer of their choice. This research will use Google Forms and a set of eight questions were asked on the questionnaire which the participant would fill in. The data collection was electronic and was done using an Apple iPad so that information from different participants is collected on one device.

The quantitative phase of data collection was used to get the opinions of the participant to understand what the participant thinks about the role that the internet has played in aiding the growth of businesses. The qualitative research was also used to understand how much the participant knows about 5G internet and the benefits that it may bring to their businesses. This will be done by interviewing the participants of the research to find out what they know about 5G internet and how they think it can be beneficial for their businesses.

Ethical considerations

When carrying out the research, it was important that I first get the consent prior to the study. This means that before one participates in the study they should understand what the study was about and they can wither choose to accept to be part of the research.

The information that was collected from the participants were kept private.

This is to ensure that the participant's views are not misquoted which may lead to any future harm of the participant. It will also ensure that information that is collected from the participant is not used for any other purposes. Confidentiality should be ensured when undertaking the research. This means that all the data that is collected will not be shared to any other persons and was used for this research only.

There was no type of bias created from the information that was provided by the participant in order for them to match with the objectives of this research. This mean that all the findings of the research were honest and according to the primary information that has been collected from the participant.

Summary

Research design and data collection methods is a critical components of any research study. In this chapter, researchers will learn about the various types of research designs and data collection methods that were used for this research on the use of 5G in businesses in Harare as well as the advantages and disadvantages of each approach.

The chapter begins by discussing the importance of selecting the appropriate research design for the research question at hand. This chapter also provided an overview of each method that were used, as well as the pros and cons of using them in the research. The chapter also covers sampling, including sample size, sampling methods, and where the research took place. The importance of selecting an appropriate sample

size and sampling method to ensure the accuracy and representativeness of the data collected is discussed.

Finally, the chapter discusses ethical considerations in research, including the protection of human subjects and the maintenance of confidentiality. Researchers are reminded of the importance of obtaining informed consent in order to maintain confidentiality and privacy throughout the research process.

Chapter 4: Data presentation, analysis and Interpretation

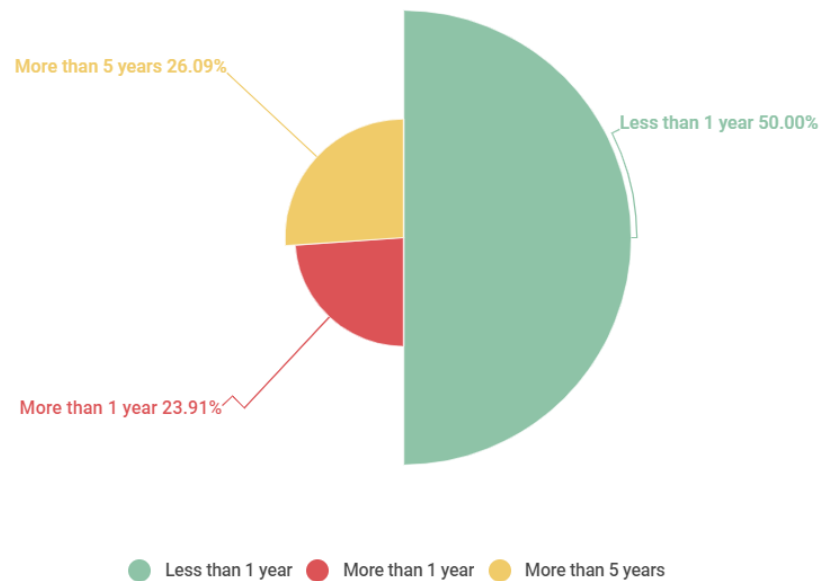
4.1 Introduction

Data presentation, analysis, and interpretation are integral components of the research process, as they enable researchers to make sense of the data they have collected and communicate their findings effectively in order to draw meaningful conclusions. In this research, it helps us to understand more about how much the people in business in Harare know about 5G and if they are using it for their day to day businesses. It provides insights that can be used to identify patterns, trends, and relationships within data collected about people in business in Harare. These insights can then be used to draw meaningful conclusions on whether 5G is useful yet to the people in business in Harare

4.2 Data Presentation and analysis

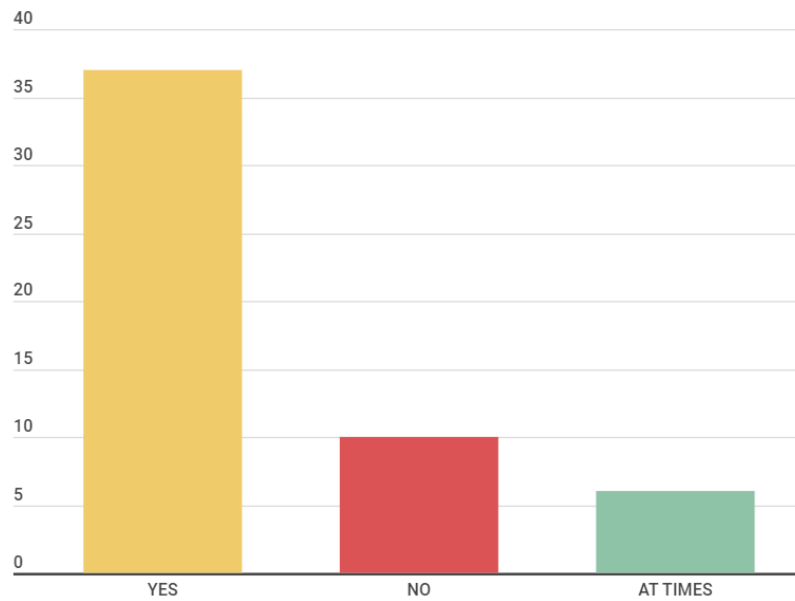
Statistical information from the research was presented using charts and the information gathered from briefly interviewing the different people on the question is also going to be beneath the charts representation. A total of 53 people filled in the questionnaires and also managed to interview some of the people who had some time to spare

Question 1: How long has your business been operational?



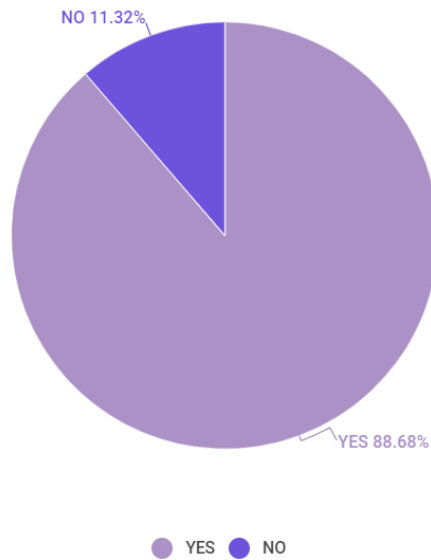
A large number of the people that were interviewed in this research have been operational for less than one year. This is because most businesses had stopped operating because of the covid-19 pandemic and are still trying to gain back the traction that they had lost during the pandemic. Most businesses that I interviewed are in the retail business, selling items such as clothing and computer accessories, and they not make projected sales during the pandemic as these were services that were not regarded to be essential.

Question 2: Do you use the internet for business



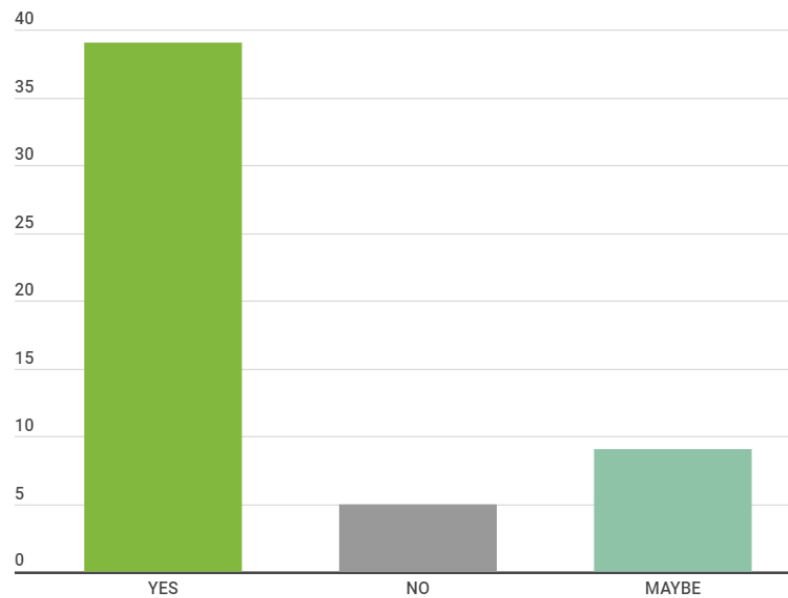
A large percentage of the people that participated in this research said they use internet for their businesses. The covid-19 pandemic helped people to setup their ecommerce stores which helped them more to get some sales during the pandemic. Social media platforms were the ones that were mainly used, the most mentioned being Facebook marketplace and WhatsApp business. However there were a few people that said they did not use it often and they still get a lot of their customers from print media such as the use of flyers as well as word of mouth advertising because they have been in business for some time and they now have a good customer base.

Question 3: Do you think the internet is important for business growth



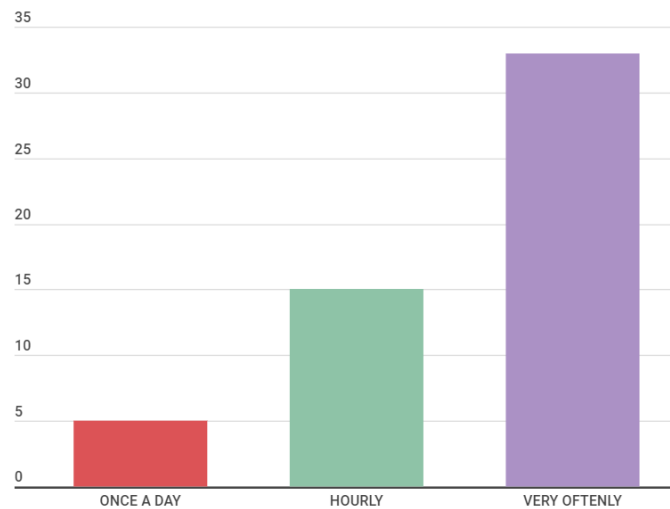
About 87% of the people that were interviewed believe that the internet is important for business growth. The major advantage being that you can reach out to a wider base of potential customers at any time. For most businesses they also use this to determine which products they offer that are liked by people by how often people enquire about it which is very important as they will be able to maximize on sales. However, there was a small percentage of people that believe that the internet is still a distraction to many people and is not yet very useful at the moment, though they believe that I will one day be able to benefit people that are in business.

Question 4: Do you believe that your business can benefit from the use of the internet.



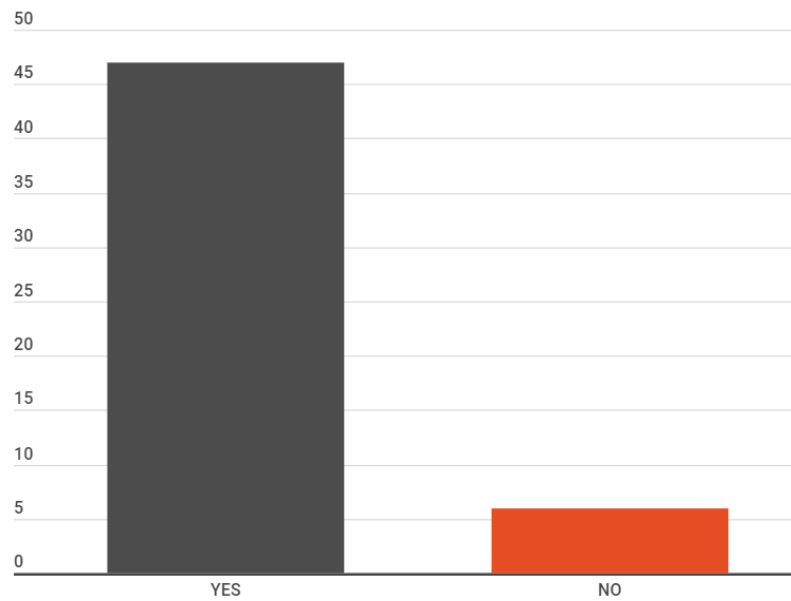
Most people that were interviewed believe that the internet is very important for their business. They can market their products easily to a wide customer base. It is also a cheap method of advertising their products. They are not only limited to their shopping center but their products can have a wider geographical reach and it also makes it easy to communicate with suppliers as most people are getting their products from places like South Africa. However there was also a small group of people that believe that there is still much that needs to be developed for the internet to be a tool that can be used for business as people are also selling counterfeit products on the internet and there are also chances that you may be dealing with products that are stolen.

Question 5: How often do you use the internet for your daily business operations?



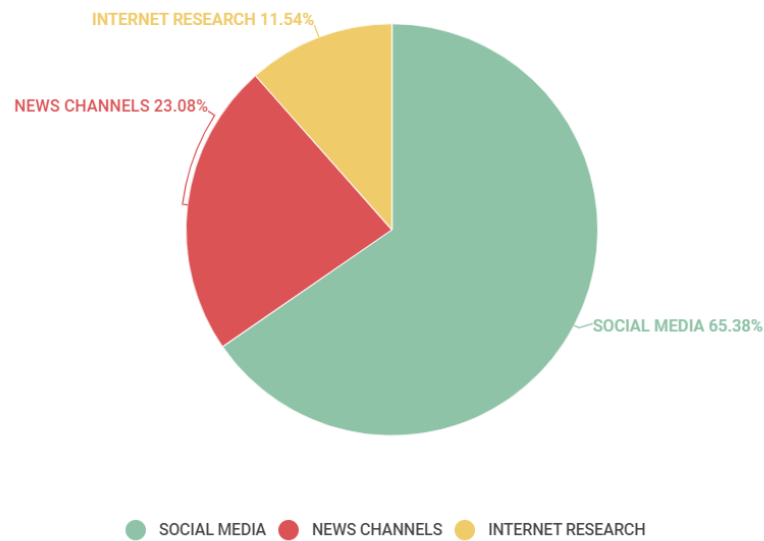
Most people that participated in the interview said that they use the internet very often during the day in order to communicate with customers and suppliers. Customers usually call ahead of time in order to place orders or to make sure that a certain item is available before heading to the shop so it is very important to make sure that they are always online. However some people said they only use the internet once or twice a day and others said hourly because the internet speeds may be slow during the day so they wait for messages to accumulate and then they can attend to them during a certain period of the day.

Question 6: Do you know about 5G internet



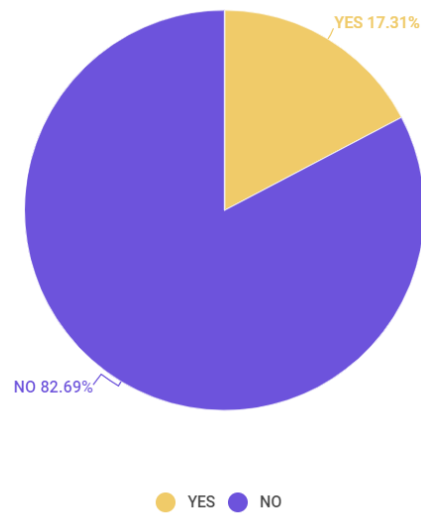
The majority of people that participated in this research said that they have heard about 5G internet. Most people heard about it at the beginning of the covid-19 pandemic when there were issues that were raised that it was one of the causes of the covid-19 pandemic. There was also a small number of people that are not tech savvy that said they did not know about 5G internet.

Question 7: Where did you learn about the covid-19 pandemic?



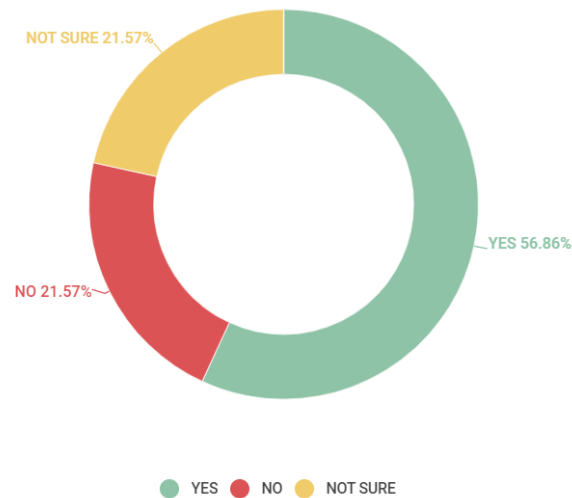
Most people learnt about the 5G spectrum on social media sites such as twitter and Facebook as there were a lot of people that were using these sites for entertainment and news related purposes during the covid-19 pandemic when people were told to stay in their homes in order to reduce future spreading of the virus. There was also a percentage of people that learnt about it on news channels such as BBC and CNN while others looked it up on the internet as they heard of the benefits that it can bring to people's day to day lives as well as the fast internet speeds.

Question 8: Have you used 5G for your business practices before



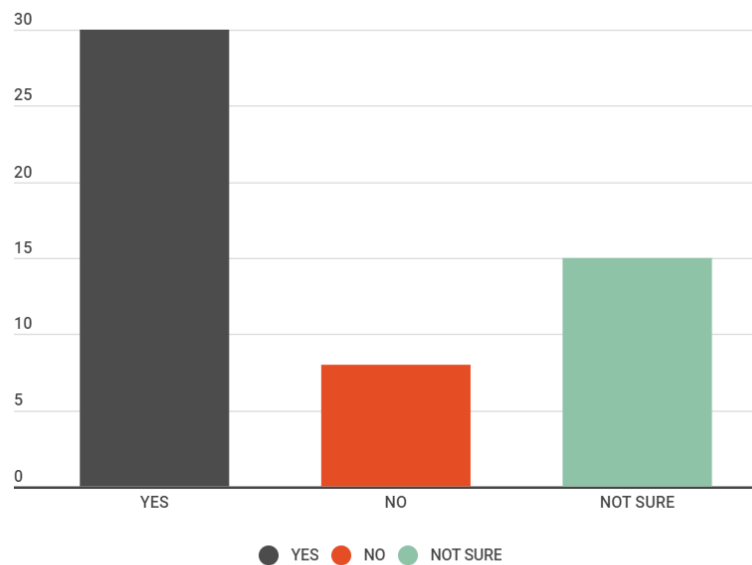
Most people cited that they have not used 5G before citing that they are not sure if there is 5G in Zimbabwe and where it is used. Some also mentioned that buying 5G compatible devices at the present moment is still expensive and they are not able to afford them for now. However there was a small percentage of people that used 5G when they were in countries like South Africa and UK where they were using the fast internet speeds to carry out some of their daily operations.

Question 9: Do you think your business would benefit from using 5G



A large number of people believed that the use of 5G will help grow their business, this is because they will be making use of the added advantages such as the higher levels of speed and reliability. Some mentioned that there will be no need for them to travel to another country in order to buy some of their inventory as they will be able to easily video call their suppliers and clearly see the inventory before it comes to Zimbabwe. However there is a percentage that is not very sure if the new spectrum will be any different from the one that we currently have because there will still be a lot of human interaction that is required whilst there are others that still believe that 5G was one of the cause of the pandemic and therefore would not bring any advantages but may also affect people's health.

Question 9: Do people understand the benefits that can be brought by 5G or they will still need to learn more



The majority of people believe that people understand the benefits of 5G, however people only know that it only brings faster internet speeds and not the other advantages that it as to offer. There was also a group of people that still believed that people only 5G from the covid-19 era and they do not really understand the advantages that it can bring to people's lives. There was also a group of people that was not sure if people really understand about it and believed that it is up to the country's network providers as well as the ministry of ict to let people know more about the new internet spectrum and what it has to offer.

Discussion and Interpretation

The market research showed that there is a large number of people that use internet for their businesses. This is to connect with customers as well as suppliers. The major advantages that it brings is that it is a cheaper mode of communication. Most of the small to medium enterprise businesses that

are in retail get their products from countries such as South Africa, so the use of social media sites such as Facebook make it easy to communicate with their suppliers who are outside Zimbabwe at little cost. Most also have a goal for business growth which they believe can be aided by the use of the internet because they can start testing markets in other towns and cities outside Harare.

The research also showed people in business use the internet to communicating very often during the day, whether they are communicating with potential customers or suppliers. The most used are is WhatsApp and they can either use voice calls or text messaging over the internet. Most communication is done on smartphones because they are portable as one may have to move from one point or the other during their work day, so they do not lose communication. However, most people only interviewed know about the internet spectrum 4G LTE and most do not know about 5G or if it offered in Harare.

Most information that people have is from social media which has an advantage that up to date information can be shared to a large number of people quickly, however the disadvantage that was there was that there were also a lot of speculations and misinformation that were written by general users and not experts in the subject of 5G, meaning that people were making decisions and conclusions on the benefits of 5G based on inaccurate information. But the research showed that people are still willing to learn more about 5G because they have heard of the positive impacts that it may have for their businesses.

There were a few people that have used 5G from my research, these were people that have managed to get a chance to go of the country for business or leisure purposes such as meeting with suppliers, or going for holiday with their families. However this was a very small percentage of the people that participated in the research and most have never used 5G because they have never been in an area that offers 5G or because they do not have a smart phone that is 5G compatible. Most phones that have 5G are high end devices which makes them expensive as compared to the phones that most people would opt to buy.

Summary

The impact of 5G on people in SME's in Harare is significant and diverse. This research has helped to understand how people use the internet for their day to day businesses and it also helped to people that have used 5G internet as well as their views on how it can be beneficial to their businesses. The data collected from participants has also given views of most of the people on how use of faster internet can be beneficial for their businesses and it can also help to connect with their suppliers and customers faster and more efficiently. Most people do not know much about the new spectrum and they depend on information that circulated during the Covid pandemic, however they are all willing to learn more about the advantages that it can bring on their day to day businesses such as improved security and an increase in innovation.

Chapter 5: Summary, conclusions and recommendations

Introduction

The introduction of 5G technology promises to revolutionize the way businesses operate by providing faster and more reliable connectivity. As such, there has been a growing interest in the potential benefits of 5G for businesses, particularly in developing countries like Zimbabwe, where access to reliable internet infrastructure remains a challenge. In this chapter, we will present a summary of our study on the use of 5G to assist business growth in Harare, Zimbabwe. We will provide a concise overview of our research methodology, data analysis, and findings, followed by our conclusions on the impact of 5G on business growth in Harare. Finally, we will offer practical recommendations for businesses and policymakers on how to leverage 5G technology to drive growth and improve productivity in Zimbabwe.

Discussion

From the research, it was evident that people understand the benefits of having 5G in businesses. Some examples include faster and more reliable connectivity, increased efficiency and productivity, better communication and collaboration, and improved customer experience. This can be beneficial for businesses in Harare as it will make their work seamless with regards to attracting and retaining new and existing customers

The research also helped to assess the current state of 5G in Harare. From the research, I noted that people do not know about 5G because the

infrastructure is not readily available in most parts of the country. Most people that are not in business are also not keen on using 5G because most believe that at the present moment, getting a 5G phone is still very expensive.

There are also opportunities for innovation and growth in such as the development of new products and services that use the new 5G, the creation of new jobs, and the expansion of existing businesses. This can help to give new and existing companies a competitive advantage.

There is Potential for 5G to bridge the digital divide in Zimbabwe and provide greater access to digital services and opportunities for businesses in rural and remote areas. This will be an advantage because a greater internet coverage can create a greater potential customer base for businesses not only in Harare.

However, there are some potential risks and challenges of using 5G in businesses. Security is still a big risk as the issues are still being debated on national stages. Issues such as security concerns, are still being discussed as companies such as Huawei and ZTE have been banned from setting up 5G in certain countries because they believe they will be spying for the Chinese government. There are also potential health risks, and environmental impacts as 5G internet uses multiple spectrums.

Regulatory and policy considerations will also need to be discussed as 5G continues to be implemented. Discuss including spectrum allocation, licensing, and data privacy and security regulations need to be discussed

as the government needs to also come up with laws that will govern these areas.⁹

Conclusions

The research showed that 5G technology has the potential to revolutionize the way businesses operate in Harare, Zimbabwe, by enabling faster, more reliable, and more efficient communication and data transfer. This means that there will be seamless transfer of products from the suppliers to the end customers. The adoption of 5G technology in Harare could significantly enhance the competitiveness of businesses by providing new markets, products, and services that can be offered in the local markets. While the deployment of 5G networks in Harare is still in its early stages, businesses that are quick to adopt this technology may gain a significant advantage over their competitors. Competition is important as it drives innovation which can also help in revenue creation in the country.

However, there are also some challenges associated with the adoption of 5G technology, including the high cost of infrastructure development. 5G enabled smartphones are still expensive at the moment for the majority of people. There is also need for skilled workers to maintain and operate the technology which may require people who are especially skilled in 5G integration and there are also potential security and privacy concerns with regards to using 5G technology.

To fully realize the potential of 5G technology for business growth in Harare, it will be important to develop policies and regulations that

encourage investment and innovation in this area, as well as to provide training and support for businesses that are interested in adopting this technology. This will help to ensure that growth in the new technology happens faster than the present rate

Overall, the use of 5G technology has the potential to be a game-changer for businesses in Harare, Zimbabwe, and could help to drive economic growth in the country as a whole.

Implications

From the research, 5G technology can play a significant role in enhancing business growth in Harare, Zimbabwe. The study found that people in the SME sector in Zimbabwe are willing to use the internet more for their business as it allows them to reach out to a larger customer base. The use of 5G technology in business can lead to increased efficiency, productivity, and competitiveness, thereby contributing to business growth.

The implementation of 5G technology in Harare, Zimbabwe, requires substantial investment in infrastructure and technology. The study found that people do not yet know much about 5G and how it can be beneficial to businesses. This is because at the moment 5G is only in a select area and it is not covering areas where some she's operate from. The adoption of 5G technology requires significant investment in infrastructure, such as network towers, base stations, and fiber-optic cables.

The adoption of 5G technology in Harare, Zimbabwe, can address some of the challenges facing businesses, such as poor connectivity and slow

internet speeds. The study found that the adoption of 5G technology can address some of the challenges facing businesses, such as poor connectivity and slow internet speeds. This is important as it can allow businesses to work more effectively and it can help them to cut operational costs.

The adoption of 5G technology in Harare, Zimbabwe, requires collaboration and partnerships among stakeholders. The study found that there is a lot of misinformation that people still have with regards to how 5G works emanating from the covid-19 pandemic. Successful adoption of 5G technology requires collaboration and partnerships among government such as the ministry of ict and the ministry of health in order to debunk the conspiracy theories that may have been raised during the pandemic. It will also require collaboration with telecommunications companies, and other stakeholders.

Based on these implications, the study recommends that stakeholders in Harare, Zimbabwe, should prioritize the adoption of 5G technology to enhance business growth. This can be achieved through the investment in infrastructure and technology, collaboration and partnerships among stakeholders, capacity building and skills development, and addressing the challenges facing businesses.

Recommendations

Suggestions for further research there is a still much that needs to be understood about 5G internet and how it can positively affect businesses

in Zimbabwe. There needs to be further research on how 5G can impact different industries in Zimbabwe. This would involve exploring how 5G can be leveraged by various sectors such as healthcare, education, manufacturing, and finance among others. An economic analysis could be conducted to assess the potential economic benefits of 5G technology for businesses in different sectors. This could involve estimating the return on investment (ROI) for businesses that adopt 5G technology and quantifying the impact on GDP growth and job creation.

There also needs to be research and comparison with other countries on how 5G can be beneficial for SME's. Some of the people who participated in the research said they have used the new spectrum in other countries such as in South Africa. Doing a comparison can help to identify the best practices and some lessons that could be applied to Zimbabwe's context.

There should also be a research in user acceptance and adoption. This is important as it can help us to understand more on user preferences, attitudes and barriers to the adoption of 5G in business. The findings could be used to inform strategies that promote the uptake of 5G among businesses in Zimbabwe.

Policy and regulation environment could be also conducted to assess the impact of government policies on the usage of 5G technology. This research could also identify areas where policy changes could be made to facilitate the deployment of 5G technology so that it can be used by more

people across the country. It can also include research on security and privacy concerns surrounding the use of 5G technology in Harare. This would involve exploring potential vulnerabilities in the network and identifying measures that can be taken to mitigate risks.

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Research Timeline

Research phase	Objectives	Time requires
Preparation of research	- Print out questionnaires - formulate questions for interviews	1 Day
Questionnaires and interviews	- hand out questionnaires to participants - Interview participants	2 weeks
Data organization and compilation	- Gather all collected information for analysis	3 days
Data analysis	- Analyze the collected data from the research participants	4 days

Budget for the research

Objective	Description	Estimates amount
Transportation from Mutare (Tenda Bus)	- Transport from Africa University to Harare to carry out research	USD 30.00
Transportation when carrying our research (Fuel for car)	- A vehicle will be used for transport from Shawasha Hills where I will be staying during the research to Eastgate then later to Kwame mall and finally Avondale	USD 40.00
Printing Questionnaires	A total of 50 questionnaires will be printed. Printing per page costs	USD 20.00
Total Budget		<u>USD 100.00</u>

APPENDIX

Appendix 1 : Questionnaire

QUESTIONNAIRE

How long has your business been operational?

- ☐ Less than 1 year
- ☐ More than 1 year
- ☐ More than 5 years

Do you use internet for your business?

- ☐ Yes
- ☐ No
- ☐ At times

Do you believe the internet is important for business growth?

- ☐ Yes
- ☐ No

Do you think your business can benefit more or less from the internet?

- ☐ Yes
- ☐ No
- ☐ Maybe

How often do you use the internet for daily business operations?

- ☐ Once a day

☐ Hourly

☐ Very often

Do you know about 5G internet?

☐ Yes

☐ No

Where did you learn about 5G?

☐ Social media e.g. Facebook, WhatsApp, twitter

☐ News channels e.g. ZBC, BBC, and CNN

☐ Internet searches

Have you used 5G for any of your business practices?

☐ Yes

☐ No

Do you your business would benefit more from using 5G?

☐ Yes

☐ No

Do people understand the benefits that can be brought by 5G or they still need to learn more?

☐ Yes

☐ No

Thank you for your time

AUREC APPROVAL LETTER



AFRICA UNIVERSITY RESEARCH ETHICS COMMITTEE (AUREC)

P.O. Box 1320 Mutare, Zimbabwe, Off Nyanga Road, Old Mutare-Tel (+263-20) 60075/60026/61611 Fax: (+263 20) 61785 website: www.african.edu

Ref: AU2421/22

20 December, 2022

Munyaradzi Chinamasa
C/O CBPLG
Africa University
Box 1320
MUTARE

RE: ASSESSING THE USE OF 5G IS ASSISTING BUSINESS GROWTH IN HARARE, ZIMBABWE

Thank you for the above titled proposal that you submitted to the Africa University Research Ethics Committee for review. Please be advised that AUREC has reviewed and approved your application to conduct the above research.

The approval is based on the following.

- a) Research proposal
 - **APPROVAL NUMBER** AUREC 2252/22
This number should be used on all correspondences, consent forms, and appropriate documents.
 - **AUREC MEETING DATE** NA
 - **APPROVAL DATE** December 20, 2022
 - **EXPIRATION DATE** December 19, 2023
 - **TYPE OF MEETING** Expedited
After the expiration date this research may only continue upon renewal. For purposes of renewal, a progress report on a standard AUREC form should be submitted a month before expiration date.
 - **SERIOUS ADVERSE EVENTS** All serious problems having to do with subject safety must be reported to AUREC within 3 working days on standard AUREC form.
 - **MODIFICATIONS** Prior AUREC approval is required before implementing any changes in the proposal (including changes in the consent documents)
 - **TERMINATION OF STUDY** Upon termination of the study a report has to be submitted to AUREC.



Yours Faithfully

Miti G.P.
RESEARCH OFFICER: FOR CHAIRPERSON
AFRICA UNIVERSITY RESEARCH ETHICS COMMITTEE