

New Technologies and the Supply Chain of African Neo-Pentecostals

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Abstract

Academic conversation in missional activities revolves around some variables, including spiritual and theological paradigms. Among African Neo-Pentecostal Churches (ANPCs), where miracles and wonders are central to missional activities, it is uncommon to think that excellent delivery in missional service goes beyond power display, miracles and spiritual due diligence. Although some Christian ministries employ professional managers to oversee certain missional operations and logistics, the dynamics and impact of such managerial services, especially the “supply chain” process in the face of evolving technologies, are rarely brought forward in theological conversations. To fill this gap, this article places a searchlight on the interaction of ANPCs’ supply chain with new technologies (NTECH) in the past. Likewise, with an empirical survey covering 219 respondents as the primary source, it juxtaposes the current state with the future of the interaction. The outcome indicates no substantial interaction in the past and a possible wide margin between current and expected future interaction, with a 22.3% total median rate. Lastly, causes of low interaction are briefly discussed and lessons are presented for improved future interaction.

Keywords: interaction; supply chain; new technologies; African Neo-Pentecostals; missional services

Introduction

It is popular knowledge that change is a constant universal occurrence, and missional activities are not excluded from this phenomenon. While African Neo-Pentecostal Churches (ANPCs), and indeed churches in general, may not be subject to constant change in terms of doctrines, there is a need for constant transformation via new

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technologies to sustain and improve missional activities.¹ Some scholars contend that the church should keep moving, as technology is moving. For example, Drescher (2012), in her work entitled “Tweet if you love Jesus,” observes that “digital ecclesiology” has become a popular term over the last decade, surfacing around discussions about churches and their use of technology. She claims that churches use digital media for ministry functions in tune with society’s growing digital environment (cf. O’Lynn 2022, 1036). Likewise, Huggins (2018) highlights four benefits of churches’ interaction with technology, namely expanded reach, high-level influence, radical collaboration via sharing fellowship and ecclesiological growth strategy, and finally mobilising and equipping congregants to achieve evangelism and outreach.

Given these benefits and positive views, the question this article seeks to ask is how well do ANPCs interact with new technologies (NTECH) vis-à-vis a ministry supply chain in the past and present, using Artificial Intelligence, Cloud Technology, 5G, Robotics, Big Data, and Analytics, among others? What are the benefits of such interaction? What are the hindrances to such interaction? What lessons abound for future use of NTECH in the missional supply chain? To answer these questions, a brief history of supply chain activities is discussed with reference to the past. This is followed by a current view, supported by an abridged supply chain infographic and empirical evidence obtained from a survey with 219 respondents. Subsequently, the survey outcome is evaluated and the overall median percentage of interaction is calculated to show the extent of such interaction. This is followed by a brief view of some causes of high or low interaction, depending on the analysis. Lastly, lessons from the interaction are presented to improve the supply chain and efficient missional services among ANPCs.

Conceptual Clarifications

Supply Chain

The term is popular in a business environment; however, supply chain also applies to other organisations, including the ANPCs. Ashcroft (2022) asserts that “supply chain management” was first released into public consciousness in 1982 by Keith Oliver, a British logistician and consultant. During Oliver’s interview with Arnold Kransdorff of the *Financial Times*, he defined supply chain management as:

The process of planning, implementing, and controlling the operations of the supply chain, with the purpose to satisfy customer requirements as efficiently as possible. It spans all movement and storage of raw materials, work-in-process inventory, and finished goods from point-of-origin to point-of-consumption (Ashcroft 2022; OSCM Module Guide 2022, 125).

1 Neo-Pentecostalism emerged in the 1950s and 1960s, but those referred to in this article are the newer African versions of the 1980s to date. These include the faith and miracle movements, prophetic, healing and deliverance movements. Also see how these newer versions are categorised as classical, contemporary and paradigm Neo-Pentecostals in Africa (Orogun 2020,10–11, 24–25).

A supply chain comprises the management of all activities involved in sourcing, procurement, conversion, and logistics management activities. It also includes coordination and collaboration with channel partners, which can be suppliers, intermediaries, third-party service providers, and customers. In essence, the supply chain integrates supply and demand management within and across organisations (Mbanje and Lunga 2015; Morvany 2020). In applying the definition to missional services, it can be inferred that the supply chain is the process of planning, implementing, and controlling all missional activities within the overall objective of the missional organisation to ensure the provision of efficient, quality, and satisfactory services to adherents and communities alike.

New Technologies (NTECH) in Supply Chain

According to Jenkins (2022), organisations with poor visibility into their inventory can suffer costly setbacks; however, using NTECH in the supply chain process can solve the problem. NTECH in the supply chain provides higher efficiency and reduces operational costs. In the context of ANPCs, inventory visibility helps the adherents to easily access and appreciate the services provided. The question, then, is: What are these usable NTECHs in the supply chain of the ANPCs? Although there may be more NTECH tools out there, this article will focus on Cloud Technology, Robotics, GPS, Learning Management Systems (LMS), 5G, Virtual Reality, Artificial Intelligence (AI) and Big Data Analytics, and Blockchain. How these NTECHs can help the ANPCs' inefficient operational management and quality service delivery will be presented in figure 1 below. First, the article will discuss ANPCs' interaction with NTECH in the past.

African Neo-Pentecostals' Supply Chain and New Technology in the Past

It is imperative to inquire what scholarly engagement, if any, exists regarding missional supply chain vis-à-vis new technologies (NTECH) among ANPCs. Although earlier research has shown that ANPCs are familiar with digital technology, very little research (if any) has been done on the interaction of the ANPCs' supply chain and NTECH. In a recent academic paper, the authors of this article established through a literature review and online research findings that very little academic research has been undertaken on the digital interaction of ANPCs. Consequently, the literature review shows an academic research gap to be filled (see Orogun and Pillay 2022, 2).

The online activities of some selected ANPCs, based on their years of interaction, suggest that some ANPCs have been familiar with digital technology for over 15 years in digital sound, light, screens, still and motion graphics technologies. Correspondingly, in the last 14 years, ANPCs have progressively carved a niche in the new media (Orogun and Pillay 2022, 4). Since both the online research and historical survey have not provided much information on NTECH and ANPCs' supply chain, it can be logically inferred (as the phrase "new technologies" implies) that robust academic research on

the interaction of ANPCs with NTECH in the past may not be available. In addition, invention records show that while some of the NTECHs have been around for a while, they have not been present in Africa long enough to create a long-standing history.² For example, Hollington (2022) reports that 5G tower installations only began between 2017–2018, and subsequently, the first 5G network was rolled out by Verizon in 2019. Likewise, the report of Adeyemi (2022) reveals that the leading GPS technology user called “Uber” was first launched in Africa in 2013. Also, *African Business* (2014) reports that GPS technology penetrated Africa in 2013 when the TomTom company covered all 54 African countries with its GPS services, providing directions and road signage for 7 million kilometres of African roads.

Correspondingly, Cloud technology, as reported by Pedamkar (2022), has been in existence since the 1960s after its invention by Joseph Carl Robnett Licklider, an American psychologist and computer scientist. Despite its long history, it only began operations in Africa recently. Idris (2020) agrees no less in his report that IBM, Huawei, and Microsoft Cloud technologies only entered the African market in 2016 and 2019, respectively.

Similarly, the Economy Report of the United Nations Conference on Trade and Development (UNCTD 2013, 1) shows that Cloud technology is only at an early growth stage in Africa. By implication, there is no significant historical past of ANPC interaction that can be provided, given the limited history of NTECH in Africa. The next section will look at the current and future interaction of ANPCs with NTECH.

Current and Future Interaction of ANPCS Supply Chain with NTECH

This section presents what is achievable in the nearest future if the ANPCs supply chain fully utilises NTECH. It further provides data on ANPCs’ current interaction to reveal the gap between the current and expected future. The gap will lead to recommended lessons for better utilisation of NTECH going forward.

2 The GPS technology project started as far back as 1973 in the United States Department of Defense. It was then called the Block-I GPS satellite and launched in 1978 from the Vandenberg Airforce Base. In 1990 and 1991, the US military relied heavily on GPS during the Gulf War with Operations Desert Shield and Desert Storm. The system made the journey through the deserts in Kuwait and Iraq feasible. See details at MyBaseGuide 2022. “When Was GPS Invented and Who Is in Charge of It?” <https://mybaseguide.com/installation/schriever-afb/community/when-was-gps-invented/>.

Infographics of Churches' Supply Chain Model

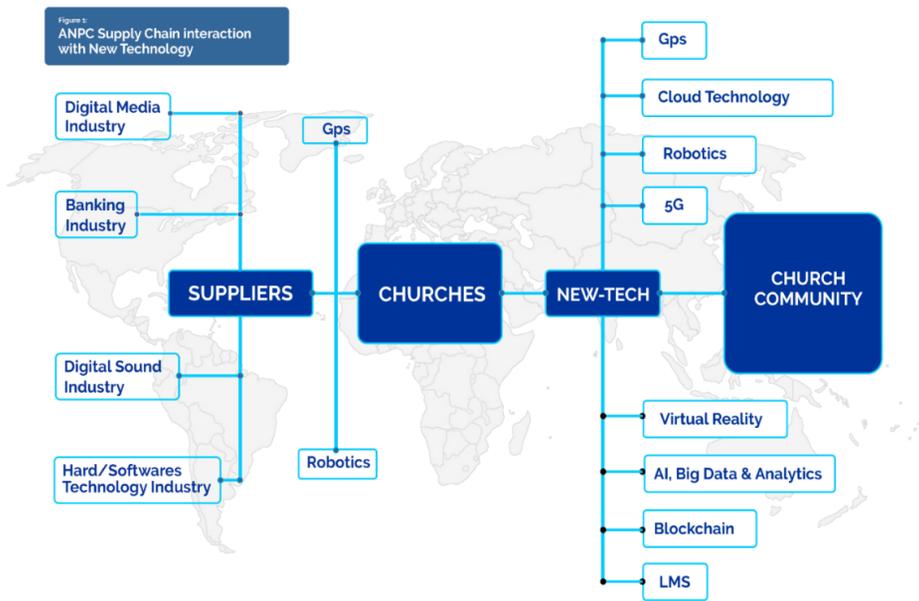


Figure 1: Infographics of African Neo-Pentecostal Supply Chain Interaction with New Technology

Figure 1 above graphically shows that operations and supply chain management entail everything required to provide efficient service to missional adherents and the church community. Generally, it takes certain functions to provide services in most organisations. In the authors' opinion, in a Christian ministry setting, these functions may include marketing and advertisement that generate demand for missional services by the adherents or community; operations that create the product or services of the organisation; finance and accounting that track the performance of the organisation, and create avenues for exchange of values and materials needed for productions. Other functions may include human resources, media sound engineering, and information technology.

However, are these supply chain functions aided by NTECH? Figure 1 above shows that in-between suppliers, churches, and church community, NTECH enables supply chain logistics that make service delivery to the congregants and surrounding communities effective. It shows the movement of goods and services from suppliers to ANPCs and from ANPCs to the church community (virtual or physical). Details of each step and function are delineated below.

Supply Chain between Suppliers and Churches

Figure 1 shows that missional service delivery does not start with church services and a display of miracles, but with the supply chain system, which includes planning, budgeting, purchasing and movement of goods from suppliers to the church locations or offices. There are four suppliers listed in figure1, and the roles of NTECH in the supply chain are simultaneously provided below.

- i. **Digital Media Industry:** Figure 1 shows that churches order media equipment from suppliers. Suppliers deliver the ordered equipment with the aid of Robotic machines and GPS to load and offload the goods and track goods in transit, respectively.
- ii. **Digital Sound Industry:** As in the case of digital media above, churches order sound equipment from suppliers. Suppliers deliver the equipment with the aid of GPS and Robotics.
- iii. **Hard/Software Technology Industries:** Churches order computer gadgets (hardware and software) and the suppliers deliver the goods with the aid of GPS and Robotics.
- iv. **Banking Industry:** The movement of goods and services involves financial transactions. In figure 1 above, banks supply payment services to the churches to ease the payment of equipment or provide financial instruments in loans and instalment payments between the suppliers and the missional organisations. Hence, banks' financial services are crucial for successful business relationships between suppliers and churches. Moreso, the banks facilitate transactions with NTECH, like AI and Blockchain, among others.

Supply Chain between Churches and Communities

In this second phase, it is assumed that all supplies are delivered. Figure 1 above shows that between the churches and their communities lie the new technologies (NTECH) that efficiently facilitate missional services. There are eight NTECHs on the info-graph applicable for an effective missional supply chain. They include i) Cloud Technology; ii) Robotics; iii) GPS; iv) Learning Management Systems (LMS); v) 5G; vi) Virtual Reality; vii) AI and Big Data Analytics; and viii) Blockchain technologies, in no particular order of importance. The listed NTECHs and their relevance in the missional supply chain are briefly delineated below.

- i. **Cloud Technology:** While this article is not particular about the Cloud types (public, private or hybrid), the advantage of Cloud technology remains the focus as it allows users to store files on a remote server. These files can be accessed from any device with an internet connection, making them a great option for people who need to access their files while on the go (NYU Dispatch 2022). Cloud technology helps organisations in managing information assets, with advantages like saving costs, security, flexibility, mobility, quality control, disaster recovery, loss prevention, and automatic software updates (Salesforce

2022). In the case of the missional supply chain, as the churches continue to serve their communities (online or physical gatherings), audio and video messages, and other big data (including training materials and membership details) are stored in the Cloud. While this information management strategy allows ANPCs to save costs, it also provides a secure environment for their information. Moreso, messages and church-related training materials can be purchased and directly downloaded from the Cloud.

- ii. **Robotics:** *Encyclopaedia Britannica* (2022) describes it as designed machines used to perform tasks traditionally done by humans. They are used to perform simple, repetitive tasks, especially where work must be performed in environments hazardous to humans. In other words, where the weights of loads are beyond human strength, robots step in. The European Commission Document (2022) on advanced technologies for industry asserts that robots are not only multipurpose but also “cognitive” as they possess the capacity for decision-making and reasoning, which allows them to function within a complex environment. In the context of the ANPCs’ supply chain, as seen in figure 1 above, robots can be deployed, for example, where mobile churches without permanent locations set up their equipment regularly and the robots are useful in uploading and offloading equipment. Robots assist the ministry workers with an easy and quick set-up, reduce the level of wear and tear of equipment and, most importantly, reduce the level of risk, injury and related hazards. For example, the sound team (by using robots) can easily reposition heavy-weight speakers as sound frequencies demand, while the still and motion cameras of the media team can be handled by robots for accurate coverage of services, either online or offline. Also, LED lights can be positioned using robots to lift light cranes³ to the right position. Again, these functions speak to timely and quality missional service delivery to congregants and surrounding communities.
- iii. **GPS:** The acronym simply means “Global Positioning System.” Although the history of GPS impact in Africa was discussed earlier (see footnote 2), it is equally important to delineate its definition and purpose. *National Geographic* (n.d.) describes it as a network of satellites and receiving devices used to determine the location of something on Earth. Additionally, some GPS receivers can accurately discover their location within 1cm. Consequently, mobile churches without a permanent worship centre and those involved in multiple locations outreach can leverage a GPS to provide the address of service or outreach venues, especially for newcomers. Likewise, ushers, security, protocol and finance teams can use GPS to track the movement of guests and

3 A crane is a piece of technical equipment used in hanging or carrying other smaller equipment or loads. They can be locally called “stands.” In the church setting, they are used as light stands, camera stands, speaker stands, and so forth. They can be lifted with motors and remote gadgets if they have to hang up heavy-duty equipment like sound speakers.

members for safety and track church offerings from venues to banks. Indeed, GPS can provide vital services to the church community.

- iv. **Learning Management System (LMS):** Worthy of note is the nature of training among ANPCs. Some of them are not deeply involved in high-level academic, theological, and continuous development training. Although the display of charisma, spiritual gifts, and miracles are more popular, human capacity-building through more training is surely one of the expected roles of ANPCs. On this note, LMS is an imperative part of NTECH for an effective supply chain among ANPCs. The Training Industry Report (2022) defines LMS as a computer-based operating system used by training organisations to register, track and monitor activity in the training function. Viewing the value of LMS in a missional service ecosystem, it can be used to develop talents and provide development training for ministry staff (see Talent LMS, n.d.). In other words, it can be used to transfer knowledge and build the capacity of skilled volunteer workers or paid staff, pastors, community leaders, and theological students. Noteworthy is the fact that some churches run primary, secondary, and tertiary institutions for profit or community service. Either way, it is imperative to leverage LMS for training and development.
- v. **5G Technology:** According to Gillis (2022), 5G is simply called the fifth-generation wireless network, and it is the latest development of cellular technology, produced to increase the speed and responsiveness of wireless networks. It allows data transmitted over wireless broadband connections to travel at multigigabit speeds, with potential peak speeds as high as 20 gigabits per second (Gbps) by some estimates. It enables a sharp increase in the amount of data transmitted over wireless systems due to more available bandwidth and advanced antenna technology. The adoption of 5G in the supply chain causes significant transformation. The idea is to enhance internet speed and latency or processing time for online activities. In the church ecosystem, as presented in figure 1 above, in order to provide efficient services to the church community, ANPCs can employ the use of 5G to run virtual services, training, or Bible classes on all media platforms. Also, ministries' information can be speedily uploaded or downloaded to or from the Cloud. As the churches serve their communities, using 5G enables faster internet delivery processes on all fronts.
- vi. **Virtual Realities (VR):** According to Gartner (2022), VR provides a computer-generated 3D environment (including computer graphics and 360-degree video) that surrounds a user and responds to an individual's actions in a natural way, usually through immersive head-mounted displays. VR technology recognises gestures, including hand, body, and touch. Carter (2021) sees it as the fastest-growing technology in the world, given consumers' response and its increasing appearance in homes and businesses across the globe. The primary purpose of VR is to transport a user into another realm of reality or another environment

of interaction. The commonest tool of engagement is the VR headset designed to replace the user's environment. The headsets contain gyroscopic sensors, accelerators, and magnetometers and connect to external cameras and computer systems to access software for the new environment experience (cf. Lowood 2022). A good example from the missional supply chain perspective is the VR church in the metaverse led by Bishop D.J Soko (VR Church 2.0, 2022). The ministry website shows interaction with NTECH, which has enabled church planting on the metaverse for more than six years, as of 2022. VR church makes a member or an attendee appear in real-time service using the VR headset. This is interesting because anybody from any part of the world can just put on VR glasses and join the church service. At the moment, efforts are being put in place by various smart church advocates to see more churches move into the metaverse via training.⁴ Consequently, in the ANPCs' supply chain ecosystem, VR can be used to reach the unchurched or conduct missional services beyond the borders of specific locations. It is more interesting because it brings attendees into a much more realistic (telepresence) experience or environment of worship than the traditional Zoom meeting space.

- vii. **AI and Big Data (BD) Analytics:** According to IMB Cloud Education (2020), AI is the science and engineering of making intelligent machines, especially intelligent computer programs to understand or imitate human intelligence for problem-solving. It helps with speech recognition, improves customer service with conversational AI, and serves as a recommendation engine for better decision-making in organisations. AI is used in some of the NTECH discussed in figure 1 above. For example, AI is used to create a better VR experience (see Gasparini 2021). It enhances better Cloud computing (Kriech 2022) and most robots use AI for decision-making (*Encyclopedia Britannica* 2022).

Talking about BD, Coursera (2022) describes it as the process of collecting, examining, and analysing large amounts of data to discover market trends, insights, and patterns that can help companies make better business decisions. Through advanced analytical procedures, big data uses large structured and unstructured data to produce valuable insights for organisations to improve processes, systems, and profitability. Just like AI, BD analytics helps to achieve a better supply chain through cost reduction, product development, strategic decision-making, better customer experience, risk management, targeted marketing, advertisement, and so forth. Besides enhancing some NTECHs like Cloud, GPS, and Robotics in the supply chain, AI is most critical in providing recommendations for effective decision-making, similar to BD analytics. This then speaks to the possible advantage of AI and BD in the supply chain of

4 For example, a group of trainers under the aegis of Digital Evangelism and The Church Digital put up an online training tagged "How to launch a Metaverse church in 3days." See details at VR MMO Church, 2022. "How to launch a Metaverse church in 3days." *YouTube Video*. https://www.youtube.com/watch?v=76BQhk_h3nw.

ANPCs, where decision-making based on AI and BD roles helps churches to make strategic decisions on how to better serve the adherents or surrounding communities. Additionally, BD analytics can help churches to achieve follow-up and targeted advertisement of missional activities in regions of their interest.

- viii. **Blockchain:** Daley (2022) describes blockchain technology as a decentralised, distributed ledger that stores the record of ownership of digital assets. Any data stored on a blockchain cannot be modified, making the technology a legitimate disruptor for industries like payments, cybersecurity, and healthcare. It is promising and revolutionary technology as it reduces security risks, blocks off fraud and creates transparency in a scalable way. Before the advent of blockchain, online banking transfer was the ultimate way of financial exchange, but today cryptocurrency (which runs on blockchain technology) has become an alternative means of payment. However, worthy of note is the intangible and extremely volatile nature of cryptocurrency. Furthermore, IBM (n.d.) reports that blockchain is an immutable ledger that facilitates the process of recording transactions and tracking assets like houses, cars, cash, land or intangible assets like intellectual property, patents, copyrights, and branding. In other words, virtually anything of value can be tracked and traded on a blockchain network because it reduces risk and cuts costs. It can also track orders and payments. In a church supply chain, blockchain can be used as a fundraising platform in the church or for transactions between the churches and suppliers of goods and services. Churches can also use it as a platform of investment in tangible assets like land and intangible assets like brands, intellectual property, or copyrights.

This subsection shows a graphical yet practical model for better missional supply chains in the nearest future. Since the possible future value of NTECH in ANPCs' supply chain has been established, it is reasonable at this juncture to interrogate the current status with the view to recommending lessons for future efficiency and quality service delivery. The information below shows the evidence, ratio, and median percentage of the current interaction of ANPCs with NTECH.

The Empirical Research Survey: Summary Table and Analysis

Table 1: Research summary

Question details	Respondents	Affirmation	Non-affirmation	Ratio	Remarks
Q1-Internet (5G)	205	21.5	78.5	1:4	Low Interaction
Q2-Media (Robots and Drones)	207	3.9	96.1	1:24	Low Interaction
Q3-Virtual (Virtual Reality)	208	15.4	84.6	1:5	Low Interaction
Q4-Info Management (Cloud)	203	25.6	74.4	1:3	Low Interaction
Q5-Security Logistics I (GPS)	219	39	61	1:1.6	Medium Interaction ⁵
Q6-Security Logistics II (Camera)	196	41.8	58.2	1:1.75	Medium interaction
Q7-Finance Logistics (Blockchain)	194	18.6	81.4	1:4	Low Interaction
Q8-Speakers and Mixers on Cloud	210	12.9	87.4	1:7	Low Interaction

Table 1 above is the summary of the empirical survey, which serves as the primary source of this research, with 219 respondents mostly from Abuja in Nigeria, and Pretoria in South Africa. They represent some of the largest African cities with vast numbers of ANPCs. Participants include pastors, sound, media, IT volunteers or paid engineers and a general workforce of ANPCs. The data are considered to adequately represent selected members with minimal knowledge of sound, media, IT, and general logistics. The survey had eight questions (Q1–Q8) applicable to the Supply Chain Model in figure 1 above. Based on the response of the participants to each question articulated in table 1 above, this article will present the results in the following subsections.

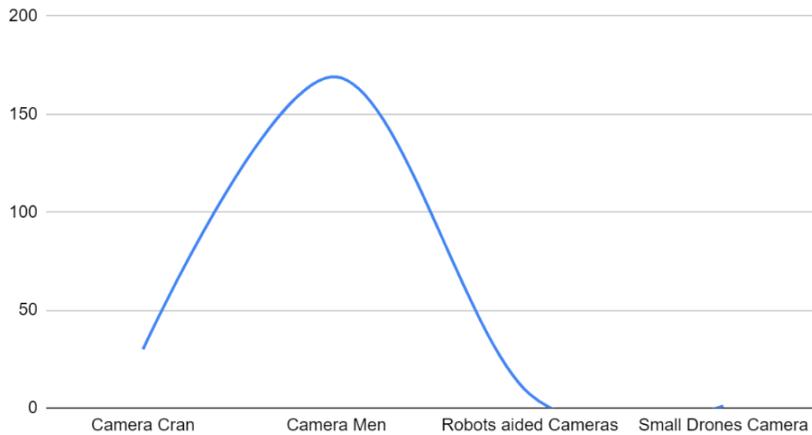
Q1: 5G Internet Logistics

The research outcome of the first question indicated that only 18.5 % of the respondents were familiar with the internet network (3G) between the years 2010 to 2020. However, during and after Covid-19, over 81% of respondents moved to 4G internet space. Perhaps the closure of churches during the pandemic may have necessitated such a massive upgrade to 4G. Also, in table 1 above, only 21.5% progressed to a 5G network between 2021 and 2022. Consequently, 78.5% of the respondents are not currently using a 5G network. This means the affirmation ratio of 5G interaction to non-affirmation is

5 See research database link: https://docs.google.com/forms/d/1i8_8JScbtaCs7sY8li3GNv4dPXnN5-b_v3zxqGuuA_A/edit#responses.

approximately 1:4, which shows a huge gap in interaction. Thus, the ANPCs' current interaction with the 5G network remains very low.

Q2 - Which of the following does your church or churches around you use for video Camera/Media recordings?



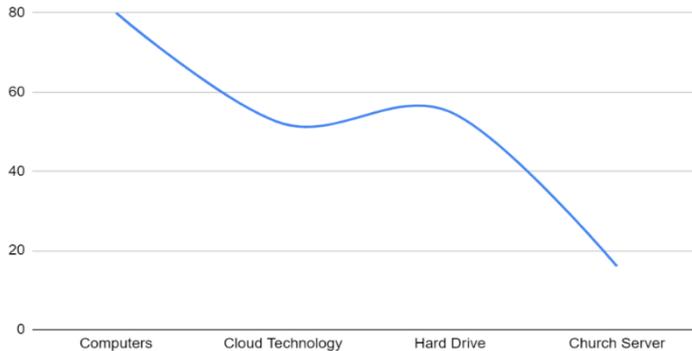
Q2: Robots and Drones NTECH in Still and Motion Media

In diagram Q2 above, the second question reveals that 169 (81.6%) of respondents continue to use the analogue style of still and motion camera recordings. This involves using camera operators rather than NTECH drones and robots enabled by artificial intelligence. While 14.5% of respondents' churches use cranes, the overall use of drones and robots is 3.9% while the analogue and crane combined are 96.1%. By ratio, the affirmation of robots and drones interaction to non-affirmation is approximately 1:24. This is a huge gap, showing extremely low evidence of ANPC interaction with drones and robots.

Q3: Virtual Reality (VR)

As explained earlier, this technology showcases a new way of virtual meetings much closer to physical gatherings compared to online Zoom meetings. Indeed, VR represents the future of the church's missional expression in the metaverse, where people are not physically present in church but feel almost as if they are in church. In the third question (Q3), while 69.2% of respondents claimed their churches used Zoom technology, only 15.4% used the VR space for missional expression. Overall, the ratio of affirmation to non-affirmation in the use of VR is approximately 1:5. This shows again that ANPCs' current interaction with VR is very low.

Q4 - Which of the following do you use to store your messages, church documents and related materials?



Q4: Information Management with Cloud Technology

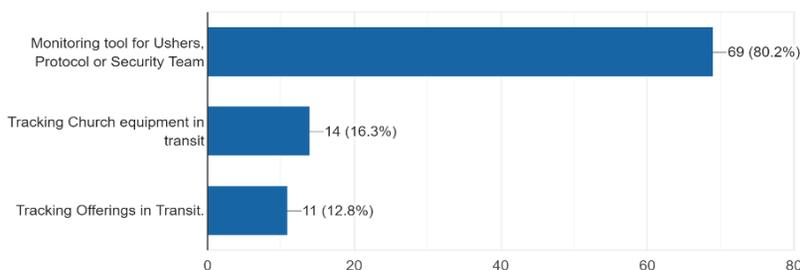
In the fourth survey question, diagram Q4 above indicates respondents’ interaction with the Cloud for information management. Altogether 135 respondents’ churches still use computers and hard drives; 16 respondents’ churches use a church server, and 52 churches use Cloud technology. As presented in table 1 above, only 25.6% of churches use Cloud technology for information management. Consequently, the affirmation versus non-affirmation ratio is 1:3. While this ratio may suggest that ANPCs are more familiar with Cloud technology than other NTECHs, the overall remark is that the current interaction can be better, as using computers and a hard drive cannot guarantee information security and cost-effectiveness.

Q5: GPS for security logistics

Graph Q5 below suggests that only 86 churches use GPS

Q5: What do you use GPS for in your church (if any)?

86 responses



If only 86 among 219 respondents acknowledged their churches’ interaction with GPS, then it stands to reason that almost two-thirds of the ANPCs are not unitising GPS technology. Consequently, the ratio of GPS respondents (86) versus the overall research respondents (219)—which is 1:1.6—indicates that the interaction of ANPCs with GPS is approximately at a medium level. Although the ratio is appreciably better than

ANPCs' interaction with other NTECHs discussed so far, more interaction opportunity abounds.

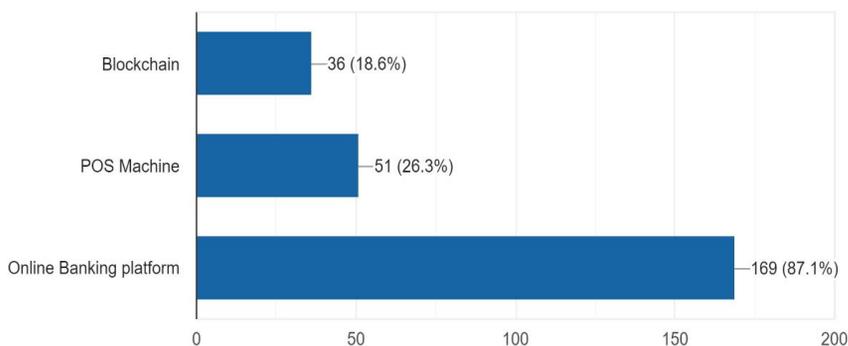
Q6: Installed Security Cameras

From the respondents' feedback on the sixth question (Q6), it seems that 54.6% of ANPCs use only physical security personnel, 13.3% use only installed security cameras, whereas 41.8% use both personnel and installed cameras. Overall, the affirmative and non-affirmative ratio is approximately 1:1.75. Indeed, it shows that ANPCs are familiar with AI-enabled digital security cameras. The overall current interaction ratio shows that the ANPCs maintain a medium interaction with installed security cameras. Though it is an appreciable development, the interaction can be better.

Q7: Finance Logistics with Blockchain Technology

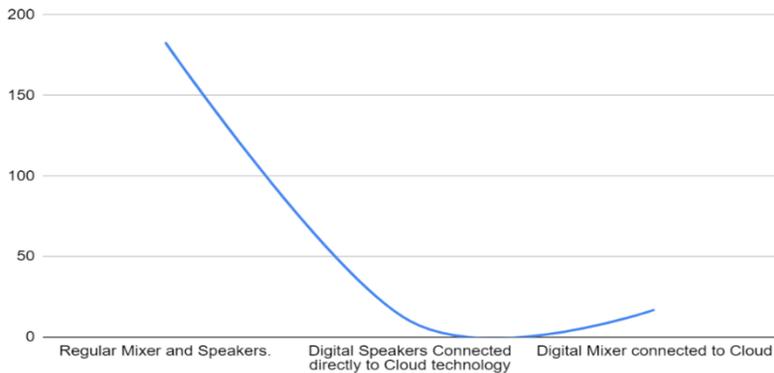
Q7: Which of the following platforms do you use in collecting offerings? You can choose more than one option.

194 responses



In graph Q7 above, the seventh question implies the dominance of online banking followed by the use of point of sale (POS) machines among the ANPCs. Only 18.6% of churches (according to the respondents) use Blockchain technology for financial transactions. Consequently, the interaction ratio is approximately 1:4. Thus, ANPCs' current interaction with Blockchain technology remains very low.

Q8 - Choose any of the following sound systems used in your church.



Q8: Sound Mixers and Speakers on Cloud Technology

Sound systems have developed beyond the analogue approach. However, respondents noted that 183 churches (87.1%) still used regular digital mixers and speakers, as opposed to 27 (12.9%) churches that used digital mixers and speakers connected to Cloud technology. Table 1 above shows that ANPCs’ current interaction ratio is 1:7. Interpretively, the current use of Cloud NTECH in ANPCs’ sound and media systems is very low.

Overall, the median percentage of interaction = Number of affirmations/Q1+7 = 178.7/8 = 22.3%. This figure represents the total percentage of ANPCs’ interaction with NTECH concerning the supply chain. By interpretation, the overall statistics show that ANPCs’ percentage of interaction with NTECH is very low. Thus, ANPCs are currently slow in catching up with the continuous evolution of technology. Such a gap needs to be closed as much as possible in the nearest future. Also, the overall median percentage indicates that low interaction is at the heart of poor and ineffective service delivery to church adherents and surrounding communities.

Now that the gap between the current and nearest future interaction has been established, this article will briefly look at why the interaction is low and the necessary lessons to be learnt for better interaction in the nearest future.

Causes of Low Interaction with New Technologies

ANPCs may have more causes for low interaction with NTECH; however, the limits of this article will only permit a discussion of three causes.

Financial Challenges

Among the 219 respondents, a few made some written comments on their challenges with NTECH interaction. One respondent in Sunnyside South Africa stated that “it is

all about finances, nobody wants to use analogue instruments or outdated technology.” Another respondent wrote the following:

We appreciate your concerns for small churches and the spread of the gospel of Christ. Unfortunately, we could not answer any of the questions. Although we are a physical church, but presently, we are not using any modern electronic communication gadgets for our services because we are not financially buoyant to acquire any. Please bear with us. (Pastor in charge, CAC Truth and Life Chapel, Nigeria)

Besides these respondents’ feedback, various writers on the affordability of NTECH suggest that some are increasingly getting cheaper, while others are rarely affordable with a high cost of maintenance. For example, mini drones with variable prices between \$50–\$2000 may be affordable for some churches, whereas a robot can be as expensive as \$25,000 and upwards of \$400,000 (See MyFirstDrone 2022; Robotic Automation Systems 2022). Likewise, smart mixers and hybrid speakers functioning with Cloud storage are expensive (see Sound Select 2022). With the feedback from respondents and from the prices stated above, it is clear that financial capacity may determine the level of interaction of ANPCs with NTECH. Most churches want to improve their missional services as technology evolves; sadly, funding may be a major obstacle. Therefore, looking at the low percentage of ANPCs’ interaction with NTECH obtained in the research data, it can be inferred that mega-churches or wealthy ANPCs are front liners in improved interaction with NTECH, whereas smaller churches with lesser financial capacity may not be able to invest much in NTECH. Consequently, many ANPCs may continue with the analogue supply chain in providing services to adherents and communities. Summarily, there is a desire for an upgrade, but financing is a deterrent.

Lack of Exposure to Emerging Technologies

A second reason for low interaction with NTECH may be the lack of exposure of ministry leaders to the changes in the world of evolving technology. This is backed by the data in Graph Q1 above, where up until 2020, 18.5% of churches were still stuck with 3G technology. When trends of evolving technology are not known, followed, or ignored, better NTECH interaction and, by extension, efficient supply chain management for better missional service delivery become impossible.

Lack of Skilled Human Resources

Developing technologies have changed the pattern of demand and supply in the labour market, and the church is not excluded from this trend. NTECH interaction requires skilled personnel. The lack of such skilled personnel to manage NTECH equipment may cause low interaction and a poor supply chain. Also, given that some churches prefer volunteer services based on doctrinal belief, or lack the financing to hire skilled labour, an efficient supply chain may be challenging. Skilled people are developing themselves to get good-paying jobs, but do not remain in volunteer positions. In this case, the movement of skilled personnel in search of good paying jobs vis-à-vis doctrinal belief on workers’ volunteerism, or lack of finance, will be an obstacle to accessing skilled

workers for missional services. Even if the churches have some NTECH equipment, providing excellent and efficient services to the communities may be challenging because of the lack of skilled personnel.

Lessons from African Neo-Pentecostals Interaction with New Technologies

- a) **New Technologies (NTECH) are changing the way the church is serving communities:** This research has shown that NTECH is reshaping the strategies needed for missional services in Africa, especially in a post-Covid era. NTECH has made the analogue ways of serving the congregants obsolete, as it is gradually becoming one of the major effective missional tools for the current and the future church. This, then, challenges the churches, especially ANPCs, to rise to the challenge and take advantage of trends and innovations in technology to advance missional services to adherents and surrounding communities.
- b) **The current level of ANPCs' interaction with NTECH needs urgent improvement:** In the empirical survey and analysis section above, the overall median percentage of interaction is 22.3%. This reveals a very low interaction rate of ANPCs with NTECH. Given that technology represents a development driver in missions, evangelism and community service, urgent improvement in interaction is imperative.
- c) **Improved Interaction requires continuous training and hiring of skilled workers:** The low percentage of ANPCs' interaction with NTECH shows the need for continuous improvement via training. This needs to begin with exposure to evolving technology, followed by an intentional interest in information technology training within the church ecosystem. Knowledge of technology is no longer an option for Christian leaders; it is as important as other priorities of the church. Thus, the lesson here is that ministry leaders, through continuous self-development and training, need to be in constant touch with evolving technologies for easier, more effective, and quality missional service. Another important point is the necessity of going the extra mile with onboarding paid skilled personnel to ensure effective interaction with NTECH. Also, where possible, Bible schools' curricula and continuous development training in the churches need to include information technology, operations, and supply chain management.
- d) **The church cannot collaborate successfully with its suppliers and related organisations without robust interaction with NTECH in the age of emerging technologies:** The infographic and church Supply Chain Model in figure 1 above show that the church, as a spiritual agency, cannot operate successfully in isolation. Churches need NTECH to effectively interact with suppliers of operational goods and services. Where the analogue system remains the approach of the church, labour

costs will be higher, security will be poor, and quality service to adherents and surrounding communities will not be achievable.

- e) **There is a need for intentional, continuous fundraising for a “SMART CHURCH PROJECT” in Africa:** Zeal and desires are not enough; finance is the underlying factor for smart church projects in Africa. On this note, educating members and consulting with financial supporters of the church on the need to support the course of the smart church project will be the game changer. This intention needs to be backed by an unwavering leadership commitment to accountability, as givers will respond better to accounting systems.
- f) **NTECH interaction in the missional supply chain is not only beneficial to the ANPCs, but to all denominations:** Although this paper focuses on the supply chain of ANPCs, the value of NTECH in the advancement of missional services to communities cannot be limited to ANPCs. Indeed, the adoption of NTECH in the overall supply chain mechanism of African churches is imperative. As technology continues to advance, African churches need to step up their game to meet the demands of time to provide quality and efficient services to their congregants and surrounding communities.

Conclusion

This article investigated past and current interactions of ANPCs with NTECH. It showed with evidence the wide margin between the current status and the future needs of interaction. The research looked further into the causes of the gap of interaction and, by extension, a poor supply chain. It also proposed an infographic Supply Chain Model usable in the nearest future, and finally recommended lessons to assist missional organisations with the capacity for better supply chain strategies and improved missional services to adherents and surrounding communities.

References

- African Business*. 2014. “Finding your Way: GPS Comes to Africa.”
<https://african.business/2014/05/technology-information/finding-way-gps-comes-africa/>.
- Adeyemi, Daniel. 2022. “Uber Crosses 1 Billion Rides in Africa.” *Techcabal*.
<https://techcabal.com/2022/05/25/uber-crosses-1-billion-rides-in-africa/#:~:text=American%20ride%2Dhailing%20giant%20Uber,presence%20in%20Johannesburg%2C%20South%20Africa.>
- Ashcroft, Sean. 2022. “Keith Liver the Man who Gave us ‘Supply Chain Management’.” *Digital Supply Chain*. <https://supplychaindigital.com/digital-supply-chain/keith-oliver-the-man-who-gave-us-supply-chain-management>.
- Carter, Rebekah. 2021. “How Does Virtual Reality Work?” *XR Today*.
<https://www.xrtoday.com/virtual-reality/how-does-virtual-reality-work/>.

- Coursera, 2022. "What is Big Data Analytics? Definition, Benefits, and More." <https://www.coursera.org/articles/big-data-analytics>.
- Daley, Sam. 2022. "Blockchain: What Is Blockchain Technology? How Does it Work?" *Built In*. <https://builtin.com/blockchain>.
- Drescher, Elizabeth. 2012. "Elizabeth Drescher: Digital Ministry, Made for the Mainline." *Faith and Leadership*. <https://faithandleadership.com/elizabeth-drescher-digital-ministry-mademainline.com>.
- Encyclopaedia Britannica*. (n.d.). "robotics" *Encyclopedia Britannica*, September 26, 2022. <https://www.britannica.com/technology/robotics>.
- European Commission. 2022. "Advanced Technology for Industry." <https://ati.ec.europa.eu/technologies/robotics>.
- Gartner, 2022. "Virtual Reality (VR)." *Gartner Glossary*. <https://www.gartner.com/en/information-technology/glossary/vr-virtual-reality>.
- Gasparini, Allison. 2021. "Stanford Researchers Are Using Artificial Intelligence to Create Better Virtual Experience." <https://news.stanford.edu/2021/11/12/using-ai-create-better-virtual-reality-experiences/>.
- Gillis, Alexander. 2022. "What is 5G?" *Techgate Networking*. <https://www.techtarget.com/searchnetworking/definition/5G>.
- Hollington, Jesse. 2022. "When Did 5G Come Out? The Long, Complicated History of its Release." *Digitaltrends*. <https://www.digitaltrends.com/mobile/when-did-5g-come-out-complicated-history-release/#:~:text=In%202017%2C%20the%20carriers%20began,5G%20mobile%20networks%20rolled%20out>.
- Hughins, Chad. 2018. "Four Ways Technology Enables the Mission of the Church." *Tithe.ly*. <https://get.tithe.ly/blog/church-technology>.
- IBM. (n.d.). "What is Blockchain Technology?" <https://www.ibm.com/za-en/topics/what-is-blockchain>.
- IBM Cloud Education. 2020. "Artificial Intelligence (AI)." *IBM*. <https://www.ibm.com/cloud/learn/what-is-artificial-intelligence>.
- Idris, Abubakar. 2020. "Africa's Cloud Computing Industry Is Set to Grow as Data Adoption Rises." *Techcabal*. <https://techcabal.com/2020/05/29/africas-cloud-computing-industry-is-set-to-grow-as-data-adoption-rises/>.

- Jenkins, Abby. 2022. "Everything Inventory Visibility: What It Is, Why It Is Important and How to Improve It." *Oracle Netsuite*.
<https://www.netsuite.com/portal/resource/articles/inventory-management/inventory-visibility.shtml>.
- Kriech, Michael. 2022. "Artificial Intelligence in Cloud Computing." *Datacentres.com*.
<https://www.datacenters.com/news/artificial-intelligence-in-cloud-computing>.
- Lowood, Henry. E. 2022. "Virtual Reality." *Encyclopedia Britannica*.
<https://www.britannica.com/technology/virtual-reality>.
- Mbanje, S., and J. Lunga. 2015. *Fundamental Principles of Supply Chain Management*. Pretoria. Van Schaik Publishers.
- Morvany, Thierry. 2020. "A Brief History of Supply Chain Management (1980–2020)." <https://www.linkedin.com/pulse/brief-history-supply-chain-management-1980-2020-23-thierry>.
- MyBaseGuide 2022. "When Was GPS Invented and Who Is in Charge of It?" <https://mybaseguide.com/installation/schriever-afb/community/when-was-gps-invented/>.
- MyFirstDrone. 2022. "Best Drones for Sale July 2022 Summer Season." <https://myfirstdrone.com/drones-for-sale>.
- National Geographic*. (n.d.). "GPS." Resource Library Encyclopedic Entry.
<https://education.nationalgeographic.org/resource/gps>.
- NYU Dispatch. 2022. "How Education Benefits from Using Utilizing Cloud Storage." *NYU dispatch*. <https://wp.nyu.edu/dispatch/how-education-benefits-from-utilizing-cloud-storage/>.
- O'Lynn, Rob. 2022. "What Comes Next: Continuing the Digital Ecclesiology Conversation in Response to the Covid-19 Pandemic." *Religions* 13 (11): 1036, 2077–1444.
<https://doi.org/10.3390/re113111036>.
- Orogun, D. 2020. "Agencies of Capitalism: Evaluating Nigerian Pentecostalism using African Moral Philosophies." PhD thesis, Faculty of Theology, University of Pretoria.
<https://repository.up.ac.za/handle/2263/85751>.
- Orogun, D. O., and J. Pillay. 2022, "A Historical Survey of the African Neo-Pentecostals' Response to Digital Transformation." *HTS Teologiese Studies/Theological Studies* 78 (1): a8040. <https://doi.org/10.4102/hts.v79i1.8040>.
- OSCM Module Guide. 2022. *Operations and Supply Chain Management*. Regent Business School, South Africa.
- Pedamkar, Priya. 2022. "History of Cloud Computing." *Educba*.
<https://www.educba.com/history-of-cloud-computing/>.

- Robotic Automation Systems. 2022. "How Much Do Industrial Robots Cost?" <https://www.roboticautomationsystems.com/blog/how-much-do-industrial-robots-cost/>.
- Salesforce. 2022. "12 Benefits of Cloud Computing." Salesforce. Accessed November 10, 2022. <https://www.salesforce.com/in/products/platform/best-practices/benefits-of-cloud-computing/>.
- Sound Select. 2022. Official Website. <https://soundselect.co.za/>.
- Talent LMS. (n.d.). "With Supply Chain E-learning." <https://www.talentlms.com/industries/supply-chain>.
- Training Industry Record. 2022. "Learning Management Systems." <https://trainingindustry.com/glossary/learning-management-system-lms/>.
- UNCTD. 2013. "The Cloud over Africa." *Research ICT Africa*. https://www.researchictafrica.net/publications/Evidence_for_ICT_Policy_Action/Policy_Paper_20_-The_cloud_over_Africa.pdf.
- VR MMO Church. 2022. "How to Launch a Metaverse Church in 3 Days." *YouTube Video*. https://www.youtube.com/watch?v=76BQhk_h3nw.