

Digital Transformation: Risk and Challenges in Nigeria's Logistics and Supply Chain Industry.

Case Study of Jumia Logistics, mds Logistics and Bollore Transport & Logistics.

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Chapter 1: ABSTRACT

The chosen topic for the IRP is “DIGITAL TRANSFORMATION: RISK AND CHALLENGES IN NIGERIA’S LOGISTICS AND SUPPLY CHAIN INDUSTRY. CASE STUDY OF JUMIA LOGISTICS, MDS LOGISTICS AND BOLLORE TRANSPORT & LOGISTICS”. The aim of the research is to identify key challenges and risks bedeviling the logistics and supply chain industry in Nigeria vis-à-vis the use of Digital Transformation to address the challenges identified. The research philosophy is based on interpretivism and constructivism which are subjective in nature and the methodological approach is the use of qualitative (inductive) research methods with research data acquired for analysis through the use of survey questionnaire administered to the 3 selected organizational case studies. It’s important to note that the sample size used in qualitative research is usually a small sample size that is adequately reflective of the research objective. For the purpose of this IRP, a sample size of 9 is adopted with 8 responses confirmed for further analysis.

The analysis and results indicate the specific challenges and risks bedeviling the industry and the importance of digital transformation in curbing these challenges. The results also show specific aspects of digital transformation that is critical to the implementation and adoption of digital transformation.

The conclusion shows the digital transformation strategy required by the organizations to implement, adopt and properly apply digital transformation as part of organization wide business strategy for sustainability.

Chapter 2: INTRODUCTION

There are a lot of gaps within the Logistics and Supply chain industry in Nigeria that is making the players within the industry to lose money/value due to inefficient and unsustainable practices albeit within an uncertain erratic business climate. In an attempt to take a deep dive into the numerous gaps for solution driven ideas, there is the need to take a critically appraise the issue of digital transformation and the lack or presence there of vis-à-vis risks and challenges as a driver or enabler for industry players in Nigeria closing gaps related to lose of value and efficiency improvement within a VUCA business environment. Up until the emergence of Covid-19 pandemic, the Logistics and supply chain industry in Nigeria was fraught with a lot of in efficiencies leading to losses for both organizations (industry players) and customers alike. Post Covid-19, Digital Transformation has now become the buzz word within the logistics and supply chain circles in Nigeria and as such not much literature is available within the Nigerian context other than literature within the Global context. This will be combined with available local context to design a research capable of addressing localized logistics and supply chain problems/gaps of inefficiency and value loss in Nigeria using a case study of a selection of industry players like Jumia Logistics, MDS Logistics and Bollore Logistics. The research for gap for this project speaks to a Practical-Knowledge Gap (Miles, 2017) where there is a conflict between the activities/behavior of professionals within the industry and existing global context research and as such there is the need to identify reasons for this gap through a detailed literature review and proffer solutions to the identified gap and problem statement through methodology, analysis, conclusions and recommendations. Based on the afore stated, the identified research gap is digital transformation implementation in Nigeria’s logistics and supply chain industry vis-à-vis its risks and challenges

The case studies to be used Jumia Logistics, MDS Logistics and Bollore Transport & Logistics are global and Nigerian leaders in the e-commerce retail and logistics industry and their footprint is felt in all the nooks and crannies of the Nigerian e-commerce and logistics space.

1. Problem statement

The research statement of the problem highlights (for the purpose of the IRP), some the fundamental issues confronting the industry that needs to be overcome for better operational and cost efficiency, improved customer satisfaction and better demand management.

- a. Inadequate visibility to meet up with customer/industry/regulatory/stakeholder demands.
- b. High operational costs and low revenue.
- c. Infrastructural decay and low level of integration between infrastructures.
- d. Delivery and fulfilment performance not meeting delivery KPIs and customer expectation

2. Objectives of research

Identifying digital transformation opportunities for solving real and critical logistics and supply chain problems confronting Jumia logistics, MDS Logistics and Bollore Transport/Logistics.

- a. To identify key challenges and risks bedeviling the logistics and supply chain industry in Nigeria.
- b. To explore the use of digital transformation as a solution of the problems stated.

3. Research Questions

- a. To what extent does digital transformation serve as a solution to problems stated in the logistics and supply chain industry in Nigeria?
- b. Are there challenges and risks to implementations of digital transformation?
- c. What are the accelerators and drivers of digital transformation?
- d. What aspects of digital transformation is critical to solving logistics and supply chain problems in Nigeria.

4. Research Structure

The structure of this research work will be based on a research design framework flowing through the various stages of the research process and well-orchestrated to ensure the delivery of the much required, needed and desired insights of the study. (Latham, 2016) states that the research design framework is divided into 9 main components which are all linked to each other where a component is linked to the previous and subsequent components; and all linked to the conceptual framework. (Latham, 2016) also postulates that the components are divided into 2 categories:

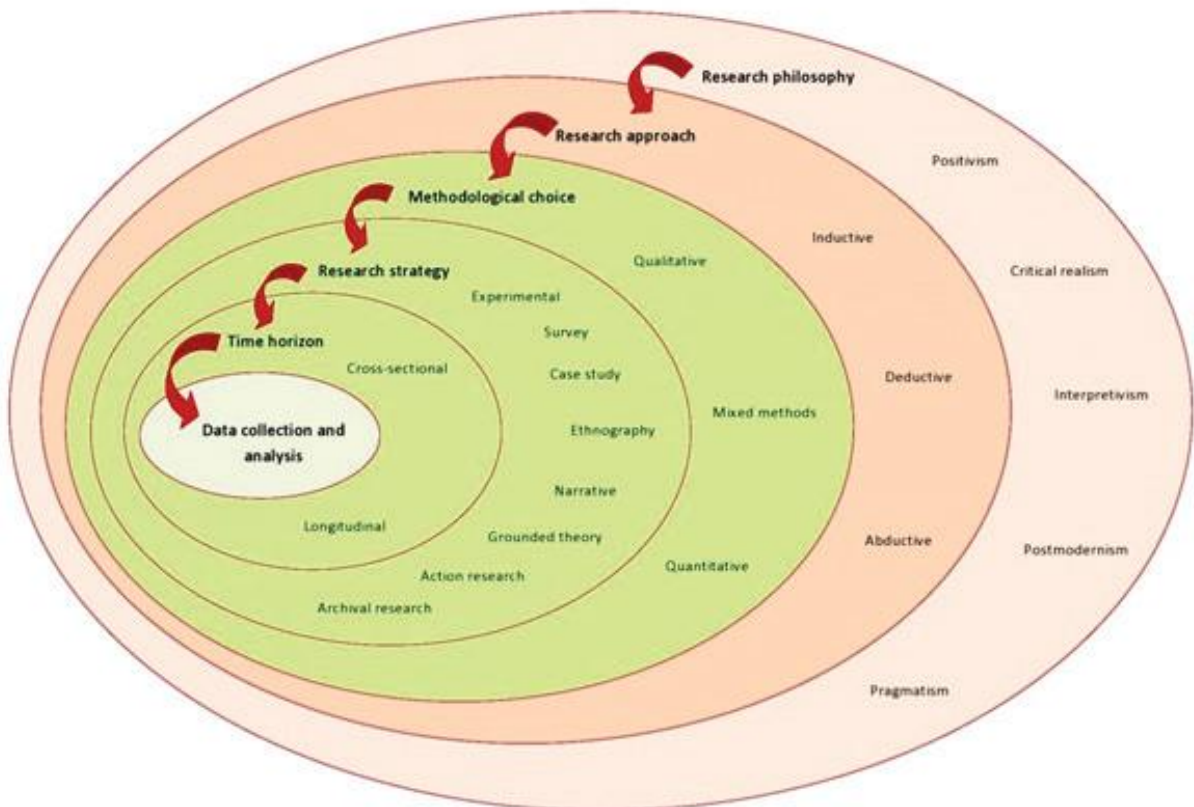
a.(T) Foundation which comprises of

- i. The problem statement.
- ii. The purpose statement
- iii. The Research question.
- iv. The Conceptual framework.

b.(U) Methodology which comprises of

- i. Literature review (Theoretical)
 - ii. Overall approach.
 - iii. Data collection
 - iv. Data analysis (Analytical)
 - v. Drawing conclusions.
- (Methodological)

The problem statement, the objectives/purpose of the research and research questions have been earlier stated. However, the conceptual design framework to be used for this research will be based upon the research onion. The research onion is a pictorial framework that can be used to explain the various stages of the research design process and also serves as a guide to researchers while going through all the steps required to develop a research methodology in a most practical and systematic manner.



Source: Mahesh BT, (2020) Blog 132-Research Onion: A Systematic Approach to Designing Research Methodology [Blog 132-Research Onion: A Systematic Approach to Designing Research Methodology](#) | Welcome to AESA (aesanetwork.org)

The philosophical paradigms of constructivism and interpretivism are consistent with the research's goals, which include identifying the key threats and difficulties facing the Nigerian logistics and supply chain sector and investigating the application of digital transformation as a remedy. Since the research itself is socio-cultural in nature, constructivism and interpretivism emphasize that socio-cultural influences and factors have a significant impact on the research's findings. This is because socio-cultural research allows people to form their own knowledge of the world through personal experience and reflection. (Adom, 2016) (Adom, Yeboah and Ankrah, 2016).

In other words, the only way to learn is to build on your prior experiences. As a result, there may be more than one reality or truth based on various perceptions and understandings of the meanings associated with acts. This leads to the development of a social construct that shapes the way we view and interpret the outside world (Carlstrom, 2022). The use of qualitative (inductive) research methods, such as interviews and case studies, which unintentionally guarantee the provision of an answer to the question of "Why" rather than trying to establish relationship between two variables by testing theories and hypotheses, is most suitable for the research due to the close subjective nature of the constructivist and interpretivist ideologies. For these reasons, the selected topic will hence require that:

- a. The research approach will be inductive and hence the methodological choice will be Qualitative.
- b. The research strategy of choice will be Survey questionnaires.
- c. The time horizon for the research will be longitudinal in nature.

Chapter 3: LITERATURE REVIEW

The literature review will give a broad overview of the research topic, enabling the researcher spot pertinent ideas, approaches, and gaps in the literature that may then be used to further inform the research thesis (McCombes, 2023). This includes a number of actions like looking for pertinent literature, analyzing the literature's sources, figuring out debates and gaps, establishing the research framework, and finally creating the literature review.

1. Digital Transformation in Logistics and Supply chain

According to (bdodigital, 2021) Digital transformation is ushering in a whole new period in the logistics and supply chain industry where both customer and suppliers align and create partnerships in entirely new ways and thereby diminishing the lines between the physical and digital/virtual worlds. This trend which promises to enhance operational efficiencies, lower costs, improve agility and flexibility, boost sustainability and resiliency has been made unavoidable due the accelerated technological disruptions such as Big Data and analytics, Machine learning, Robotics and automation, Artificial intelligence (AI), Augmented reality (AR), Virtual reality (VR), and 3D printing etc.

Digital transformation in the logistics and supply chain actually represents much more than just having a new system or software; but rather it encompasses organizational cultural adjustment which is embedded in the organization's values and goals by adopting more efficient and proactive ways to reengineer outdated systems and practices to ultimately optimize, grow and sustain the supply chain (Saliba, 2022). To ensure supply security, visibility, stability and sustainability, it is imperative to adopt and implement a digitization of the logistics and supply chain so as to protect the supply chain, people and customers as old/legacy systems, processes and practices will no longer be able to cope with global shocks and stressors such as pandemics and political crisis that impact GLOBAL supply chain. It's also important to state that digital transformation requires an integration of the proper practices and organizational mindset shifts to ensure the supply chain is set up for success. A digitized Logistics and Supply chain is a resilient one (Chukwuelue, 2021). The onset of the Covid-19 pandemic accelerated and increased the reliance of organizations across various industries on digital processes to optimize processes and operations which attendant benefits such as building operational synergy amongst partners, creating a competitive advantage and accelerating economic resilience and growth within industries.

In Nigeria, less than 20% of the Logistics and supply chain industry seems to be digitized despite the awareness of the digital transformation concept. As Digital platforms transform industry ecosystems, revenues tend to grow though digital platform-based competitors put pressure on profits. Also, as organizations' digitize its processes, profits tend to increase albeit with overall little growth momentum (Jacques Bughin, 2017) (Bughin, LaBerge, Mellbye, 2017).

2. How is Digital Transformation transforming the Logistic and Supply chain?

As stated by (bdodigital, 2021), there are 6 ways that digital transformation is transforming the supply chain. They are:

a. Having a connected supply chain from the supplier to the end customer. Smart logistics solutions such as automated warehousing, fleet and cargo tracking, Enterprise resource planning tools for inventory and warehouse management give organizations real time insights and visibility for planning, procurement and fulfilment. Business intelligence technologies and data analytics also improve adaptability and supply chain optimization for unpredictable demand through increased visibility, responsiveness and reliance all through the entire ecosystem of the logistics and supply chain.

b. Having a Demand-driven supply chain with vast amount of data and the ability and tools to draw meaning and insights for prompt business decisions and business resiliency is most critical for business sustainability. Historically, demand planning and forecasting relied solely on historical data. However, now predictive analytics, Artificial intelligence (AI) and machine learning have enable smart analysis have infused additional variable to identify patterns, anticipate changes and thus to some extent reliably predict demand.

c. Ensuring an improved data communication and integration of people and workflow across the entire supply chain through as this will enable supply chain responsiveness in terms of demand identification, planning, designing, , manufacturing, shipping, storage and fulfilment between the

organization and its suppliers and customers. The collaboration between the organization, supplier and customers is the change from a supply network to an integrated value chain network where all parties work to achieve efficiencies and lower costs and these feed into data which will be available as business intelligence for further ongoing digital corporation through Collaborative Planning Forecasting and Replenishment (CPFR).

d. Visibility and accessibility of data across the entire supply value chain for synergistic co-creation of value, generation of shared savings and opportunities between partner organizations.

e. Coping and meeting up with changing customer needs has been part of the motivation for digital transformation. Same day deliveries and seamless online ordering and fulfilment is now the hallmark of today's customers. This has resulted to changes in distribution models, order to shipping strategies, centralized distribution and real-time inventory management that is more responsive to demand. Using virtual and augmented reality as well as Artificial intelligence tools has helped to enable new digital experiences for the customers. According to (Brown, 2022) the challenge of meeting up with customer changing needs and behaviors comes in having an agile supply chain that can leverage the power of automations to optimize fulfillment and handle increasing demand with ease.

f. Digital transformation is enabling innovation and collaboration. While this is going on, there is always the risk of cyber-attack by sophisticated hackers seeking to exploit vulnerabilities in the technology mostly for financial gains. There should be an evaluation of all potential cyber risk amongst all partners and where such risks are identified should be immediately addressed. Digital transformation can also help in evaluation of potential risks.

3. Risks and challenges in Logistics and Supply chain management

According to (Woollard, 2017), there are 4 key risks and challenges in Logistics and Supply chain that requires effective management and mitigation. They are:

a. The risk of solely being run by technology rather than creating good alliances with key partners and suppliers. This ensures that the organization is working with the best in the field and allows the organization learn and understand new technology and systems.

b. The risk of failing to integrate logistics. This also requires alliances and partnerships supported by technology and digital transformation.

c. The risk of encountering bottlenecks in the logistics and supply chain. Creating visibility all through the chain with effective controls backed up by technology could be pivotal.

4. Risk and Challenges of Digital Transformation in Logistics and supply chain

The adoption and implementation of digital transformation in Logistics and supply chain is not without its risks and challenges despite the perceived importance and usefulness to the growth and sustainability of the industry. As stated by (Saliba, 2022), (Sagina, 2022) and (Jabil, 2023) Some of these risks and challenges are:

a. In ability of organizations to develop an effective change management strategy and a digital transformation strategy to support the implementation and adoption drive of digital transformation. The organization needs to ensure that digital transformation issue is properly infused into the organizational strategy and culture. There also needs to be a clarity of vision and goal setting to attain digital transformation goals and as well give the entire organization personnel a purpose to achieve because without strategy and purpose, continuous business growth and sustainability is not guaranteed. Also, it's important that change teams are put in place to drive change implementation for successful planning, implementation and adoption. To mitigate this risk, there has to be a structured stakeholder engagement and a clearly mapped project plan with clear timelines and responsibilities as well as clear and open communication plan to keep everyone informed and involved. Also test the new systems and tools during pilot tests before rollout.

b. Inability of personnel to properly use the system and tools due to knowledge gap and inadequate training. Due to this, we often see situations where organizations revert back to using old legacy systems and tools and thinking that they are more efficient due to the fact that they have been used for long. What organizations fail to realize is that without the required level of training and learning of the new systems and tools, they will not derive the benefits to be accrued from using the new systems. The more the new systems are used, the more learnings are taken and the more efficiencies and benefits that will be discovered. To mitigate this risk, the personnel need to have the right training based on their functional use.

c. Constantly changing demand patterns as well as unpredictable GLOCAL stressors like pandemics, political instability, micro and macro environmental and economic issues could distract organizations from achieving the digital transformation goals.

d. Where the digital transformation change is not integrated with organization culture, it is often a sign that the existing culture is detrimental to the digital transformation implementation process. Implementation of digital transformation in an organization requires the people to use the systems and tools are made a priority in the entire process as the transformation is bound to fail should that not happen. Also, accordingly to (Sagina, 2022), people may feel that their jobs are being threatened by the change and as such low morale and productivity may set in and impact overall organizational structure negatively. To mitigate this risk, there need to be a cultural transformation with change in values within the organization. Make the people understand and realize how much easier and efficient that their day to day work activities will be. Also be sure to give assurances that the new ways of working brought on by the new system and tools will not necessarily lead to job losses.

e. Many organizations face budgetary and funding constraints for digital transformation projects required for procuring new tools, training and upskilling, hiring for specialized digital skills etc. There is also some skepticism at the Senior executive management level if the ROI is commensurate with the total investment in the transformation project and as such they may not be willing to allocate budget to the project. To mitigate this risk/challenge, there is the need to project the forecasted ROI of the transformation based on a long term strategic vision in both quantitative and qualitative terms to determine the true expected benefits of the investment.

f. The importance of data in digital transformation cannot be overemphasized and as such inability of organizations find expertise to lead the digital transformation initiatives and inability to leverage available data with data analytics capabilities for business insights and transformational strategy implementation is a major risk area. To mitigate this risk, the business can adopt the use of Artificial intelligence and machine learning capabilities to help the organization with better business insights. And also consider the use of business partners or potential new hires with the requisite skills to aid the organization digital transformation journey.

g. Threats of cyber security risks on data security is a constant worry for organizations that take on digital transformation initiatives. Risk governance and cyber security measures need to keep improving and evolving to meet the constantly changing cyber security treats. Also, the organizational culture need to also account for cyber security and secure design processes and practices.

5. Digital Transformation Trends

(Magenest, 2022) and (MALAK, 2023) confirmed that technology associated with digital transformation can be used to develop and re-engineer new or existing business processes, organizational structure and culture and as well experiences of the end customer for sustainability and continuous adaptability to the ever (VUCA) Volatile Uncertain Complex and Ambiguous business and market environment in the 21st century. To this end, organizational adaptability and resilience is key to survival for organizations and as such it is important to address trends that will enable organizations to be able to achieve this goal of sustainability, adaptability and resiliency. Some of these digital transformation technology trends are:

a. Everything as a Service (XaaS).

b. Artificial Intelligence (AI)

c. Machine Learning

d. 5G

e. Robotics and Automation

f. Internet of Things

g. Distributed Cloud

h. Augmented Reality Cloud (AR)

i. Customer Data Platform

j. Data Democratization (Big Data and Analytics)

k. Block chain

l. Low Code Platforms

6. Digital Transformation in Nigeria's Logistics and Supply Chain Industry

According to (Kedrus, 2021) Nigeria loses up to =N=3.46 Trillion Naira (\$7 Billion) annually in the Logistics and Supply Chain industry as a result of poor infrastructure, poor integration, poor tracking and tracing, inefficient and unsustainable/inconsistent practices and policies. An example of digital transformation in logistics and supply chain was the Nigerian 2017 startup called Kobo360 which played a huge role in digitizing and improving efficiency and also solving problems within the industry through the development and use of an app to connect supply chain partners as well as the value chain up till the customer (oxfordbusinessgroup, 2022).

(Ofoefule, 2018) stated that with regards to implementation and adoption, businesses and organizations in Nigeria are very far from actual implementation and adoption of digital transformation and digital experience to enhance operational efficiency within their value chains and supply chains. (Ofoefule, 2018) also postulates that digital transformation which is powered by (IT) Information Technologies enables successful organizations to constantly adapt and evolve in accordance with global trends and customer behavioral changes and driven by:

- a. New market growth opportunities.

- b. Increased competitive pressure within industry.

- c. New emerging technologies that will enable and facilitate greater efficiencies.

- d. Existing or new regulatory standard requirements.

- e. Constantly changing customer preferences.

It is also pertinent to note that the logistics and supply chain industry in Nigeria has just about 35% digital transformation conformity which is quite low for a country with the largest GDP in Africa (about 400 billion U.S. dollars); however with about 65% potential for adoption (Ofoefule, 2018). Suffice to say that digital transformation in Nigeria's Logistics and supply chain industry offers so many localized benefits for organizations such as:

- a. Enables organizations to reduce and control risk.

- b. Facilitates better service delivery.

- c. Helps to boost revenue and plug leakages.

- d. Helps to get real time data for business insights and performance measurements.

- e. Enables business leaders to make quick and appropriate decisions

7. Strategies for Implementing Digital Transformation

Implementing digital transformation by Organizations in Nigeria requires a deep understanding of local intricacies surrounding the local business environment and as such the use of a local and reputable solutions provider or one with adequate local knowledge is key to implementation based on the below listed strategies by (Ofoefule, 2018):

- a. Identify gaps and local challenges.

- b. Understand the business processes.

- c. Ensure a complete digital footprint.

- d. Adopt agile and project management mindset.

- e. Ensure the right Key Performance indicator (KPI) is in place.

- f. Ensure users are adequately trained.

- g. Leverage user feedback to continually improve and ensure documentation.

- h. Adopt the ‘kaizen’ principle of continuous improvement.

Chapter 4: METHODOLOGY

Here, the “How” as to the systematical design of the research will be determined and operationalized to ensure the validity and reliability of the results that will adequately meet research objectives and answer the research questions. This will also be based upon the research design framework for the selected research topic.

1. Research Design Approach

Constructivism and Interpretivism are philosophical paradigms that are in line with the objectives of the research, which include identifying the main risks and challenges facing the Nigerian logistics and supply chain industry and exploring the use of digital transformation as a solution to those problems. Constructivism and Interpretivism emphasize that socio-cultural factors and influences have a significant impact on the research's findings as the research itself is socio-cultural in nature as a result, it allows individuals to create their own knowledge of the world via personal experience and reflection.

(Adom, 2016) (Adom, Yeboah and Ankrah, 2016).

To put it another way, the only way to learn is by building on experiences. As a result, there can be more than one reality or truth based on different understandings and interpretations of the meanings attached to actions, which in turn creates a social construct that affects how we see and perceive the world. (Carlstrom, 2022). That is why multiple organizations will be adopted as case studies for this research as

have the same objectives of meeting customers demand, ensuring sustainability and profitability for the business. The use of qualitative (inductive) research methods, such as interviews and case studies, which unintentionally guarantee the provision of an answer to the question of "Why" rather than trying to establish relationship between two variables by testing theories and hypotheses, is most suitable for the research due to the close subjective nature of the constructivist and interpretivist ideologies. And as such for the above stated reasons, the selected topic will hence require that:

- a. The research approach will be inductive and hence the methodological choice will be Qualitative.

- b. The research strategy of choice will be Survey questionnaires through case studies.

- c. The time horizon for the research will be longitudinal in nature.

- d. The sample to be selected for the research will be based upon purposive Non-probability sampling technique. This is due to the need to ensure some level of data validity and subjective nature of the research.

2. Research Operationalization

In attempting to operationalize the research, it is important to take a look at the problems bedeviling the Logistics and supply chain industry in Nigeria with emphasis on 3 key players which are Jumia Logistics, MDS Logistics and Bollore Transport & Logistics; and how the methodical research will be carried out and analyzed for an outcome/recommendations that will play a role in alleviating problems they are currently facing.

The statement of problems are:

- a. Inadequate visibility to meetup with customer/industry/regulatory/stakeholder demands.

- b. High operational costs and low revenue.

- c. Infrastructural decay and low level of integration between infrastructures.

- d. Delivery and fulfilment performance not meeting delivery KPIs and customer expectation.

These problem statement can only be alleviated by eliciting information/data from key stakeholders in the industry using the cases studies for data collection via a survey questionnaire while focusing on Digital Transformation vis-à-vis its risk/challenges and opportunities for leveraging technology to solution the problem statement. The research questions that will be inculcated into the research questionnaire that will facilitate these are:

- a. To what extent does digital transformation serve as a solution to problems stated in the logistics and supply chain industry in Nigeria?

- b. Are there challenges and risks to implementations of digital transformation?

- c. What are the accelerators and drivers of digital transformation?

d. What aspects of digital transformation is critical to solving logistics and supply chain problems in Nigeria.

3. Qualitative/Inductive research method

The qualitative approach is an unstructured, exploratory research technique that uses observation and interpretation to achieve a comprehensive understanding of human behavior, experience, attitudes, intentions, and motives (Surbhi, 2018). In order to better comprehend a particular topic of interest, it also requires the gathering, analysis, and interpretation of textual, visual, or auditory data.

As earlier stated, the constructivist and interpretivist research philosophy/paradigm informs the qualitative method of research because human subjective thought and ideas are a function of the socio-cultural factors influencing the individual's actions and these socio-cultural factors influence the outcome of the research. As a result, the qualitative method of research is closely related to the inductive research approach where theories are generated from previously conducted research. Case studies and literature reviews are examples of qualitative research/data gathering methods as will be adopted for this research project. The motivation and justification for using a qualitative approach are based on the goals, objectives and purposes of the study earlier stated, which in the case of the qualitative approach (inductive approach) for this research is to comprehend phenomena (Digital Transformation) in terms of ideas, feelings, and experiences of organizations within the Nigerian Logistics and Supply chain industry for better organizational output and results.

4. Data Analysis

While the survey questionnaire will be used to extract and gather data from sample respondents, it is also important to undertake an analysis of that data. Data analysis is the procedure of modifying, analyzing, and cleaning raw data in order to obtain useful, pertinent details that assist businesses in making decisions (Kelley, 2023). With an emphasis on descriptive (mean, median, mode, standard deviation, sample variance, Kurtosis and Skewness, range and correlation) and narrative analysis and the use of Microsoft excel as the analytical tool, data gotten from all the sample respondents from the case studies will be analyzed to derive trends and patterns that will translate into further research insights. In order to add meaning to data, descriptive analysis will also assist in summarizing and presenting data in a useful way using statistical analysis. Also, it is important that the reliability and validity of the data used for data analysis vis-à-vis the survey questionnaire is also determined as that will either lend credence to the final output or otherwise.

Suffice to say that the output of the data descriptive analysis can be enabling the making of wise decisions, assist companies in remaining profitable and thriving in order to increase their chances of success in a Volatile Uncertain Complex and Ambiguous (VUCA) business environment.

Chapter 5: FINDINGS AND RESULTS

The results and the findings from the administration of the survey questionnaire is detailed below:

a. Survey questionnaire was sent out to 9 research participants across 2 case study organizations.

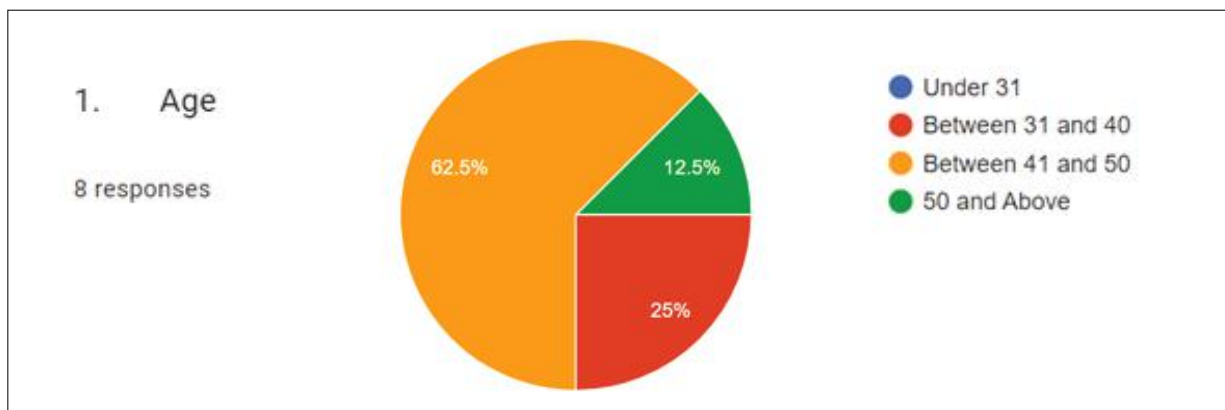
b. Out of the 9 research participants, 8 responses were recorded representing 88.9% response rate.

c. There were 13 questions asked with a combination of both open ended and closed questions.

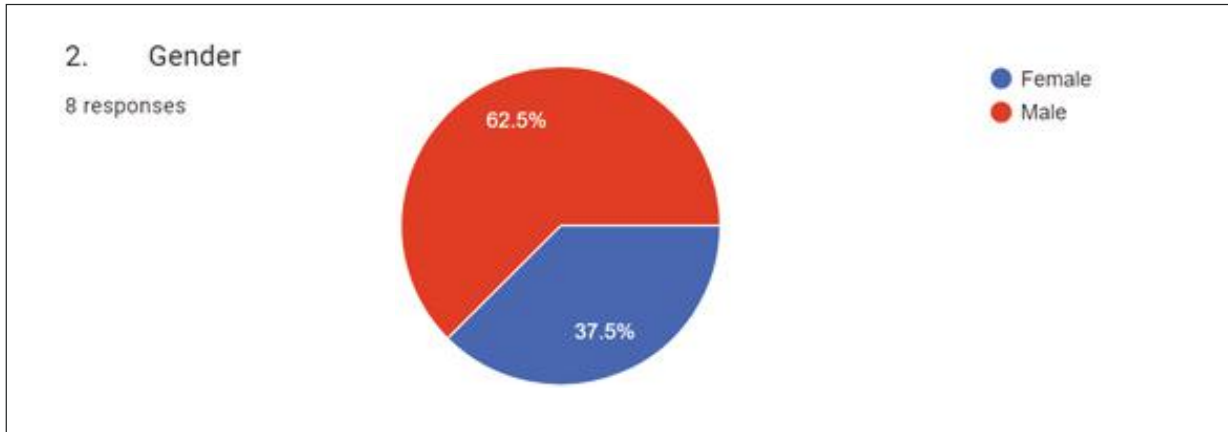
IRP Questionnaire Results.xlsx

	1. Age	2. Gender	3. How many years of experience working within your Logistics and Supply Chain organization or Industry?	4. What is your level within your organization or Industry?	5. Do you understand the concept of Digital Transformation?	6. Your organization currently faces problems and challenges of Operational inefficiency, inadequate visibility and low profitability.	7. There are risks and challenges to the implementation and adoption of digital transformation within your organizations supply chain.	8. What risks and/or challenges are impacting (or will impact) the implementation and adoption of digital transformation in your organizations' Supply Chain?	9. Digital transformation can improve Logistics and Supply Chain operational efficiency for your organization.	10. Digital transformation can improve revenue and profitability for your organization.	11. Do you believe that digital transformation can facilitate and improve visibility through your organizations' supply chain?	12. Digital Integration between infrastructures is a critical aspect of your organizations' logistics and supply chain operation.	13. What aspect of digital transformation is critical to improving operational efficiency and profitability of your organizations? Click all that apply.
1	Between 31 and 40	Male	11 - 15 years	Middle Level	Not sure	Agree	Agree	quick positive response to digital transformation	Agree	Agree	Agree	Agree	Robotics and Automation; Big Data and Analytics; Customer Data Platform
2	Between 41 and 50	Female	11 - 15 years	Middle Level	Yes	Agree	Agree	Culture.	Agree	Agree	Agree	Agree	Everything as a Service (XaaS); Big Data and Analytics; Customer Data Platform
3	Between 31 and 40	Male	11 - 15 years	Senior Level	Yes	Agree	Agree	Digital skilled personnel and fund Many employees need to upskill when it comes to digitalisation, and as such, some still want to work the analog way carry papers and giving unless reasonable paper copies should continue.	Agree	Agree	Agree	Agree	Low Code Platforms
4	Between 41 and 50	Male	16 years and above	Senior Level	Yes	Agree	Agree		Strongly agree	Strongly agree	Strongly agree	Agree	Everything as a Service (XaaS); Internet of Things; Big Data and Analytics; Low Code Platforms
5	Between 41 and 50	Male	16 years and above	Senior Level	Yes	Strongly agree	Strongly agree	Some people are adverse to digitalisation because of low skill set.	Agree	Strongly agree	Strongly agree	Agree	Everything as a Service (XaaS); Internet of Things; Big Data and Analytics; Block chain
6	Between 41 and 50	Male	16 years and above	Senior Level	Yes	Strongly agree	Strongly agree	Some people are adverse to digitalisation because of low skill set.	Agree	Strongly agree	Strongly agree	Agree	Everything as a Service (XaaS); Internet of Things; Big Data and Analytics; Block chain
7	50 and Above	Female	16 years and above	Senior Level	Yes	Strongly disagree	Strongly disagree		Agree	Strongly agree	Strongly agree	Agree	Customer Data Platform; Block chain
8	Between 41 and 50	Female	16 years and above	Senior Level	Yes	Neutral	Agree	Increased security risk, high budget required for digital transformation, culture mindset.	Strongly agree	Agree	Strongly agree	Agree	Big Data and Analytics; Customer Data Platform

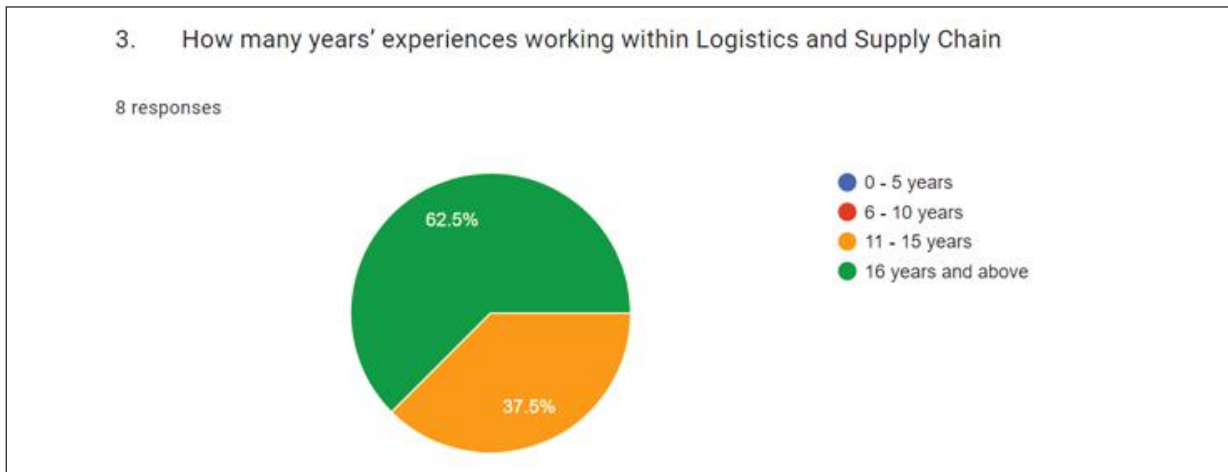
1. Questionnaire Results/findings



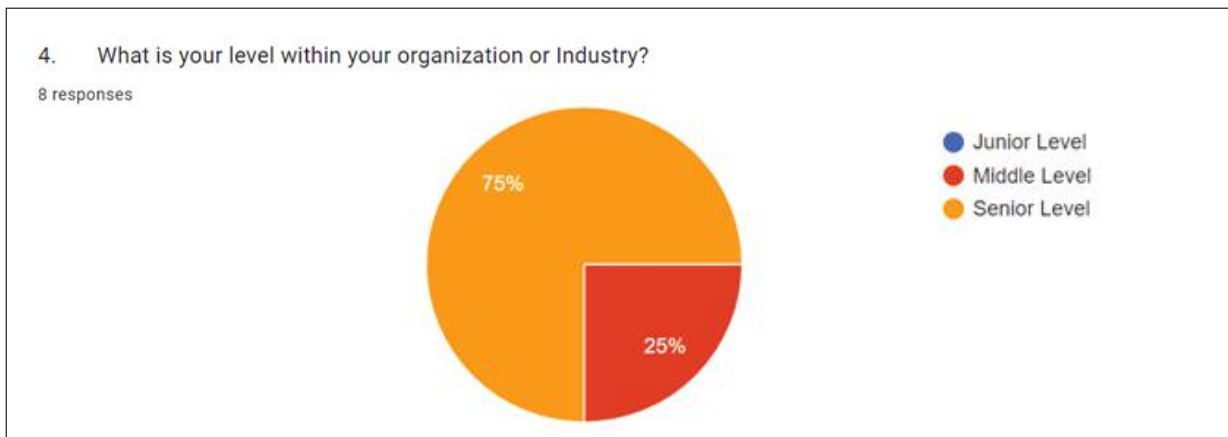
Of the 8 respondents, 5 (62.5%) were between the ages of 41 – 50, 2 (25%) were between the ages 31 – 40 and 1 (12.5%) was above 50 years of age. This shows that a higher percentage of respondents have reached middle age, have sufficient work experiences and are also approaching the twilight of their careers.



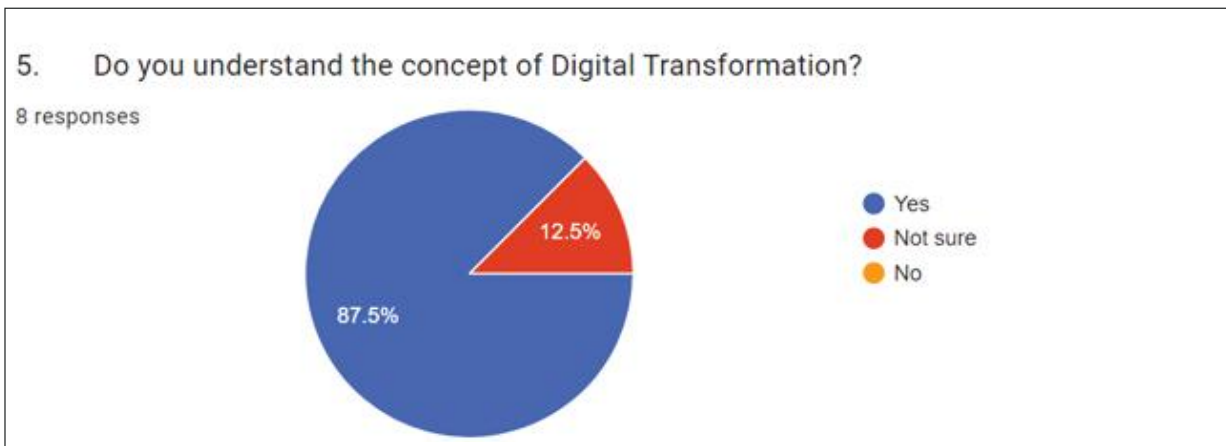
The results show that we had 5 respondents that were male and 3 respondents are female. This indicates that the logistics and supply chain industry in Nigeria is male dominated.



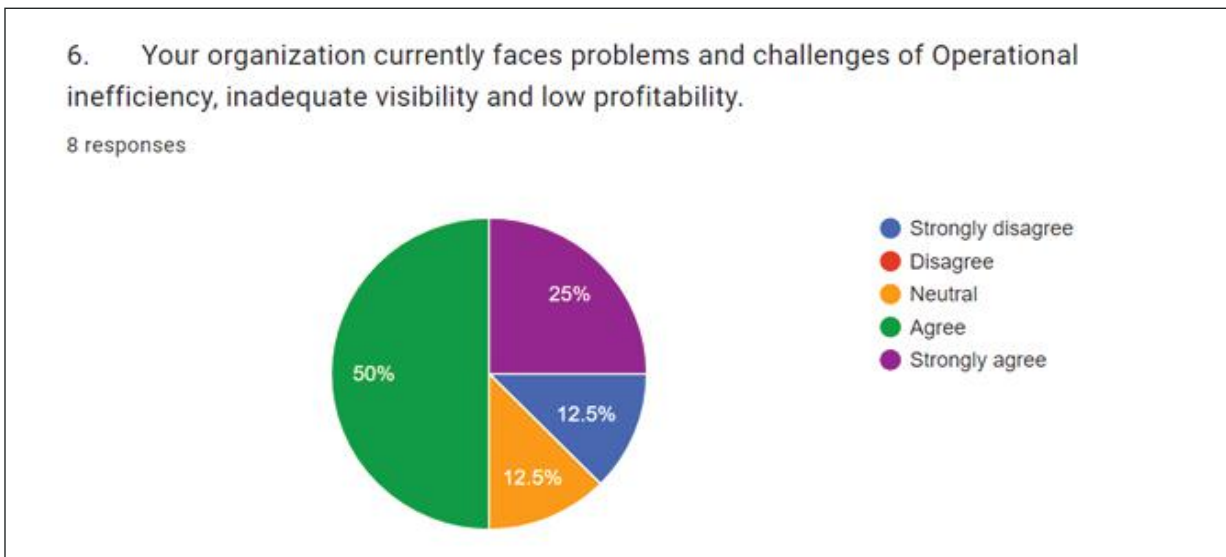
5 (62.5%) of the respondents have spent 16 years and above in the logistics and supply chain industry, while 3 (37.5%) have worked in the industry between 11 – 15 years.



6 (75%) of the respondents are senior level personnel within the industry while 2 (25%) are middle level personnel.



All of the respondents except 1(12.5%) understand the concept of digital transformation in the logistics and supply chain industry.



2 (25%) of the respondents strongly agree that their organizations currently face problems and challenges of operational inefficiency, inadequate visibility and low profitability, 4 (50%) agree, 1 (12.5%) are neutral, while 1(12.5%) strongly disagree.



2 (25%) of the respondents strongly agree that there are risks and challenges to the implementation of digital transformation within their organizations' supply chain, 5 (62.5%) agree, and 1(12.5%) strongly disagree.



2 (28.6%) of the respondents stated that “some people are averse to digitalization because of low skill set” as part of the risks and/or challenges impacting (or that will impact) the implementation and adoption of digital transformation in their organizations' supply chain, 1 (14.3%) gave “quick positive response to digital transformation”, 1 (14.3%) gave “Culture”, 1 (14.3%) hinted at “Digital skilled personnel and fund”, 1 (14.3%) hinted that “Many employees need to upskill when it comes to digitalization, and as such, some still want to work the analog way carry papers and giving endless reason why paper copies should continue”, and 1 (14.3%) gave “Increased security risk, high budget required for digital transformation, culture mindset”, while 1 (14.3%) abstained from giving a response to this question.



2(25%) of the respondents strongly agreed that digital transformation can improve logistics and supply chain operational efficiency for their organizations, while 6(75%) agree.

10. Digital transformation can improve revenue and profitability for your organization.

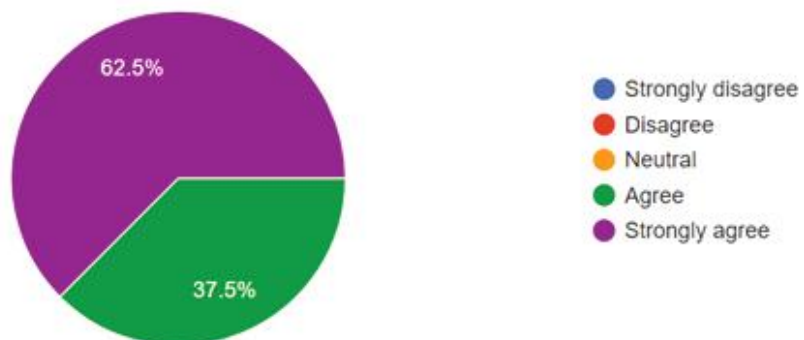
8 responses



4 (50%) of respondents strongly agree that digital transformation can improve revenue and profitability for their organizations, while 4 (50%) agree.

11. Do you believe that digital transformation can facilitate and improve visibility through your organizations' supply chain?

8 responses



5 (62.5%) of the respondents strongly agree that digital transformation can facilitate and improve visibility through their organizations, while 3 (37.5%) of the respondents agree.

12. Digital Integration between infrastructures is a critical aspect of your organizations' logistics and supply chain operation.

8 responses



All respondents 8 (100%) agree that digital integration between infrastructures is a critical aspect of their organizations' logistics and supply chain operation.



4 (50%) respondents chose “Everything as a Service (XaaS)” one of the key aspects of digital transformation which is critical to improving operational efficiency and profitability of their organizations. 1 (12.5%) respondent chose “Robotics and Automation”, 3 (37.5%) chose “Internet of Things”, 6 (75%) selected “Big Data and Analytics”, 4 (50%) chose “Customer Data Platform”, 3 (37.5%) chose “Block chain”, and 2 (25%) selected “Low Code Platforms”.

Chapter 6: ANALYSIS DISCUSSIONS AND

In order to analyze and carefully examine the data based on the closed questions in the administered survey questionnaire for in-depth insight and patterns, descriptive analysis will be employed as a research analytical technique. This will also help with data summarization and presentation in a useful way through statistical analysis to give data meaning (Rawat, 2021). Some of the statistical tools for descriptive analysis to be used are mean, median, mode, standard deviation, sample variance, Kurtosis and Skewness, range and correlation.

Also, the below stated is the basis of the findings and analysis of this research project:

- a. Due to the fact that the philosophy of this research is based upon constructivism and interpretivism, the qualitative research technique is adopted and used.
- b. The qualitative research approach is an unstructured, exploratory research technique that uses observation and interpretation to achieve a comprehensive understanding of human behavior, experience, attitudes, intentions, and motives (Surbhi, 2018).
- c. The qualitative research approach which is inductive in nature aims to understand phenomena in terms of concepts, thoughts and experiences.
- d. A small sample size which sufficiently represents the target case study population (Logistic and Supply chain industry in Nigeria) of study is most desirable.

e. The results from the survey questionnaire were coded to enable descriptive analytical tools to be used to analyze and interpret data.

f. Upon conclusion of the analysis, part of the discussion will include the reliability and validity of the data used for the research which will also speak to the conclusions and recommendations based on research outcome.

1. IRP results and analysis1.xlsx

1. Age	2. Gender	3. How many years of experience working within Logistics and Supply Chain?	4. What is your level of understanding of Digital Transformation within your organization or industry?	5. Do you understand the concept of Digital Transformation?	6. Your organization faces problems and challenges of Operational inefficiency, inadequate visibility and low profitability.	7. There are risks and challenges to the implementation and adoption of digital transformation within your organizations' supply chain.	8. What risks and/or challenges are impacting (or will impact) the implementation and adoption of digital transformation in your organizations' Supply Chain?	9. Digital transformation can improve Logistics and Supply Chain operational efficiency for your organization.	10. Digital transformation can improve revenue and profitability for your organization.	11. Do you believe that digital transformation can facilitate and improve visibility through your organizations' supply chain?	12. Digital integration between infrastructures is a critical aspect of your organizations' logistics and supply chain operation.	13. What aspect of digital transformation is critical to improving operational efficiency and profitability of your organization? Click all that apply.	
1	Between 31 and 40	Male	11 - 15 years	Middle Level	Not sure	Agree	Agree	quick positive response to digital transformation	Agree	Agree	Agree	Agree	Robotics and Automation;Big Data and Analytics;Customer Data Platform;Everything as a Service (XaaS);Big Data and Analytics;Customer Data Platform
2	Between 41 and 50	Female	11 - 15 years	Middle Level	Yes	Agree	Agree	Culture.	Agree	Agree	Agree	Agree	Customer Data Platform
3	Between 31 and 40	Male	11 - 15 years	Senior Level	Yes	Agree	Agree	Digital skilled personnel and find	Agree	Agree	Agree	Agree	Low Code Platforms
4	Between 41 and 50	Male	16 years and ab	Senior Level	Yes	Agree	Agree	Many employees need to upskill when it comes to digitalisation, and as such, some still want to work the analog way carry papers and giving endless reason why paper copies should continue.	Strongly agree	Strongly agree	Strongly agree	Agree	Everything as a Service (XaaS);Internet of Things;Big Data and Analytics;Low Code Platforms;Everything as a Service (XaaS);Internet of Things;Big Data and Analytics;Block chain
5	Between 41 and 50	Male	16 years and ab	Senior Level	Yes	Strongly agree	Strongly agree	Some people are adverse to digitalisation because of low skill set.	Agree	Strongly agree	Strongly agree	Agree	Everything as a Service (XaaS);Internet of Things;Big Data and Analytics;Block chain
6	Between 41 and 50	Male	16 years and ab	Senior Level	Yes	Strongly agree	Strongly agree	Some people are adverse to digitalisation because of low skill set.	Agree	Strongly agree	Strongly agree	Agree	Everything as a Service (XaaS);Internet of Things;Big Data and Analytics;Block chain
7	50 and Above	Female	16 years and ab	Senior Level	Yes	Strongly disagree	Strongly disagree		Agree	Strongly agree	Strongly agree	Agree	Customer Data Platform;Block chain
8	Between 41 and 50	Female	16 years and ab	Senior Level	Yes	Neutral	Agree	Increased security risk, high budget required for digital transformation, culture mindset.	Strongly agree	Agree	Strongly agree	Agree	Big Data and Analytics;Customer Data Platform

The results and the findings from the administration of the survey questionnaire is detailed in the above table. There were responses from 8 participants out of 9 survey questionnaires administered representing 88.9% response rate. 13 questions were posed containing both open ended and closed questions.

2.Coded Survey Questionnaire results for closed questions.

Q5	Q6	Q7	Q9	Q10	Q11	Q12
3	4	4	4	4	4	4
5	4	4	4	4	4	4
5	4	4	4	4	4	4
5	4	4	5	5	5	4
5	5	5	4	5	5	4
5	5	5	4	5	5	4
5	1	1	4	5	5	4
5	3	4	5	4	5	4

The closed questions in the questionnaire were coded to enable analysis with the highest figure allocated to the most desired response. 5 – Strongly agree, 4 – Agree, 3- Neutral, 2- Disagree,

1- Strongly Disagree. Also closed question with desired response of either Yes, No or Not sure was coded 5- yes, 3- Not sure, 1- No.

3. Survey Questionnaire results for Open ended questions.

We have 2 open ended questions in the survey questionnaire relating directly to the subject matter.

They are:

a. What risks and/or challenges are impacting (or will impact) the implementation and adoption of digital transformation in your organizations' Supply Chain?

b. What aspect of digital transformation is critical to improving operational efficiency and profitability of your organization? Click all that apply.

The results from these questions and their interpretation is stated below:

a. What risks and/or challenges are impacting (or will impact) the implementation and adoption of digital transformation in your organizations' Supply Chain?

Result and interpretation

% Response	Response
2 (28.6%)	Some people are averse to digitalization because of low skill set.
1 (14.3%)	Quick positive response to digital transformation.
1 (14.3%)	Culture.
1 (14.3%)	Digital skilled personnel and fund.
1 (14.3%)	Many employees need to upskill when it comes to digitalization, and as such, some still want to work the analog way carry papers and giving endless reason why paper copies should continue.
1 (14.3%)	Increased security risk, high budget required for digital transformation, culture mindset.
1 (14.3%)	Abstained from giving a response to this question.

This shows that the risks and challenges impacting (or that will impact) the implementation and adoption of digital transformation in Nigeria's logistics and supply chain is multifaceted, diverse and varied in almost equal measure. Some of these are within the control of the organizations e.g. skill and culture, while others are external and beyond the control of the organizations such as high security risk and cost of implementation. According to (Okonji, 2019) the low economic performance of the overall economy has reduced the economic power of organizations to make investments in required technology and as such 90% of Nigerian organizations were operating below the security poverty line, thereby placing them at substantial risk from cyber security threats and this negated the revolution that digital transformation promises.

b. What aspect of digital transformation is critical to improving operational efficiency and profitability of your organization? Click all that apply.

Result and interpretation

% Response	Response
4 (50%)	Everything as a Service (XaaS)
1 (12.5%)	Robotics and Automation
3 (37.5%)	Internet of Things
6 (75%)	Big Data and Analytics
4 (50%)	Customer Data Platform
3 (37.5%)	Block chain
2 (25%)	Low Code Platforms

The above stated shows that the respondents felt that Everything as a Service (XaaS), Robotics and Automation, Internet of Things, Big Data and Analytics, Customer Data Platform, Block chain technology and Low Code Platforms are much more critical to improving operational efficiency and profitability in Logistics and supply chain organizations in Nigeria. And other technology solutions like Artificial Intelligence (AI), Machine Learning, and Augmented Reality Cloud (AR) play little or no role and are not critical to improving operational efficiency and profitability. However, according to (Gardner, 2019), Artificial Intelligence (AI) has the potential to significantly shorten reporting times and accelerate data analysis as both the accuracy of the data analysis and the reporting speed are improved and this enhances operational efficiency as compared to when humans handle same task. Also, machine learning improves operational efficiency and business performance as it aids in the extraction of meaningful information from unstructured data and solving complex business issues involving a wealth of unstructured data that cannot be solved by more conventional methods like software engineering or human judgment (Tripathi, 2016)

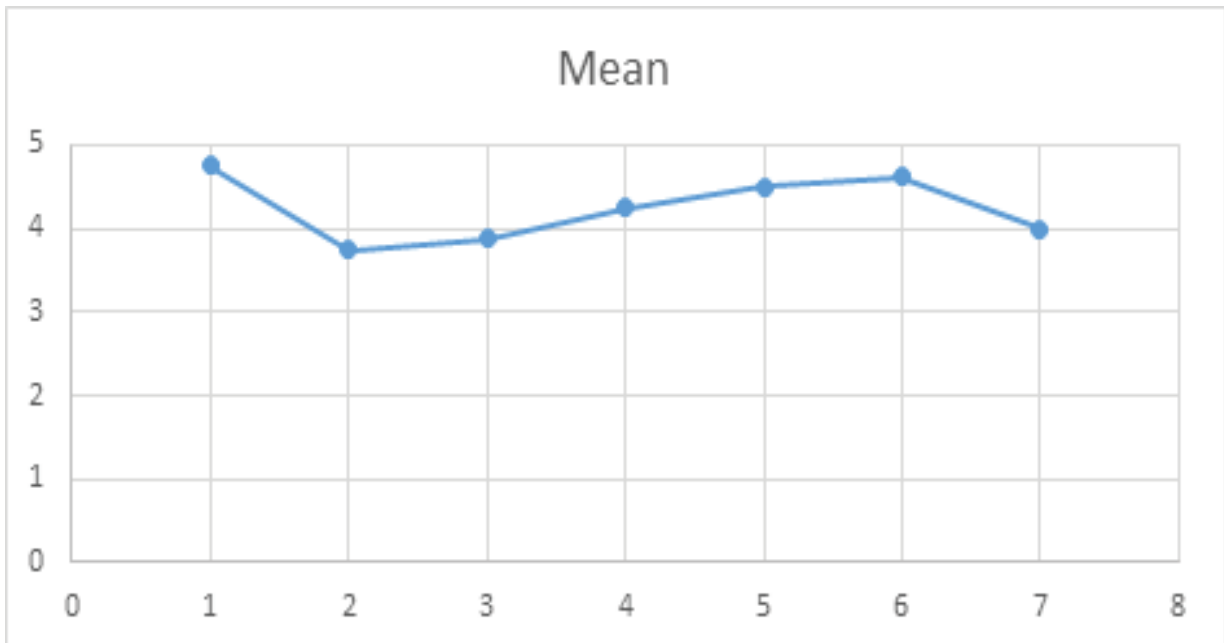
A benefit of Artificial Intelligence (AI) and machine learning in operations is that systems are being connected to customers, automation is being enabled to eliminate pointless manual operations, and fresh data is being promptly analyzed to find opportunities. In order to take advantage of these opportunities, further alter business processes, and modernize operations, organizations must continue to invest in the appropriate technologies (insidebigdata, 2022).

4.Descriptive Statistical Table for closed questions

	Q5	Q6	Q7	Q9	Q10	Q11	Q12
Mean	4.75	3.75	3.875	4.25	4.5	4.625	4
Standard Error	0.25	0.4531635	0.4406772	0.1636634	0.18898224	0.1829813	0
Median	5	4	4	4	4.5	5	4
Mode	5	4	4	4	4	5	4
Standard Deviation	0.7071068	1.2817399	1.2464235	0.46291	0.53452248	0.5175492	0
Sample Variance	0.5	1.6428571	1.5535714	0.2142857	0.28571429	0.2678571	0
Kurtosis	8	3.0275992	5.2604043	0	-2.8	-2.24	#DIV/0!
Skewness	-2.8284271	-1.560379	-2.056459	1.4401646	0	-0.6440612	#DIV/0!
Range	2	4	4	1	1	1	0
Minimum	3	1	1	4	4	4	4
Maximum	5	5	5	5	5	5	4
Sum	38	30	31	34	36	37	32
Count	8	8	8	8	8	8	8

a.Mean: Mean is the average of the responses given for each of the closed questions. This will show coded scores for each question so as to determine the center of the data distribution. By so doing we can trend the acceptability of the response for this questions asked. Here we will be calculating the mean using the data analysis tool on Microsoft Excel.

	Q5	Q6	Q7	Q9	Q10	Q11	Q12
Mean	4.75	3.75	3.875	4.25	4.5	4.625	4



Here we can see that the mean of all responses for each question lies between 3.75 and 4.65 which shows that all respondents are in agreement with all statements posited in the survey questionnaire.

b. Mode

	Q5	Q6	Q7	Q9	Q10	Q11	Q12	=MODE(C3:I3)
Mode	5	4	4	4	4	5	4	4

The mode is the most frequent value in set of/series of data. Using the data analysis tool on Microsoft excel, we are able to determine that the mode is 4 which implies that the most acceptable response to the statements posited in the questionnaire was “Agree”.

c. Standard Deviation

	Q5	Q6	Q7	Q9	Q10	Q11	Q12
Standard Deviation	0.707107	1.28174	1.246423	0.46291	0.534522	0.517549	0

The standard deviation measures how far or how close a given data set's values are to the mean or average. It illustrates the controversy and distribution of data surrounding the average and mean. A low standard deviation indicates that the data is close to the mean, whereas a large standard deviation indicates that the data is distributed over a wide range of values and distant from the mean. In this case, the standard deviation for each of the questions shows the data set variability from the mean for each question. The standard deviation of Q6 (1.28174) is farthest from the means hence data variability is highest while that of Q12 (0) is the lowest showing there is no variability from the mean and standard deviation is equal to mean.

d. Kurtosis and Skewness

Skewness is a metric used to assess the degree of symmetry or lack thereof in a distribution or set of data. The distribution curve will be skewed to the left if the skewness is negative and to the right if it is positive. It is symmetrical between 0 and -0.5. A moderate negative skew is defined as -0.5 to -1 and anything greater than or equal to -1 (\geq or $= -1$) is a severe high negative skew. A positive skew is defined as symmetrical between 0 and 0.5. Anything greater than or equal to 1 (\geq or $= 1$) is a strong high positive skew, and 0.5 to 1 is a moderate positive skew. Kurtosis gauges how heavy-tailed or light-tailed the data are in comparison to a normal distribution. In essence, it refers to the distribution curve's hump. Plytokurtic hump/tails are flat if the kurtosis is less than three (< 3), mesokurtic hump/tails are normal if it is between equal to three ($= 3$), and leptokurtic hump/tails have high peak if the kurtosis is greater than three.

	Q5	Q6	Q7	Q9	Q10	Q11	Q12	Interpretation
Kurtosis	8	3.027599	5.260404	0	-2.8	-2.24	#DIV/0!	Questions 5 and 7 have leptokurtics hump/tails as they are above 3; Question 6 is approximately 3 and as such carries a mesokurtics hump/tail while Q9, 10,11 are plytokurtic curves as they are below 3.
Skewness	2.82843	-1.56038	-2.05646	1.440165	0	0.64406	#DIV/0!	The curves for Q6 and 7 have a severe high negative skew, while that of Q5 and 9 have severe high positive skew. Q10 is symmetrical.

e. Correlation

The correlation method is used to gauge how closely two variables are related. Pearson's correlation, often known as Pearson's R, is the most popular correlation coefficient. In linear regression, it is frequently employed. In correlation, a strong positive association is indicated by a R value of 1, a strong negative relationship by a value of -1, and no relationship at all by a value of 0.

	Q5	Q6	Q7	Q9	Q10	Q11	Q12
Q5	1						
Q6	-0.07881	1					
Q7	-0.04052	0.961269	1				
Q9	0.218218	-0.12039	0.061898	1			
Q10	0.377964	0	-0.10721	0	1		
Q11	0.48795	-0.16151	-0.08305	0.447214	0.774597	1	
Q12	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	1

From the above analysis, we can deduce that

- a. There only strong/somewhat positive relationships between Q7 and Q6 and between Q11 and Q10.
- b. All other relationships weak and negative relationships between all other questions or even no relationship at all.

This is a testament to the fact that this research is not about measurement of variables but more about seeking to understand phenomena in terms of concepts, thoughts and experiences through observation and interpretation of human behavior, experience, attitudes, intentions, and motives. This is a limitation of using correlation coefficient analysis in qualitative research (Papadakis, 2023). (Papadakis, 2023) also stated that researchers must choose two or more variables they wish to explore the link between in order to perform a correlational research design in qualitative research. They would next need to gather information on those variables using techniques like document analysis, focus groups, and interviews. Following the collection of the data, researchers would need to analyze it to find trends and themes associated with the variables of interest. This can be accomplished using strategies like coding, memoing, or matrixing.

The purpose of the majority of qualitative research is to understand the meaning and experiences of the phenomena rather than establishing links between variables, hence it is important to note that qualitative correlational research is less common than other qualitative research designs.

5. Reliability and Validity of research data

Validity refers to the credibility and integrity of the research by assessing the extent to which the measurement tool actually measures what it claims or is intended to measure, whereas reliability refers to the degree to which a particular research method or tool is capable of producing consistent results from one test to the next (Joe O'Brian, 2018) (O'Brian, Orn, 2018).

The analysis of the reliability and validity of the data used will be based on:

- i. What the results of the questionnaire say and measure.

- ii. How the results are assessed in terms of consistency and reliability with existing concepts.

- iii. The reproducibility of the results

	Reliability	Validity
What the results of the questionnaire say and measure.	Under same condition and time construct, the results can be reproduced and as such is reliable.	The questionnaire was able to measure the objectives of the research and as such are valid.
How the results are assessed in terms of consistency and reliability with existing concepts.	The fact that the digital transformation status can change over time implies that overtime data may not be reliable. it is reliable as at time data was collected.	The result of the research data correspond with existing experiences on digital transformation implementation and as such data is valid.
The reproducibility of the results.	The result of the research can be reproduced and as such reliable within the time construct.	Validity is a given once reliability is assured.

Chapter 7: CONCLUSION AND RECOMMENDATIONS

Based on the findings, results, analysis and discussion thus far in the research, there has to be a validation that the below listed/stated research objectives have been met. The research objectives are:

- a. To identify key challenges and risks bedeviling the logistics and supply chain industry in Nigeria.
- b. To explore the use of digital transformation as a solution of the problems stated.

This is also predicated on the assumption and/or confirmation that the research questions reflected in the survey questionnaire was instrumental in ensuring that the research objectives have been met.

1. Conclusions

A summary of the conclusions based on research findings and analysis are:

- a. Vastly experienced industry professionals in Nigeria are of the opinion and agreement that the Logistics and supply chain industry is facing problems and challenges of operational inefficiency, low visibility and low profitability.
- b. The industry is also faced with risks and challenges in implementation and adoption of digital transformation due to factors like inadequate skill, funding, security and organizational culture.
- c. Digital transformation once implemented and adopted can improve operational efficiency, improve visibility and grow profitability for organizations in Nigeria.

d. Key areas of digital transformation that are critical to organizations in Nigeria include Everything as a Service (XaaS), Robotics and Automation, Internet of Things, Big data analytics, Customer Data platform, Block chain and Low code platforms.

2. Recommendations

For successful implementation and adoption of digital transformation within Nigeria's Logistics and Supply chain industry, business leaders have to be very pragmatic in:

- a. The expectations of ROI on digital transformation.

- b. Identifying gaps and challenges that actually and only require digital transformation.

- c. Understand the business processes to know where digital transformation fit in for optimization and efficiency.

- d. Creating an agile atmosphere for organizational mindset and cultural change.

- e. Ensuring that the right Key Performance indicator (KPI) are set and monitored.

These very important factors which can also be terms as the Digital Transformation strategy are required in ensuring the success of the organizations' supply chain which is hinged on agility, flexibility, resiliency and productivity. This Digital Transformation strategy is important because it is required to realign the entire business model while focusing on exemplary customer experience and also having a high value and outcome driven technological innovative capabilities.

It is important to note that innovation has to be at the core of the overall business strategy as this will drive technology disruption and digital transformation; and hence promote/enhance business sustainability through effective and efficient technology use to monitor the Macro and Micro business environment, drive sustainable business practices, anticipate demand, realign supply, and develop a "circular supply chain economy". A "circular supply chain economy" will ensure and guarantee supply where macro-economic and environmental factors impact all suppliers even where the organization has created multiple supply channels to guarantee supply.



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Appendices

Survey Questionnaire

IRP Survey Questionnaire.xlsx