

**THE IMPACT OF INFORMATION TECHNOLOGY (IT) ON SUPPLY CHAIN  
AGILITY :A CASE STUDY OF CENTURY BOTTLING COMPANY COCA-COLA**

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**UGANDA CHRISTIAN  
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**DECLARATION**

I **UMUTONI PATRICIA** declare that the work is authentically mine and to the best of my knowledge ,it contains no traces of plagiarism or any other unethical practices .The only work used that has already been published by other persons has been purely for reference purposes .

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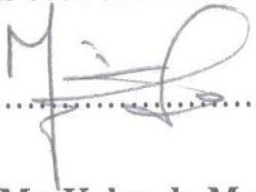
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**APPROVAL**

This paper has been submitted for examination with my approval.

Signature .....  .....

Date ..... 10<sup>th</sup> / 09 / 2024 .....

**Supervisor; Mr. Kabanda Martin**

## **DEDICATION**

I dedicate this research report to my beloved parents Mr. & Mrs. Mutsinzi who have tirelessly supported me financially and ethically for the entire time of this course and their endless efforts to see me educated. May the heavenly father bless them for their kindness and affection towards me.

I also thank my supervisor Mr. Kabanda Martin for the support throughout the research journey and not giving up on me but rather teaching me how to get better each time. Have a learnt a lot with him and this journey has been a success cause of him.

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## **ABSTRACT**

The dissertation aimed at finding out the impact of Information Technology (IT) on supply chain agility with a case study of Century Bottling Company (Coca-Cola). The study sought to achieve three objectives: to establish the contribution of technological infrastructure on supply chain agility in Century Bottling Company, to assess the contribution of digital solution on supply chain agility in Century Bottling Company and to examine the contribution of integration and connectivity on supply chain agility in Century Bottling Company. To achieve these objectives, a mixed methods research approach was adopted. Data was collected through a close-ended questionnaire and interviews with the different departments at Century Bottling Company. 60 returned the responses. 50 of which filled the questionnaires and 10 were interviewed. The response rate was 75% in this case. Krejcie and Morgan (1970), a rate of 50% and above is acceptable, this was regarded as a representative sample for subsequent studies. This research highlights IT as a critical enabler of agility in non-traditional supply chain contexts, emphasizing its role in enhancing operational effectiveness and humanitarian outcomes. Furthermore the study underscores the critical role of digital solutions in improving operational efficiencies and overall supply chain performance. The study highlights that organizations leveraging integrated supply chain solutions can achieve higher operational efficiency and adaptability, crucial for sustaining competitive advantage

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## **CHAPTER ONE**

### **1.0 Introduction**

This study is considering the impact of information technology (IT) on supply chain agility: a case of Century Bottling Company (Coca Cola). The study includes

background, problem statement, purpose, aims, research questions, justification, significance, and conceptual framework are all presented in this chapter.

### **1.1 Background of the Study**

Businesses today run on their ability to adjust to the demand of changing customer preferences, supply chain issues, and random new chances in an ever-evolving market. Supply chain agility is the term for this adaptability (Abdallah & Ayoub, 2020). Supply chain agility is the organizational capability to not just react to such trends quickly but also foresee them. The capacity to blend the latest technologies for visibility and responsiveness improvement, efficiency through the elimination of traditional processes together with enhanced partnerships with suppliers and business partners are the characteristics of agile supply chains (Gu et al., 2021). These virtually are very crucial advantages for companies thus they are the ways that permit businesses to get benefit from virgin markets and also mitigate the impacts of disruptions. With the current rate at which businesses are developing and becoming turbulent, supply chain agility is the business's fundamental element so they can stay competitive (Bai, 2023).

The revolutionary usage of information technology is required in order to gain agility within the supply chain. It provides an effective platform for integrated planning, valid execution throughout the network, and real-time information sharing. Various IT solutions, including ERP systems, SCM software, and progressive analytics platforms, allow companies to enhance the accuracy of forecasts made, thus optimizing inventory levels and smoothing logistical processes. Moreover, emerging technologies like blockchain and IoT add to supply chain visibility and traceability since a business can track the flow of goods to identify possible risks or bottlenecks. Setiawati et al. also add that companies successful in applying IT can get greater agility and reactivity against changes in the market environment.

This is also reflected in how collaboration between IT and supply chain agility takes place. Firstly, IT enables companies to have real data visibility in real time. This will help immediately facilitate the identification of a potential disruption, such as supplier shortages or a supposedly sudden demand raise. With such knowledge, a company can proactively adjust production plans, source another materials base,

or implement demand forecasting strategies in the market (Panigrahi et al., 2023). In the second way, IT facilitates integrated planning and collaboration. The result is the optimization of logistics networks, reduction in lead time, and timely delivery by sharing information across departments and with supply chain partners. Lastly, IT enables continuous improvement through data-driven decision-making. Analysis of historical data combined with performance metrics enables firms to identify areas of improvement and implement process optimizations that will help raise overall supply chain efficiency. In fact, the effect of IT on supply chain agility is clearly positive around the world. The leading companies in the developed regions of the United States control cultured IT solutions to achieve superior agility. For example, Amazon and Walmart make use of advanced analytics and ERP systems to optimize their inventory, forecast demand with highly superior accuracy, and respond rapidly to customer requirements. Similarly, European giants such as Volkswagen and Siemens use IT to optimize the structure of the logistics network, work effectively with the supplying agents, and fine-tune the lines of production. In Asian countries like Japan and Korea, IT automation and robotics are combined to smoothen production and give them greater responsiveness against altered market conditions. The above-mentioned instances depict that the adoption of IT has become a basis for supply chain agility in developed economies. However, while the developed regions have witnessed widespread IT adoption in supply chains, in the case of Africa, the picture remains different.

Above all, sub-Saharan Africa has poor infrastructure related to IT, a limited number of personnel trained in IT departments, and indirectly inadequate and uneven logistical networks. All these might question the implementation and efficiency of the IT solution. On the other hand, promising news is available: it is foreseen that countries like Kenya, Rwanda, and South Africa will keep on investing in IT infrastructure and digital knowledge programs. Moreover, mobile technology has become a recent game-changer. The high diffusion rates of mobile phones in Africa will enable firms to use the applications of mobiles to track and communicate real-time information in the supply chains, especially for agricultural perishable products. This is indicative of the immense possibility that

mobile technology holds for driving agility in the African supply chains. Uganda is an East African country that presents a case of the challenges and opportunities of improving supply chain agility through the adoption of information technology. The Century Bottling Company case is a minor case study of Coca-Cola Beverages Africa in this regard.

Despite the infrastructural limitations and logistical challenges evident in the region, Century Bottling Company has invested in IT solutions as a way to improve supply chain agility. The adoption of the ERP system, along with innovative technologies for real-time monitoring and collaboration platforms, has enhanced operational efficiency in the supply chain and made them responsive to market demand although challenges still continue (Watera et al., 2023). The case of Century Bottling Company illustrates how IT becomes a transformative factor in increasing supply chain agility. Strategic investment in technology can bridge the logistical gap and ensure operational excellence in even hostile environments.

## 1.2 Problem statement

Agility is a hazardous factor in the supply chain that enables organizations to act promptly to changes in the market, save on resources, and ensure high levels of customer satisfaction. For example, Oliveira-Dias et al. (2022) establish that evidence shows most supply chains, including that of Century Bottling Company, are stressed with agility. For instance, it has been revealed through a recent industry report that responsiveness had decreased by 15 percent due to the delays of delivery of items by suppliers and poor demand forecasting. Tukamuhabwa et al., 2023. The flexibility has also been affected; the time has increased to make the adjustment to production by 20 percent hence causing some opportunities to be missed on time. There are issues with visibility: Inventory inaccuracies increased by 25%, leading to stockouts and overstock situations. Efficiency metrics such as cost per unit and lead time decreased by 18% and 22%, respectively, which indicates supply inefficiencies. This might be the consequence of outdated IT systems, lack of integration, and poor data management. These issues, if not addressed, might amplify to further operational inefficiencies, loss of market shares, and lower profitability levels in the future Aziona 2024. In contrast, although there are significant volumes of researches related to supply chain management and IT integration, a research gap still prevails, particularly pertaining to how IT affects the agility of supply chains in beverage companies such as Century Bottling Company.

While previous studies by scholars like Bai 2023 and Dubey et al., 2021 have focused on manufacturing and retail sectors, there was least attention given to the unique set of challenges faced by the beverage industry. Further, while individual components of IT, such as ERP or SCM software, were explored by some scholars, the function of the full spectrum of IT solutions-from technological infrastructure and integration to all dimensions of supply chain agility-remains a rarely discovered area. The present study, therefore, tries to fill this gap by providing a critical overview of how information technology affects supply chain agility in organizations, such as the Century Bottling Company.

### **1.3 Purpose of the study**

The purpose of the study was to observe the impact of information technology (IT) on supply chain agility: a case of Century Bottling Company (Coca Cola).

### **1.4 Objectives of the study**

- i. To establish the contribution of technological infrastructure on supply chain agility in Century Bottling Company.
- ii. To assess the contribution of digital solutions on supply chain agility in Century Bottling Company.
- iii. To examine the contribution of integration and connectivity on supply chain agility in Century Bottling Company.

### **1.5 Research questions**

- i. What is the contribution of technological infrastructure on supply chain agility in Century Bottling Company?
- ii. What is the contribution of digital solutions on supply chain agility in Century Bottling Company?
- iii. What is the contribution of integration and connectivity on supply chain agility in Century Bottling Company?

### **1.6 Scope of the study**

The scope of the study covered three dimensions that is; content, geographical and time and these are discussed in detail below.

#### **1.6.1 Content scope**

This study specifically focused on; establishing the contribution of technological infrastructure on supply chain agility, assessing the contribution of digital solutions on supply chain agility, and examining the contribution of integration and connectivity on supply chain agility in Century Bottling Company.

#### **1.6.2 Geographical scope**

Geographically, this study was conducted in Century Bottling Company located on Plot 964, Namanve Industrial Area, Jinja road century bottling company 2990, Kampala Uganda Mukono, Kampala. Century Bottling Company is chosen in this

study because it exemplifies how robust information technology adoption can significantly enhance supply chain agility in the company.

### **1.6.3 Time scope**

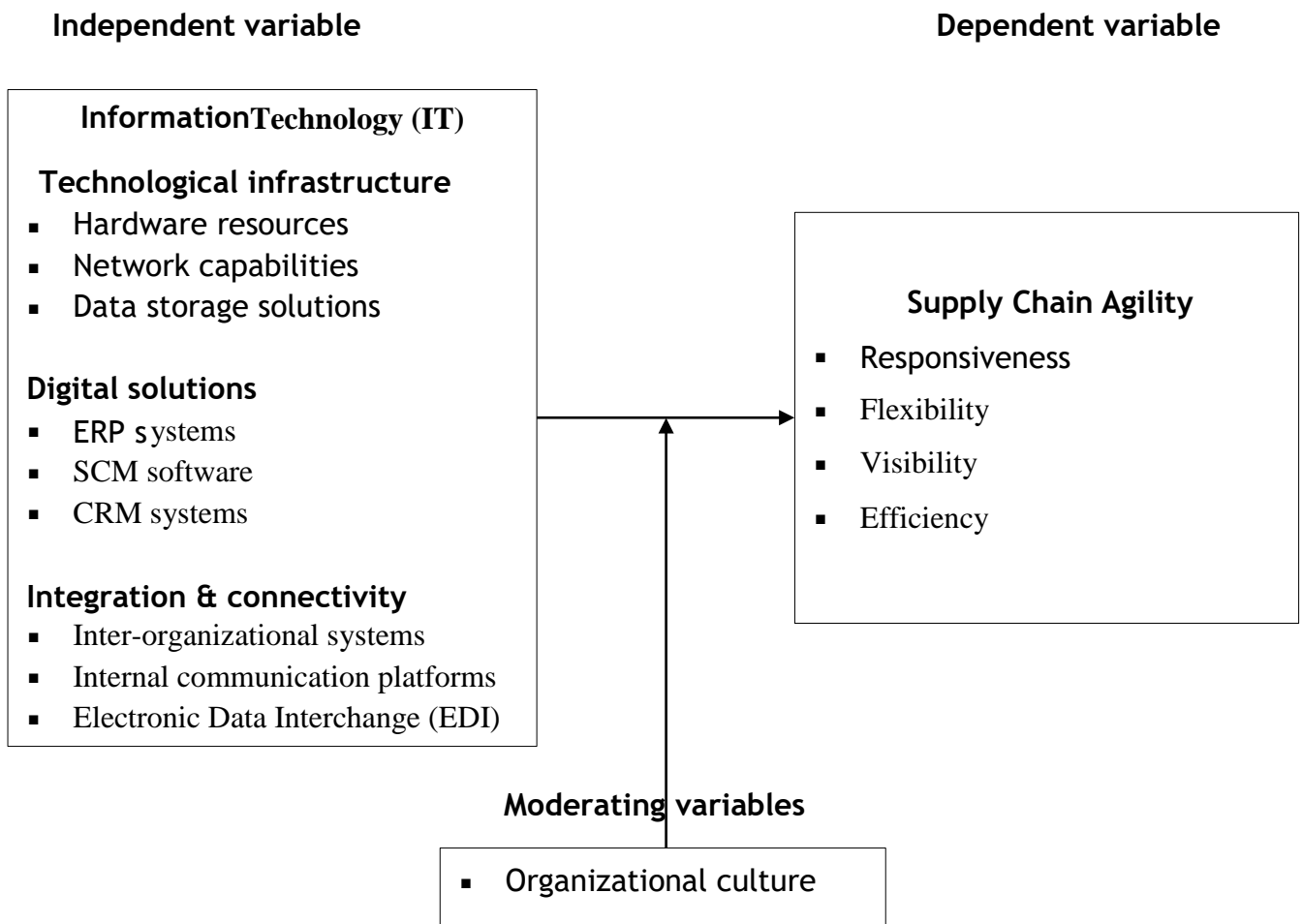
The study focused on scholarly material from the period 2019 to 2024.

### **1.7 Justification of the study**

The justification of this study lies in the pressing need for Century Bottling Company (Coca Cola) and similar beverage companies to optimize their supply chain agility through effective utilization of Information Technology (IT). As the beverage industry faces increasing competition and evolving consumer demands, the ability to swiftly adapt and respond to market dynamics becomes paramount for sustained success. By comprehensively examining the impact of IT on supply chain agility, this study aims to provide valuable insights and actionable recommendations that can empower companies like Century Bottling Company to enhance their operational efficiency, improve customer satisfaction, and maintain a competitive edge in the market landscape.

## 1.8 Conceptual framework

Figure 1: Conceptual Framework



**Source:** Adopted from, Fathollahi-Fard et al. (2020) and modified by the researcher (2024)

The conceptual framework for this study examines the impact of Information Technology (IT) on supply chain agility, focusing on Century Bottling Company (Coca Cola). The independent variable, IT, is explored through three dimensions: Technological Infrastructure (hardware resources, network capabilities, data storage solutions), Digital Solutions (ERP systems, SCM software, CRM systems), and Integration & Connectivity (inter-organizational systems, internal communication platforms, Electronic Data Interchange). The dependent variable, Supply Chain Agility, includes responsiveness, flexibility, visibility, and efficiency. Furthermore, the framework considers the controlling effects of organizational culture on the relationship between IT and supply chain agility.

### **1.9 Significance of the study**

The study was helpful to Century Bottling Company (Coca Cola) by providing actionable insights into how Information Technology (IT) can be leveraged to improve supply chain agility. By performing the findings of this study, the company improved operational efficiency, reduced costs, and better respond to changing market demands, ultimately strengthening its competitive position in the beverage industry.

The study was valuable to the broader beverage industry, offering insights into best practices for integrating IT into supply chain management to enhance agility. Companies operating in similar sectors can learn from the experiences and strategies of Century Bottling Company, enabling them to optimize their own supply chain operations and adapt to evolving market conditions more effectively.

The study was also beneficial to future researchers and academicians by providing a comprehensive analysis of the relationship between IT and supply chain agility in the context of the beverage industry. It served as a foundation for further research and exploration into this topic, stimulating academic discourse and contributing to the advancement of knowledge in the field of supply chain management and IT integration.

## **CHAPTER TWO**

### **LITERATURE REVIEW**

#### **2.0 Introduction**

This chapter will review the scholarly materials put forward by several personalities on the impact of contract management on project conclusion in the local government as well as critically examining the deviations in the explanations to find out the research gap in the study variables. Literature will be reviewed objectively by starting with definition of a concept followed by reviewing of objectives. Sources like newspaper articles, magazines, encyclopedia and books related to the people will be used.

#### **2.1 Concept of Information Technology**

Information technology refers to the use of computers, software, networks, and other digital tools in storing, retrieving, transmitting, and manipulating data for various uses within organizations. IT, in the view of Abdallah & Ayoub (2020), encompasses a wide variety of technologies that help an organization accelerate its processes, enhance its communications, and make better decisions. It includes technologies like ERP systems, CRM software, cloud computing, and advanced analytics. IT provides the ability to automate processes, integrate business functions, and facilitates access to important information in real time, thereby optimizing efficiency and enabling strategic actions. Aziona, 2024, draws on the role of emerging technologies, including blockchain, in changing supply chain operations. Blockchain is a kind of decentralized digital ledger that ensures data integrity, transparency, and traceability in the supply chain network.

On the other side, Dubey et al. (2021) have specified that IT arrangement and collaboration are the keystone for real IT management inside the organizational environment. Alignment of IT involves a deliberate incorporation of information technology into the business strategy with the aim of realizing organizational objectives and developing the competitive advantage being sought. Collaborative information technology situations ensure that teams from different functional areas can report to each other in a proper flow of knowledge and synergy that bestows innovation and responsiveness. The work of Gu et al. (2021) further expands the

influence of information technology by setting out to investigate the role it plays in enhancing supply chain resilience and performance. IT investments offer the organization the potential to establish agile supply chains responsive both to disruptions and changes that occur in the marketplace. The use of IT capabilities, such as critical analytics and the supply chain management system, can be applied by firms to optimize overall inventory levels, reduce risks, and enhance the efficiency of the firm.

Jafari et al. (2023) have discussed the strategic role of BI in leveraging IT capabilities for competitive advantage. BI is the application of information analytics techniques and tools to turn raw data into useful insights for informed decisions. IT-enabled BI systems integrate various information and provide real-time data to executives and managers concerning market drifts, customers' interests, and effective performance. This will help organizations predict the demand, enhance resource allocation, and delight their customers, hence driving IT in terms of strategic business outcomes through insights provided by data-driven decisions. Further, the work of Setiawati et al. (2022) contributes to how IT is transforming organizational agility and innovation. Through involvement in IT infrastructure and digital capabilities, it would lead to increased responsiveness to marketplace variations, reduction of product development cycles, and the development of a continuous improvement/adaptation culture.

## **2.2 Concept of Supply Chain Agility**

SCA refers to the capability of an organization to respond swiftly and effectively to changes in the marketplace, customer demands, or externally caused disruptions while continuing to ensure operational efficiency and cost-effectiveness of operations. Gu et al. (2021) add that SCA places firms in a position where they can always stay ahead of any change and alter their course before damage is caused, ensuring responsiveness and elasticity at every node of the supply chain network. Agility is possible by taking advantage of the available information technology capabilities that enhance prominence, collaboration, and speed of decision making. For example, real-time data analytics, cloud computing, and supply chain management systems enable an organization to change quickly in production

schedules, inventory levels, and ways of logistics with the aim of satisfying dynamic customer expectations and taking advantage of evolving market opportunities, hence competitively advantageous.

As argued by Dubey et al. (2021), SCA is dependent not only upon IT infrastructure but also on effective information alignment and collaboration among the supply chain partners. These elements nurture a sensitive and interlinked supply chain environment that's responsive to any sudden disruption or change in the market. With the help of information-sharing IT systems, it will be able to coordinate more than one supply chain for risk mitigation and resource optimization. It enhances bounciness and agility in the supply chain with collaboration and hence enables firms to continue operational activities with customer satisfaction amidst unpredictability and hesitation.

Jafari et al. (2023) reiterated that BI may facilitate SCA by providing integration among data sources and facilitating in-depth analysis. The tools of BI make it easy to analyze the huge volume of data to help an organization reach valuable conclusions from the data to inform decision-making and planning strategies. It does this by integrating BI into the supply chain process, whereby a firm may have increased demand forecasting, optimization of inventories, and smoothing of operational workflows. This data-driven approach not only improves operational efficiencies but also enables adaptive replies toward constantly changing market conditions and customer preferences, strengthening the concept of SCA as the strategic authoritative entity to maintain sustainable competitive advantage in dynamic business environments.

### **2.3 Contribution of technological infrastructure on supply chain agility.**

Abdallah & Ayoub (2020), in their study, addressed the role of IT drivers in enhancing supply chain agility and its implications for market performance. This research underlines the fact that IT integration into supply chains really boosts their agility due to enabling real-time information sharing and decision-making processes. Moreover, it will also enable companies to be more responsive to customers'

changing demands and markets, which in turn increases responsiveness in the overall supply chain and customer satisfaction. The results indicate that investment in IT infrastructure and the association with operational agility is critical; hence, IT underlines a major enabler in adaptive supply chain strategies in dynamic business environments.

Other studies, such as one conducted by Aziona, 2024 on blockchain technology adoption and its effects on the efficiency of the supply chain in Uganda. The agility of the supply chain would, therefore, be enhanced by blockchain in improving the transparency, traceability, and security of transactions throughout the supply network. In facilitating real-time views into supply chains with integrity of data across all stages, blockchain lowers the transaction costs, which saves against risks related to asymmetry in information and 'greases' the process of supply chains. Agility enabled through the technological advancement contributes to speed in decision-making and makes the supply chain operations responsive, hence making the supply chains efficient and resilient.

Dubey et al. (2021) contribute to this body of literature through their analysis of the role of information alignment and collaboration as complements to humanitarian supply chain agility. This study underlines the importance of information technology in fostering agile responses to humanitarian crises. It would help organizations be more agile in coordinating relief efforts, managing resource allocation, and providing timely responses in disaster situations by including IT systems that support data sharing and collaboration among humanitarian actors. The next research underlines IT as a key enabler of agility within the non-tradition supply chain context and brings focus to operational effectiveness and humanitarian outcomes.

Gu et al. (2021) explore the influence of information technology use on supply chain resilience and performance from an ambidextrous perspective. The findings revealed that IT capability enhances not only supply chain agility by supporting the real-time processing and analysis of data but also resilience through its impact on enhancing the capabilities of risk management and adaptation. IT can be used both for exploitation-blackdot, that is, enhancing present operations-and exploration-white dot, that is, exploiting new opportunities-which will create a balance in the

realms of agility and resilience, leading to improved overall supply chain performance and a sustained competitive advantage in turbulent markets.

Jafari et al. (2023) investigate how business intelligence influences the performance of a supply chain in relation to integration and agility. Their mixed-method approach developed an overall sense of how BI enables data integration for supply chain functions, thus facilitating proactive decision-making and strategic agility. Organizations use BI capabilities to anticipate market fluctuations toward the optimization of resources and to enhance supply chain agility to meet the dynamic customer demands. This study points to the transformative role that BI plays in augmenting supply chain capabilities and improving general business performance through improved agility.

Kyagante et al. (2024) discuss the mediating role of information integration in relation to IT capabilities and supply chain resilience among Ugandan agro-food processing firms. Their findings present that solid IT infrastructure enhances information integration within the supply chain partners themselves and fosters resilience by developing adaptive responses toward disruptions and uncertainties. More precisely, IT capabilities are seen helping to enhance information visibility and communication structures for agile supply chain practices that foster continuity and operability within agro-food supply chains.

#### **2.4 Contribution of digital solutions on supply chain agility**

Oliveira-Dias et al. (2022) have identified the interlink between IT and lean and agile supply chain strategies. Indeed, digital solutions are the backbone of supply chain agility and tend to take full benefits from real-time data sharing and analytics. In addition, this will offer the ability of an organization to change production schedules, better control the inventory, and swiftly react to the fluctuation in customers' demand. The integration of IT systems with lean principles will, therefore, enable firms to smoothen their operations and enhance the overall responsiveness of the supply chain toward achieving a competitive advantage in dynamic market environments.

Panigrahi et al. (2023) looks at the impact of supply chain agility on operational performance, using a Partial Least Squares Structural Equation Modeling approach. These findings suggest that digital technologies, such as advanced analytics and cloud computing, significantly enhance supply chain agility by making timely and accurate information available for decision-makers. Hence, proactive decision-making with reduced lead time and competence in meeting changing customer expectations become possible. This study underlined the important role of digital solutions in improving operational efficiencies and general performance of the supply chain.

The study by Setiawati et al. (2022) reviews the literature in terms of the role of information technology in business agility. The authors have mentioned that digital solutions, like ERP systems and IoT-enabled devices, facilitate smooth information flow across nodes in the supply chain. It enables agile practices in supply chains through the monitoring of inventory levels, production processes, and distribution networks in real time. This will enable the organization to operate with greater flexibility, adaptability, and responsiveness-features necessary to cope with turbulent market conditions-by better leveraging IT capabilities.

Watera et al. (2023) investigates the distribution system of antiretrovirals in Uganda and discusses how information technology integration mediates sourcing flexibility for supply chain agility. The adoption of digital solutions enhances supply chain visibility and coordination among health providers for on-time delivery of medications to patients across regions. This case provides evidence of digitalization improving the supply chain for resilience by reducing the disruptiveness of supplies and responsiveness to healthcare demands to ensure better outcomes for the patient and operational efficiency.

Maemunah & Cuaca, 2021, present the influence that digital solutions have on the agility of supply chains within medical device organizations during the COVID-19 pandemic. They observe that when organizations have more developed IT infrastructures with adequate digital capabilities, they are able to make agile changes to supply chains in response to the sudden surge in demand for medical supplies.

Examples are digital solutions such as predictive analytics and AI-driven forecasting

that would enable proactive risk management and scenario planning in pursuit of agile responses in the context of disruptions and market uncertainties.

Firmansyah & Siagian (2022) investigate how sharing information influences the performance of the supply chain with respect to such features of suppliers as quality management, agility, and innovation. It is argued that digital platforms promote effective communication and coordination among supply chain partners, thus promoting their innovativeness and increasing the supply chain's agility. This can be done by applying digital solutions for managing supplier relationships and developing products together in order to cut time-to-market, enhance product quality, and generally increase the flexibility of the supply chain.

In turn, Cherian et al. (2023) probe into how supply chain resilience, IT capability, and agility influence cost and delivery performance in Indian construction supply chains. Their study underscores the role of digital solutions, including BIM and RFID technology, in enhancing supply chain visibility and operational efficiency. The ability to gain superior insights from these technologies enables construction firms to plan a project, manage material resources, and coordinate logistical functions more effectively at a superior level related to cost efficiency and timely project completion

## **2.5 Contribution of integration and connectivity on supply chain agility**

Setiawati et al. (2022) also express how IT capabilities promote business agility through integration. They mention that IT capabilities provided by things such as ERP systems and real-time data analytics enable smooth integrations across nodes of supply chains. This in turn enhances the agility of the supply chain by enabling them to respond to changes in demand and supply conditions in record time. The integrated IT systems will enable organizations, through shared information and collaboration among their stakeholders, to facilitate business processes and enhance the responsiveness of the whole supply chain, thereby inducing competitive advantages in the dynamic markets.

Another study was conducted by Shukor et al. (2021) to investigate the influence of supply chain integration on agility and organizational flexibility within the setting of manufacturing companies. Their findings indicate that effective integration of supply chain processes and technologies of Radio Frequency Identification and the Internet of Things heightens the visibility and coordination of the whole supply chain network. That would mean a situation where, for example, a company can track and have real-time visibility of the levels of inventory, status of production, and the time for delivery, hence make it responsive to customers' demands and reduce the lead times. The study establishes that the integrated supply chain solutions ensure the organization acquires operational efficiency and adaptability that is crucial for sustaining the organizational competitive advantage.

Dubey et al. (2021) discuss the complementing abilities of humanitarian supply chains through information alignment and collaboration as supply chain agility enablers. They stress that, with appropriate integrated information systems and collaborative platforms, humanitarian organizations coordinate relief operations during crises. This will have the impact of allowing such organizations to optimize their logistics operations by providing a platform on which they can share, in real time, inventory levels, resource availability, and demand forecasts for quick responses in humanitarian emergencies.

The study underlines the essence of integration and connectivity in accelerating agility within specialized contexts of supply chains. Muafi & Sulistio 2022 explore the connection between green intellectual capital, supply chain integration, digital supply chain, agility, and business performance. They further contend that integration of sustainability into supply chain operations increases agility since the latter acts to develop resource efficiency and environmental sustainability. With integrated platforms and digital supply chain solutions, organizations can optimize the resource allocation further, minimizing carbon footprints and increasing the flexibility in supply chains. It will also integrate all of the positive impacts regarding operational agility and integrate the supply chain practices towards the attainment of sustainability goals for an overall business performance and increased stakeholder value.

Jafari et al. (2023) conduct an integrated analysis of both qualitative and quantitative tests on the consequences of business intelligence on the performance of the supply chain with regard to integration and agility. They found that the BI tools enable organizations to integrate a wide-ranging data derived from a myriad of sources and gain actionable insights helping them enhance the agility of the supply chain. Accordingly, it would make more sense to use BI by firms in demand forecasting, risk assessment, and performance monitoring to ensure proper inventory management, reduce supply chain disruptions, and improve the ability to respond to changed market conditions. This study highlights the fact that integration facilitated by BI leads towards agile decision-making processes, which is crucial for achieving a competitive advantage in dynamic business settings.

Aunyawong et al. (2020) explore supply chain BI as a mediating variable influencing the relationship between integration and supply chain agility. They also indicate that BI systems support real-time data analysis and decision support, which in turn enable organizations to integrate information across supply chain functions. This type of integration enhances their ability to be agile through rapid responses to shifting market conditions, customer preference changes, or operational interruptions. By leveraging the predictive analytics and scenario planning capabilities of the BI for firms, the resilience of the supply chain and responsiveness will be enhanced. As such, the overall performance of the supply chain and customer satisfaction will be improved.

## **2.6 Summary and literature gap**

The review of the literature above has established the role of IT and digital solutions in enhancing supply chain agility across diverse sectors. Most the reviewed studies emphasize that IT contributes towards real-time data integration, collaboration, and capabilities for decision-making that are essentially required for meeting changing market dynamics and disruptions. Key enablers are blockchain, BI, and digital supply chain solutions for enhanced visibility, responsiveness, and operational efficiency. With such breadth of research, there is still a major gap in understanding how such IT-driven capabilities particularly impact project

completion within local government settings. Most available studies focus on commercial sectors or generalized supply chain contexts and lack specific insights into the unique challenges and opportunities faced by manufacturing companies in attaining agility through IT integration. This would fill an existing gap, which would be highly useful in bringing about an improvement in project management practices and results in government settings.

## **CHAPTER THREE**

### **RESEARCH METHODOLOGY**

#### **3.0 Introduction**

This chapter presents the methodology that was used in conducting the research. It described how this study was conducted. It includes the study design, study population and the sample size. It also describes the sampling procedure definition of variables, research instruments, data analysis and management, ethical considerations, and limitations of the study.

### **3.1 Research Design**

According to the definition by Bloomfield & Fisher, 2019, research design entails organizing the approach to performing research. This study will adopt a cross-sectional survey research design to collect data from respondents of the representative population at a particular point in time without repetition. The design will be adopted since it takes less time to complete according to Spector, 2019. It will also be applied as it will allow the researcher to collect data relating to information acquired on a specific point in time. The subjects in the data collection population will vary in terms of variables, or characteristics and attributes. Moreover, using a cross-sectional research design, the research findings will help substitute assumptions with hard data and facts regarding the specific variables under study (Patrik & Ugo, 2019).

It also used a mixed-method approach in combining the use of quantitative and qualitative research methods. A quantitative research study was done using questionnaires on the employees in the various departments in Century Bottling Company. Qualitative study was conducted through interviews with the top management of Century Bottling Company, such as a managing director, procurement manager, IT manager, logistics manager, and supply chain manager, who participated in the study as key informants so that a comprehensive analysis of the subject could be obtained; these were also considered as key informants because they possess relevant expertise related to the subject being studied. The quantitative approach was adopted with the purpose of analyzing the impact of information technology on supply chain agility at Century Bottling Company, commonly known as Coca Cola.

### **3.2 Area of the study**

The study was conducted in Century Bottling Company located on Plot 964, Namanve Industrial Area, Jinja road century bottling company 2990, Kampala Uganda Mukono, Kampala. Century Bottling Company is chosen in this study because it exemplifies how robust information technology adoption can significantly enhance supply chain agility in the company.

### 3.3 Study population

Trochim (2006) defines population as the group in which a researcher wants to pick a sample from in order to make generalizations. The study population included all employees and senior staff members of Century Bottling Company (CBC). According to human resource management of CBC records of 2023, there are 100 workers at the headquarters and this number will be the source of the sample size that will help the researcher to get the required data.

### 3.4 Sampling procedure and sample size

According to Katamba & Nsubuga (2014) sample size is the portion or subset of the total population. The sample size will be determined by the sample calculation formula by Taro Yamane's formula as follows;

$$n = \frac{N}{1 + N(e)^2}$$

“n” is sample size, “N” is population, “e” is error (0.05) or level of confidence 95%

“N” (population) = 100 employees of Century Bottling Company (Coca Cola)

$$n = \frac{100}{1 + 100(0.05)^2}$$

$$n = \frac{100}{1 + 100(0.0025)}$$

$$n = \frac{100}{1 + 0.25}$$

$$n = \frac{100}{1.25}$$

**n = 80** selected employees of Century Bottling Company Ltd in the different departments

Therefore from the table above, the sample size is 80 respondents got from a total population of 100 employees working in different departments in Century Bottling Company.

Furthermore, the top management of Century Bottling Company specifically 10 respondents were included in the study as the key informants for qualitative data.

**Table 1: Target Population, Size and Selection**

Category of Respondents	Population Size	Sample size	Sampling Techniques
Employees of CBC	100	70	Stratified sampling
Managing director	3	2	Purposive sampling
Procurement manager	3	2	Purposive sampling
IT manager	3	2	Purposive sampling
Logistics manager	3	2	Purposive sampling
Supply chain manager	3	2	Purposive sampling
<b>Total</b>	<b>115</b>	<b>80</b>	

*Source: Century Bottling Company (2024)*

### 3.5 Sampling techniques and methods

The study used stratified and purposive sampling methods. The stratified sampling method was used to select the respondents, who are employees from the different departments in Century Bottling Company. In this stratified random sampling, the population is divided into distinct subgroups or strata that bear alike characteristics and then selects a sample proportional in size to that population. This method ensures that each subgroup is well represented in the sample, which increases the accuracy and reliability of the results to be obtained by the study. In this case, the employees from the various departments in Century Bottling Company were stratified into groups according to their respective departmental sizes. A number of employees that is proportional to the size of each stratum was then randomly selected. Stratified random sampling is used to ensure that the sample represents most of the diverse departments that exist within each organization, thereby obtaining a thorough understanding of e-procurement and supply chain management.

In contrast, in the case of top management, purposive sampling is made. In purposive sampling, which is a non-probability sample method, participants are selected based

on characteristics or criteria important to the research. For example, in this study, the managing director and board of directors were targeted for their specialized knowledge or expertise in integrating IT into the supply chain toward achieving supply chain agility. These top management officials were selected through a purposive sampling method in order to gain detailed information with depth that is relevant to the research objectives. This method was adopted to ensure that data collected is rich, relevant, and directly applicable to the focus of the study: the relationship between information technology and supply chain agility.

### **3.6 Sources of data**

**Primary source:** Primary data are always most relevant in any area of research because they are facts concerning findings of an experiment or observation. From the field, primary data were obtained since selected respondents were personally interviewed and given self-administered questionnaires in order to obtain their opinions. The primary data helped the researcher in the collection of information for specific purposes of his research work. The actual data will be collected by the researcher himself with the use of questionnaires and interview guides.

**Secondary source:** Secondary data can be defined as handling, collecting, and possibly processing data by people other than the researcher in question. For the purposes of a historical research project, secondary sources are generally scholarly books and articles. This source was used to collect data from already written literature for example e-books, journals, published articles and periodicals. Documentary resources are classified in order to facilitate the data collection and textual analysis (Mubazi 2008).

### **3.7 Data collection methods**

The study used questionnaire survey and interviews as the data collection methods. These data collection methods elicited information on IT and supply chain agility.

### **3.7.1 Questionnaire Survey**

According to Amin (2005), a survey can be defined as a self-report investigation used in the collection of information about variables of interest. In this present study, a questionnaire survey was employed to collect quantitative data on e-procurement and supply chain management in CBC with the selected employees of CBC. This questionnaire contains structured items that are intended to elicit responses on the objectives of the study. This method of survey was used because it is an efficient way of collecting large-scale data, and indeed, it has enabled the researchers to quantify trends, correlations, and patterns associated with e-procurement and supply chain management.

### **3.7.2 Interviews**

According to Desncombe (2008), interviews are open questions often administered to key informants to give them wide latitude to talk about the subject. The interviews complimented and triangulate the information gathered from respondents and the available documents. This was intended to elicit a wide view on the subject. Interviews will be both face-to-face and telephone interviews. These will contain both structured and semi structured questions. Interviews shall be adopted because they have the advantage of ensuring probing for more information, clarification, and capturing facial expressions of interviewees. Secondly, they equally provide an opportunity to the researcher to revisit some of the issues that have been an oversight in other instruments and yet are considered vital for the study.

## **3.8 Data collection instruments**

### **3.8.1 Questionnaires**

The forms consisted of closed-ended substances accompanied by a list of possible substitutes from which respondents were requested to select the answers that best describe their opinion about the problem of study and state of affairs, Mugenda and Mugenda 2005. The survey was homogeneous and rigid, permitting no flexibility and answers were to items set in the questionnaire. This facilitates recruiting validity and control of the extraneous variables. Information on the

subject was collected using a structured questionnaire covering sections as per study variables. It was directed to the respondents. It had a five-point Likert scale with answer choices such as, (5) strongly Agree, (4) Agree, (3) Not sure, (2) Disagree, (1) Strongly Disagree. The format was an open-ended Likert because the respondents have a diversity of responses for choice, and the format also makes it easy to arrange the data obtained for comparison purposes. This survey was used to gather information from selected 60 employees in different departments of Century Bottling Company with their consent.

### **3.8.2 Interview guide**

An interview topical guide was used as the basis for collecting information to ensure reliability. Interviews are preferred in the case of top management who are a knowledgeable group by virtue of their offices, with wide autonomy to talk about the subject at length without limit. The interview guide contained unstructured items on each and every variable in the conceptual framework. According to Ragin, 2009, an interview guide contains items used to guide the interviewing process. Henceforth, the process has the advantage of ensuring probing for more information, clarification, and capturing facial expression by the interviewees. The researcher interviewed the 10 key informants who are the top management.

### **3.9 Data collection procedure**

A recommendation and introductory letter obtained from Uganda Christian University was used to seek permission to conduct a case study from various respondents in Century Bottling Company Ltd. Consented permissions were obtained from the various respondents whom the researcher approached for interviews and distribution of questionnaire guides.

### **3.10 Validity and reliability of the research instruments**

#### **3.10.1 Validity**

As Cohen, Manion and Keith (2007) have stated, to ensure validity of the research results, an appropriate scale has to be chosen, there has to be adequate resources so that the required research can be undertaken, appropriate methodology for ensuring the research questions, avoiding having too long or too short an interval

between pre-test and post-test, ensuring standardized procedures for gathering data or for information administering tests, and tailoring the instruments to the concentration span of the respondents. Validity was done in order to find out whether the questions are capable of capturing the intended data. Experts in research reviewed the questions to see whether they were capable of capturing the intended response. A Content Validity Index (CVI) was calculated in order to establish the validity of the research instrument. The following formula was used by a researcher in establishing the validity of the research instruments as seen below.

Content validity Index (CVI)

= Relevant items by all judges as suitable

Total number of items judged.

If the CVI is equal to or greater than the recommended 0.70 (Kent, 2001), this will imply that the questionnaire is valid for data collection.

### **3.10.2 Reliability**

As stated by Mugenda and Mugenda, 2003, reliability refers to the degree to which a research instrument yields consistent results or data upon repeated trials. For this study, the reliability of this questionnaire instrument was enhanced by computing the Cronbach's coefficient alpha. A pilot study, involving 10 respondents, was conducted, and the results of reliability were computed using the Statistical Package for the Social Sciences. The coefficient must be at least the recommended .70. In the words of Amin, 2005, this means the instrument is appropriate to collect data.

## **3.11 Data Analysis**

### **3.11.1 Analysis of quantitative data**

In the quest for data analysis, SPSS version 26 was used due to its friendly use and suitability in handling the correlations between the variables and regressions that were characteristic in the study. SPSS has helped the researcher analyze quantitative data from the questionnaires. All variables were assigned names and coded for computer entry. The responses were then coded in order to facilitate computer data input. In addition, after data entry was completed, negatively

worded scales were recorded and new values assigned. Target variables were computed to obtain composite scores for items on a scale. Then, data screening was done in an effort to minimize such data entry errors. Quantitative data was analyzed using descriptive, bivariate, and multivariate statistics in order to ascertain the level of association of the independent variables with the dependent variable.

### **3.11.2 Analysis of qualitative data**

This involved the use of thematic review. Thus, qualitative data was edited and reorganized into meaningful phrases. That is, the thematic approach to analyzing qualitative data entailed identifying themes, categories, and patterns. The recurring themes, which emerged with regard to each of the guiding questions from the interviews, are presented in the findings, with selected direct quotations from participants used to illustrate points.

### **3.12 Ethical Considerations**

The researcher got a recommendation and introductory letter from the School of Business in Uganda Christian University, where thereafter permission from the different respondents in Century Bottling Company was sought to use it as a case study. The various respondents were approached for KIs and questionnaires distribution.

The researcher has indicated ethical conduct while implementing the study, confidentiality in that the information derived from the field shall only be used for academic purposes. There was also anonymity of the respondents exhibited so that they can get the freedom to express themselves. Informed consent was obtained from all the respondents before including them into the study.

Moreover, all data collected were used only for the purpose of this study and nothing else. The research procedure was explained to all the respondents before they take part in the research and their informed consent obtained. All sources of literature will be acknowledged throughout the whole study through proper

citations and referencing. Last but not least, personal bias has been avoided during the entire study, to be said in an interview, data analysis, and reporting.

### **3.13 Anticipated limitations and delimitations of the study**

Others would not volunteer their information on suspicion of what ground the information was taken. This challenge was resolved through the excellent reputation in the study context as a learning institution and also by seeking an introductory letter from the university.

The researcher was constrained by funds needed to facilitate the research, such as motivating the respondents, printing fees, and even daily transport to the company for the collection of data. The researcher used self-initiatives and strategies to mobilize financial assistance from family and friends who wish her well.

Finally, due to circumstances on the part of the respondents such as travels, sickness, and hospitalization, not all questions were filled or not all interviews may be conducted. Some may even refuse or withdraw from participation.

## CHAPTER FOUR DATA PRESENTATION, ANALYSIS AND INTERPRETATION OF THE FINDINGS

### 4.0 Introduction

This chapter discusses data presentation, interpretation, and analysis as well as discussion of the findings, response rate, demographics of the respondents, and discussions of the study about the research technique and objective.

### 4.1 Response Rate

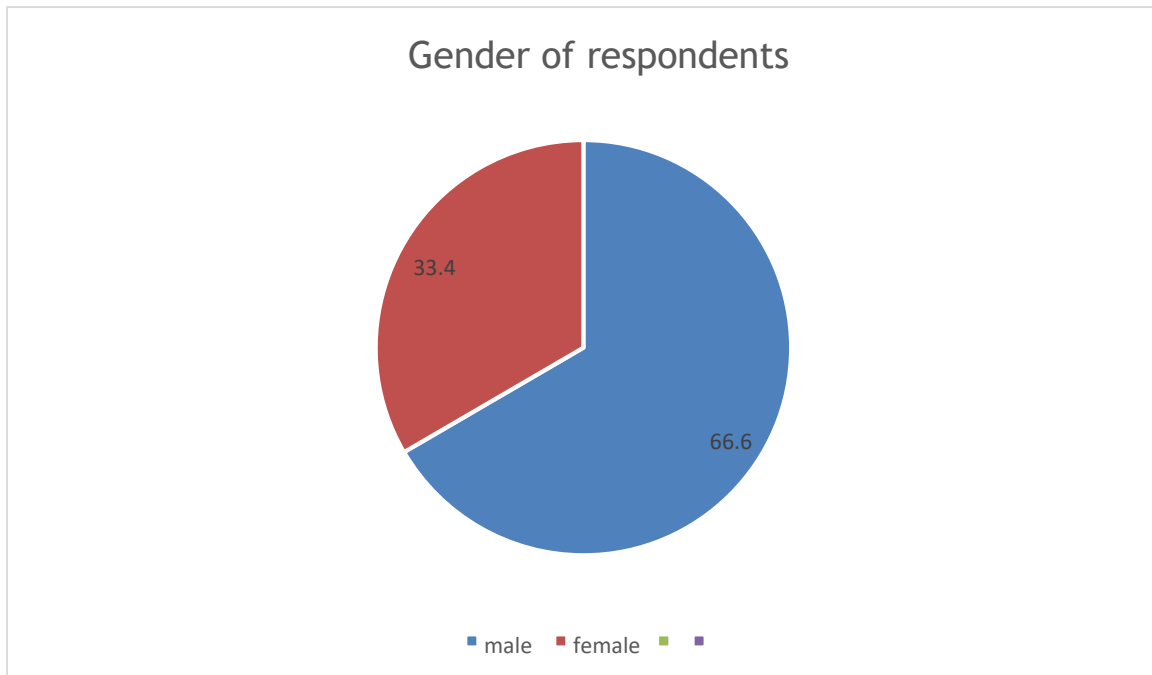
There were distributed 80 questionnaires in all. 60 returned the responses. 50 of which filled the questionnaires and 10 were interviewed. The response rate was 75% in this case. Krejcie and Morgan (1970), a rate of 50% and above is acceptable, this was regarded as a representative sample for subsequent studies.

### 4.2 Descriptive analysis of the study demography

Table 4.1 shows the gender of the respondents

Gender	Frequency	Percentage
Male	40	66.6%
female	20	33.4%
Total	60	100

Source: field data (2024)

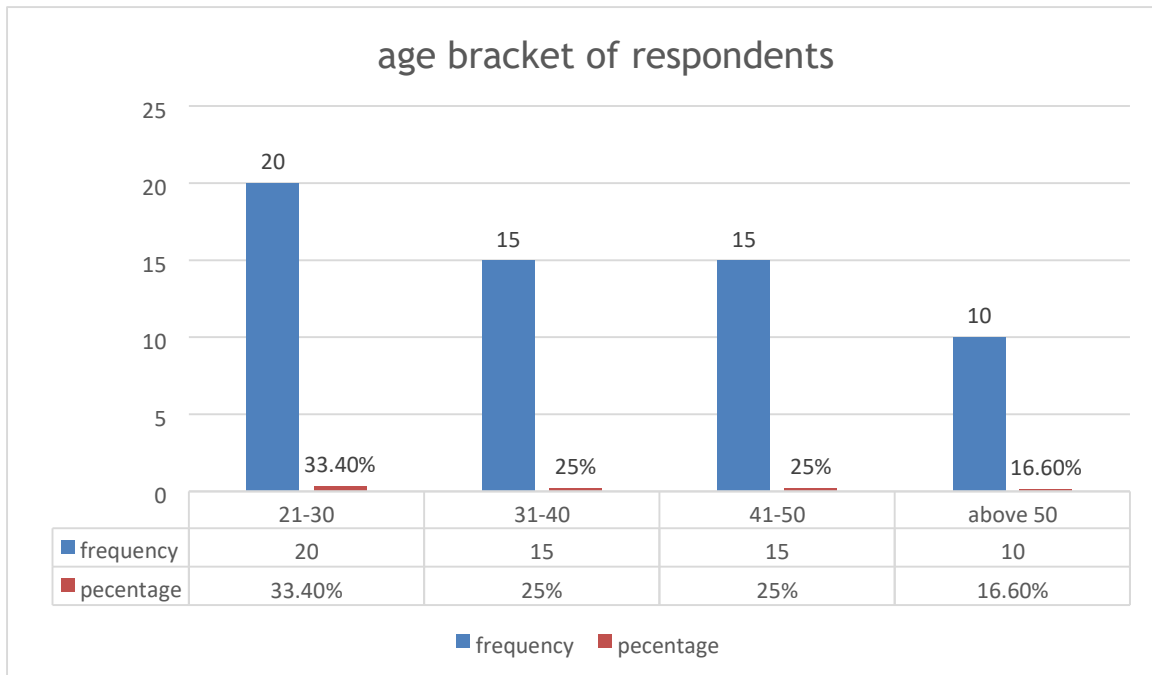


The findings from the study reveal that 66.6% of the respondents were male, 33.4% of the respondents were female. The findings from the study show that there are more male respondents in century bottling company

Table 4. 2 shows the age bracket of the respondents

Gender	Frequency	Percentage
21-30 years	20	33.4%
31-40 years	15	25%
41-50 years	15	25%
50 and above	10	16.6
Total	60	100%

Source: field data (2024)



The findings from the study reveal that 33.4% of the respondents were between 21-30 years, the findings of the study further showed that 25% of the respondents were between the age of 31-40, the findings further showed that 25% of the respondents were also between the age of 41-50 and lastly the findings of the revealed that 16.6 percent of the respondents were above 50 years. This gave away the impression that the majority of the respondents were below the age of 40 years.

Table 4.3 shows the education level of the respondents

Source: field data (2024)

The findings from the study showed that 16.6% of the respondents held a certificate level of education, 50% of the respondents held a degree as a level of education, 16.7% of the respondents held a diploma level of education and 16.7% were of masters level of education. This gave an impression the respondents were literate and relevant to the study. Table 4.4 length of service in the company

Education level	Frequency	Percentage
Less than 1 year	10	16.6%
1-5 years	33	55%
6-10 years	7	11.6%

Above 10 years.	10	16.6
Total	60	100%

The findings of the study revealed that 16.6% of the respondents had worked with the company for less than 1 year, 55% of the respondents had worked for the company for a period between 1-5years, 11.6% of the respondents had worked with the company for a period between 6-10 years and 16.6% of the respondents had worked with the company for a period above 10 years.

Table 4.5 department of work.

Education level	Frequency	Percentage	Cumulative frequency
Certificate	10	16.6%	16.6
Degree	30	50%	66.6
Diploma	10	16.7%	83.2
Masters	10	16.7%	100
Total	60	100%	

Department of work	Frequency	Percentage
Administration	05	8.4%
Procurement and logistics	30	50%
Human resource	5	8.4%
Marketing	10	16.6%
operations	10	16.6%
Total	60	100%

The findings from the study revealed 8.4% of the respondents worked in the administration department, 50% of the respondents in the procurement and logistics company.8.4% of the respondents in the human resource company, 16.6% of the respondents in the marketing department and 16.6% in the operations department.

#### **4.3 THE CONTRIBUTION OF TECHNOLOGICAL INFRASTRUCTURE ON SUPPLY CHAIN AGILITY IN CENTURY BOTTLING COMPANY.**

Table 2 present's responses from respondents using a Likert scale, with SA (Strongly Agree), A (Agree), NS (Not Sure), D (Disagree), and SD (Strongly Disagree) denoting agreement with the statement (Strongly Disagree).

Statements	The extent of agreement & disagreement			Mean	Std. Dev.
	A	N	DA		
	Freq.	Freq.	Freq.		
The company's technological infrastructure supports real-time data sharing across the supply chain.	31	0	19	3.55	0.090
Our IT infrastructure is capable of handling large volumes of data efficiently	28	0	22	3.94	0.871
Technological infrastructure upgrades have improved the flexibility of our supply chain operations	35	0	15	4.63	0.487
The company's investment in technological infrastructure enhances the speed of supply chain processes	38	0	12	4.77	0.420
Our technological infrastructure allows for quick adaptation to market changes	25	0	25	3.79	0.480
Our technological infrastructure allows for quick adaptation to market changes	40	0	10	4.79	0.358

Table 2: shows contribution of technological infrastructure on supply chain agility in century

**Source:** Primary data 2024

The findings from the study revealed that The Company's technological infrastructure supports real-time data sharing across the supply chain. This statement however had a (mean of 3.55 and a standard deviation of 1.090). Therefore this shows that IT enables the company to better understand their customers and develop better strategies to meet their needs thus the critical need for regular development and meticulous care of the techno-infrastructure to adapt to new requirements and stay ahead in the market.

The study's findings revealed that the company's IT infrastructure can handle large volumes of data efficiently. This statement met a (mean of 3.94 and a standard deviation of 0.871). This indicates that there is a good degree of agreement among respondents about how well the IT infrastructure handles large amounts of data. This was shown whereby 56% of the respondents agreed hence evidence that the company's IT infrastructure is capable of handling large volumes of data efficiently helps in tracking the movement of goods, monitoring environmental conditions, and capturing data on production processes.

The findings of the survey further revealed that Technological infrastructure upgrades have improved the flexibility of the supply chain operations in the company. This statement was evident with (a mean of 4.63 and a standard deviation of 0.487). That is to say, technology has been one of the cornerstones for the company's capacity to be prompt enough in coping with the transitions in supply, demand, and other conditions, thereby, making the supply chain self-sufficient and more reliable than it had been in the past.

The primary findings of the study revealed that The Company's investment in technological infrastructure enhances the speed of supply chain processes. This statement however attained a (mean of 4.77 and a standard deviation of 0.420). This shows a positive impact of technology innovation on the company's supply chain operations, indicating that businesses look towards increasing their operating speed since processes are streamlined and this would be achieved by making investments in technology infrastructure.

The findings from the study further revealed that the company’s technological infrastructure allows for quick adaptation to market changes. This report garnered (a mean of 3.79 and a standard deviation of 0.480), this is evidenced by 50% respondents in agreement hence the possibility of fast reactivity to changes in the market therefore the business's technological systems and procedures enable immediate reaction in case of changes in customer preferences, the status of the economy, or the competitive environment.

#### 4.4 CONTRIBUTION OF DIGITAL SOLUTIONS ON SUPPLY CHAIN AGILITY

**Table 1: shows the contribution of digital solutions on supply chain agility**

Statements	The extent of agreement and disagreement			Mean	Std. dev.
	A	N	DA		
	Freq.	Freq.	Freq.		
	The use of digital solutions has streamlined our supply chain management processes	40	0	10	1.42
Digital solutions employed by the company enhance collaboration with supply chain partners.	39	0	11	2.23	0.096
Implementing digital solutions has reduced the lead times in our supply chain.	40	0	10	1.88	0.758
The digital tools available improve our ability to respond to supply chain disruptions	36	0	14	1.68	0.471
Our digital solutions provide accurate and timely information for decision-making	46	0	4	1.23	0.425
The use of digital solutions enhances visibility throughout our supply chain	39	0	11	1.27	0.389

**Source:** *Primary data 2024.*

The findings of the study revealed that the use of digital solutions has streamlined our supply chain management processes in the company. This was portrayed with a (mean of 1.42 and a standard deviation 0.499). Survey has proven that the utilization of digital technologies have improved productivity and ensured a more responsive and integrated supply chain environment it also is revealed that the company's supply chain management operations are presently much better in terms of effectiveness and efficiency thanks to the usage of digital solutions. The use of digital technologies had led to better supply chain performance which is a result of the streamlined procedures and the reduction of errors.

Secondly, the findings from the study showed that Digital solutions employed by the company enhance collaboration with supply chain partners. This was evident with a (mean of 2.23 and a standard deviation of 1.096). It shows that digital tools have facilitated increased collaboration, information exchange, and communication with suppliers and other stakeholders. The usage of real-time data-sharing platforms, online collaboration tools, and automated processes that allow for smooth interaction.

The findings to the study further revealed that implementing digital solutions has reduced the lead times in our supply chain. This was depicted with a (mean of 1.88 and a standard deviation.758). This is because the digital solutions are used to keep track of customers' needs/ preferences and know when and what to produce for the specific customers thus reducing on the time between ordering and delivery leading to customer satisfaction and reducing errors.

The findings from the study further revealed that the digital tools available improve our ability to respond to supply chain disruptions within the company, this was evident with a (mean of 1.88 and a standard deviation.758). The outcomes of the study indicate that the company's use of digital technologies has improved its capacity to attend to supply chain interruptions this may include price fluctuations, economic depression and changes in customer interests.

The findings from the study further showed that the digital solutions provide accurate and timely information for decision-making in the company hierarchy. This was showed with a (mean of 1.23 and standard deviation.425). The results of the

study implies that the company's adoption of digital solutions has greatly enhanced the timeliness and accuracy of the data that is readily available for decision-making at all organizational levels.

Lastly, the findings from the study showed that the use of digital solutions enhances visibility throughout our supply chain. This was evident with a (mean of 1.27 and a standard deviation 0.389). Based on the analysis, it can be concluded that the company's supply chain has much-improved visibility after digital solutions were implemented which improves supply chain operations' transparency by allowing for better tracking of inventory, shipments, and other crucial variables

#### **4.5 CONTRIBUTION OF INTEGRATION AND CONNECTIVITY ON SUPPLY CHAIN AGILITY.**

Agility in supply chains has become a key differentiator for gaining a competitive advantage in today's business environment. Quick responses to the dynamics of the market, consumer demand, and unexpected disruption are what every organization needs for sustaining operations with high efficiency and remaining relevant within the marketplace. Integration and connectivity all revolve around reaching this agility.

The research results showed that integration and connectivity improve Coordination and Efficiency. The integration of the supply chain processes has provided the possibility for Century Bottling Company to coordinate the time of production according to the inventory. This coordination reduces bottlenecks and also decreases the lead times, hence improving efficiency.

These findings revealed that through integration and connectivity, integrated systems facilitate improved demand forecasting, which consolidates several data sources. The firm has been in a position to forecast market trends with better certainty and changes in its production. The said one of the key informant expressed:

*"Integration has been a game-changer for us. By harmonizing our production schedules with inventory levels and customer orders, we've significantly reduced lead times and improved our responsiveness to market changes"*

The study findings indicated that Integration fosters clear and straightforward communication between different functional groups and business partners. This reduces the potential for misalignment and ensures that all shareholders possess the same information. By integrating other functions, Century Bottling Company has been able to identify and weed out duplications of processes that have helped them cut costs and develop functional resources.

The findings of the study showed that with IoT sensors and cloud-based platforms, connectivity tools, for instance, would deliver real-time inventory levels, production and distribution status. The advantage of this is that one can rapidly respond in case of disruption and strategizes accordingly. Digital connectivity has fostered collaboration between Century Bottling Company and its supply chain partners. This fosters coordination and information sharing among partners and resolves issues more promptly. This was evident whereby our second key informant said that:

*"Our investment in advanced connectivity tools has enabled us to monitor and manage our supply chain in real-time. This capability has been crucial for swiftly addressing disruptions and seizing new opportunities."*

Findings from the study further established that the company with real-time data access can identify and contain potential issues before they blow out of proportion. For example, predictive analytics may alert one of potential supply shortages or delays in production well in advance for timely control. Connection catalyzes innovation: The company can therefore use analytics to uncover new business models, enhance processes along the supply chains, and build better experiences for the customers. Another key informant said that :

*"Integration and connectivity have transformed how we manage our supplier relationships. By sharing real-time data with our suppliers, we've improved the accuracy of our demand forecasts and reduced lead times for raw materials. This collaboration has made our supply chain more resilient and responsive".*

The study showed that the outcome of such connectivity has improved Supplier Relationships: Real-time data sharing with suppliers has improved the accuracy of demand forecasting and inventory management. This collaboration reduced the lead times for raw materials, hence enhancing the efficiency of the overall supply chain. Fast sharing and receipt of information from suppliers strengthen resilience in the supply chain. This allows for faster responsiveness to disruptions in supply or changes in demand. The final thing our last key informant said was that.

*"Connectivity has been crucial in optimizing our distribution network. With real-time tracking and data analytics, we can better manage our logistics operations, reduce transportation costs, and improve delivery accuracy."*

## CHAPTER FIVE

### SUMMARY OF FINDINGS, CONCLUSION, AND RECOMMENDATIONS

#### 5.0 Introduction

The findings, conclusion, restrictions, and suggestions of the study are summarized in this chapter. It also points out areas for additional investigation.

#### 5.1 Summary of the Research Findings.

##### 5.1.2 The contribution of technological infrastructure on supply chain agility in century bottling Company.

The study's conclusions underscored the critical relationship between IT infrastructure investment and operational agility, highlighting IT as a key enabler of adaptive supply chain policies in dynamic business environments. These conclusions were consistent with the research by Abdallah & Ayoub (2020). The study's results showed that IT integration within supply chains significantly improved agility by enabling real-time data sharing and decision-making procedures. This integration allowed CBC to respond swiftly to variations in customer request and market conditions, thereby improving overall supply chain responsiveness and customer satisfaction.

The study further echoed that such findings on information technology play an essential role in enhancing rapid responses towards humanitarian disasters. The integration of IT solutions to share and communicate data amongst humanitarian actors can enable organizations to be flexible, for instance, organizing relief operations, resource allocation, and rapidly reacting towards emergency conditions. This study underlines the enabling role of IT in achieving agility in non-traditional supply chain scenarios and indicates how it enhances operational efficacy along with humanitarian outcomes.

##### 5.1.2 Contribution of digital solutions on supply chain agility

Results from the study showed that digital solutions facilitate supply chain agility by facilitating real-time data sharing and analytics in CBC. It allows an organization

to be more adaptable to production schedules, maintaining inventory levels more effectively and responding quicker when there is changed customer demand. This is further integrated into the IT systems of firms to let lean principles facilitate smooth operations that enhance the overall responsiveness of supply chains for competitive advantages in dynamic market environments. The finding was then related to the study of Oliveira-Dias et al. (2022).

Their analysis revealed that supply chain agility increases significantly owing to advanced analytics, cloud computing, and so on, which have the power to provide timely and accurate information to decision-makers. This nurtures proactive decisions, cuts lead times, and heightens the capacity of an enterprise towards volatile customer expectations. The present study underlines the critical role that can be played by digital solutions in enhancing operational efficiencies and the general performance of the supply chain.

### **5.1.3 Contribution of integration and connectivity on supply chain agility.**

The conclusions drawn from the study indicated that IT capabilities, such as real-time data analytics and ERP systems, enable seamless integration among nodes of the supply chain. This integration promotes timely response towards changes in supply and demand; thus, it enhances agility within a supply chain. Integrated information systems facilitate efforts by organizations in increasing overall responsiveness of the supply chain and speed up operations to create a competitive advantage in unstable market conditions. They do so by facilitating principles of openness to information and collaboration amongst stakeholders.

The study's conclusions supported the findings of Shukor et al. (2021) in that it showed that companies using integrated supply chain solutions can achieve higher operational efficiency and adaptability, which is crucial for maintaining competitive advantage. The findings also showed that effective integration of supply chain processes and technologies, such as RFID (Radio Frequency Identification) and IoT (Internet of Things), enhances visibility and coordination across the supply chain network. This integration enables real-time tracking of inventory levels, production status, and delivery schedules, improved responsiveness to customer demands, and lead times.

## **5.2 Conclusion**

The comprehensive assessment of technological infrastructure, digital solutions, and integration and connectivity reveals their critical roles in enhancing supply chain agility at Century Bottling Company. Technological infrastructure provides the foundation for real-time data access, operational efficiency, and scalability. Digital solutions offer predictive capabilities, automation, and enhanced visibility, all of which contribute to more responsive and efficient supply chain management. Integration and connectivity ensure that supply chain components operate cohesively, improving collaboration, reducing lead times, and enhancing overall resilience.

Together, these elements form a synergistic framework that enables Century Bottling Company to navigate the complexities of the global market effectively. As the company continues to evolve, leveraging advancements in technology and maintaining seamless integration and connectivity will be essential for sustaining supply chain agility and achieving long-term success. The insights from Century Bottling Company offer valuable lessons for other organizations striving to enhance their supply chain agility in an increasingly dynamic and competitive environment.

## **5.3 Recommendations.**

Based on the findings from the study on the contribution of technological infrastructure, digital solutions, and integration and connectivity to supply chain agility at Century Bottling Company, the following recommendations are proposed to further enhance supply chain agility and operational efficiency:

**Invest in Advanced Technological Infrastructure.** To maintain a competitive edge and support ongoing growth, Century Bottling Company should prioritize the regular upgrading of its technological infrastructure. This includes investing in high-performance servers, advanced networking equipment, and scalable cloud solutions that can accommodate increasing data volumes and processing needs.

**Expand the Use of Digital Solutions.** To improve demand forecasting and decision-making, the company should explore and integrate advanced analytics tools that

utilize machine learning and artificial intelligence. These tools can provide deeper insights into market trends, consumer behavior, and operational performance.

**Implement IoT Solutions:** Expanding the use of IoT devices can enhance real-time monitoring of inventory, equipment, and transportation. IoT sensors can provide valuable data on production efficiency, supply chain conditions, and asset management, enabling more proactive issue resolution. Increasing the use of automation in areas such as order fulfillment, inventory management, and procurement can further streamline operations, reduce manual errors, and improve response times.

**Strengthen Integration and Connectivity.** Improving data integration across all supply chain functions and partners is essential for achieving a unified view of operations. Implementing an integrated supply chain management system that consolidates data from procurement, production, and distribution will enhance visibility and coordination.

To improve collaboration with suppliers and distributors, Century Bottling Company should invest in collaborative platforms that facilitate real-time communication and data sharing.

Establishing standardized communication protocols and joint planning processes can strengthen relationships and align objectives.

**Focus on Agility and Flexibility.** To build a more resilient supply chain, Century Bottling Company should develop contingency plans and risk management strategies. This includes identifying potential vulnerabilities, diversifying suppliers, and implementing backup systems to mitigate the impact of disruptions.

## **5.5 Suggestions for Further Studies.**

**Artificial Intelligence and Machine Learning:** Investigate how AI and machine learning can further enhance predictive analytics, demand forecasting, and automation within the supply chain. Research could focus on the effectiveness of AI-driven decision-making tools and their impact on operational efficiency and agility.

Explore the potential of block chain for improving transparency, traceability, and security in supply chain transactions. Studies could assess how block chain can address issues related to fraud, counterfeiting, and inefficiencies.

**Supply Chain Risk Management Strategies:** Study the effectiveness of various risk management strategies in mitigating supply chain disruptions. This includes researching best practices for contingency planning, supplier diversification, and resilience-building measures.

Analyze how global events, such as pandemics or geopolitical tensions, affect supply chain resilience and agility. Research could focus on how companies can better prepare for and respond to such disruptions.

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5. Period spent working in Century Bottling Company

- a) Less than 1 year                       b) 1-5 years
- c) 6-10 years                               d) Above 10 years

**Section A: Information Technology (IT)**

**Note:** *In this subsequent section, use the scale provided to tick in the box of the relevant answer that describes your opinion. Use the following scale to indicate your level of agreement with each statement:*

- 1 = Strongly Disagree  
 2 = Disagree  
 3 = Not sure  
 4 = Agree  
 5 = Strongly Agree

No.	Statements	Strongly agree	Agree	Not sure	Disagree	Strongly disagree
No.	Technological infrastructure	5	4	3	2	1
1	The company’s technological infrastructure supports real-time data sharing across the supply chain.					
2	Our IT infrastructure is capable of handling large volumes of data efficiently.					
3	Technological infrastructure upgrades have improved the flexibility of our supply chain operations.					
4	The company’s investment in technological infrastructure enhances the speed of supply chain processes.					
5	Our technological infrastructure allows for quick adaptation to market changes.					
6	The reliability of our IT infrastructure minimizes disruptions in supply chain operations.					
No.	Digital solutions	5	4	3	2	1

1	The use of digital solutions has streamlined our supply chain management processes.					
2	Digital solutions employed by the company enhance collaboration with supply chain partners.					
3	Implementing digital solutions has reduced the lead times in our supply chain.					
4	The digital tools available improve our ability to respond to supply chain disruptions.					
5	Our digital solutions provide accurate and timely information for decision-making.					
6	The use of digital solutions enhances visibility throughout our supply chain.					
<b>No.</b>	<b>Integration and connectivity</b>	<b>5</b>	<b>4</b>	<b>3</b>	<b>2</b>	<b>1</b>
1	Integration of IT systems across the supply chain enhances our operational efficiency.					
2	Our connectivity with suppliers and partners is seamless due to integrated IT systems.					
3	Integrated systems enable real-time communication across the supply chain.					
4	Connectivity between our internal systems and external partners improves supply chain agility.					
5	Integrated IT systems facilitate better coordination of supply chain activities.					
6	Connectivity with our logistics providers has enhanced our supply chain responsiveness.					

### **Section B: Supply Chain Agility in Century Bottling Company**

**Note:** *In this subsequent section, use the scale provided to tick in the box of the relevant answer that describes your opinion. Use the following scale to indicate your level of agreement with each statement:*

1 = Strongly Disagree

2 = Disagree

3 = Not sure

4 = Agree

5 = Strongly Agree

No.	Statements	<i>Strongly agree</i>	<i>Agree</i>	<i>Not sure</i>	<i>Disagree</i>	<i>Strongly disagree</i>
No.	<b>Supply chain agility in Century Bottling Company</b>	<b>5</b>	<b>4</b>	<b>3</b>	<b>2</b>	<b>1</b>
1	Our supply chain can quickly adapt to changes in customer demand.					
2	The company can efficiently manage unexpected disruptions in the supply chain.					
3	Our supply chain processes are flexible and can be reconfigured rapidly.					
4	We can rapidly scale our supply chain operations up or down based on market needs.					
5	Our supply chain strategy effectively responds to fluctuations in supply and demand.					
6	The agility of our supply chain provides a competitive advantage in the market.					

**Thank you for your cooperation**

**Interview Guide**  
**For Key Informants**

Introduction

Dear sir/madam

My name is Umutoni Patricia; I am a student of BPLM at Uganda Christian University. I am conducting a study on “the impact of information technology (IT) on supply chain agility: a case of Century Bottling Company (Coca Cola).” You have been specifically selected to participate in this study and the information collected shall be purely for academic purpose and treated with the highest level of confidentiality. The success of this study shall greatly dependent on your response. Your cooperation shall highly be appreciated.

**Section A: Introductions**

1. Tell me about yourself (*age and level of education*)
2. What position do you hold in Century Bottling Company (Coca Cola)?
3. How long have you worked with Century Bottling Company (Coca Cola)?

**Section B: Questions on the Objectives**

4. How has the implementation of technological infrastructure influenced the agility of your supply chain operations?
5. Can you provide examples of how technological infrastructure improvements have impacted supply chain responsiveness?
6. How have digital solutions contributed to enhancing supply chain agility at Century Bottling Company?
7. In what ways have digital tools helped streamline supply chain processes and decisionmaking?
8. How has the integration of IT systems affected the connectivity and overall agility of your supply chain?

9. Can you describe the role of connectivity in improving coordination and responsiveness within your supply chain?

**Thank you for your cooperation.**