The Development of Electronic Green Supply Chain and Logistics Management for Blockchain: Sky Handling Partners as a Case Study

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Abstract— *The evolution of blockchain started a few decades ago as part of the effort to promote competitive and reliable digital transformation in the area of logistics and supply chain. This has further evolved due to convergence of several technologies ranging from database programming, right through to digital communications including embedded systems. As a result, thereof, blockchain environments are highly developed.*

In this research, a framework known as "UAMBNPP Blockchain Framework" is design for SHP-SL in order to incorporate green supply chain and logistics through the adoption of green technologies to enhance business growth and competitive advantages.

Owing to the hustling of several logistics businesses embracing green technologies particularly in the supply chain and logistics market, modern values are used for the optimization of competitive business in the aspect of established trade. In order to increase the chances of success, in the circumstance where trade logistics and supply chain challenges exist, the intervention of efficient blockchain frameworks are required for logistic and supply chain. Even though there are other hindering factors, the standards of green supply chain and logistics within Blockchain frameworks needs to be continually improve and adopted.

The integration of such technological framework within SHP-SL business environment introduces a dynamic uturn for competitive business growth and hence attract more logistics and supply chain confidence and successful business advantages and growth. Based on these reasons, ensuring a secured health and communication environment between reliable green equipment is essential to protect the exchange of information within this business.

Focusing on this framework and taking into consideration the business characteristics of blockchain based technological environments, this thesis shows a secure, reliable and distributed framework for green resource management via blockchain environment. This proposed framework enabled by UAMBNPP blockchain is not only dynamic but efficient and can yield better competitive advantage.

Keywords— *UAMBNPP Blockchain, Framework, Competitive Advantage, Trust, WoT.*

I. INTRODUCTION

Based on the hustling of businesses to embrace green businesses especially in the area of supply chain and logistics to make modern values for the optimization of trade. In order to increase the chance of success in circumstances where trade challenges exist, the introduction of efficient blockchain frameworks are required for logistic and supply chain. This is so because it helps to end universal risk of no benefit to businesses is required. Even though there are other hindering factors, the standards of green supply chain and logistics in a Blockchain framework needs to be adopted.

The introduction of a structured blockchain with the aid of green supply chain and logistics into Sky Holding Partners in Sierra Leone (SHP-SL) will significantly reduce the manual administrative work and allow the automation of all administrative work and improve transparency and efficiency. Furthermore, the addition of green components in to the framework Hence there's a need for the requirement and adaption of blockchain in green supply chain administration to suppress the complexities presented by the logistics administration situations in the company. Therefore, counting on modern innovation intelligent upgrade by the different arrangement including stock administration frameworks will be of essence.

This research focused on Blockchain framework for Green Supply Chain and Logistics business with the Sky Holding Partners in Sierra Leone (SHP SL). This is a logistics company operating in Sierra Leone focusing on Supply Chain and Logistics operations. Indisputably, SHP-SL has been focusing on steps to reducing air, water and waste pollution as a way forward towards the main goal of green supply chain. Owing to the fact that green operations will also enhance the company's' operational and financial output. SHP-SL placed premium on reduced waste, reuse and recycling of energy product, reduction in energy costs, more efficiency, higher credibility and higher client satisfaction. Nevertheless, the steps towards adherence for the adoption of green supply chain and logistics administration, there is still a need for incorporating a robust blockchain framework. This robust blockchain framework captures the incorporations of green techniques that helps the daily operations of the company to maximize efficiency and profit.

Nowadays, technologically oriented businesses are carefully organized to meet the needs of professional business entities. No single business institution works in confinement. With those indicators, disappointment of trade frameworks and forms progressively begins from a complex blend of social and specialized business components. These components include or incorporate blockchain framework integration to correct those components. Information capture, human errors of exclusion and other specialized variables. This research will point out the required component to adopt robust blockchain framework and investigate how SHP-SL

(Supply Chain and Logistics Company) would utilize Blockchain to progress effectively and efficiency in its operations and administration by addressing it previous blunders related with green supply chain and logistics administration.

B. Q. Tan, Wang, Liu, Kang, & Costa (2020) One way of being more versatile and competitive in the business environment is to address frameworks diversities by utilizing inventive innovations like Blockchain to form user-friendly systems with high security and unwavering quality. By integrating business systems with blockchain innovation, different frameworks can associate consistently with the standard operating procedures (SOPs) and workflow of the tailored businesses. Those procedures can rise above persons, organizations and companies, whereas disposing of issues made by wasteful aspects or needs for believe, security and straightforwardness. All of these advancements can streamline the trade efficiencies and up hold esteem business procedures alongside with a sound business environment.

The administration of supply chain and logistics businesses involves huge capital and reasonable commitments. With the continued process to outlive growing businesses, numerous supply chain and logistics companies have been concerned with the issue of controlling resources and maximize benefit. Subsequently staying competitive over the computing competitors should be the ultimate goal of all business partners. In this case, with asset exhaustion and progressively negative natural burden, this business raises concern approximately their economical advancement on supply chain and logistics which is referred to as green supply chain and logistics (Ali, Bentley, & Cao, 2013).

I.I. Problem Statement

The main problem in this research is to design a blockchain framework within Sly Handling Partners SHP-SL that will capture green supply chain and logistics environment in order to improve the business turnover and protect the environment including human lives within the surroundings. With such consideration, the guarantee health security policies would be validated and considered with safety.

A. The Urgency and Significance of this Research

The urgency of this research is to come up with a sustainable solution that will improve business and create a positive effect on the environment while adhering to green business rules. Further, this will in turn generate a positive health impact to lives of SHP-SL staff and its environs (Zhou, Soh, Loh, & Yuen, 2020) (Aldakhil, Nassani, Awan, Abro, & Zaman, 2018).

Supply Chain and Logistics administration may be a complex system in which numerous partners are included within the course. Coordination and collaboration among distinctive partners are for the most part accepted to reduce expenditure taken into consideration a huge cost with incremental effectiveness in the thrive to realizing green supply chain and logistics. Be that as it may, there are a few challenges regarding to the diverse partners to cooperate with each other, and the method models or strategies within the supply chain and logistics also changes due to the varieties in

trade and obtainment methods. For example, the recording of supply chain and logistics information is ascribed physically.

For instance, within the obtainment of plumbing materials, amongst the arrangement and the filling of the arrange form, all forms included within the supply chain are exceedingly subjected to manual matchings, arrange through checking on paper and after that input into framework physically (Katoch, 2021). In situation like this, online information cannot be gathered and model arrangements will not at that moment be estimated using feasible contemplations. With the usage of the Blockchain innovation, the computerizations of supply chain and logistics forms are conceivable.

Moreover, information sharing could be a challenging among distinctive partners. Effective supply chain and logistics procedures need cooperation between partners, nevertheless deprived shared information among partners may also lead to failure in accomplishing the seven privileges within SCM (convey the correct item, within the right amount and the correct conditions, to the proper place, correct time and proper client with the proper cost) (Orji, Kusi-Sarpong, Huang, & Vazquez-Brust, 2020).

B. Aims and Objectives

This research aims to create an organized blockchain framework to back green supply chain and logistics administration at SHP-SL with the consolidation of the Web of Things (WoT) and support of consistent information. In which case, the WoT is utilized to convert conventional items into strong objects in order for real-time information can be obtained by means of data collection. At that point, blockchain is utilized to realize consistent real-time information sharing, information security. Based on consistent information, a set of applications with blockchain will be outlined to create green supply chain and logistics for different companies and financial specialists.

C. Strength and Weaknesses of this Research

The strength of this research is to obey the principles of green business practices and maximize profit for the business and improve on the health conditions of staff at SHP-SL. The weakness of this research is the tendency that adoption might be slow from the point of view of the business stakeholders. This is because the company will need to do an overhaul of the previous carbon machines which they might considered as a high capital investment for the business.

II. LITERATURE REVIEW

Within this section, dual primary flows of writing are studied, counting on green supply chain and logistics administration (GSCLA) and blockchain innovation. Numerous thinks about have checked on pertinent writing with reason to recognizing green supply chain and logistics research on issues relating to blockchain. Through classified in the category of worldwide supply chain and logistics administration, (Lee, Azamfar, & Singh, 2019) presented an investigation on the circumstance of green logistics and green supply chain in detail, pointing out research about bearings that gives future openings to other analysts.

In any case, their investigate fizzled to address the issue of

security in a appropriate way. (Ahi, Jaber, & Searcy, 2016) to begin with recognized and examined the 22 descriptions of green supply chain and logistics management and 12 descriptions of maintainable supply chain management based on papers distributed in 2013, at that point concluded that there was no significant recognition for the definition supply chain management that proposed a modern feasible supply chain management definition. Their investigations did not address the issues or maybe the attempted to supply definitions of the terms. In expansion, their references are ancient and so did not reflect current issues (Ahi, Searcy, & Jaber, 2018).

Based on the investigation of more than 1000 distributed papers considered, (Verma & Yadav, 2021) they proposed a biblio-metric and organize examination that can dispassionately distinguish compelling works, creators and developing an investigation cluster. Specifically, they proposed an efficient outline that may be utilized to demonstrate the progression of distributions within the area of logistics and to discover possible research about headings. Agreeing to a written survey for the supportability of logistics frameworks and logistics exercises and examination of the supportability for reports distributed towards logistics companies within Brazil companies. This outline presented the commonsense application to feasible hones with the operations of logistics (Taleizadeh, Ahmadzadeh, Sarker, & Ghavamifar, 2022).

In expansion to summary of the survey of green logistics and green SCM hypothetically, an audit summary of green Supply chain and logistics based on a modeling approach was concluded. The investigations about the status of numerical modeling innovation towards feasible supply chain and logistics was looked into while the audit contributions towards encouraging helpful substantiation in the field of logistics and supply chain (Yeh, Cheng, & Chi, 2007).

In relations to other sorts of written research, the ways to plan and assess the execution of feasible logistics and supply chain systems has taken into consideration various significant aspects. Only a few analysts concentrate on utilizing optimization strategies including scientific programming prototypes to reflect green supply chain and logistics. For instance, (Walker, Vermeulen, Simboli, & Raggi, 2021) created a system for the planning and assessment of economical calculation systems as natural impacts plays a progressively vital role in the logistics arrange plan. In such a case, it utilized an European mash with paper division as foundation to look at strategies required for the execution of the logistics and supply chain plan.

Additionally, conceptual shows a cost effective and productive invers logistics and supply chain arrangement was proposed and valuable experiences from different partners and business were put forward for advance investigations which were presented based on point-by-point layout and arrangements (SOARES, JUNIOR, FRANÇA, AZEVEDO, & NEVES, 2020). Suryawanshi & Dutta (2022) Proposed a fluffy scientific programming shown for the vital arrangement plan of green supply chain and logistics systems under questionable conditions. The most unique advantage of those systems was that they can accomplish an adjustment between minimal environmental effect and accept highly organized logistics development plan. In common, various logistics and supply chain companies thinks about have appeared that successful and effective in green logistics and supply chain might make exceptional commitments to financial, natural, operational and social execution (Maity, Tolooie, Sinha, & Tiwari, 2021).

A. Blockchain in Logistics and Supply Chain

To viably counter the challenges in logistics and supply chain, blockchain innovation has been utilized to encourage the efficiencies within development framework. This research points to investigate the application of blockchain within the logistics industry by coordinating with the Web of Things (WoT) and big data. In any case, information security and security issues regularly emerge for the application of this innovation. Blockchain innovation is based on a strategy by which already obscure parties can together create and keep up nearly any database on a to light disseminated premise (Omar et al., 2022).

This area portrays a blockchain-based system for green logistics and supply to realize the feasible operations of logistics and supply chain. With the integration of the Web of Things and huge information repositories (Hameed, Barika, Garg, Amin, & Kang, 2022).

B. Blockchain Architecture for Industries

The blockchain design incorporates the open and the private alternatives. Within the open choice, anybody can connect and read. The blockchain within the open can be made secure by allowing as it was authorized members to compose. In a private-based blockchain proprietorship show, as it was authorized members can connect and perused (Islam, Shen, & Badsha, 2022).

C. Industrial Improvement of Blockchain Technology

The blockchain innovation is primarily utilized to store the records and exchanges. The record may contain inactive or tradeable data (Kumar, Khan, Kadry, & Rho, 2022)

a. Static registry for blockchain

Here the ledger comprises of records that are put away as a reference reason. Take, for instance, the title of the ledger. Numerous cases of validation in title possession. With blockchain innovation, the records once put away cannot be modified (Ritchi, Bandana, Adrianto, & Alfian, 2021). Any changes are time stamped. In case of discussions, the title can be followed the root. The other places where it can be utilized are in licenses, research about articles, and nourishment security & root records.

b. Identity administration for blockchain

This shows similarity with the static registry. Though in this case it forms a separate design based on the stored identity related information. This can be used in areas like voting identity frauds, civil registry, police institutions records and

cases related to court matters (Ritchi et al., 2021)

c. Dynamic registry management for blockchain

In this situation, the ledger keeps updating upon the continuous exchange of goods and services on the digital platform of the blockchain. The most appropriate use case of this situation is the drugs logistics and supply chain administrations. The supply chain of drugs could be mapped right from the initial point of manufacturing to distribution right through to the drug store where consumers can directly purchase. Updated information is provided on the moving channels of drugs which highlight ways of mitigating or discouraging the supply of counterfeit drugs into the market (E. Tan, Mahula, & Crompvoets, 2022).

d. Sky handling partner's profile

Sky Handling Partner in Sierra Leone is a branch of the French based Company named Groupe Europe Handling registered in Sierra Leone since December 2009. It is Eighty percent (80%) owned by Groupe Europe Handling, which in itself a subsidiary of Groupe Centre de Recherches Industries, Techniques (CRIT) and Twenty percent (20%) by local investors in Sierra Leone. (http://shp.sl/about-us.html).

They operate in more than five countries in Africa as well as Europe and North America (https://skyhandlingpartner.ie/index.php/our-network/). Its office is located at the Freetown International Airport in Lungi which is co-located on the other side of the peninsula, 13km North from downtown Freetown the capital city of Sierra Leone (http://shp.sl/freetown.html).The company's objective is to provide logistics and supply chain management as well as flight handling services in Sierra Leone's aviation industry (Source: Researcher)

With over nine years' experience in the industry, it is dedicated to delivering quality services to its customers across Sierra Leone. With continuous increase in Cargo, the company constructed a new cargo shed facility approximately 2,300 m² equipped with modern technological tracking systems (http://shp.sl/cargo.html). For instance, the company in 2011 handled about 2,650 tons cargo import and nearly 150 tons export (http://shp.sl/freetown.html).

They also handle regular and non-schedule flights including passengers for both arrival and departure aircraft. In the same year also, they handled 1,360 aircrafts. In other words, 2,720 movements of arrival and departure flights comprising a total of 159,594 passengers. (http://shp.sl/key-figures.html).

In conclusion, it may be a service-oriented company that gives cost-efficient logistics and supply chain administration and flight taking care of arrangement in Sierra Leone's aviation industry.

Hence, this research points towards bridging that information gap that has not been captured in past research about planning a blockchain-based system for green logistics and supply chain administration. By implications, examining an Organized Blockchain for Green Supply Chain and Logistics as a case to consider Sky Handling Partners.

e. The current blockchain system

The current Blockchain system use by SHP-SL used within their supply chain and Logistics refers to the administration of a stream of merchandise between supply chain initiations to the point of utilization. Wherein the arrangement to deliver the total supply chain system is done [55]. Based on Figure 1, a normal supply chain comprises of providers and clients. Upstream partner can be perceived as dealers of downstream producers, wholesalers and partners. In such manner, within the business handle, upstream partners can be dreamy as venders and downstream partners can be preoccupied as buyers. For instance, producers are dealers of wholesalers.

In the case wherein purchasers buy products from retailers, there is minimum two methods, counting acquirement and conveyance. From the point of putting completing an agreed purchase actively, dealers will orchestrate a third-party logistics (3PL) for supplier to transport merchandise. In most cases, multimodal transport is utilized.
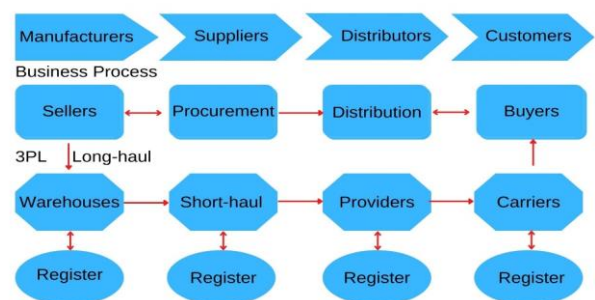

Fig. 1. Current Blockchain System used by SHP-SL

Transportation encompasses long and short distance transporters including warehousing. As such, products are conveyed to buyers and transaction is completed. Within the logistics preparations, partners ought to collaborate and coordinate to get the total transportation assignments. In order to realize the collaboration and coordination of the sum total of the required transportation, partners need to utilize real-time information concerning transportation.

f. Green Supply Chain and Logistics Systems

In this current business era, Green Supply Chain and Logistics has picked up spreading towards the scholarly world and industries considerably. Thus, this has evolved a development within the number of scholarly spreading in the field of supply chain and logistics (Ameknassi, Aït-Kadi, & Rezg, 2016). Whereas the government makes arrangements, counting within the ranges of exchange and venture, it is companies that exchange and contribute. In a showcase economy, the trade division is dominated by the private segment and covers the whole range of financial movement in agribusiness, fabricating and administrations, counting exchange, as well as foundation and social administrations. (Chan, Man, Fang, & Campbell, 2020) Inside the private division, there are different sorts of advertise on-screen characters: self-employed, miniaturized scale, little, medium and expansive endeavors and multinational companies.

This will also look at how to improve Blockchain innovation competitiveness in creating and moving economies particularly within the case of developing and transitional economies, with a specific center on what governments,

development partners, and Blockchain got to do to:

i) Building on green supply chain and logistics' capacities to exchange and take up growing territorial and worldwide exchange openings, and

ii) Fortify Blockchain' linkages with remote speculators and hence upgrade benefits to the nearby economy.

Fig. 2. Structured Green Supply Chain

III. RESEARCH METHODOLOGY – USING THE UAMBNPP BLOCKCHAIN FRAMEWORK

This research designs the UAMBNPP Blockchain Framework comprising of seven (7) stages to accomplish the businesses processes of blockchain using green supply chain and logistics at SHP-SL. It further utilized qualitative techniques to analyze the result and findings from this research. For the purpose of this research, the unit of analysis for this method or framework which achieved 76% of the administered questioners our of 100 sample size of Individual company staff. Data was collected using a questioner.

A. Overview of UAMBNPP Blockchain Framework

An outline of the UAMBNPP Blockchain Framework with seven stages as appeared in Figure 3. of the UAMBNPP blockchain Framework shown in this research methodology.

a. User Stage

The user stage function/serves as the utility of the UAMBNPP Blockchain Framework for data inputting, monitoring, managing and the analysis of logistics and supply chain process and identify the problems/errors.

Fig. 3. UAMBNPP Blockchain Framework for SHP-SL

These are more or less the users/humans that are using the system. The stage is also used for generating both the public and private keys from the system. Data analytics is used for the processing of data which are stored within the blockchain framework of the software applications within the application stage.

b. The application stage

The application stage diversifies the applications used to manage the operations of the supply chain and logistics systems at SHP-SL. Such logistics and supply chain software includes the feasibilities and analysis from the management s and blockchain stage. The application stage is the hosting base of all applications running within the UAMBNPP Blockchain framework.

c. The management stage

This stage serves as a management tool to enhance the operations of the UAMBNPP Blockchain framework designed for SHP-SL. These tools comprise of blockchain, user, network and data analysis. The UAMBNPP Blockchain management intend to manage and update the application and blockchain stages.

d. Blockchain stage

This stage collected data application that is stored within series of blocks which are chained one after the other in a sequential order to makeup the blockchain at SHP-SL. The blockchain consist of a header with a body. The former comprises of a whole lot of meta-data and the latter stores processed or verified data. The UAMBNPP blockchain framework is the operational system which manages data processing including documentation and communications for SHP-SL. It enhances the facilitation of all supply chain and logistics business processes.

e. Network Stage

At the network stage there is a provision for communications through which data channels are facilitated. The data from the subsequent perception stage is transmitted into the blockchain stage via the communication channels. The internet protocol/transmission control protocol, ultra wideband etc are all the communication means that facilitate easy data communication within the UAMBNPP Blockchain framework. The network stage of this framework is conducive for the handling of fast data transmission for real-time network/data safety and securely SHP-SL.

f. The perception stage

This stage makes available the capability of SHP-SL for monitoring and perceiving the individual status of supply chain and logistics machineries/resources via a broad variety of sensitive devices which are made up of radio frequencies and identification technology, barcode readers, labeling tags and scanners. The aforementioned equipment are used by SHP-SL for the identity of goods to uniquely ascertain the location of delivery and ownership. Furthermore, surveillance equipment such as Webcams are utilized for the monitoring of the workplace environment, the stores including the protection, security and safety of goods with and out of the worksite. Global positioning systems or GPS are embedded in their trucks, vehicle and other delivery vans so that as to capture real-time positions of their delivery equipment. At SHP-SL wearable innovations are applied towards their
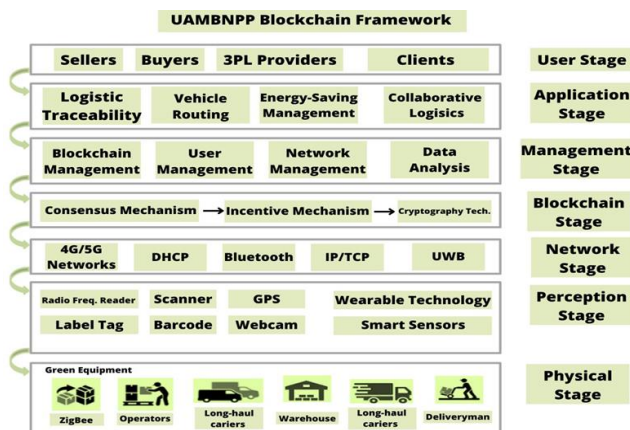
logistics and supply chain equipment in the fact that this technology has the potential to improve the capacity's revenue and reduce the workload of the logistics and supply chain equipment operators.

g. Physical stage

This is the last stage in this framework which is made wholly for green logistics and supply chain resources that is part of the logistics and supply chain business processes. This stage is highly supportive to the operations of green supply chain and logistics. In accordance with this UAMBNPP Blockchain framework. The resources have been classified into three various kinds. These are goods awaiting to be transported to their located destination(s). Next is the kind of logistics and supply chain operators that are responsible to move the goods to their designated location(s). Third and final one is the selection of the logistics and supply chain equipment which are required to carry such goods. For instance, vehicles, forklifts, trucks, cranes etc.

Blockchain administration points to oversee and upgrade the blockchain. Client administration is mindful for overseeing examination of the supply chain and logistics handle in supply chains, and logistics issues clients and producing open and private keys (Hameed et al., 2022).

IV. RESULTS OF THE UAMBNPP FRAMEWORK

This research introduce the results and it impact on green supply chain and logistics equipment's and their potential utilization on blockchain to enhance green business and present it as an environmentally friendly framework for implementation. Therefore, this thesis presented the expected properties and aspects of a structured blockchain for green supply chain and logistics which will show results demonstrating its feasibility at SHP-SL."

A. Work Environment

Professionalism in different skills will keep the company on a firm standing for the migration process on prospective green business and green equipment to be used by the company. Further, it will also enhance the ease of managing a blockchain system with the agenda to support green supply chain and logistics at SHP-SL in the near feature.

Regarding the execution of this research, this thesis will apply an evidence-based framework shown in the preceding Chapter and illustrated the addition of green supply chain and logistics equipment for both hardware and software mechanisms of this research.

Demographic Details of Respondents: The demographic details of respondents are the potential evidence to show the capacity and maturity of SHP-SL as a logistics-based business in Sierra Leone.

a. Respondents Gender

According to on the data acquired for this research at HSP-SL, the result shown on the summary for the gender of the respondents indicate a positive gender balance

The respondents gender distribution for which the leading sex amongst the respondents were male having a percentage representation of 54% and 46% female (Appendix 1.).

Implying that SHP-SL management has greater male majority as oppose to female.

b. Age of Respondents

According to the data acquired at SHP-SL for this research, the respondent's age distribution shows perfect working age and maturity.

The results shows that respondents between the age range of 31-37 years carries the majority of the personnel with 36.8% of the workforce (Appendix 2.). This demonstrated that HSP-SL had majority of their company's staff youthful, which indicate a productive assurance for SHP-SL. Further, this aging gap is far from the age retirement of sixty years stipulated by the labor low of Sierra Leone.

c. Educational qualification of respondents

The data regarding the educational qualification of respondents is shows positive educational qualification for staff at HSP-SL.

The results from the educational data shows that majority of the respondent representing 45.0% attained bachelor's degree level (Appendix 3.) in their educational background. This is an assertion that SHP-SL employs majority of it workforce with bachelor's degree owing to the fact that they desire greater efficiency within their company. This research can Therefore, conclude that it respondents possessed sufficient educational qualification to manage the proposed system.

d. Year of service

The results from the research data indicated that 63.2% of the respondents had lengthy year of service (Appendix 4.) ranging between 5-10 years which imply the majority. This means that SHP-SL posses' staff with lengthy duration of service. Therefore, SHP-SL can be considered dependable of providing up-to-date answers to the questionnaires for this research.

e. Organizational hierarchy

Based on the results of this study, an overview of respondent's position level in the organization shows positive. The results from the data shows that 53.9% junior management staff (Appendix 5.) are in the majority among the workforce of SHP-SL staff. This shows an indication that respondents from the junior level management are crucial to the success of green logistics and supply chain integration management of the company.

f. Material handling equipment for SHP-SL

These are equipment's used to carry out the daily operations of the company. This equipment can further be categorized into green or non-green equipment. Furthermore, green equipment is those equipment that does not uses any hydrocarbon in the form of fuel for it operations, and thus courses less or no harm to the surrounding environment and it existing living species. While non-green equipment is those that uses some kind of hydrocarbon in the form of fuel forit operations including any other harmful means of coursing environmental hazards or pollution for it existing living species.

B. Operational Processes of this Framework

The operational processes of this study assess the operational mechanisms of the company and segment them into the following:

a. Transport management

This indicate the most efficient part of the proposed system whereby green supply chain and logistics can be highly recognize at SHP-SL. It carries out the operations of the transportation systems that aids the transfer of materials from root to the destination where the materials are needed. The data shows that 73.7% of the respondents strongly agreed with the Transportation management in this framework (Appendix 6.). Below are the criteria used:

Identifying a system of safe and clean (green) transportation of goods and services by utilizing methods of renewable energy generations to meet the needs of business without delays can enhance SHP-SL transportation system within the logistics and supply chain marketplace. This statement signifies the fact that green transportation systems are not only safe but good and efficient for the operations of SHP-SL.

The arrangement of renewable or clean (green) energy efficiently for vehicles or transport equipment used to transport goods from the warehouse to customers or users in good order enhances SHP-SL transportation system within the logistics and supply chain marketplace. This implies that green equipment arrangement in an effective manner is best for achieving performance and financial competitiveness.

b. Physical distribution management

This shows the capabilities of the designed framework to enhance SHP-SL with efficient green supply chain and logistics. Therefore, physical distribution management actually shows the tangible equipment used to manage those equipment. The data in this research shows that 64.3 of the respondents strongly agreed with the physical distribution management (Appendix 6.). Below are the criteria used:

The distribution of goods in a timely manna to customers when needed influences business competitiveness at SHP-SL. In terms of physical distribution systems within the logistics and supply chain timeliness has been a good positioning strategy for the marketplace.

Ensuring that the distribution of goods to their customers reach at the right place and in the right quality with the right quantity can positively impact the competitive advantage at SHP-SL transportation system within the logistics and supply chain marketplace.

Undamaged goods distribution to customers using green technologies, maximize confidence for utility and protection which also enhances greater competitive advantage at SHP-SL transportation systems within the logistics and supply chain marketplace. Hence logistics business confidence can make a great difference in a productive business environment like SHP-SL.

c. Inventory management

This is the potential of the designed system to provide effective inventory operations for SHP-SL. Within the design of UAMBNPP framework SHP-SL inventory system makes it efficient for the stock management of their store system. In this case, the data shows that 73.0% respondents strongly agreed with the inventory management (Appendix 6). Below are the criteria:

Continuously ensuring that there is an availability of stock via demand forecast to meet high customer needs enhances greater competitive advantage through positive perceptions. Therefore, customer demands for efficient supply chain and logistics are a key objective for achieving the goals of SHP-SL.

The need for maintaining satisfactory record of stock t to determine whether stocks are low or high in order to influence firm's/companies' competitive advantage through positive perceptions. Therefore, maintaining satisfactory records for stock determinant is also a key for SHP-SL inventory system.

d. Warehousing management

This is the safest tendencies for which SHP-SL is utilizing it spacious and decent storage for the enhancement of satisfactory green supply chain and logistics. The data in this research shows that 75.0% of the respondents strongly agreed with the warehouse management of this framework (Appendix 6). Below are the criteria used:

A warehouse that has the facility to preserve goods in standard and ensure that they are safe and in good quality also enhances competitive advantage through positive perceptions.

Organizing goods in an orderly manner that create an easier or flexible means of locating goods within the warehouse enhance positive impacts in the competitive capability via positive perceptions. Therefore, the proper arrangement of goods within the warehouse positively impacts the efficiency and productivity of UAMBNPP Framework for HSP-SL

From the data, both the physical and perception stages shows that UAMBMPP Blockchain Framework can yield more efficient output. It is Therefore, observed that an average total (A.Total) 70.2% of respondent among SHP-SL staff strongly agreed with physical and perception stages of the UAMBNPP Blockchain framework system designed at SHP-SL via this research has greater competitive advantage. Therefore, the design framework is viewed by the respondents to yield significant output.

e. Better communication

The UAMBNPP blockchain framework is proven better for data communication system at HSP-SL. This is because it channels are efficient for the transmission of data from one location and device to another location and device. The data in this research shows that 68.5% of the respondents strongly agreed with better communication in this framework (Appendix 7.). Below are the two criteria used.

Regular exchange of relevant logistics and supply chain business information among the blockchain cycle business partners improves competitive advantage over their colleagues. Therefore, it is relevant for logistics and supply to have better communication systems.

Sustaining mutual commitment among the blockchain cycle partners to facilitate logistics activities is a means of influencing competitive advantage over other logistics businesses. Therefore, maintainable communication among

colleagues in the supply chain and logistics is a means of objective competitive edge.

f. Quick access to information

The tendency of the UAMBNPP blockchain framework to access information at a faster rate will also enhance HSP-SL in terms of information retrieval. In this case quick access to information is a means by which this company achieve competitive edge. In this research, the data shows that 57.9% of the respondents strongly agreed with quick access to information (Appendix 7.). Below ate the criteria used:

Providing producers and suppliers with relevant specification of required or with relevant information for product/goods in advance also influence competitive advantage over the colleague. Therefore, satisfactory information for goods or product prior to supply also place this company on the competitive edge.

Blockchain technology usage among business partners to exchange vital business information with the goal to expedite processes also enhances reduced costs and competitive capability. Therefore, the use of blockchain to achieve reliable info is a means of getting competitive edge.

g. Improve billing

The improvement in the billing process of the UAMBNPP Blockchain Framework facilitate better data communication for HSP-SL. The billing system is to enhance blockchain financial system. The data in this research shows that 75.0% of the respondents strongly agreed with the improve billing (Appendix 7.). Below are the criteria used.

Using Blockchain technology to maintain up-to-date data records of transactions to facilitate efficient billing mechanism among business partners impact competitive advantage and hence improving the billing process. Therefore, for the billing system to be efficient, there is need for maintainable data records.

The provision of accurate information to the blockchain framework (UAMBNPP) with business partners to avoid discrepancies that ensure trust and confidence can lead to competitive advantage over colleague partners. Therefore, accurate information provision is a step-in stone for SHP-SL.

From the data, it is observed that an average total of 67.1 of the respondents who are staff of SHP-SL strongly agreed with the Network and Blockchain stages within the UAMBNPP blockchain framework. Therefore, it is eminent to ascertain the design blockchain system efficiently matched with the green logistics and supply chain of SHP-SL and will Therefore, hopefully be a better system for the operations of SHP-SL.

h. Cost of service

The cost components of the proposed system also have greater potential to place HSP-SL on a greater competitive advantage over it business rivals. It is essential to have good costing rate to make use of floating customers. The data in this research shows that 73.7% of the respondents strongly agreed with the cost of service (Appendix 8.). Below are two criteria used.

Ensuring cost minimization of operation and labor to achieve company's objective enhances competitive advantage

for SHP-SL. It is necessary for a business to have a good prizing determinant in order to influence or attract good customer base.

Offering prices at a competitive rate than competitors that customers can compare influence competitive advantage for SHP-SL. This imply that prizing system in the logistics business are a means for competitive lead for logistics business. Therefore, good prizing can lead to good customer base.

i. Quality of service

This is prerequisite to show that the proposed framework will produce highly competitive advantage at HSP-SL. The quality of reliable service offered to customers is a means by which SHP-SL immerge above its competitors. The data in this research shows that 77.6% of the respondents strongly agreed with the quality of service (Appendix 8.). Below are the criteria used?

A company that offers products or services that are highly reliable quality service can enhance competitive advantage at SHP-SL. Reliable high quality service places a company on the advantage side of things. Therefore, the provision of reliable services embraces highly competitive edge.

Providing products and services to customers that are very durable impacts competitive advantage at SHP-SL. With this quality service has a greater advantage to gain customers attention.

j. Timely delivery

This shows responsiveness of SHP-SL to deliver goods and services within specific period. This is to improve on the responsiveness of a business and taking full responsibility of satisfying customers at the required time. The data in this research shows that 72.4% strongly agreed with timely delivery (Appendix 8.). Below are the criteria used:

Fulfilling customer order on time enhances company's competitive advantage. This implies that logistics and supply chain companies need to improve on their latency time. The greater the latency time the greater the reliability and confidence from customers.

Responding effectively to customer demands than competitors influence competitive advantage. The efficient response of SHP-SL leads to it competitive edge over colleagues' business partners.

k. System flexibility

This indicates the possibility of HSP-SL to keep it operations responsive towards the needs of their customers. Flexibility plays a key role towards the adoption of a system. The flexibility of the designed system, has greater advantages for the improvement of SHP-SL. The data in this research shows that 79.6% of the respondents strongly agreed with the flexibility of the framework (Appendix 8.). Below are the two criteria used:

Enhancing quick delivery service of customer order influences competitive advantage. This is one of the ways in which any logistics company can gain competitive edge over other company hence SHP-SL gains competitive edge through quick delivery.

Responding to customer needs whenever and wherever impacts SHP-SL competitive advantage. This indicate that

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customer needs are a priority for SHP-SL. Therefore, customers are pivotal part for any logistics business to succeed and hence enhancing competitive advantage.

l. Outsourcing Service

This is the tendency of hiring another company which uphold the principles of green supply chain and logistics business just as HSP-SL. This idea shares the risk while achieving a kind of mutual benefit to both business partners. However, if there is a loss along the way, both parties share responsibility. The data in this research shows that 65.2% of the respondents strongly agreed with outsourcing process in this framework. Below are the two criteria used.

Outsourcing service to a Third Party with the right expertise which can significantly enhance green supply chain and logistics using positive perceptions. Therefore, the application of objective decision to outsource services when the need arises is a step in the right direction for SHP-SL.

Applying advanced technology (blockchain) in the operation using green methods of logistics activities can impact the green supply chain and logistics via positive perceptions. Therefore, the application of a state-of-the-art technology makes significant in the operations of SHP-SL.

From the data collected, it illustrates an indication that an average of 75.8% of the respondents strongly agreed with the management, application and user stages of the design UAMBNPP Blockchain Framework that it is highly recommended to implement this framework for competitive advantage over other companies of the same business goal.

C. Analysis of UAMBNPP Blockchain Framework for SHP-SL

The UAMBNPP Blockchain Framework design constitute of seven stages namely, physical stage, perception stage, network stage, blockchain stage, management stage, application stage and the user stage.

a. Physical stage

The bottommost stage is the physical stage. This stage is made wholly for green logistics and supply chain resources which are part of the logistics and supply chain processes that are supportive to the operations of green supply chain and logistics. In accordance to this framework, these resources have been classified into three various kinds. These are goods awaiting to be transported to their located destination(s).

b. The perception stage

This stage makes available the capability of SHP-SL for monitoring and perceiving the individual status of supply chain and logistics machineries/resources via a broad variety of sensitive devices which are made up of radio frequencies and identification technology, barcode readers, labeling tags and scanners. The aforementioned equipment is used by SHP-SL for the identity of goods to uniquely ascertain the location of delivery and ownership.

c. Network stage

In the network stage, there is a provision for communications through which data channels are facilitated. The data from the subsequent perception stage is transmitted into the blockchain layer via the communication channels. The

internet protocol/transmission control protocol, ultra wide band etc. All the communication means that facilitate easy data communication within the UAMBNPP Blockchain framework.

d. Blockchain stage

This stage collected data that is stored within series of blocks which are chained one after the other in a sequential order to makeup the blockchain at SHP-SL. The blockchain consist of a header with a body. The former comprises of a whole lot of meta-data and the latter stores processed or verified data. The UAMBNPP blockchain framework is the operational system which manages data processing including documentation and communications for SHP-SL.

e. The management stage

This stage serves as a management tool to enhance the operations of the UAMBNPP Blockchain framework designed for SHP-SL. These tools comprise of blockchain, user, network and data analysis. The UAMBNPP Blockchain management intend .to manage and update the application stage. In the aspect of competitive advantage for this system, two criteria are also used to showcase the efficiency and productiveness of the system.

f. The application stage

The application stage diversifies the applications such as logistics and supply chain software including the feasibilities and analysis from the management layer. The application stage is the hosting base of all software applications running within the UAMBNPP Blockchain framework.

g. User stage

The user stage functions are to managing the analysis of logistics and supply chain process in the UAMBNPP Blockchain framework and identify the problems that users are facing, while generating both the public and private keys from the system. Data analytics is used for the processing of data which are stored within the blockchain framework of the applications within the application stage.

D. Discussion of Results

The participating respondents who took part in this study are overall very qualify in fields of Blockchain as well as supply chain and logistics. After the conduct of interviews, this research attained its effect by showcasing those experts employed by SHP-SL works in diverse range of department with various range of skills within SHP-SL and this is a potential that will impact the company on it sustainability in the near feature.

Based on the reasons that skill multiplicity in the workplace is an advantage to both the company and it staff this research assess and ascertained it potential benefit in this study. With respect to this, discussions with a range of staff at SHP-SL lead to the conclusion that skill diversity can capacitate their knowledge for future career.

This study used a sample of 100 employees at SHP-SL, out of which a total number of 76 filled questioners were obtained, which has ascertained the UAMBNPP Blockchain framework. The respondents comprised senior managers, middle and junior-level management staff of the company. The major

objective of this research had been achieved by determine a better blockchain system that incorporate green supply chain and logistics for better output. However, 76 respondents out of 100 distributed questionnaires were answered and that translated to a total response rate of 76% of the distributed questioner. This response was highly satisfactory and represented the research population and hence it matches with a stipulation that a response rate of 70% and above which shows excellent turnout.

Initially, the demographic data indicate that the respondents at HSP-SL are highly qualify considering their educational background, experience on the job and age bracket. It also shows that there is significant gender balance, which shows commitment to wards the principles of green business.

Secondly, the data also show significant prospect for business growth for HSP-SL Considering the fact transport management, physical distribution, inventory management, warehouse management and outsourcing are criteria to wards success of green supply chain, aif the proposed framework is implemented with a focus towards the principles of green business at HSP-SL. Which imply that the proposed framework will improve on the operational processes of HSP-SL.

Thirdly, the data communication for blockchain indicates that the proposed system will improve and yield better communication, quick access to information and improved billing system. These three aspects are highly significant towards a centralized data repository system for the daily operations of HSP-SL.

Finally, the framework accommodates the operations of HSP-SL, on a distinct competitive advantage over it colleague business rivals considering the fact that cost, quality, delivery and flexibility will improve significantly and hence productivity will also be ascertained. Based on the above discussions, it is now satisfactory to pinpoint that the Design system is trust worthy to overhauled the previously system at HSP-SL.

V. CONCLUSIONS

In this chapter, the blockchain framework for addressing the incorporation of green supply chain and logistics at SHP-SL have been developed. Formal research procedures have been followed with reliable data obtained from SHP-SL staff as respondent.

In this research, the UAMBNPP Blockchain Framework is designed to replace the existing framework. The UAMBNPP considered seven stages in it framework namely, the User Stage, the Application Stage, the Management Stage, the Blockchain Stage, the Network Stage, the Perception Stage and the Physical Stage. All stages and their components are thought explained in the chapter 3 and 4 respectively.

This framework focus on the incorporation of green supply chain and logistics to addressed the issues of green business with the supply chain of SHP-SL. It is eminent to note that, the inclusion of green equipment and techniques into the design and framework of SHP-SL is a stepping stone for the company to attract greater competitive edge over colleagues' business partners in the logistics and supply chain sector.

In the instance of this case study, the blockchain framework design for this company serves as a hob for the proper management and administration of the company's logistics and supply chain operations. The clean energy as a result of green equipment and procedures is beneficial service to the company both financial, health and the environment. It is also business benchmark-strategy to attract investors and other partner's that might want to enter the logistics and supply chain industries.

Furthermore, the main objective of this research was to address the adoption of green supply chain and logistics at HSP-SL which implies the adoption of green equipment for improve performance and unique output. All criteria relating to the production of the expected have be analyzed and discussed in chapter 4. Hence there were sufficient evidences to show that the proposed system framework shall be of a greater advantage of the company if implemented and adopted.

Blockchain innovation an awesome advancement with potential to convert current businesses and businesses. This research proposes a structured blockchain framework for green supply chain and logistics based on efficient technique. This is done by coordination with the Web of Things (WoT) and huge information within the supply chain and logistics company (SHP-SL). This research work will be investigating the implementation of unstructured blockchain in green supply chain and logistics operations. The commitment of this research is highly significant to unearth the hidden features of a structured blockchain. To begin with, this investigation will analyze the green supply chain and logistics handle in supply chains and logistics existing issues that ruin the supply chain and logistics industry from realizing green logistics and supply chain.

The structure of blockchain has the potential to empower the supply chain and logistics companies to convert from the conventional operation mode into a structured blockchain operation mode. A few imperative applications are displayed to decrease the taken a high operation and administration while making strides productivity. Third, benefits and challenges are clarified in detail so that supply chain and logistics professionals can conduct a cost-benefit examination.

The primary address is how to successfully interface the physical layer of blockchain with the recognition layer to gather supply chain and logistics information. The moment is how to plan motivating force components that motivate supply chain and logistics companies to take an interest within the development of blockchain. The third address is how to address high costs and reduce risk when receiving blockchain innovation.

After thorough analysis of the results obtained for this research, it is hereby concluded that the framework ascertains to produce better output with distinct performance and hence will yield competitive advantage over colleague's logistics businesses.

VI. RECOMMENDATIONS

As for the future work, it will focus on enriching this framework with other blockchain frameworks which incorporate green techniques when considering inter-business parties by introducing specific business models and scenarios of dynamic business growth.

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APPENDICES

Appendix 1. Gender of Respondents Table

No	Sex	Frequency	Percentage Rep. (%)
1	Male	41	54.0
2	Female	35	46.0
	Total	**76**	**100**

Appendix 2. Age of Respondents Table

No	Age Range	Frequency	Percentage Rep.
1	18 – 25	12	15.8
2	26 – 30	11	14.5
3	31 -37	28	36.8
4	38 – 45	25	32.9
	Total	**76**	**100**

Appendix 3. Educational Qualification of Respondents Table

No	Qualifications	Frequency	Percentage Rep.
1	Diploma	32	42.0
2	Bachelors Degree	34	45.0
3	Masters Degree	10	13.0
	Total	**76**	**100**

Appendix 4. Years of service of Respondents Table

No	Years of Service	Frequency	Percentage Rep.
1	5 – 10	48	63.2
2	10 - 15	18	23.6
3	15 – 20	10	13.2
	Total	**76**	**100**

Appendix 5. Organizational Hierarchy Table

No	Hierarchy	Frequency	Percentage Rep.
1	Management Staff	12	15.8
2	Jr. Management Staff	41	53.9
3	Junior Staff	23	30.3
	Total	**76**	**100**

Appendix 6. The Physical and the Perception Stage

No	Criteria	Highest Score	Percentage Score%
1	Transport Management	10	Strongly agree 73.7
2	Physical Distribution Management	15	Strongly agree 64.3
3	Inventory Management	10	Strongly agree 73.0
4	Warehousing Management	10	Strongly Agree 75.0
A.Total			**70.2 (Strongly Agreed)**

Appendix 7. The Network and the Blockchain stages

No	Criteria	Highest Score	Percentage Score%
1	Better Communication	10	Strongly agree 68.5
2	Quick access to Information	10	Strongly agree 57.9
3	Improve Billing	10	Strongly agree 75.0
A.Total			**67.1 (Strongly Agreed)**

Appendix 8. The management, Application and User stages

No	Criteria	Highest Score	Percentage Score%
1	Cost	10	Strongly agree 73.7
2	Quality	10	Strongly agree 77.6
3	Delivery	10	Strongly agree 72.4
4	Flexibility	10	Strongly agree 79.6
5	Outsourcing	10	Strongly Agree 65.2
A.Total			**75.8 (Strongly Agreed)**