E-Tracking and Service Performance of the Pharmaceutical Industry in Port Harcourt

Nwador, Chuks Anthony, Ph.D; Dike, Lawrence Bekwele, Ph.D; Nwachukwu, Darlington, PhD; Origbo, Henry, PhD

Abstract: *This study investigated e-tracking and service performance of the pharmaceutical industry in Port Harcourt. In order to conduct this study, the causal research design method was adopted, and the population of the study consisted of thirty one (31) registered pharmaceutical companies in Port Harcourt. Using census sampling technique, the whole 31 pharmaceutical companies were studied. Two (2) copies of questionnaire were administered to each of the 31 pharmaceutical firms managing Directors and customer service personnel which amounted to a total of sixty two (62) copies of questionnaire. Out of the 62 copies of questionnaire administered, fifty (50) copies retrieved were valid and used for the analysis. The study utilized Kendall tau-b analysis in testing the influence of the Predictor variable on the Criterion variable. The study found out that GPS tracking system has a strong positive influence on both reliability and customer assurance. Also, that radio frequency identification significantly influences reliability and customer assurance. Based on the findings, the study concludes that e-tracking such as GPS tracking and radio frequency identification significantly influences the service performance of pharmaceutical industry in Port Harcourt. Based on the conclusion, the study recommends that in order to check counterfeiting, fake drugs distribution and consumption e-tracking devices (systems) should be used in the pharmaceutical industries in Port Harcourt and Nigeria, secondly government through its agencies should enact tracking and tracing regulations not only in the pharmaceutical industries but also in other areas of government activities like FMCG (Fast Moving Consumer Goods), and lastly, e-tracking system should be developed through researches in the academics to widen the horizon of knowledge in this area of study.*

Keywords: *E-tracking, Service Performance, Pharmaceutical Companies, GPS Tracking System, Radio Frequency Identification*

Introduction

Technology is ruling the world of e-commerce and internet is at the heart of marketing practices and strategies. The impact of technology is ubiquitous in all marketing activities and has changed overtime in terms of spheres of marketing practices. Businesses have increased in speed, accuracy and specificity to the delight of customers. E-service as a new paradigm in e-commerce has challenged the traditional ways of marketing services to the extent that customers are not only interested in delivery time, but safety of such products. Much of the works presently being undertaken by human are now automated with the advent of information technology and its adoption (Kanyanuth et al, 2018).

To ensure the safety of goods in transit, it is important that products are tracked to determine their location in the supply chain. Tracking not only provide information on location but also reduces cost and time of delivery of products which have contributed to the competitive advantage of firms in the logistic and pharmaceutical industries. Information technology is the bedrock of e-commerce, although relatively new in Nigeria, its adoption is fast expanding, (Salami & Ogeta, 2014).

In Nigeria, the pharmaceutical industry occupies a wide space in the generation of revenue to government because of its wide market in the sub region, but such opportunity is hindered by the prevalence of counterfeiting, fake drug production, distribution and consumption. Such unacceptable practices put the health of customers in jeopardy. This led to the establishment of NAFDAC (National Agency for Food and Drug Administration and Control) by Decree No. 15 in 1993. NAFDAC's mandate is to oversee and regulate the production, distributing, selling, and the utilization of medical devices, drugs, food, cosmetics, chemical items, and packaged water in Nigeria.

To ensure that the health and safety of customers are protected the use of tracking and tracing devices have been employed to help the industry meet it competitive and price challenges in the 21st century.
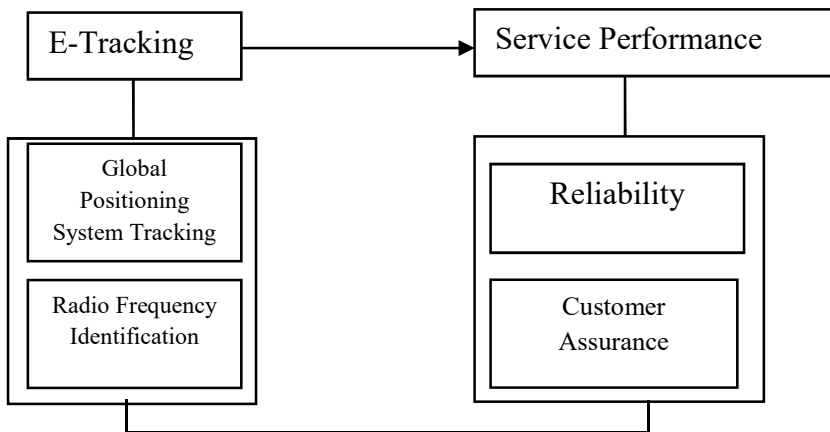
Statement of the Problem

Nigeria imports about 70% of pharmaceuticals from Asia countries like China, India, Brazil, Mexico, Pakistan and Russia to mention a few, (Parmatimes, 2016). The rest 30% drugs are produced locally. There is huge export potential for Nigeria pharmaceutical market among ECOWAS (Economic Community of West African States) countries. According to Ugbam & Okoro (2017), the pharmaceutical industry has huge potentials the world over and the pharmaceutical market is expected to more than double to US $1.3trillion by 2020. The authors contend that in the pharmaceutical industry a gap exist between the level of import and local manufacturing to meet domestic needs.

The pharmaceutical industry in Nigeria fraught with challenges including counterfeiting, "fake drugs", consumption and illegal trafficking. This problem is of great concern to practitioners, manufacturers, distributors and other stakeholders. The Nigerian government response to this state of affair was to establish the National Agency for Food and Drug Administration in 1993 to curb the influx of counterfeit and fake drugs in the country. Nigeria is a major route in the import and export of pharmaceuticals in West Africa, (Ugbam & Okoro, 2017). Tracking and Tracing systems in line with global practices have to be put in place to check the menace of counterfeiting and "fake drugs" production, distribution and consumption. As a developing nation, with the dearth of infrastructural facilities especially in the information technology arena, a lot still need to be done to ensure that Tracking and tracing policy with its accompanying

serialization are adhered to in order to save the health of the growing population. Despite the popular view on e-tracking and service performance, there exist scarce empirical studies on the association between e-tracking and service performance within the domain of pharmaceutical industry in Port Harcourt, thus, the aim of this study.

Conceptual Framework of the Study

Source: Parasuraman, et al. (1996).

Aims and Objectives of the Study

The aim of this study is to empirically investigate the influence of e-tracking on service performance in the pharmaceutical industry in Port Harcourt.

The study has other specific objectives as follows to:

i)   determine the influence of e-tracking on the reliability of pharmaceutical services in Port Harcourt, Rivers State
ii)   examine the extent of influence of e-tracking on customer assurance of pharmaceutical services in Port Harcourt.

Research Questions

Due to the objectives of the study, these research questions were formulated:

1.   How does e-tracking influence the reliability of pharmaceutical services in Port Harcourt, Rivers State.
2.   To what extent does e-tracking influence customer assurance of pharmaceutical services in Port Harcourt, Rivers State.

Research Hypotheses

Utilizing the research questions and the conceptual framework as backbone to the study, the following research hypotheses were formulated.

Ho₁: Global Positioning System tracking has no significant influence on the reliability of pharmaceutical services in Port Harcourt.

Ho₂: Global Positioning System tracking does not influence significantly the customer assurance of pharmaceutical services in Port Harcourt.

Ho₃: Radio Frequency Identification has no significant influence on the reliability of pharmaceutical services in Port Harcourt.

Ho₄: Radio Frequency Identification has no significant influence on the customers assurance of pharmaceutical services in Port Harcourt.

Scope of the Study

The geographical scope of this study is on all the pharmaceutical firms in Port Harcourt. The topical and content scope of the study is on e-tracking and service performance of Pharmaceutical firms in Port Harcourt. The unit of analysis is at the macro level meaning that the views of managers and employees were surveyed.

Review of Related literature

Conceptual Review

The Concept of e-tracking

E-tracking is not a brand-new idea to mankind. "A multi-tiered system built to remotely monitor products while in transit, and control as the commodities travel along the supply chain from source to destination," according to Kabiru (2016), is what Electronic Cargo Tracking System (ECTS) is. In a distribution network or supply chain, tracking is the process of acquiring and providing data on the whereabouts of delivery goods (Deschner et al, 2008). A tracking system is used to keep tabs on people or moving items and to provide a timely, ordered series of position data for processing**.** As far back as the 15th century, "foot print, mark left by anything", including horses were tracked by the French and Germans. Africans were also involved in tracking while hunting with dogs and keeping track (foot prints) of domesticated animals, (Liebenbery, 1990).

The pharmaceutical industry has designed tracking and tracing regulations to ensure that goods produced, distributed, consumed are free from counterfeiting, falsification, fake, illegal

trafficking, pilferage and grey market activities, (Raffael et al, 2014). According to Raffaele et al. (2014), tracking entails constantly comprehending the precise location of a specific good around the supply chain, whereas tracing entails a rapidly shifting regulatory landscape that promotes an increasingly stringent control of goods handling, particularly for food and drugs. Production and distribution processes in the pharmaceutical industry are aligned with traceability regulation/requirement. This is because the industry products are expensive and have profit potentiality. Forgers in the form of wholesalers and retailers cash in to make "abnormal profit" at the detriment of the patient health and safety.

Tracking gives real time information about fleet, data of objects on the move, personnel or merchandise (Johnson, 2021). In addition, it saves money, offers visibility; improve safety measures, helps in efficiency and productivity. Other benefits of tracking include management and control of inventory, distribution and sales monitoring, counterfeiting and theft, Raffaele et al. (2014). Almost everything can be tracked in this present era with the advancement of technology and e-commerce and e-service. From cargo tracking, instant generation of data, online service agreement, order status signal detection, asset, portfolio, to vehicles etc tracking technology has become pervasive (Juma, 2014; Samchez, 2016; Rana & Pratima, 2014; Florence & Queree, 2005; Scolari, 2019; Shamuzzonal et al., 2013). Monitoring of cargo movement is done using the technology of Radio Frequency Identification (RFID) and the Global Positioning System (GPS/GPRS), (Kabiru, 2016).

Dimensions of e-Tracking

Global Positioning System (GPS), the Radio Frequency Identification (RFID, Real-Time Locating Systems (RTLC), Barcodes, Quick Response (Q.R) and recently, Global Navigation Satellite system (GNSS) etc are some of the dimensions of tracking. Anand (2019) listed Radio Frequency Identification (RFID), Geofencing, Internet-Tracking, Global Positioning System & Satellite Tracking, Radio-Tracking, and Cell-phone Triangulation as dimensions of E-Tracking. In this study, we selected global positioning system tracking and radio frequency identification as our dimensions for E-Tracking.

Global Positioning System (GPS): The GPS has acquired a growing importance in the field of wireless communication. The American (American) Department of Defense launched GPS in 1978. Delivery of packages, mobile commerce, reaction to emergencies, exploration, resource management, surveying, etc. are all tracked using GPS. A network of 24 satellites in six separate 12-hour orbital patterns makes up the GPS. Tracking techniques are based on the distance, direction, or both of a moving object. This tracking technology has been used for business purposes as well as transportation all around the world. It enables staff navigation and location awareness (Abha et al., 2015). Using a built-in cellular (GSM), radio, or satellite modem, the tracking device can keep the recorded position information or transfer it to a central location database or a computer that is internet enabled.

The GPS has been useful in package delivery, resource management, tracking pharmaceutical products. In the logistic industry, GPS tracking is now an accepted practice and as well as a market qualifier, (Ciuba, 2004; Day, 1991; Williams &Tao, 2008). A product's precise location may be known at any moment when it is being transported from one end to another in the supply chain, thanks to GPS technology. This has improved consumer engagement and customer retention.

Similar to GPS, Radio Frequency Identification (RFID) is used to pinpoint the position of people, stock, and items that are in motion. Access to more exact stock information is made available through RFID. In order to automatically detect and monitor connected items, it uses radio frequency electro-magnetic fields in a wireless, non-contact manner to send data. One significant benefit of RFID, according to Bradawl (2000), is the quick, automated information transfer between tags and scanners that doesn't require line of sight or touch**.** The use of Global Positioning System and Radio Frequency Identification has contributed to fast and reliable delivery of goods and enhance customer experience (Kunyanuth et al, 2018).

Concept of Pharmaceutical Services

Pharmaceutical Services **could be seen as service provided** by a pharmacist which include the dispensing of medications in a pharmacy by the order of a licensed practitioner prescribing within his or her practice scope (Law Insider, nd.). Pharmaceutical services is not limited to the manufacturing of drugs, it among other things ensures safe supply of medicines, poisons and therapeutic goods; distribute medicine and regulate activities in the industry especially to curbs counterfeiting along the supply chain.

Concept of Service Performance

A task's performance is evaluated against the current accepted standards for correctness, completeness, cost, and speed (Unam et al., 2015). The metrics used to measure a firm's performance relate to how a particular request is handled or the effective performance of an action (Ngugi & Karina, 2013). It also involves the evaluation of predetermined metrics or benchmarks for accountability in terms of effectiveness, efficacy, and the environment, such as financial performance (profitability), market share, and industrial expansion. Customer feedback, open and closed issues, rate of complaint escalation, response time, conversion rate, and progress in customer satisfaction are all subjective indicators of customer service performance (Kamakia, 2014). According to Salamon and Robinson's (2008) study, customer service was rated more highly when employees felt that management trusted them.

The accomplishment of initial aims is successfully measured via performance measurement. In the service sector, measuring customer happiness and service quality has become common practise (Maimunah et al., 2002). Financial performance used to be thought of as a way to evaluate corporate performance, but that is no longer the case (Drucker, 1993). Fitzgerald et al.

(1991) instead presented alternative performance indices in six dimensions: competitive performance, financial performance, service quality, adaptability, resource use, and innovation. Four broad categories were created as a result of further categorization of the general performance measurement: quality of service, flexibility, resource use, and innovation. Some scholars like Schmelzer (2008) would like service performance to be seen from functional, operational, process and business performance dimensions.

In assessing an organization service performance, it is crucial to look at the quality of services provided, the level of customer satisfaction and loyalty. A satisfied customer would not only through word-of-month inform other friends, peers and family members but also come back to purchase the service. In some other cases, service performance could be measured by average order fulfillment times and time taken for order to be delivered. Bradly (2001) and Gronross (1988) suggested using service quality/Servqual of Parasuraman et al (1994) to measure service performance. This involves five qualities namely tangibility, reliability, responsiveness, assurance and empathy known with an acronym RATER. Also, Aghdaie and Faghani (2012 cited in Nwachukwu et al., 2022) utilized the five SERVEQUAl to measure performance include: reliability, assurance, tangibles, responsiveness, and empathy. In this study we selected reliability and assurance as our measures for service performance.

Reliability: Parasuraman et al. (1991) assert that the most vital determinant of service quality is the reliability, which according to them could be seen as the degree of consistency of a measure. A test is considered reliable if it gives the same repeated output under the same conditions. Within the context of a business, reliability is capacity to deliver the promised service accurately and dependably. It simply means that the business or firm delivers on its promises. Every consumer will want to work with companies that honour their commitments, particularly in regards to the result of the service and essential service characteristics.

Assurance: Encouragement of confidence It is understood to be the practise of civility among employees and the capacity of the business and its personnel to foster trust and confidence (UKessay, nd.). The employee who serves as a conduit between the client and the business might represent confidence and trust. The maintenance of a desired level of quality in a service is known as quality assurance, and it involves paying attention to each step of the delivery or manufacturing process.

Theoretical Framework

To effectively check unwholesome practices in the pharmaceutical industry, tracking of objects in motion along the supply chain is inevitable. Tracking require sight and touch which is based on new theory of vision and Resource Based View. This study is anchored on Resource Based View theory since the organization needs to look from within and use its resources to track its product so as to stay competitive..

Theory of Resource Based View (RBV)

Jay Barney is credited to be the father of modern RBV and Resource Based Theory (RBT) of the firm, although the term was coined by And Borger Wermerfelt in 1984. According to this hypothesis, businesses have resources, some of which help them gain a competitive edge and some of which result in better long-term success. Rare and precious resources can help an organisation gain a competitive edge. Insofar as the business can guard itself against the imitation of resources, replacement or transfer, the advantage can be maintained for extended time period.

The RBV hypothesis states that a corporation uses its competitive edge to achieve sustainability. The efficient use of a firm's scarce, valued, and appropriateable resources results in a temporary competitive advantage that is maintained over time by the resources' substitutability, imitability, and mobility. According to the resource-based view idea, businesses should search within themselves to identify the sources of their competitive advantage.

Empirical Review

The study "Quality KPIs in Pharmaceutical and Food Industry" by Marianna et al. (2013) looked into the kinds of key performance indicators (KPI) that businesses employ and how they make use of the KPI findings. Those working in Finland's pharmaceutical and food industries who are accountable for quality were the target of an email poll. It was discovered that while there were significant changes in their application and reporting, quality KPIs were similar for both the pharmaceutical and food businesses. The amount of complaints, product flaws, and variations were the next most popular KPIs in the pharmaceutical sector. The most popular quality KPI for the food business was the total number of complaints. The study's findings indicated that the food business was using quality indicators somewhat more effectively than the pharmaceutical industry.

Quality in the Pharmaceutical Industry: A Literature Review was the focus of Haleem et al. The research was done in Saudi Arabia. It outlined the most significant quality standards and best practises in the pharmaceutical sector and structured them into a manual to help other academics who wanted to delve further into the standards and best practises. A study of 102 papers was conducted, of which 46 focused on general quality procedure and 56 on pharmaceutical quality. The findings indicated that there are several papers explaining broad principles and practises, but that there is a dearth of literature showing their implementation, case studies of pharmaceutical factories using them, and the relevance of such guidelines and practises.

A research on reverse logistic process control methods for the pharmaceutical sector supply chain in India was conducted by Sameer et al. in 2009. The paper's objective was to analyse the pharmaceutical supply chain utilising the DMAIC approach in order to enhance the reverse logistics during a recall and reduce the risk of consumer damage. A cause-and-effect study of the supply chain and the potential trouble spots was carried out. The usage of Radio Frequency

Identification (RFID), reliable information systems, and transportation carriers were then improved upon in order to simplify the supply chain and lower the chance of fake medications entering the forward supply chain. The reverse logistic supply chain's failure types and corresponding failure severity were studied using FMEA. The investigation produced some intriguing and novel ideas that are now being tried and created, however there was little particular data on the pharmaceutical supply chain. Since third-party suppliers manage the majority of the reverse logistics for medicines, this unique expertise is well-guarded because it is a key skill. The study provides guidance for changes linked to the quality of service currently provided between logistic users, logistics service providers, pharmaceutical firms, and customers and aids in analysing gaps, suggesting strategies to close them.

An assessment of trace and track rules in the pharmaceutical business and their effects on the reverse logistics of pharmaceuticals - situation in Regulated nations and India - was published by Moniveena & Kumar in 2017. The research examined the efforts of industrialised nations to control the pharmaceutical industry's track and trace procedures and reverse logistics in the regulated nations and India. While Europe is moving toward 2D barcodes, developed nations like the USA have used RFID. The demand for effective monitoring, visibility, and control measurements—essential elements of any reverse logistics process—has grown as a result of substantial government laws and reporting requirements as well as a greater emphasis on lineage.

Impact of Track and Trace integration on Turkish pharmaceutical production systems was reported by Raffaele et al. in 2014. This study provided a succinct review of the traceability international rules in the pharmaceutical industry, the effects of their application on the production and logistics processes, the technologies created, and their advantages. The study's objective was to evaluate the current and future advantages of deploying traceability systems throughout the pharmaceutical supply chain. The writers covered the use of contemporary approaches and technology in traceability systems. Distributed e-pedigree model and federal registry model were both employed. The study reviewed the primary legal and technological aspects of track and trace while emphasising its influence on manufacturing procedures and intrinsic benefits.

In Turkey, Kunyanuth et al. (2018) investigated the impact of utilising an e-tracking system for small businesses. The goal of the research was to supply and manage publisher operations and materials. The project was developed using RAD (Rapid Application Development). Black Box Testing and a questionnaire were used to assess the effectiveness and acceptability of the suggested application. The project created an online application for e-tracking. The approach works better for tracking publications to tackle the issue of working inside a day.

Ahm et al. (2013) released research on the tracking and tracing performance evaluation for logistics operations in Finland. Before introducing such technologies as auto-ID which includes barcodes, Quick Response (QR) codes, RFID tags, etc., their goal was to assess performance and feasibility gaps. The authors recommended that each stage in the chain of supply, including

distribution, the packing, transportation,, etc., have their own information related with the system of tracing at the conclusion of the study.

In Nairobi, Kenya, Juma (2014) conducted research for her Master of Business Administration (MBA) thesis on the use of cargo monitoring systems as a competitive strategy for service delivery. The goal of the system was to look into how DHL Express leverages the Congo tracking system as a service delivery method to compete. With a qualitative study approach, both the secondary and primary data were utilised. The results of the study demonstrated the value of tracking systems in determining the location of shipments and informing customers well in advance.

In Mumbai, India, Manohar et al. (2006) researched on the use of RFID in the pharmaceutical business. The conference paper's primary goal was to list all of the uses for RFID in the pharmaceutical sector. The use of RFID in the pharmaceutical industry has been proven to aid with expiration date management, pharmaceutical tamper detection, and fraud identification and prevention.

Gap in Literature

Extant publications published in the literature on e-tracking and service performance were reviewed to identify gaps in the literature.

Ahm Shamsuzzoha et al. (2013) published on tracking and tracing performance evaluation for Finnish logistics operations. In order to track the movement of materials along the logistics chain, the research indicated the usage of technologies of auto-ID like quick response codes, barcodes, radio frequency identification tags, etc. The study found a discrepancy between performance and feasibility assessments prior to the use of such technology. To evaluate the effectiveness of tracking and tracing tools, an experimentational setup was developed and carried out. The study's findings were turned into a helpful road map for manufacturing firms before they use the right monitoring and tracing tools and technology in their day-to-day operations in the future.

Kabiru (2016) released a piece on the Kenya Revenue Authority's electronic tracking system, operational effectiveness, and transporters. The research design used in the study was exploratory. A study questionnaire was used and given to the various officials at various stations around the nation. The system has been deployed and it has a good influence on operational performance at the Kenya Revenue Authority (KRA) as well as at transport businesses that have integrated the system, according to data analysis using descriptive statistics. For the system to function properly, the study suggested that both the KRA and the transporters maintain constant communication.

Juma (2014) researched the use of a cargo tracking system as a competitive tactic in Kenyan service delivery. Secondary and primary data were employed in the investigation. The first

information was gathered using an interviewing guide. The data was qualitative in nature, and it was analysed using content analysis. The research revealed that tracking systems assist in determining the whereabouts of shipments and alerting customers well in advance.

In the above published works so far examined, none has been done empirically on e-tracking and service performance of pharmaceutical firms in Port Harcourt. This work with its emphasis on pharmaceutical firms intends to close the existing literature gap.

Methodology

Research Design

This study adopted a causal investigation to establish the influence of e-tracking on service performance of pharmaceutical firms in Port Harcourt, Rivers State. The variables utilized in the study were not in any ways interfered with by the researcher. This study involved the collection of standardized information from the population census.

Quantitative method was used for the research work. Kendall tau-b analysis was adopted to test the influence of the Predictor variable on the Criterion variable.

Population of the Study

There are thirty (31) registered pharmaceutical companies in Port Harcourt and over 105 registered pharmaceutical companies in Nigeria listed in the Nigeria stock exchange and registered members of the pharmaceutical society of Nigeria. The study population is on the thirty one pharmaceutical companies, and using census sampling technique, we study all the 32 registered pharmaceutical companies in Port Harcourt. The study unit of analysis is at the organizational level, hence the managing director of these companies and their operations (functional) managers were surveyed. Two (2) copies of questionnaire were administered to each of the 31 pharmaceutical firms managing Directors and customer service personnel which amounted to a total of sixty two (62) copies of questionnaire. Out of the 62 copies of questionnaire administered, fifty (50) copies retrieved were valid and used for the analysis.

The study used construct, content, and face validity metrics. Senior academics from the IAUE department of marketing granted face, content, and construct validity to our measurement tools. The instrument underwent two steps to increase its dependability. The first step was completed before to data collection, whereas the second was completed following data collection.

The threshold was set at a Crobach alpha coeficient of 0.7 to assess the instrument's dependability. Following a reliability test conducted through the use of SPSS which stands for Statistical Package for Social Science, all items scoring lower than 0.7 were eliminated. Every item tested was determined to be trustworthy and to have scored higher than 0.7.

Descriptive Analyses and Interpretation

This study adopted the existing threshold of mean of 3.00 as the acceptance level at which mean value accepted to be significant, meaning that any mean value below 3.00 is considered not significant.

RESULTS AND DISCUSSION

4.0 Data Presentation

This chapter begins with the presentation of the results of data analysis. As part of data collection efforts, the researcher designed and distributed a questionnaire comprising of 28 items, which were given to sixty two respondents in the area of research. Fifty (50) copies of questionnaire retrieved were discovered suitable for analysis resulting in 81% response rate. While 12 copies or 19% were dropped based on errors. The first part of the chapter presented descriptive statistics (Table 4.1) followed by presentation of each of the research questions.

Demographic Characteristics of Respondents
Table 4.1 Distribution of the respondents by their sex

Sex	N	Percentage
Male	35	70%
Female	15	30%

Out of the 50 valid responses, 35 (70%) were for male, while 15 (30%) were for female.

Table 4.2 Distribution of firm by branches

Branches	N	Percentage
1-3	18	36%
4-6	22	42%
7-Above	10	22%

Out of the 50 valid responses, 18 (36%) had 1-3 branches, while 17(48.57%) had 4-6 branches and 10(22%) had 7 branches and above.

Table 4.3 Distribution of the firms by years of existence of pharmaceutical firm

Years of existence	N	Percentage
Below 5 yrs	22	44%
6-10 yrs	23	46%
11 yrs- Above	5	10%

Out of the 50 valid responses, 22 (44%) has been in existence below 5 years, 23(46%) were between 6 -10 years, 5(10 %) fell between 11 years and above of existence.

Table 4.4 Distribution of the respondents by their Educational qualification

Educational Qualification	N	Percentage
WAEC	18	36%
BSC/Equivalent	24	48%
Post Graduate	8	16%

Table 4.4 Indicates that out of the 50 valid responses, 18 (36%) are WAEC certificate holders, 24(48%) are BSC holder, while 8(16%) are Post Graduates.

Table 4.5 Distribution of the respondents by Age bracket

Age Bracket	N	Percentage
Under 20	18	36%
20-29	10	20%
30-39	10	20%
40-49	7	14%
50-Above	5	10%

Table 4.5 shows that out of the 50 valid responses, 18 (36%) were under 20 years, 10(20%) were between 20-29 years, 10 (20%) were between 30-39, 7(14%) were between 40-49, and 5(10%) were 50 and above.

Univariate Analysis

Analysis of Research Questions

Research Question 1

Table 4.6 Mean and standard deviation of respondents on tracking system

S/N	Tracking System	SA	A	N	D	SD	STD	X	Remark
1	The essence of tracking is to obtain information on goods in transit	23	12	2	8	5	1.07	3.70	Accepted
2	Radio frequency identification (RFID) and the global positioning system (GPS) are often used tools in item tracking.	28	12	1	6	3	1.09	3.40	Accepted
3	Tracking systems are limited to logistics firms alone.	26	17	2	3	2	0.74	3.17	Accepted

4	One goal of tracking is to identify the precise position of commodities within the supply chain.	25	10	1	8	5	0.92	3.40	Accepted
5	Tracking system saves cost, offer visibility and improves safety measure in the supply chain management.	13	12	2	6	2	0.78	3.11	Accepted

Table 4.6, sampled the public's opinion on tracking systems. Item 1 stated that The essence of tracking is to obtain information on goods in transit, it had a mean value of 3.70. Item 2 with a mean value of 3.4 stated that GPS which stands for Global positioning system and RFID which stands for Radio frequency identification are common devices used in object tracking. This finding had amazing results with all the items accepted due to the fact that they are higher than the criterion mean of 3.0

Research Question 2

Table 4.7 Mean and standard deviation of respondents on Global Positioning System (GBS) and RFID (Radio Frequency Identification)

S/N	Global Positioning System (GBS) and Radio Frequency Identification (RFID)	SA	A	D	N	SD	STD	X	REMARK
6	GPS, RFID, RTLS (Real Time Locating System), Bar Codes, Quick Response (QR) and Global Navigation Satellite System (GNSS) are all forms of tracking.	23	12	10	2	3	0.74	3.1	Accepted
7	GPS has been useful in package delivery, resource management, and	21	10	13	12	5	1.04	3.08	Accepted
8	tracking of pharmaceutical products. The use of GPS and RFID has contributed to fast and reliable delivery of goods and enhance customer experience.	24	12	15		2	1.15	3.04	Accepted
9	Tracking and Tracing systems have been integrated into pharmaceutical services in Europe, United States and India.	25	12	10	3	4	0.94	3.40	Accepted
10	Counterfeiting, fake drug distribution and illegal trafficking in drugs could be checked by tracking.	22	10	12	2	4	1.02	3.03	Accepted

Table 4.7 sampled the public's opinion on Global Positioning System (GBS) and Radio Frequency Identification. Item 6 stated that GPS, RFID, RTLS (Real Time Locating System), Bar Codes, Quick Response (QR) and Global Navigation Satellite System (GNSS) are all forms of tracking, It had a mean value of 3.1.Item 10 stated that Counterfeiting, fake drug distribution and illegal trafficking in drugs could be checked by tracking. These findings had amazing results with all the items accepted due to the fact that they are higher than the criterion mean of 3.0

Research Question 3: Service Performance

Table 4.8: Mean and standard deviation of respondents on Service Performance

S/N	Service Performance	SA	A	N	D	SD	STD	X	Remark
11	Service performance is measured against known standards of accuracy, speed of delivery of service and reduces cost.	25	12	2	8	3	1.07	3.70	Accepted
12	Procurement, dispensing, distribution and storage of drugs are pharmaceutical services.	23	10	1	10	6	1.09	3.40	Accepted
13	Response rate, rate of escalation of complaints and improvement in customer satisfaction are some of the indices in service performance.	28	9	2	10	1	0.74	3.17	Accepted
14	Service quality is measured against the background of tangibility, reliability, assurance, responsiveness and empathy.	22	12	1	8	7	0.92	3.40	Accepted
15	Innovation, resource utilization, service quality and flexibility of service are the measures of service performance.	25	10	2	10	3	0.78	3.07	Accepted

Table 4.8 sampled the public's opinion on Service Performance. Item 11 stated that Service performance is measured against known standards of accuracy, speed of delivery of service and reduces cost., It had a mean value of 3.70.Item 14 stated that Service quality is measured against the background of tangibility, reliability, assurance, responsiveness and empathy. This finding had amazing results with all the items accepted due to the fact that they are higher than the criterion mean of 3.0

Research Question 4: Reliability and Assurance as Measures of Service Performance

Table 4.9: Mean and standard deviation of respondents on Reliability and Assurance as Measures of Service Performance

S/N	Reliability and Assurance as Measures of Service Performance	SA	A	N	D	SD	STD	X	Remark
16	Reliability brings about word-of-month influence and repeat purchase of customer for a product.	15	15	1	10	9	1.07	3.70	Accepted
17	Company gain competitive advantage and customer loyalty through trust and confidence as measure of assurance in service performance.	20	15	2	10	3	1.09	3.40	Accepted
18	Customer perceived assurance as quality of service is an important indicator for service delivery.	18	9	1	5	1	0.74	3.17	Accepted
19	Skilled employees are capable and polite in their relationship with clients.	25	12	1	8	4	0.92	3.40	Accepted
20	Reliable service is seen to be accurate and dependable.	22	12	1	10	5	0.78	3.22	Accepted

Table 4.9 sampled the public's opinion on Reliability and Assurance as Measures of Service Performance. Item 16 with a mean value of 3.15 stated that Reliability brings about word-of-month influence and repeat purchase of customer for a product. Item 19 stated that Skill employees are capable and polite in their relationship with clients. This findings had amazing results with all the items accepted due to the fact that they are higher than the criterion mean of 3.0.

Bivariate Analysis

Test of Research Hypotheses

From the research questions and conceptual framework, the following important research hypotheses were formulated.

Ho$_1$: Global Positioning System tracking has no significant influence on the reliability of pharmaceutical services in Port Harcourt.

Ho$_2$: Global Positioning System has no influence on customer assurance of pharmaceutical services in Port Harcourt.

Ho₃: RFID **(**Radio Frequency Identification) has no influence on the reliability of pharmaceutical services in Port Harcourt.

Ho₄: RFID has no influence on customer assurance of pharmaceutical services in Port Harcourt.

4.2.1 Testing of Hypotheses

The study's initial chapter's hypotheses were statistically evaluated in this section using Kendall tau-b. The null hypothesis, which was stated at 0.05 level of significance, was either accepted or rejected based on the outcome of the statistical testing**.**

Ho₁: Global Positioning System tracking has no significant influence on the reliability of pharmaceutical services in Port Harcourt

Table 4.10 Kendall's tau_b Tests Output

Correlations

			GPS	Reliability
Kendall's tau_b	GPS	Correlation Coefficient	1.000	.786[**]
		Sig. (2-tailed)	.	.000
		N	50	50
	Reliability	Correlation Coefficient	.786[**]	1.000
		Sig. (2-tailed)	.000	.
		N	50	50

**. Correlation is significant at the 0.05 level (2-tailed).

Source: SPSS,2.1

According to the data in the table above, there is a high and positive connection between GPS and reliability (r = 0.786). According to the coefficient of determination (r2 = 0.62), GPS may account for 62% of the change in reliability returns. A substantial link is shown by the significant value of 0.000 (p 0.05). The null hypothesis was disproved as a result. As a result, there is a strong connection between GPS and reliability**.**

Ho₂: Global Positioning System has no influence on customer assurance of pharmaceutical services in Port Harcourt

Table 4.11 Kendall's tau_b Tests Output

Correlations

			GPS	customer assurance
Kendall's tau_b	GPS	Correlation Coefficient	1.000	.822[**]
		Sig. (2-tailed)	.	.000
		N	50	50
	customer assurance	Correlation Coefficient	.822[**]	1.000
		Sig. (2-tailed)	.000	.
		N	50	50

[**]. Correlation is significant at the 0.05 level (2-tailed).

Source: SPSS, 21.0

According to the data in the table above, there is a high and favourable association between GPS control and customer assurance (r = 0.822). According to the coefficient of determination ($r2 = 0.68$), GPS may account for 68% of the change in customer satisfaction. A substantial impact is shown by the significant value of 0.000 (p 0.05). The null hypothesis was disproved as a result. Consequently, in Port Harcourt, the Global Positioning System significantly affects client satisfaction with pharmaceutical services

Ho₃: RFID **(**Radio Frequency Identification) has no influence on the reliability of pharmaceutical services in Port Harcourt.

Table 4.12 Kendall's tau_b Tests Output

Correlations

			RFID	reliability
Kendall's tau_b	RFID	Correlation Coefficient	1.000	.812[**]
		Sig. (2-tailed)	.	.000
		N	50	50
	Reliability	Correlation Coefficient	.812[**]	1.000
		Sig. (2-tailed)	.000	.
		N	50	50

**. Correlation is significant at the 0.05 level (2-tailed).

Source: SPSS,21.0

According to the data in the table above, there is a substantial and favourable association between RFID and dependability ($r = 0.812$). According to the coefficient of determination ($r2 = 0.55$), RFID may account for 55% of the change in dependability. A substantial link is indicated by the significant value of 0.000 (p 0.05). The null hypothesis was disproved as a result. Therefore, RFID (Radio Frequency Identification) has a big impact on Port Harcourt's pharmacy services' dependability**.**

Ho4: There is no significant influence of RFID on customer assurance of pharmaceutical services in Port Harcourt

Table 4.13 Kendall's tau_b Tests Output

Correlations

			RFID	customer assurance
Kendall's tau_b	RFID	Correlation Coefficient	1.000	.772**
		Sig. (2-tailed)	.	.000
		N	50	50
	customer assurance	Correlation Coefficient	.772**	1.000
		Sig. (2-tailed)	.000	.
		N	50	50

**. Correlation is significant at the 0.05 level (2-tailed).

Source: SPSS, 21.0

According to the data in the table above, there is a substantial and positive association between RFID and client assurance ($r = 0.772$). According to the coefficient of determination ($r2 = 0.60$), RFID may account for 60% of the change in consumer assurance. A substantial impact is indicated by the significant value of 0.000 (p 0.05). The null hypothesis was disproved as a result. As a result, RFID has a big impact on Port Harcourt's consumer satisfaction with pharmaceutical services

Discussion of Findings

From the findings of this study, there is significant influence of Global Positioning System on reliability of pharmaceutical services in Port Harcourt. This was shown by the outcomes in table 4.10 with correlation co-efficient (0.786) and significant value 0.000 which lead to the study rejecting the null hypothesis of no significance influence of Global Positioning System (GPS) tracking system on the reliability of pharmaceutical services in Port Harcourt. This is consistent with our expectation apriori, which suggest that GPS tracking system positively relates with the reliability of pharmaceutical services. This adds to the validity of the claim made by the resource based theory which lay emphases on the fact that the productive of a firm resources lead to competitive advantage. This finding is also consistent with the study by Juma (2014) that tracking system helps to identify the position of shipment and inform the customer well in advance.

Also the findings suggest that the GPS tracking system has strong and positive influence on customer assurance of pharmaceutical services in Port Harcourt. This is evidenced in table 4.11 with the co-efficient determinism $r^2 = 0.68$ which indicate that 68% of change in customer assurance of pharmaceutical services in Port Harcourt is accounted for by GPS tracking. This finding is in agreement with our apriori expectation that there is a positive and strong influence of GPS tracking system on customer assurance of pharmaceutical services in Port Harcourt.

Again, the finding in table 4.12 indicates the RFID has positive effect on the reliability pharmaceutical services in Port Harcourt. This is shown by the significant value of 0.000 (P<0.05) which reveals a significant influence leading us to reject the null hypothesis and accept the alternate that Radio Frequency Identification (RFID) has a strong influence with the reliability of pharmaceutical services in Port Harcourt. This finding is in agreement with the resource-based theory that resources that are valuable and rare can lead to superior long term performance. When a company promise is dependably and accurately performed, the level of customer satisfaction increases. This finding validates the work of Ahm et al (2013) on evaluation of tracking and tracing for logistic operation.

Finally, table 4.13 shows that correlation co-efficient (r = 0.772) between RFID and customer assurance is strong and positive. With a significant value of 0.000 (P< 0.05) reveals a significant influence leading us to reject the null hypothesis and accept that there is a significant influence of RFID on customer assurance of pharmaceutical services in Port Harcourt. This discovery supports the New Vision theory, which claims that the integration of the two separate sensory modalities of touch and sight leads to the sense of moving things. This finding is consistent with Semeer et al(2009) .'s article, which offers guidance for enhancing the level of service provided by logistics service providers, pharmaceutical companies, and customers.

Conclusion

The results of this study lead us to the conclusion that the Global Positioning System (GPS) monitoring and the dependability of pharmaceutical services in Port Harcourt are significantly and favorably correlated. The GPS tracking system and client satisfaction with pharmaceutical services in Port Harcourt also have a significant and favourable association. Once more, RFID and the dependability of pharmaceutical services in Port Harcourt are positively and significantly related. Finally, RFID and customer assurance of pharmaceutical services in Port Harcourt have a strong and favourable association**.**

Recommendations
The following recommendations were made due to the findings of the study:
a)   In order to check counterfeiting, fake drugs distribution and consumption e-tracking devices (systems) should be used in the pharmaceutical industries in Port Harcourt and Nigeria.
b)   Government through its agencies should enact tracking and tracing regulations not only in the pharmaceutical industries but also in other areas of government activities like FMCG (Fast Moving Consumer Goods).
c)   Finally, e-tracking system should be developed through researches in the academics to widen the horizon of knowledge in this area of study.

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