The Effect of Logistics Service Attributes on Customer Satisfaction: A case of Ethiopian Pharmaceutical Supply Agency of Jimma, Nekemte, and Gambella Hubs.

A Thesis paper submitted to the School of Graduate Studies of Jimma University in Partial Fulfillment of the Requirements for the Award of the Degree of Master of Logistics and Transport Management.

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Declaration

I hereby declare that, this thesis entitled "**The Effect of Logistics Service Attributes on Customer Satisfaction: A case of Ethiopian Pharmaceutical Supply Agency of Jimma, Nekemte, and Gambella branches**, has been carried out by me under the guidance and supervision of Dr. Mekonnen Bogale and Mrs. Gadise Amensis.

The thesis is original and has not been submitted for the award of any degree or diploma to any university or institutions.

Researcher's Name   Date   Signature

_____   _____   _____

Statement of Certificate

This is to certify that the thesis entitled "**The Effect of Logistics Service Attributes on Customer Satisfaction: A case of Ethiopian Pharmaceutical Supply Agency of Jimma, Nekemte, and Gambella Hubs**" submitted to Jimma University, College of Business and Economics for the award of Degree of Master of Logistics and Transport Management (LTM) is a record of genuine research work carried out by Tafesse Gizaw, under our guidance and supervision. Therefore, we hereby declare that no part of this thesis has been submitted to any other university or institution for the award of any degree or diploma.

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List of Abbreviations and Acronyms

7Rs	Seven Rights
AMOS	Analysis of Moment of Structures
AVE	Average Variance Extracted
CH	Complaint Handling
EPSA	Ethiopian Pharmaceutical Supply Agency
FA	Factor Analysis
FMoH	Federal Ministry of Health
IQ	Information Quality
LSQ	Logistics Service Quality
OA	Order Accuracy
OP	Ordering Procedure
OC	Order Condition
ODH	Order Discrepancy Handling
OP	Ordering Procedure
M	Mean
PA	Product Availability
PCA	Principal Component Analysis
PCQ	Personnel Contact Quality
Sat	Satisfaction
SD	Standard Deviation
SPSS	Statistical Package for Social Science
T	Timeliness

ABSTRACT

These days, Pharmaceutical customers are one of the utmost key stakeholders in the healthcare supply chain, and ensuring their satisfactions with the logistics services have become worthwhile. This study aimed to examine the effect of logistics service attributes on customer satisfaction in the Ethiopian Pharmaceutical Supply Agency of Jimma, Nekemte, and Gambella branches. The study employed a cross-sectional descriptive and explanatory research design. A pretested questionnaire was used to collect data from 237 respondents employing a systematic sampling method. The data were analyzed through SPSS and AMOS software. Regarding customers' satisfaction level about 62.1%, 37.1%, and 49.1% of respondents expressed that they were satisfied with pre-transaction, during-transaction, and post-transaction logistics services delivery process. All logistics service attributes information quality, ordering procedures, personal contact quality, product availability, timeliness, order accuracy, order discrepancy handling, and complaint handling have affected customer satisfaction positively and significantly explaining 68.9% variation. Thus, it is worth pointing that the higher logistics service attribute is likely to enhance customer satisfaction. Therefore, Logistics managers should strive to ensure customers get the desired products and services reliably with a high level of requested quantities that are delivered on time to satisfy them even by far better than their expectations and perceptions.

Keywords: *Logistics service attributes, Customer satisfaction, Ethiopian Pharmaceutical Supply Agency**, EPSA*

CHAPTER ONE

1 INTRODUCTION

The introduction part contains the background of the study, statement of the problem, research questions, objective, significance, scope, operational definitions and organization of the study.

1.1 Background of the study

In a situation where and when pharmaceutical demand is complex, the attention and actions of researchers in the supply side is highly pronounced and increased considering services delivery quality as a means to bridge the gap. Providing customers with demanded products with reliable service delivery is considered as a solution for both sides sustainability. Pharmaceutical product providers can get satisfied customers if the service delivery process meets expectations; otherwise, dissatisfaction can occur (Lee, 2019; Oliver, 2015; Querin & Göbl, 2017; Rahman et al., 2018).

Many studies reveal that service delivery quality is linked to how logistics service is used as an intermediary operation (Daniel J. Flint, Tomas M. Hult, 2001; Gajewska & Grigoroudis, 2015; Polyakova & Mirza, 2015). Their base of argument is on how logistics activities create time and place utility, thereby enhancing product value. Many scholars proved this by describing the seven rights (7Rs) of utility creation by logistics services: delivering the right product, at the right amount, at the right place, in the right condition, at the right time, with the right information, and at the right price. Therefore, the purpose of the logistics activity is to provide good customer service by ensuring the seven rights (CSCMP, 2018; Danovičs, 2014; The Chartered Institute of Logistics and Transport UK, 2019).

Pharmaceutical logistics involves the processes and activities of warehousing, inventory management, and transportation of the products while maintaining their stability in medicine quality during inventory management and delivery. It is exceptional compared to other logistics because it must meet the special needs of hospitals, clinics, pharmacies and health centers that take into account storage conditions as well as temperature and humidity control (Lee, 2019).

Organizations start paying keen attention to logistics service quality mainly due to its close customer relationships, increased customer satisfaction, and improved business profitability.

Hence, logisticians need to have a valid and reliable measure of how customers perceive logistics service quality (Ghoumrassi & Ţigu, 2017; Gil-Saura, 2010; Huang, 2012).

In this study, customer satisfaction was studied as a customer's experience and expectation regarding logistics services. The logistics customer services are often examined by dividing its constituent elements into three phases to reflect the nature and timing of the particular service delivery as (1)**Pre-transaction elements**: are customer service factors that arise before the actual transactions taking place (e.g. organization structure, salesperson quality, method of ordering, system flexibility), (2)**Transaction elements**: are elements directly related to the physical transaction (e.g. stock availability, order cycle time, order information, delivery reliability, and condition of goods), and (3)**Post-transaction elements**: involve elements that occur after the delivery has taken place (such as repairs, warranties, returns, product tracing, complaints, invoicing accuracy) (Alan Rushton, 2010; Christopher, 2011; Kotylak, Michalowska, & Kulyk, 2017; Trzęsiok, 2019). The authors also emphasized that satisfaction may only be realized from these elements.

To strengthen the public healthcare supply chain, the Ethiopian Pharmaceutical Supply Agency (EPSA) in earlier times known as Pharmaceutical Fund and Supply Agency (PFSA) was established with mandate of availing affordable and quality pharmaceuticals sustainably to all public health facilities. Since 2007, the agency is responsible for managing, operating, and developing the healthcare supply chain in the county's public sector.

The agency has 19 branches grouped into seven clusters. Clustering the branches, a new initiative of the agency, aimed at delivering efficient services by creating mutual coordination among clustered branches on geographic proximity that paves the way to more easily tap performance reports and other information via the seven senior branches. The Western EPSA Cluster consists of Jimma, Nekemte, and Gambella hubs.

Table 1: *Western EPSA Cluster's profile*

Branch name	Jimma	Nekemte	Gambella
Address	Jimma Town, Ethiopia	Nekemte town, Ethiopia	Gambella, Ethiopia
Distance (from A.A)	335km	328km	714km
Population	About 9.2million	About 6million	936,439
No of Hospital	22 }=334	18 }=254	4 }=31
No of Health center	312	236	17

(Source: Researcher, based on data from reports and EPSA website: epsa.gov.et)

These days, Pharmaceutical customers are one of the utmost stakeholders in the healthcare supply chain, and ensuring their satisfactions with the logistics services have become worthwhile. Thus, this research is intended to examine the effect of logistics service attributes on the customer satisfaction of the Western EPSA cluster.

1.2   Statement of the Problem

The Ethiopian Pharmaceutical Supply Agency (EPSA) is meant for quantification, procurement, warehousing, and distribution of pharmaceuticals to ensure the availability, accessibility, and affordability of pharmaceuticals with appropriate quality, safety, and efficacy in the country's public healthcare system. Cognizant of these crucial roles, the agency has been striving to ensure an optimal level of product availability and excellent customer service by coordinating branches, modernizing its operations, and creating an agile system. Despite these efforts, the logistics operation of the agency is not free from efficiency and effectiveness default complaints emanated from customers and employees. Health facilities at different levels reported product stock-outs; implementation gaps in its operation were frequently reported, and the level of logistics data accuracy is not satisfactory (FMOH, 2015; PFSA, 2017).

Owning special characteristics of pharmaceutical products, associated challenges are observed in this study context. Furthermore, customers complained about fill rates and delays in the delivery of products to their facilities. These problems may affect the level of customer satisfaction in the logistics service delivery process.

The health commodities supply chain is exceptional compared to other logistics systems owning its visible health impact on the consumers. Delivering goods to customers and the way of performing this core activity matters to have satisfied customers (Černá, 2016; Christopher, 2011; Kushwaha, Sohani, & Kumar, 2017).

The national surveys conducted to measure public health facilities logistics system performance at different times indicated the point availability has decreased [89% to 79.2%] from 2015 to 2018 survey for tracer medicines selected while an assessment conducted in 17 Federal and Addis Ababa City government hospitals revealed that the availability of key medicines varies significantly [33.3% to 100%] among hospitals. The performance of public and private importers in supplying pharmaceuticals in response to hospital requests was 44.7% (EPSA, 2018; FMOH, 2015).

Logistics customer service is linked to the process of distribution and transportation. Within this process, many influences are relevant to customer service. These range from the ease of ordering to stock availability and delivery reliability (Ensermu, 2015).

Logistics customer service has been growing increasingly important and become a considerable element for organizations operating in the market. Adjustment of the key components of logistics services to customer's expectations and perceptions is important at every stage of the service process as effective logistics management involves delivery of products as well as services (Florez-Lopez R., 2012; Huang, 2012; Meidutė-Kavaliauskienė, 2014).

Customers go to service providers expecting to get a quality service. Finding out what customer's expectations is essential in providing a quality service. This can be done through focusing on issues such as what features are important to customers, what levels of these features customers expect and what customers think the company can and should do when problems occur in service delivery (Collett Miles, 2013).

In Ethiopia, several studies have been conducted on customer satisfaction in general but, no studies were focused particularly on logistics service attributes. Moreover, studies conducted in other countries with varying settings of logistics performances with facilities, inventory, transportation, customer power, and information system could not be generalized to the Ethiopian context as the subject of the study.

Hence, this study sought to fill these research gaps by conceptualizing the logistics service attributes in pre-transaction, during-transaction, and post-transaction phases and their effects on customer satisfaction. To this end, the study attempted to answer the following research questions and objectives.

1.3   Research Questions

In line with the aim of the study, the following basic research questions guided the study:

1) What is the overall customers' satisfaction level with logistics services in the Western EPSA cluster?

2) How do the Pre-transaction, During-transaction, and Post-transaction attributes of Logistics Service quality affect the customer satisfaction in the cluster?

3) Do demographics variables influence satisfaction in the customer?

1.4 Objective of the study

1.4.1 General Objective:

The study intended to examine the effect of logistics service quality attributes on customer satisfaction in the EPSA Jimma, Nekemte, and Gambella Hubs – the Western EPSA cluster.

1.4.2 Specific Objectives:

Specifically, the study is intended:

1) To determine the customer satisfaction level of the western EPSA cluster.
2) To examine the effect of pre-transaction Logistics service attributes on customer's satisfaction in the cluster.
3) To examine the effect of during-transaction Logistics service attributes on customer's satisfaction in the cluster.
4) To investigate the effect of post-transaction Logistics service attributes on customer's satisfaction in the cluster.
5) To explain the overall logistics service attributes on customer satisfaction in the cluster.
6) To identify significant demographics variables associated with customer satisfaction

1.5 Significance of the study

Meeting the customer's expectations and perceptions at every stage of the service provision is important to have a satisfied customer. This study is believed to help provide a clear understanding of the effects of logistics service attributes on customer satisfaction in the Ethiopian Pharmaceutical Supply Agency. The result of the study would serve various purposes. The Managers of Ethiopian Pharmaceuticals Supply Agency can be benefited by using information from the study to work on areas that are important to improve logistics service attributes to enhance customer satisfaction by applying recommendations. The study can provide relevant input as well to logistics organizations, service-providers, customers, and stakeholders. The study will also contribute its part in the literature of the customer satisfaction survey, and pave a way for researchers to carry out further studies on the area.

Therefore, investigating the effect of logistics service attributes on customer satisfaction will give a scientific perspective and provide relevant information on the logistics service attributes that need an intervention in the cluster.

1.6   Scope of the Study

The focus of this study was customer satisfaction of EPSA Jimma, Nekemte, and Gambella branches. The study focused on the pre-transaction, during-transaction, and post-transaction attributes of logistics services being provided in the branches. The respondents were employees who acquire and manage pharmaceuticals in the public health facilities of Western Ethiopia. The study employed a descriptive and explanatory research design. A cross-sectional survey was conducted from Dec 23, 2019 to Feb 28, 2020 – for around ten weeks.

1.7   Operational definitions

Customer: Person or public organization that purchases or receives services and/or pharmaceuticals from EPSA (i.e., Health facility – both Health centers and Hospitals).

Customer Satisfaction level: a measure of extent how products and/or services supplied by EPSA meet customers' expectations and perceptions.

Logistics customer service: A process of activities (procedures) aimed to process customer order that in turn enhances the level of customer satisfaction that is the feeling a product or service has met the customer expectation and perception.

Logistics service attribute: The product or service dimension of logistics customer services that influence customer satisfaction in different ways and used to construct the LSQ model.

1.8   Organization of the study

The study was organized into five main parts. Chapter one presents the 'Introduction' that deals with the background of the study, problem statement, research questions, objective, operational definitions, significance, and scope of the study. Chapter two discusses 'Literature Review'. Here, concepts and related empirical literatures were reviewed and concluded by the conceptual framework of the study. The third chapter clarifies the 'Research Methodology' employed for the investigation. Chapter four presents the 'Results and Discussions of the study. The last chapter, chapter five, presents the 'Summary findings, Conclusions, and Recommendations' based on the analysis result provided by the researcher.

CHAPTER TWO

2   LITERATURE REVIEW

This chapter presents the literatures related to the research topic. It is composed of three sections. The first section, theoretical review, elaborates on the service quality, logistics customer service, logistics service quality models, logistics service attributes, and customer satisfaction. The second section highlights empirical studies on the effect of logistics service attributes on customer satisfaction, and the third section emphasizes the proposed conceptual framework and hypothesis of the study.

2.1   Theoretical Review

2.1.1   Service quality

The definition of quality depends on the point of view of the people defining it. Quality is defined as *conformance to requirements/specifications* or *performance to standards* in process/ supply-led or manufacturing-based approach whereas it is compared with the *satisfaction or fitness for purpose* in user-based approach (Ghobadian et al., 1994; Jurgen Rudolph; Christopher W. Harris, 2018; Polyakova & Mirza, 2015; Render et al., 2012). There are notable differences between services and finished products due to unique service characteristics of inseparability, heterogeneity, intangibility, and perishability (Ghobadian et al., 1994; Mentzer, Flint, & Kent, 1999; Polyakova & Mirza, 2015).

Service inseparability: services cannot be separated from their providers. The production and consumption in service industries take place at the same time. When an employee provides the service, the employee and customer are present as the service is produced. Thus, provider - customer interaction is a special feature of services marketing.

Service variability implies the quality of services depend on who provides them, as well as when, where, and how they are provided. In-service provision settings, heterogeneity complicate the provider's task to reproduce the same service consistently on each occasion.

Service intangibility refers to the lack of physical attributes, so they cannot be seen, tasted, felt, heard, or smelt before they are bought.

Perishability of service indicates that services cannot be stored for later sale or use. This places extra responsibility on the service provider to get the service right the first time, and every time.

2.1.2   Perceived Service quality

According to different authors, the perceived service quality is the end-result of an evaluation process where the customers compare their expectations with service they have received (Gronroos, 1984; Parasuraman, V, & Berry, 1998). Service quality is a measure of the extent to which the customer is experiencing the level of service that he or she is expecting. Thus, it is the match between what the customer expects and what the customer experiences. Any mismatch from this can be called the *service quality gap*. The authors noted that the customer's viewpoint is what the customer perceives or believes to be happening, not necessarily what is happening in terms of what the supplier is providing. Perceived quality is always a judgment that the customer makes – whatever the customer thinks is reality is reality, no matter what the supplier may believe to the contrary! (Alan Rushton, 2010; Parasuraman, V, & Berry, 1985).

To measure the quality of intangible services, researchers generally use the term *perceived service quality*. It is a result of the comparison of perceptions about the *service delivery process* and *actual outcome of service* (Gronroos, 1984).

Playing a leading role in service quality research, Parasuraman, A., Zeithaml, V.A., Berry, and L.L. (1988) defined service quality as the discrepancy between consumer perceptions and expectations. If customers' perceptions and expectations are equal the customer is considered satisfied. They have put forward perceived service quality is the summation of prior customer expectation, actual process quality, and actual outcome quality. This hypothesis implies that *prior expectations* are compared with the actual *service delivery process* and the *service outcome* and that it is through this comparison that the perceived quality is formed   (Parasuraman et al., 1998).

Service quality is the result received comparing customers' expectations with the perception of service quality. Clients, before ordering the service, already have expectations of what the service provider should offer them. Therefore, the quality of logistical service perceived by the client is the difference between the perceived service and expectation (Huang, 2012).

2.1.3   Logistics customer service

Based on the definition, the essence of logistics customer service is to meet the needs of customers related to the delivery time, delivery reliability, convenience, and good communication. The literature acknowledges many attempts to define the logistics customer

service. For instance, D. Kempny (2001), defined as the ability or capacity to satisfy the requirements and expectations of customers, mainly as to the time and place of the ordered supplies, using all available forms of logistics activity, including transportation, warehousing, inventory management, information & packaging, and Kramarz (2014), ability of the logistics system to respond to customer needs in terms of time, reliability, communication and convenience.

2.1.4 Logistics service quality model

Over the years, several conceptual models have been developed by different researchers for measuring service quality even though measuring service quality is more difficult due to unique characteristics of services - intangibility, heterogeneity, inseparability, and perishability - than products quality. A firm may find it difficult how the customers perceive their services and evaluate the service quality (Ghobadian et al., 1994; Parasuraman et al., 1998; Vrat, 2014). The most influential LSQ models in the literature are described below.

I) Grönroos (1984) Model

According to Grönroos's model (1984, 2015), consumers' views of technical and functional services dimensions form the perceived quality. Technical quality refers to the outcome of the service performance whereas functional quality defines customers' perceptions of the interactions that take place during service delivery. *Technical quality* is interested in *what* was delivered whereas *functional quality* is interested in *how* the service was delivered. Corporate image has a positive impact on customer perceptions. The author also noted that the quality of a particular service is whatever the customer perceives it to be (Gronroos, 1984; James, 2004).

II) GAP model

Parasuraman et al. (1985) analyzed the dimensions of service quality and set up a GAP model that provides an important basis for defining and measuring service quality.

The GAP relations and names are shown below:

GAP 1: Customer expectation-management perceptions gap: *The Knowledge Gap.*

GAP 2: Management perception-service quality specifications gap: *The Policy Gap.*

GAP 3: Service quality specifications-service delivery gap: *The Delivery Gap.*

GAP 4: Service delivery-external communications gap: *The Communications Gap.*

GAP 5: Expected service-perceived service gap: *The Service Quality Gap.*

After the gaps modeling, the determinants of service quality that consumers used when interpreting the quality are identified as reliability, responsiveness, competence, access, courtesy, communication, credibility, security, understanding/knowing the customer, and tangibles (Parasuraman et al., 1985).

III) SERVQUAL Model

Parasuraman et al. (1988), revising the former model, developed service quality (SERVQUAL) - an advanced model for measuring service quality. The model summarized service quality in five dimensions as *Tangibles, Reliability, Responsiveness, Assurance, and Empathy.* They measured functional service quality in banking, repair and maintenance, and long-distance telephone services (Parasuraman et al., 1998).

IV) SERVPERF Model

Cronin and Taylor (1992) developed the service performance (SERVPERF) model arguing that service quality is a performance-only measure. They developed the model for measuring service quality with empirical studies in banking, pest control, dry cleaning, and fast food sectors (Cronin, 1992).

V) PDSQ Model

Carol C. Bienstock, John T. Mentzer, and Monroe Murphy Bird (1997) developed a measure of Physical distribution service quality (PDSQ) - emphasizes the physical distribution service attributes of timeliness, availability, and condition in their marketing efforts to their customers which is the technical component of logistics service quality. Here, 'condition' refers to the order condition and covers quality (Bienstock, 1997).

VI) MFK's Logistic Service Quality

Mentzer, Flint, and Kent (1999) denoted as MFK developed and validated the LSQ using Defense Logistics Agency (DLA) - logistics services provider firm in the United States. They developed a 25 item instrument of the nine dimensions for evaluating LSQ by expanding the concept of service quality into logistics context. The nine constructs are information quality, ordering procedures, order release quantities, timeliness, order accuracy, order quality, order condition, order discrepancy handling, and personnel contact quality (Mentzer et al., 1999).

VII) Logistics Service Quality as a Segment-Customized Process

John T. Mentzer, Thomas M. Hult, and Daniel J. Flint (2001) expanded PDSQ's technical/outcome dimensions with the addition of functional/process nature dimensions such as personnel contact quality, order release quantities, information quality, ordering procedures, and order discrepancy handling. They emphasized that LSQ should be conceptualized as a process that can be applied across multiple customer segments (Daniel J. Flint, Tomas M. Hult, 2001).

Table 2: *Summary of Dimensions of Service Quality Models*

Author(s)	Model	Dimensions
Grönroos (1984)	SQ Model	Technical quality, Functional quality, and corporate image
Parasuraman et al. (1985)	GAP Model	Reliability, Responsiveness, Competence, Access, Courtesy, Communication, Credibility, Security, Understanding or Knowing the Customer, and Tangibles
Parasuraman et al.(1988)	SERVQUAL	Tangibles, Reliability, Responsiveness, Assurance, and Empathy
Cronin and Taylor (1992)	SERVPERF	Same as SERVQUAL with performance only statements
Bienstock et al. (1997)	PDSQ	timeliness, availability, and condition
Mentzer et al. (1999)	MFK LSQ	information quality, ordering procedures, order release quantities, timeliness, order accuracy, order quality, order condition, order discrepancy handling, and personnel contact quality
Mentzer et al. (2001)	LSQ as 'process'	Same as that of Mentzer et al. (1999) except attributes contribute differently to the model in terms of satisfaction
Davis (2006)	Operational and relational LSQ	The operational dimension refers to activities of physical distribution service and the latter one involving activities of marketing customer service
Rafiq& Jaafar (2007)	Customer's perception of LSQ	Same as that of Mentzer et al. (2001) except the 'information quality' and 'ordering procedure' constructs were modified to contain at least three measuring items

Source: Summarized from models discussed above

2.1.5 Logistics customer service Attributes

When we talk about the effect of logistics in service providing organizations, the concern is no longer only moving from the supplier to the buyer, but also pursuit logistics service in a short time, with flexible service, and high value-added services and in a way that satisfies the customers. Therefore, the quality of logistics has become more and more important to the development of commerce (M. Wang, 2016).

Bienstock et al. (1997) validated a 15-item physical distribution service quality (PDSQ) scale based on the value-added utilities of time, place and form, and comprised of three technical/outcome physical distribution service attributes of timeliness, availability & condition (Bienstock, 1997).

They explained that the difficulties confronted in put on this scale to an industrial service context were based on the relative importance of technical/outcome versus functional/process dimension that significantly affects the evaluation of industrial service transactions. Technical/outcome quality determines whether the service delivers the core benefit or outcome that is promised, while functional/process quality addresses the process of service delivery (Gronroos, 1984).

The LSQ concept was expanded by encompassing PDSQ's technical/outcome dimensions of timeliness, availability, and condition, along with additional dimensions of a functional/process nature such as personnel contact quality, order release quantities, information quality, ordering procedures, and order discrepancy handling (Bienstock, 1997; Daniel J. Flint, Tomas M. Hult, 2001).

A study carried out in third-party logistics (3PL) industry in India indicated that the number of attributes of LSQ as seven (information quality, ordering procedures, timeliness, order accuracy, order condition, order discrepancy handling, and personnel contact quality) and that all 25 items of MFK are valid in the Indian situation (Kamble, 2011).

A study conducted in Ethiopia on online shopping from the Jumia market established the same seven attributes of LSQ as a study carried out in third-party logistics (3PL) in India (Alemu, 2016).

2.1.6 Customer satisfaction

Customer satisfaction has been the theme of considerable research and it has been defined and measured in various ways (Oliver, 2015; Parasuraman et al., 1998; Vrat, 2014). It is important for logistics companies while carrying their activities to show that their actions and deeds are satisfying the customer (Ghoumrassi & Țigu, 2017).

Oliver (2015) has concluded that satisfaction cannot be defined but based on the theoretical and empirical evidence, it can be defined as *Satisfaction is the consumer's fulfillment response while dissatisfaction isn't. It is a judgment that a product or service feature, or the product or service itself, provided (or is providing) a pleasurable level of consumption-related fulfillment, including levels of under or over fulfillment*. Nowadays, the expectancy disconfirmation model of consumer satisfaction is considered an important paradigm in satisfaction. The author suggests that customers purchase goods and services with pre-purchase 'performance-specific expectations' based on their previous experiences and used as reference points against which the product/service's performance, once purchased and used, is compared (Oliver, 2015).

Kotler (2010) defined satisfaction as: "a person's feelings of pleasure or disappointment resulting from comparing a product perceived performance (or outcome) with his or her expectations". Customers would be satisfied if the service outcome meets expectations. When the service quality exceeds the expectations, the service provider has won a delighted customer. Dissatisfaction will occur when the perceived overall service quality does not meet expectations (Kotler, 2010; Looy, 2013; Parasuraman et al., 1998).

If the company understands customers' requirements, it is easier for service providers to satisfy them. Knowing customers' satisfaction level and their requirements will also help in finding out the best direction in which the company needs to go on (M. Wang, 2016).

The level of customer satisfaction is an assessment of how the customer understands the business activities of logistics companies as their supplier. Customers have satisfaction with the logistics services when their expectations are confirmed. Otherwise, they are dissatisfied. The greater the differences between expectations and actual perceived performance of logistics services are, the stronger the customer satisfaction or dissatisfaction is (Černá, 2016).

Customer satisfaction depends on various factors such as the perceived quality of service, customer mood, emotion, social interaction, customers' associates' experience, and other specific subjective factors. Besides, it is necessary to keep in mind that customer satisfaction with the quality of service is not the objective assessment of the real situation, but an element of emotional nature. Measuring customer satisfaction level plays an important role in identifying the customer perception on the product /services offered by a given company and help to take a corrective action to retain the customer's satisfaction at the highest level (Meidutė-Kavaliauskienė, 2014).

Logistics services can be evaluated first of all by measurement of customer satisfaction. Customer satisfaction has been a subject of great interest for organizations and numbers of researches because customers are key stakeholders in organizations and their satisfaction is a priority for sustainable growth (L. Wang, 2015).

2.2   Empirical Review: The Effect of LSQ attributes on Customer satisfaction

Service quality has become an important parameter to identify the customer satisfaction in various service organizations. "Service quality can win and keep customers" (Ghobadian et al., 1994). A considerable number of researchers in the literature agree that there is a correlation between service quality dimension and customer satisfaction (Giovanis, 2013; Lúcia et al., 2015; Sampaio, 2012).

Customer satisfaction is a key factor in assessing the quality of a service attribute. Xie (2011) argued that service quality is the predecessor of customer satisfaction. It can, therefore, be assumed that the quality of service leads to customer satisfaction (Gang Xie, 2011).

A survey conducted in Singapore shows that logistics service activities performed focusing on the needs and requirements of customers would be appreciated by customers. Quality of customer focus activities in the interactions between logistics service providers and their customers is deemed the most critical to enhance perceived logistics service quality (Thai, 2014).

The logistics service companies in Lithuania perceived the expectations of consumers and able to meet the needs of consumers since the Customer Satisfaction Index of 80.79% was received from the customers (Meidutė-Kavaliauskienė, 2014).

A survey conducted in Poland shows that >89%, >93%, and 76% of the respondents expressed satisfaction with pre-transaction service, during the transaction, and after the transaction services respectively (Kułyk;, Michałowska;, & Kotylak, 2017).

A study on logistics service providers in Poland has shown that logistics costs and shorter delivery time are significant logistics services for customer's satisfaction (Trzęsiok, 2019).

A study conducted in manufacturing companies in Greece shows that outcome quality dimension conceptualized across four sub-dimensions of availability, timeliness, order accuracy, and order condition, and process quality dimension that comprised of ordering procedures, personnel contact quality, information quality, and order discrepancy handling influence customer satisfaction significantly (Giovanis, 2013).

A study conducted among customers in the maintenance service industry in Ghana revealed that improving overall service quality is likely to enhance customer satisfaction. The overall service quality explains 73% of the variance of customer satisfaction (Baffour-Awuah, 2018).

Assessment of service delivery and customer satisfaction at Ethiopian Shipping and Logistics Service Enterprise (ESLSE) in Logistic transport sector shows that only 41.08% of respondents are satisfied with the quality of service delivery by the enterprise (Taye, 2014).

A study conducted on consumers' satisfaction with logistics services on the online Jumia market shows that 81.3% of the consumers are satisfied with shopping experience (Alemu, 2016).

2.3 Research gaps

Conventionally, the existing researches in logistics research approach inventory levels, facility locations, warehousing, and logistics network designs and has focused on the logistics service providers. Most of these studies concentrated on the operational performance of the companies while placing little importance with regard to customers' perception. This is an important gap that paves for studies regarding the logistics service attributes from the customer perspective.

Another gap arises from the scarcity of research on the effects of logistics service attributes on customer satisfaction in logistics context. The existing logistics service models have been developed before 2000s since then e-service models just start evolving. Attributes of service quality vary from one service industry to another especially industries that offer service-product to customers. In the EPSA, customer services are offered in combination with a physical product.

2.4 Conceptual framework and Hypothesis of the study

The conceptual framework discusses the interrelationships among the variables that are deemed to be integral to the dynamics of the situation being investigated. Developing a conceptual framework helps to hypothesize and test certain relationships and thus to improve understanding of the dynamics of the situation (Cohen, 2017; Kumar, 2011).

Kothari (2004) defined an independent variable as the explanatory variable that is the presumed cause of the changes of the dependent variable – the variable the researcher wishes to explain (Kothar, 2004).

The proposed LSQ Models are not consistent when compared across different types of service industries. Dimensions of service quality vary from one industry to the next. This is especially true for industrial services like logistics that focus on tangible things directed toward physical objects versus intangible actions directed toward thoughts and attitudes. Therefore, researchers have to carefully assess which issues are important to service quality in their particular situations and to modify the LSQ scale accordingly (Gronroos, 1984).

Specifically, as far as my experience in EPSA and operating procedures, it is generally understood that customers place orders, interact with contact personnel, orders are processed, available products are picked, dispatched, and ready for receipt. Customers have contact with this process when receiving orders. At the order receipt stage of the logistics process, customers confirm product availability, order accuracy, and condition. When order receipt is not as expected, customers stay engaged in the logistics process through discrepancy handling. If the discrepancy management is not satisfactory or have other query, customers start an inquiry, claim, or complaints about the order.

This research proposes a new model of logistics service quality which consists of nine dimensions with 35 items in the scale. The following table illustrates the logistics service quality dimensions considered in this study along with their interpretations.

Table 3: *LSQ Attributes considered in this study with interpretations*

S.no	LSQ Attributes (Variables)	Interpretation	Items
1	Information Quality	The adequacy, timeliness, completeness, credibility, and accuracy of the information provided by the agency	5
2	Ordering procedure	The effectiveness, easiness, and convenience of order receiving procedures followed by the agency	4
3	Personnel Contact quality	The agency's contact personnel knowledge, experience, empathy for customer's situation, and help them resolve problems.	4
4	Product Availability*	Stock availability and ability to obtain desired order quantities from the agency	4
5	Order condition	The agency's ability to provide orders without any damage or loss (intact and conveniently packaged)	3
6	Timeliness	The agency's ability to deliver orders as promised, and timely response for urgent/emergency requests	3
7	Order accuracy	The agency's ability to deliver the right items in the order, the correct number of items, no substitutions with accurate invoices.	4
8	Order discrepancy handling	Capability of the agency on addressing any discrepancies in orders after the orders had delivered	4
9	Customer complaint handling*	Handling of customer query (customers' claim, complaints, and questions)	4

*Source: Adopted from Mentzer et al. (2001) (*Included in this study)*

Based on the gaps identified and discussions made on empirical and theoretical evidences, the following conceptual framework is proposed by the researcher.
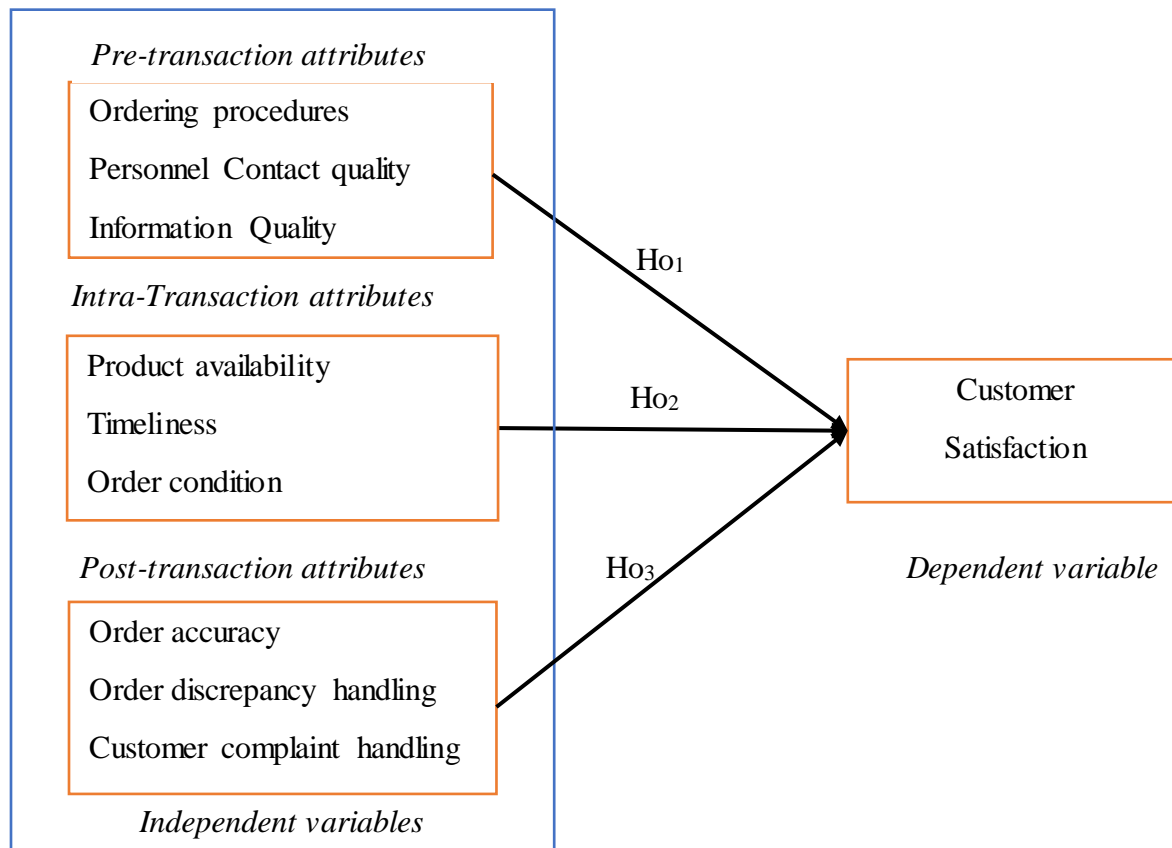
Figure 1: Conceptual Framework of the Study Modified by the researcher

As Figure 1 depicts, customer satisfaction can be influenced by logistics service attributes considered in this study: Pre-transaction, During-transaction, and post-transaction attributes. The following null hypotheses were developed and tested in the finding part of the study:

Ho1. *Pre-transaction logistics customer service attributes have no positive significant effect on customer satisfaction in the agencies.*

Ho2. *During-transaction logistics customer service attributes have no positive significant effect on customer satisfaction in the agencies.*

Ho3. *Post-transaction logistics customer service attributes have no positive significant effect on customer satisfaction in the agencies.*

Ho4. *All transaction logistics customer service attributes have no positive significant effect on customer satisfaction in the agencies.*

CHAPTER THREE

3   RESEARCH METHODOLOGY

Research methodology is a way to systematically solve the research problem. It may be understood as a science of studying how research is done scientifically (Cohen, 2017). In this chapter, research design, sampling design, method of data collection, and analysis was described.

3.1   Research Design

Research design is the plan and structure of investigation to obtain answers to research questions (Jack R. Fraenkel, 2012; Richard A., 2009). Since the study intended to examine the effect of logistics service attributes on customer satisfaction, it employed both a descriptive and explanatory research design. The descriptive research design was employed with focuses of portraying the level of customer satisfaction and logistics service attributes in the agencies that gives an in-depth understanding of customer perceptions related with logistics service delivery in the agencies. On the other hand, to explain the relationship between logistics service attributes and customer satisfaction in addition to the effect of logistics service attributes on customer satisfaction, explanatory research design was applied by testing hypotheses.

There are three types of research approaches namely: qualitative, quantitative, and mixed approach (Creswell, 2012, 2014). A quantitative approach involves the use of statistical methods to assemble, classify, analyze, and summarize the collected data to derive meaning. The study utilized quantitative research approach to quantify the problem and to collect data from the respondents to understand and predict the perceptions and experiences of the target population.

3.2   Data and their sources

The study used both primary and secondary data. Primary data refer to data collected though questionnaire from employees working at public health facilities in the stated area. Data were also gathered from the websites, journals, books, reports, magazines of different institutions along with relevant literature and empirical findings to supplement the research.

3.3 Sampling Design

3.3.1 Target population

Target population is the group of people, events, or things of interest that the researcher wants to investigate for research purposes (Leeuw, 2012). The target population of this study consisted of employees who are responsible for acquiring and managing pharmaceuticals in the public health facilities of EPSA Jimma (334), Nekemte (254), and Gambella (31) hubs. Therefore, the sampling frame was 619 public health facilities.

3.3.2 Sample size

There are several approaches to determining the sample size. These include using a census for small populations, using published tables, and applying formulas to determine a representative sample size from the target population. The calculation aims to determine an adequate sample size that can estimate results for the target population with a good precision. Assuming the maximum variability (p =0.5) and taking 95% confidence level with 5% precision, Yamane (1967:886) provides a simplified formula to calculate sample sizes as $n = \frac{N}{1+N[2e/Z]^2}$ where n is the sample size and N is the target population (619). Therefore, a total of 237 respondents were selected by applying this formula.

3.3.3 Sampling Technique

To select the respondents, a systematic random sampling method that ensures even spread of sample over the target population was used to draw sampling unit from the branches. In this method, the first unit is selected with the help of random numbers and the remaining units are selected automatically according to a fixed interval. Having sorted the list of health facilities in alphabetical order within woreda at each zones and branches, a sampling interval of $[Ni / ni = 619/237 = 2.6118]$ 2.6118 was used. To select a systematic random sample of 237 elements from 619 subjects, a random number '1' was drawn by using a lottery method (from 1, 2, and 3). As a result, numbers selected at regular sampling interval constituted the sample.

To realize the required number of samples from each branch, a sampling fraction [n/N=237/619] 0.38 that estimates the sample size with higher degree of precision was employed.

Table 4: *Distribution of sampled respondents from each branch*

S. No	Name of Branch	Target Health facilities (Ni)	Sampled Health facilities (ni)
1	Jimma	334	334*0.38 = 128
2	Nekemte	254	254*0.38 = 97
3	Gambella	31	31*0.38 = 12
	Total	**619**	**237**

(Source: Researcher, based on data from reports and EPSA website)

Thus 128, 97, and 12 health facilities were included from Jimma, Nekemte, and Gambella branches respectively. The researcher focused on employees with relevant experiences in logistics services who acquire and manage pharmaceuticals in the sampled hospitals and health centers as a unit of analysis (Fuller, 2009).

3.4 Data collection instrument

The study consisted of nine LSQ constructs: information quality, ordering procedure, personnel contact quality, product availability, order condition, timeliness, order accuracy, order discrepancy handling, and complaint handling with 35 indicators (items), and customer satisfaction (with five items) as a dependent variable in the survey tool [See APPENDIX].

A self-administered questionnaire was used to collect data from respondents. The questionnaire was adopted from previous works (Mentzer et al. (1999, 2001)) to suit the objectives and conceptual framework of the study. To improve the reliability of the LSQ scale, two-item scales from previous works were modified to contain at least three items in the scale, 'order quality' which has a similar concept with 'order condition' in the agency was dropped and instead 'customer complaint handling' included in the study. Also, there are changes in wording to reflect the context of the agency and the rewording of some statements.

The questionnaire comprised of four parts. The first part with six questions was used to assess demographic information and the recent purchase time of respondents. The second part of the questionnaire was used to examine LSQ attributes by a 5-point Likert scales tapped at (1) 'strongly disagree' to (5) 'strongly agree' for 35 measuring items, the third part was used to determine customer satisfaction by a 5-point Likert scales marked at (1) 'Very dissatisfied' to (5)

'Very satisfied' for five customer satisfaction statements and the final part was used to collect customer's suggestion in open-ended questions.

3.5 Pilot test

Before a cross-sectional survey, the questionnaire was pretested on a 23 customers who were part of the target population, and minor changes were made at this point in order to ensure that it was fully and correctly understood.

3.6 Reliability and Validity

Reliability refers to the degree of consistency with which an instrument measures the attribute it is designed to measure (Kothar, 2004; Sekaran, 2003). To establish reliability of items in the questionnaire, Cronbach's alpha was tested on the pilot study. The below table depicted all variables have values greater than 0.65 (cut-off value of 0.70). The preliminary analysis indicated that the variables had sufficient reliability in terms of the coefficient alpha.

Table 5: *Reliability results for pilot test study*

S. No	Study variables	No of items	Cronbach α
1	Information Quality (IQ)	5	0.752
2	Ordering Procedure (OP)	4	0.675
3	Personnel Contact Quality (PCQ)	4	0.715
4	Product Availability (PA)	4	0.733
5	Order Condition (OC)	3	0.811
6	Timeliness (T)	3	0.652
7	Order Accuracy (OA)	4	0.720
8	Order Discrepancy Handling (ODH)	4	0.689
9	Complaint Handling (CH)	4	0.738
10	Satisfaction (Satis)	5	0.861
	Overall	**40**	**0.923**

(Source: Pilot study Data, 2020)

A questionnaire is valid if it measures the concept we are attempting to measure. Content validity was ensured by making questionnaire encompass an adequate coverage of the topic under study and relied on professional knowledge, experiences, and review of literatures in general, and

academic experts. The questionnaire also gets comments from main advisor and other academic researchers. After rephrasing some questions, the data collection gets started.

3.7 Method of Data Analysis

The researcher ensured the technical data quality for its consistency, completeness, and other errors before data entry. Each questionnaire was also assigned a serial number to facilitate easier references to the questionnaires during the process of data processing. The collected data were coded and entered into EpiData version 3.1software. The EpiData output was exported into Statistical Package for Social Sciences (SPSS) software version – 26.0. Then it was analyzed through the use of SPSS and AMOS (Analysis of Moment Structure) version – 22.0 Software.

Descriptive statistics of frequencies and percentages were computed for the respondents' demographics information and recent purchase/receipt time. Means and standard deviations were used to assess the respondents' level of agreement to Logistics service attributes based on their expectations and perceptions. Bar graph was used to determine the level of customer satisfaction on the logistics services.

Before examining the effect of Logistics service attributes on customer satisfaction, fit of data for multivariate analyses (assumptions of Multivariate normality & outliers, Multicollinearity, Linearity and Homoscedasticity) were tested. Pearson's product-moment correlation was computed to measure the strength of the linear relationship between variables.

Factor analysis mainly principal component analysis was conducted to establish the construct validity, and to use the results for subsequent multivariate analysis. The reliability and validity of constructs were tested after summarizing the significant factor loading of items. The summated scale of items with the highest factor loadings used for linear regression analysis.

Analysis of variance (ANOVA) and independent sample t-test were used to compare whether the means of groups formed from demographics variables differ significantly on customer satisfaction. Tukey HSD posthoc test was employed to identify any specific differences for significant multivariate tests. Output of the analysis was displayed in tables, graphs, and charts.

Model specification: Multiple regression models

The researcher tried to predict customer satisfaction (CS) based on the effect of logistics customer service attributes in the study. A multiple regression model with one dependent variable –CS– was predicted as a linear combination of the nine independent variables as:

CS = f (order quality, ordering procedures, personnel contact quality,…, Complaint handling)

Multiple regression equation assumes the form:

$$Y = a + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + b_7X_7 + b_8X_8 + b_9X_9 + e \qquad \text{where:}$$

✍ $X_1, X_2, X_3, X_4, X_5, X_6, X_7, X_8,$ and X_9 are independent variables (information quality, ordering procedures, personnel contact quality, product availability, order condition, timeliness, order accuracy, discrepancy handling, and complaint handling) which predict' Y 'being the response variable (customer satisfaction)

✍ $b_1, b_2, b_3, ….,b_8,$ and b_9 are regression coefficients - a measure of how strongly each independent variable predicts the dependent variable, 'a' is constant, and 'e' represents the error or leftover unexplained by the model.

3.8 Ethical Considerations of the Study

Ethics in business research refers to a code of conduct or expected societal norm of behavior while conducting research. The researcher has undertaken the following measures to ensure the code of ethics while conducting the research: ethical clearance was obtained from Jimma University, College of Business and Economics, consent of the respondents were obtained before they took part in the research, data obtained were treated with utmost confidentiality and objectives of the research and their contribution to its completion was debriefed, and literature used for this study were acknowledged and credited at the references.

CHAPTER FOUR

4 RESULTS AND DISCUSSIONS

This chapter has four sections namely demographic characteristics, customer perception towards logistics service attributes, satisfaction level on logistics customer service provided by the agency, and the effect of pre-transaction, transaction, and post-transaction logistics service attributes on customers satisfaction.

4.1 Survey Response rate

From a total of 237 respondents, 224 were usable for data analysis representing the response rate of 95%. The rest of the responses were either unable to access the respondent (7), incomplete (2), or showed a pattern of inconsistency in filling the questionnaire (4).

4.2 Demographic Information and recent purchase time of the Respondents

Demographic characteristics assessed from respondents were the type of health facility, gender, age, profession, experience, and recent purchase or receipt time. Table *6* provides details of the respondents' profile. Most of the respondents (93%) were from health centers. Male respondents represented 73% of the surveyed health facilities. The greatest group of respondents (71.1%) is aged between 25 and 34 years of age. Pharmacy professionals represented 66.5% of the respondents. Most respondents (82%) had more than two (2) years of working experience and almost all of the respondents (94.6%) purchased/received products within six months. This conveys that majority of the respondents had recent purchase/receipt experience with the agency and more familiar to agencies logistics customer services and they were in a position to give credible information relating to the study. Thus, the context of the study meant that the age, experience, and professional distribution of the customers were skewed towards young adults, more experienced, and pharmacy professionals.

Table 6: *Demographic information of the Respondents*

Variables		Frequency (%)	Cumulative %
Type of Health Facility	Health center	209(93.3)	93.3
	Hospital	15(6.7)	100.0
Gender	Male	163(72.8)	72.8
	Female	61(27.2)	100.0
Age in Years	20-24	23(10.3)	10.3
	25-29	95(42.4)	52.7
	30-34	71(31.7)	84.4
	35-39	26(11.6)	96.0
	40-44	9(4.0)	100.0
Profession	Pharmacy	149(66.5)	66.5
	Clinical nurse	55(24.6)	91.1
	Laboratory Technician	20(8.9)	100.0
Experience in Years	Less than 2	40(17.9)	17.9
	2 to 4	63(28.1)	46.0
	Greater than 4	121(54.0)	100.0
Recent purchase or receipt time in months	Less than 3	166(74.1)	74.1
	3 to 6	46(20.5)	94.6
	7 to 10	9(4.0)	98.7
	Greater than 10	3(1.3)	100.0

(Source: Study Data, 2020)

4.3   Customers perception towards Logistics Service Attributes

A descriptive analysis was performed to identify respondents' expectations and perceptions of the attributes of Logistics service quality. Respondents were requested to rate their agreements to logistics service quality attributes by a 5-point Likert scale tapped at (1) 'strongly disagree' to (5) 'strongly agree'. Accordingly, based on the attributes' mean scores, the customers' perceived agreements were indicated for each logistics service attributes. A summary for each logistics service component is provided below.

4.3.1   Customer's Agreement to Pre-transaction Logistics Service Attributes

The perception of customers for each pre-transaction logistics service attributes were presented in Table 7. Of the 3 dimensions, the highest mean score was ordering procedure (3.60), followed by Personnel contact quality (3.52), and information quality (3.44). These values indicate agreement of customers to logistics service provisions as all of the mean scores are above 3 (neutral point of measurement scale) with a cumulative mean score of 3.52.

Table 7: *Descriptive statistics for Pre-transaction Logistics Service Attributes*

	Measured Items	Mean	SD*
Information Quality (IQ)		**3.44**	**.812**
IQ_1	Communication platforms provide the current information	3.69	.819
IQ_2	The information about the products/services is complete	3.57	.766
IQ_3	The information about the products/services is adequate	3.46	.792
IQ_4	The information about the products/services is accurate	3.22	.842
IQ_5	The information about the products/services is credible	3.25	.840
Ordering procedures (OP)		**3.60**	**.818**
OP_1	Requisitioning procedures are effective	3.71	.751
OP_2	Requisitioning procedures are convenient	3.62	.772
OP_3	Requisitioning procedures are flexible (can be sent online)	3.46	.872
OP_4	Requisitioning procedures are simple	3.61	.877
Personnel Contact Quality – PCQ		**3.52**	**.876**
PCQ_1	Distribution officer makes an effort to understand needs	3.50	.836
PCQ_2	The officer has adequate knowledge to handle the request	3.63	.889
PCQ_3	The officer has required experience to process the request	3.59	.836
PCQ_4	The employees show real interest in solving problems	3.35	.944

(Source: Study Data, 2020; SD = Standard deviation)

Responses grouped from open-ended questions accommodate additions that may not have addressed by closed-ended Likert scale type. The result reveals few respondents emphasized the EPSA's customer relationships at pre-transaction level of the logistic service is found worthy, and recruitment of experienced druggists at invoicing class to enable them an easy selection of products.

4.3.2 Customer's agreement to Transaction Logistics Service Attributes

The customers' perception for each transaction-related logistics service attributes are displayed in Table 8 below. In terms of the attribute, the highest mean score was order condition (3.60) followed by product availability (3.10), and timeliness (2.93). These values indicate a slight agreement of customers as the overall mean score (3.18) is near to the neutral point. The mean average of 2.93 for timeliness attribute implies customers disagreed with most of the items under this construct.

Table 8: *Descriptive Statistics for Transaction Logistics Service Attributes*

	Measured Items	Mean	SD*
Product Availability (PA)		**3.10**	**.801**
PA_1	Ordered products are available in the inventory	3.17	.732
PA_2	Ordered quantities are not challenged due to stock shortages	2.86	.877
PA_3	Ordered quantities not challenged due to maximum quantity	3.14	.762
PA_4	Difficulties never occur due to experiences of stock out items	3.05	.832
Order Condition (OC)		**3.60**	**.748**
OC_1	Products received after order placement are undamaged	3.63	.741
OC_2	Orders are packaged conveniently	3.63	.722
OC_3	Damage rarely occurs as a result of the transportation	3.54	.780
Timeliness (T)		**2.93**	**.975**
T_1	Ordering and receiving is provided at an appropriate timeframe	2.71	.960
T_2	Deliveries reach on the date promised	2.58	.971
T_3	The agency gives timely response for emergency/urgent orders	3.49	.993

(Source: Study Data, 2020; SD* = Standard Deviation)

The analysis result of open-ended questions pertaining to transaction level of logistics services attributes is found not beyond satisfactory performance. The responses indicated stock-out/shortage of life-saving pharmaceuticals, delay of products delivery, need of update of pharmaceuticals procurement list, and delivery of cold-chain requiring products up to service delivery endpoints.

4.3.3 Customer's agreement to Post-transaction Logistics Service Attributes

As shown in Table 7 below, the most agreed post-transaction logistics service attributes in order perceived by respondents' are complaint handling (3.46), order accuracy (3.40), and Order discrepancy handling (3.37). The results indicated that the respondents' perceptions were above neutral point regarding the post-logistics service offerings by EPSA on the logistics customer service elements. It indicated that the composite mean scores were less than 4 for all logistics customer service attributes yet, the maximum possible score is 5. The health facilities still expect more in terms of the quality of logistics service delivered by the agencies.

Table 9: Descriptive Statistics for post-transaction logistics service attributes

Measured Items		Mean	SD*
Order Accuracy (OA)		**3.40**	**.886**
OA_1	The products requested delivered, not unordered products	3.17	.896
OA_2	The products delivered rarely contain the substituted item	3.27	.884
OA_3	The products delivered rarely contain incorrect quantity	3.46	.892
OA_4	The invoices match with orders delivered	3.71	.872
Order Discrepancy Handling (ODH)		**3.37**	**.849**
ODH_1	In a case discrepancy occurred, item return is accepted	3.46	.841
ODH_2	Store manager willingly provides exchanges to be replaced	3.43	.855
ODH_3	Correction of delivered quality discrepancy is satisfactory	3.35	.807
ODH_4	Response to quality discrepancy report is satisfactory	3.23	.893
Complaint Handling (CH)		**3.46**	**.854**
CH_1	The employees are willing to listen to a customer complaint	3.73	.786
CH_2	The office/help desk is accessible to handle the complaint	3.61	.834
CH_3	The agency is willing to respond to a customer complaint	3.39	.819
CH_4	The agency gives a quick response to a customer complaint	3.12	.977

(Source: Study Data, 2020; SD* = Standard Deviation)

Having grouped the responses of open-ended questions, a respondent complained about voiding of invoices and reprinting the invoice, and skills related with utilization of automated health commodity management information system – the software the agency uses to automate the warehouse management and inventory control.

4.4   Level of Customer Satisfaction

The logistics customer services are often examined by dividing its constituent elements into three phases to reflect the nature and timing of the particular service delivery as pre-transaction, transaction, and post-transaction elements (Christopher, 2011; Kotylak et al., 2017; Trzęsiok, 2019).

Customers were requested to rate the level of satisfaction based on their experiences and perceptions of Logistics services provided by EPSA using a 5-point Likert scale (1=very dissatisfied to 5 =very satisfied). The level of satisfaction was analyzed with the descriptive statistics as portrayed in Figure 2 below. Majority of the respondents 141(62.1%) were satisfied with the pre-transaction logistics services (55.4% rated logistics services as satisfied, and 6.7% very satisfied); 83(37.1%) of the respondents were satisfied with the transaction logistics services; while 110(49.1%) of the customers expressed as satisfied for the post-transaction logistics services.

This result is below a survey conducted in Poland as 89%, 93%, and 76% of the respondents expressed satisfaction with pre-transaction, during the transaction, and after the transaction services respectively (Kotylak et al., 2017). This shows the need of improvement of logistics service attributes to enhance customer satisfaction at each stage.

Relatively, smaller numbers of customers were dissatisfied with the logistics customer services (10 % in the pre-transaction, 21.4% in the transaction, and 12.5% post-transaction phases). It is also worth noting among dissatisfied, the largest number of customers were during-transaction as every 5th customer rated the level of logistics service as dissatisfied, and every 56th as very dissatisfied. This finding coincides with regards to the mean scores of customers' rating for transaction-related attributes with items under product availability and timeliness was below or near the neutral point of measurement scale.

A considerable number of customers, 28.6% in the pre-transaction, 41.5% during-transaction, and 38.4% in the post-transaction stages did not favor any option and chose the neutral response.

This result is in par with the survey conducted in the logistics service companies in Lithuania (Meidutė-Kavaliauskienė, 2014) as well as, assessment of service delivery and customer satisfaction at Ethiopian Shipping and Logistics Service Enterprise (Taye, 2014).
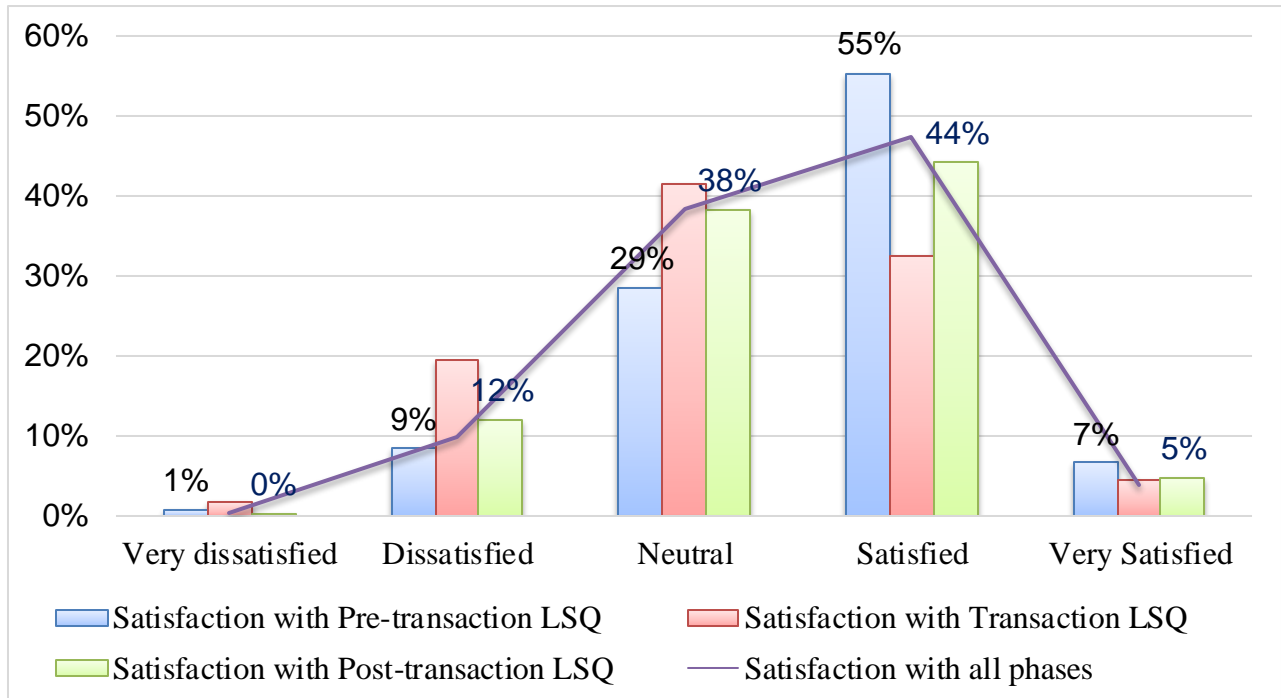
Figure 2: Level of Customer Satisfaction for components of LSQ attributes

4.5 The effect of Logistics Service Attributes on Customer Satisfaction

4.5.1 Testing Assumptions Related to Multivariate Techniques

Before performing Multivariate techniques, its underlying assumptions that substantially affect the ability to represent multivariate relationships need to be tested. Hence, the researcher used statistical and/or graphical procedures to assess the assumptions of (1)Multivariate normality & outliers (2)Multicollinearity (3) Linearity and (4) Homoscedasticity (Fidell, 2013; Joseph F. Hair Jr., 2014; Perry R. Hinton, Charlotte Brownlow, 2004).

4.5.1.1 Assessment of Multivariate Normality and outliers in the dataset

A multivariate explanatory analysis method requires approximately normally distributed outcome variable for each category of predictive variables. In this study, normality was assessed by exploring data both graphical and statistical test methods. A plotted data on the histogram outlines the scores were approximately normally distributed in the graph. The index of both kurtosis and skewness is less than ± 1.2.
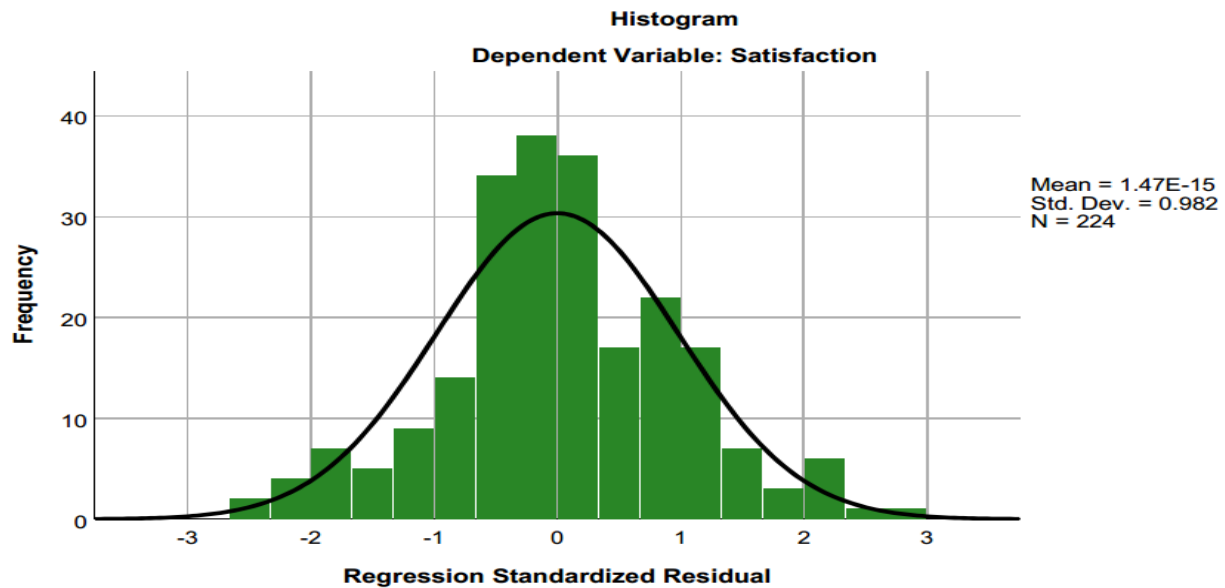
Figure 3: Histogram (with a superimposed normal curve)

After inspecting the plotted data on the histogram, the researcher carried out a one-sample Kolmogorov Smirnov (K-S) test which statistically confirms the normality of the data is asymptotically significant (p< .001). Hence, there is no reason to reject the null hypothesis and concluded that the data follow a normal distribution.

Table 10: *Assessment of normality (One-Sample Kolmogorov-Smirnov Test)*

Variables		IQ	OP	PC	PA	OC	T	OA	OD	CH	SATIS
Normal Parameters[a,b]	Mean	3.31	3.59	3.57	3.05	3.59	2.93	3.29	3.37	3.57	3.39
	Std. Dev	.689	.635	.717	.608	.604	.774	.755	.677	.646	.633
Most Extreme Differences	Absolute	.143	.116	.128	.129	.148	.111	.102	.102	.097	.117
	Positive	.089	.076	.119	.087	.124	.111	.081	.102	.097	.092
	Negative	-.143	-.116	-.128	-.129	-.148	-.10	-.102	-.096	-.095	-.117
Test Statistic		.143	.116	.128	.129	.148	.111	.102	.102	.097	.117
Sig asymp. (2-tailed)		.000[c]	.000[c]	.000[c]	.000[c]	.000[c]	.000[c]	.000[c]	.000[c]	.000[c]	.000[c]

a = Test distribution is Normal, b = Calculated from data and c = Lilliefors Significance Correction. IQ = Information quality, OP = ordering process, PC = personal contact, PA = product availability ,OC = order condition, T = Timelines, OA = order accuracy, OD = order discrepancy, CH = compliant handling, and SATIS = Satisfaction

(Source: Study Data, 2020)

An **outlier** is an observation that deviates significantly from the remaining data (i.e., falls more than 1.5 times the interquartile range above the third or below the first quartile) on one or more variables (Babu, 2018; Joseph F. Hair Jr., 2014). **Boxplot** - pictorial representation of data distribution for each variable – portrays the existence of outliers in the five of nine variables (information quality, personal contact quality, timeliness, order accuracy, and order discrepancy handling as noted in the Figure 4).
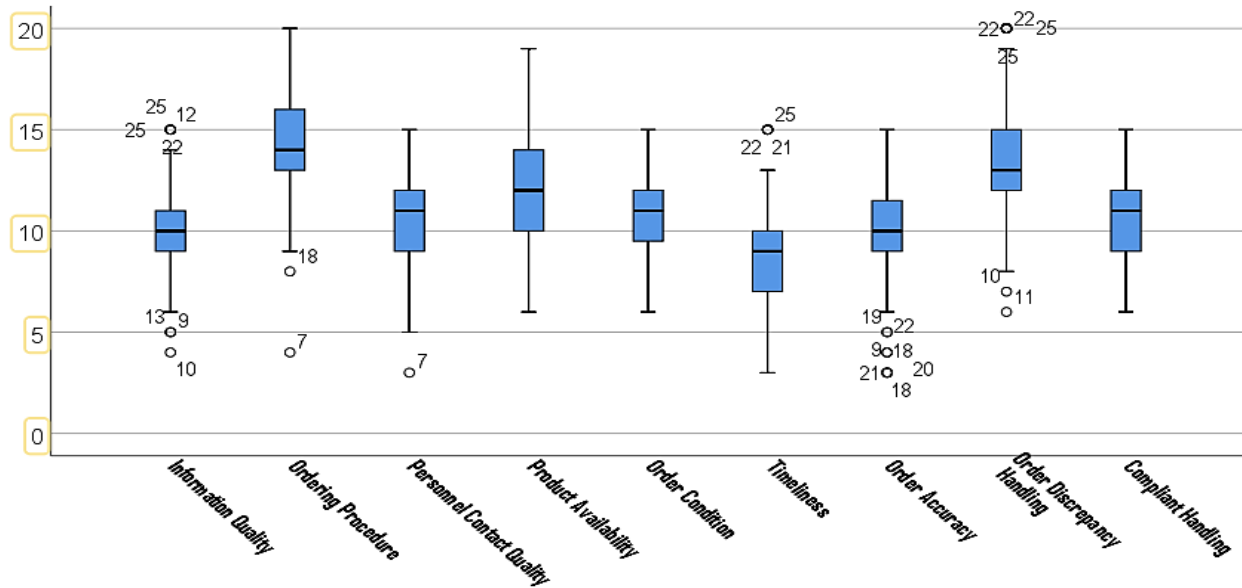
Figure 4: Boxplots

The **Mahalanobis distance (M-D)** – a means to objectively measure the multidimensional position of each observation relative to the mean center (centroid) of all observations – was compared to a chi-square distribution (Degree of Freedom= 9) to identify significant multivariate outliers in the dataset whose probability for M-D is less than .001. The threshold value of .001 was suggested by (Fidell, 2013), who states that a very conservative probability estimate for outlier identification is appropriate for the Mahalanobis Distance. Since only one case (Leverage value of mean =.036) was identified as a significant multivariate outlier, it was retained in the analysis due to little effect relative to the number of the respondents (n = 224).

Table 11: *Multivariate Outlier Detection Methods: Residual statistics*

Distance-based Method	Minimum	Maximum	Mean	Std. Deviation
Mahalanobis Distance(D^2/df)	.881	37.353	7.964	5.051
Cook's Distance	.000	.061	.005	.008
Centered Leverage Value	.004	.168	.036	.023

(Source: Study Data, 2020)

4.5.1.2 Checking Linearity

Linearity defines the dependent variable as a linear function of the predictors. The linearity among pairs of variables was examined through inspection of a scatterplot of residuals and scatterplot matrix. Both graphs showed a linear relationship among variables.
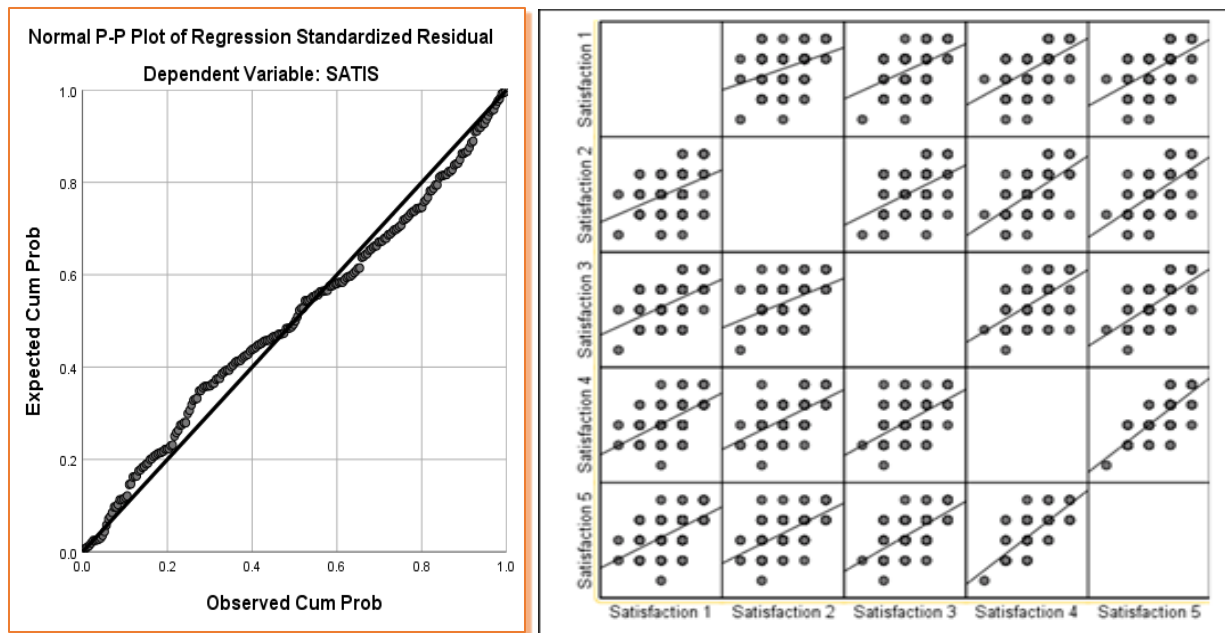
Figure 5: Normal P-P Plot of standardized Residuals and Scatterplot matrix

4.5.1.3 Multicollinearity

It refers to the situation when the predictor variables are highly correlated with each other. This causes inflation in the standard error of regression coefficients resulting in a reduction of their significance. The absence of multicollinearity was confirmed by tolerance [T] statistics values for the predictor variables being greater than 0.1 and variance inflation factor [VIF] less than 10 as displayed in Table *12.*

Table 12: *Multicollinearity Statistics Coefficients*

Predictor variables	Tolerance	VIF
Information Quality	.668	1.497
Ordering Procedure	.870	1.149
Personnel Contact Quality	.588	1.700
Product Availability	.557	1.796
Order Condition	.776	1.289
Timeliness	.786	1.272
Order Accuracy	.655	1.527
Order Discrepancy Handling	.714	1.400
Compliant Handling	.604	1.655

(Source: Study Data, 2020)

4.5.1.4 *Homoscedasticity*

Homoscedasticity is an assumption in regression analysis that the residuals at each level of the predictor variables have similar variances. That is, **the error variance** around predicted scores is the same for all predicted values. Inspection of residuals scatterplot graph with standardized residuals (ZRESID to *Y*-axis) against predicted (ZPRED to X-axis) provides a test of assumptions of normality, linearity, and homoscedasticity between dependent Variable scores and errors of prediction as the residuals (differences between obtained and predicted scores) are normally distributed about the predicted scores, that is residuals have a horizontal-line relationship with predicted scores, and the variance of the residuals about predicted scores is the same for all predicted scores.
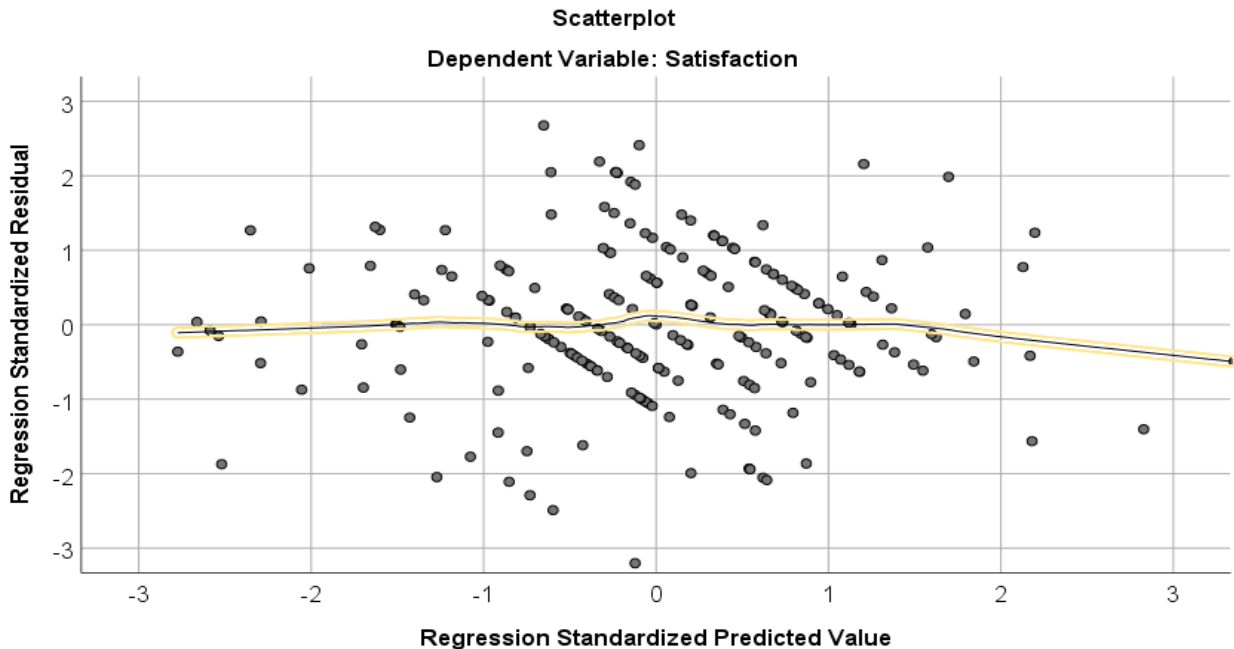
Figure 6: Residuals scatterplot with ZRESID (Y-axis) and ZPRED (X-axis) variables

4.5.2 Correlation Analysis

Correlation is a measure of the size and direction of the association (relationship) between variables. Pearson's product-moment correlation coefficient (*r*) gives a mathematical value for measuring the strength of the linear relationship between two variables. It can take values between −1(perfect negative) to 1(perfect positive) correlation. According to a rule of thumb, [0.1 <*r*< 0.3] indicates weak correlation, [0.4 <*r*<0.6] reveals moderate correlation, and [0.7 <*r*< 0.9] indicative of strong correlation between variables. Correlation analysis is carried out before Multivariate analysis to rule out strong relationships between the independent variables(Gaur, 2009; Joseph F. Hair Jr., 2014).

The measured items are positively correlated [$0.082 \leq r \leq 0.537$] with dependent variable items. The correlation analysis result reveals a positive significant correlation between all composite logistics service quality attributes and customer satisfaction although the strength varies. As noted in Table 13, most LSQ attributes have a moderate correlation [$0.49 \leq r \leq 0.62$, $p<0.001$] except ordering procedures [$r = 0.32$, $p<0.001$] and order condition [$r = 0.32$, $p<0.001$] with customer satisfaction. All predictor variables are positively correlated [$0.082 \leq r \leq 0.537$] with each other. Indeed, all LSQ attributes and customer satisfaction are positively correlated, the better the LSQ attributes the higher customer satisfaction will be.

Table 13: Correlation between Variables

Variables	IQ	OP	PCQ	PA	OC	T	OA	ODH	CH
Information Quality - IQ	1								
Ordering Procedure - OP	.275**	1							
Personnel Contact Quality	.465**	.256**	1						
Product Availability - PA	.321**	.160*	.398**	1					
Order Condition - OC	.220**	.231**	.272**	0.119	1				
Timeliness - T	.325**	.213**	.306**	.270**	.288**	1			
Order Accuracy - OA	.286**	0.082	.202**	.537**	.218**	.151*	1		
Order Discrepancy Handling	.376**	.215**	.409**	.319**	.258**	.332**	0.114	1	
Compliant Handling - CH	.393**	.217**	.532**	.420**	.346**	.286**	.259**	.375**	1
Satisfaction	.518**	.319**	.578**	.620**	.324**	.490**	.445**	.569**	.587**

** Correlation is significant at the 0.01 level (2-tailed).

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

4.5.3 Results of Factor Analysis

Following Hair et al. (2014) and Fidell Tabachnick (2013), Factor analysis (FA) – a statistical method to summarize most of the original information (variance) in a minimum number of factors for prediction purposes – was conducted to establish the construct validity, and to use the results for subsequent multivariate analysis (Fidell, 2013; Joseph F. Hair Jr., 2014).

After several iterations of retaining/removing variables, a FA was re-run on the remaining 27 items (removing eight items) using a principal component analysis (PCA) with an orthogonal 'Varimax' rotation of Kaiser's normalization, allowing the KMO statistics, extracting a fixed number of factors (8), and suppressing all factor coefficients less than 0.4 to enable better visualization of the factor structure. The FA output analyses are provided hereafter:

The **Kaiser-Meyer-Olkin (KMO)** – the **measure** of **sampling adequacy** – quantifies the degree of intercorrelations among the variables and the appropriateness of factor analysis. Samuels (2016) recommends the KMO value of 0.5 as a minimum, and **values between 0.7** and **0.8 acceptable**. As exhibited in Table 14, the KMO measure of 0.83 is indicative of the sufficiency of data to proceed with factor analysis. **Bartlett's test -** another indication of the strength of the relationship among variables **-** is a statistical test for the overall significance of correlations within a correlation matrix. A statistically significant Bartlett's test of sphericity (sig. < .001) indicates that sufficient correlations exist among the variables to continue FA and the existence of nonzero correlations.

Table 14: *Kaiser-Meyer-Olkin (KMO) and Bartlett's Test*

Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy.		.826
	Approx. Chi-Square	2512.836
Bartlett's Test of Sphericity	Degree of freedom *(df)*	351
	Sig.	.000

(Source: Study Data, 2020)

Communality is a total amount of variance a measured variable has accounted for (shared) based on the variable's correlations with all other variables in the analysis. Mathematically, it is the *sum of squared factor loadings* for a variable across all the factors. Higher communalities are better. Low values (<0.4) – candidates for removal after examining the factor loading matrix – may struggle to load significantly on any factor. The Table 15 shows all measured items (except product availability 1, PA_1) have communalities greater than .50, therefore; the extracted factors can explain much variance in the variables.

Eigenvalue is the measure of total variance explained by a factor. Indeed, an eigenvalue of less than one means that the factor explains less variance than a single item and therefore should not be considered to be a meaningful factor.

Table 15 summarizes the **Total Variance Explained** by each factor and the cumulative variance after extraction and rotation of factors. The 'Variance explained (%) column' – the percent of variance attributable to each factor after extraction and rotation – implies the first factor (Order discrepancy handling) consists of four (4) measured items with loadings ranged from 0.696 to 0.808 that accounts for 25.79% of the variance in the extract, the second 9.87% and the third 7.83%. The eight extracted factors accounted for 67.83% of the total variance in the data set. Hair et al., (2014) suggests values between 70 and 90%, although smaller values might be appropriate as the number of variables or number of respondents increases.

Rotated Component Matrix contains the factor loading of each item on each component. Following threshold values for the sample size of 224, factor loadings of .40 and higher were considered significant loadings for practical purposes. Indeed, statistically significant (p < .05) rotated factor loadings (loadings > 0.5) obtained for all items.

The idea of rotation is to facilitate the interpretation of the underlying factor structure. It also shows the grouping of the measured items under each factor. As shown in Table 15, factor-1 contains Order discrepancy handling items; factor-2 consists of ordering procedure items; and so on. All items (except order condition items, IQ_1, IQ_2, PC_4, OA_4, and CH_4 **-** removed from the final PCA) exhibited relatively high factor loadings and load into the designated variables. All factors have at least three items with a significant loading from 0.50 to 0.87 that is above the recommended minimum value of 0.4 while *PA_2 & PA_3* exhibit cross-loadings with factor-3, and T_3 with factor-4.

Table 15: *Rotated Component Matrix, Communalities, and Total variance explained*

LSQ Attributes (Factors)	Measured Items	Standard Loadings	Item communality	Mean (S. Deviation)	Eigenvalue	% of Variance Explained	% of Variance Cumulative
Order Discrepancy Handling (ODH)	ODH_3	.808	.740	3.35(.807)	6.97	25.79	25.79
	ODH_2	.768	.718	3.43(.855)			
	ODH_4	.731	.641	3.23(.893)			
	ODH_1	.696	.619	3.46(.841)			
Ordering procedures (OP)	OP_3	.833	.719	3.46(.872)	2.67	9.87	35.67
	OP_2	.771	.686	3.62(.772)			
	OP_4	.730	.631	3.61(.877)			
	OP_1	.672	.645	3.71(.751)			
Order Accuracy (OA)	OA_2	.809	.761	3.27(.884)	2.11	7.83	43.50
	OA_1	.779	.677	3.17(.96)			
	OA_3	.756	.659	3.46(.892)			
Personnel Contact Quality (PCQ)	PCQ_2	.828	.803	3.63(.889)	1.71	6.33	49.83
	PCQ_1	.720	.606	3.5(.836)			
	PCQ_3	.675	.672	3.59(.836)			
Product Availability (PA)	PA_3	.665	.626	3.14(.762)	1.52	5.61	55.44
	PA_4	.652	.676	3.05(.832)			
	PA_2	.649	.648	2.86(.877)			
	PA_1	.580	.462	3.17(.732)			
Information Quality (IQ)	IQ_4	.857	.824	3.22(.842)	1.39	5.15	60.59
	IQ_5	.754	.738	3.25(.840)			
	IQ_3	.646	.602	3.46(.792)			
Complaint Handling (CH)	CH_2	.740	.724	3.61(.834)	1.01	3.74	64.33
	CH_3	.737	.691	3.39(.819)			
	CH_1	.650	.592	3.73(.786)			
Timeliness (T)	T_1	.872	.814	2.71(.96)	.95	3.50	**67.83**
	T_2	.850	.800	2.58(.971)			
	T_3	.497	.541	3.49(.993)			

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.

(Source: Study Data, 2020)

4.5.4 Reliability

Having identified the determinant variables underlying the attributes, the constructs have been tested for validity and reliability. As exhibited in Table 16 below, the reliability was performed for each construct as well as for the measurement scale. All LSQ attributes after factor analysis exhibited high Cronbach's α establishing the reliability of the instrument. The item-to-total correlation – the extent of correlation of an individual item to a composite score of a factor – identifies items contributing to a low Cronbach's alpha. The higher the item-to-total correlation for all items, the higher the reliability of the construct measurement. The minimum values for each construct in the item-to-total correlation are above 0.351 and the reliability values for all constructs exceeded the cutoff value of 0.70, supporting the validity of the measurement scale. The Cronbach's alpha for this study was 0.916, an indication of the acceptability of the scale for further analysis.

Table 16: *Reliability of variables after factor analysis*

Constructs (Components)	No of Items	Item-to-total[a]	Cronbach α
Information Quality	3	.544 - .693	.783
Ordering Procedure	4	.540 - .627	.779
Personnel Contact Quality	3	.565 - .699	.791
Product Availability	4	.394 - .617	.754
Timeliness	3	.351 - .665	.708
Order Accuracy	3	.598 - .761	.805
Order Discrepancy Handling	4	.552 - .687	.809
Complaint Handling	3	.497 - .569	.709
Satisfaction	5	.589 - .816	.868
Overall	*32*	*.353 – .756*	*0.916*

(Source: Study Data, 2020) (a = Range of Item-to-total correlation)

4.5.5 Validity

Validity is important since constructs are not observable, and relationships among unobservable constructs are tested indirectly via observed variables (i.e., measured variables). Thus, validity reflects how well a measure reflects its unobservable construct. It is established using

relationships between measured variables and their constructs, as well as the relationships between constructs. In this study, construct validity was assessed by using factor analysis and AMOS software. The ability to demonstrate convergence and discriminant validity establishes evidence of construct validity (Creswell, 2014; Joseph F. Hair Jr., 2014; Kumar, 2011).

For a Convergent validity to exist, the items that are indicators of a specific construct should converge or share a high proportion of variance in common. This was evident by:

(1) **Bivariate correlations:** all pairs of items within components exhibited highly statistically significant ($p < .01$) correlations between them.

(2) *Factor loadings* – Statistically significant ($p < .05$) factor loadings (loadings > 0.5) obtained for all items.

(3) **Average Variance Extracted (AVE) >0.5**

AVE is computed as the sum of all squared standardized factor loadings (squared multiple correlations $-R^2$) divided by the number of items. In other words, it is the average communality. The square of a standardized factor loading represents how much variation in an item is explained by the construct and is termed the **variance extracted** of the item. Thus, the loading of 0.71 squared equals 0.5. In short, the factor is explaining half the variation in the item with the other half being error variance. Using this logic, an AVE of 0.5 or higher is a good rule of thumb suggesting adequate convergence. The results demonstrated that all constructs exceeded the estimates of 0.50 except complaint handling (AVE = 0.450) and Product availability (AVE = 0.462) which are also close to cut-off points.

Discriminant validity refers to the extent to which *components* are *distinct* and *uncorrelated*. Based on the results of factor analyses, composite scores (the sum of the items that measure a specific construct) for each of the variables was computed. The rule of thumb is that variables should relate more strongly to their component than to another component. Correlations with other constructs below 0.70 are usually accepted as evidence of construct distinctness and thus discriminant validity (Joseph F. Hair Jr., 2014). A correlation between constructs greater than 0.7 indicates a majority of shared variance (0.7 * 0.7 = 49% shared variance). As was checked in assumptions of multivariate analyses, the inter-correlations among the items were less than 0.67, items significantly load on designated components (the cross-loadings differ by more than 0.2) and correlations between components were all less than 0.537 – suggesting all eight components demonstrated discriminant validity.

The square root of average variance extracted estimates greater than the correlation between constructs will establish the component's distinctness. This implies that the variance explained by its items should exceed than it shares with another construct. As the Table 17 presents, all shared variances of one construct (correlation) with other constructs are less than the square root of AVE for each construct, suggesting the discriminant validity of the factors.

Table 17: *Construct correlation, Discriminant Validity Analyses and construct reliability*

Constructs (Factors)	IQ	OP	PCQ	PA	T	OA	ODH	CH
Information Quality - IQ	**0.746**							
Ordering Procedure - OP	.275**	**0.717**						
Personnel Contact Quality	.465**	.256**	**0.743**					
Product Availability - PA	.321**	.160*	.398**	**0.671**				
Timeliness -T	.325**	.213**	.306**	.270**	**0.726**			
Order Accuracy - OA	.286**	0.082	.202**	.537**	.151*	**0.778**		
Order Discrepancy Handling	.376**	.215**	.409**	.319**	.332**	0.114	**0.724**	
Complaint Handling - CH	.393**	.217**	.532**	.420**	.286**	.259**	.375**	**0.680**
Satisfaction	.518**	.319**	.578**	.620**	.490**	.445**	.569**	.587**

** Correlation is significant at the 0.01 level and * at the 0.05 level (2-tailed), Shaded diagonal numbers represent the square root of average variance extracted (AVE) for each construct

(Source: Study Data, 2020)

4.5.6   Hypotheses Testing

Having checked the fit of data for multivariate analyses, the stated hypotheses were examined by *Linear Regression Model*. Multiple linear regression was performed to investigate the effect of explanatory variables (information quality, ordering procedure, personnel contact quality, product availability, timeliness, order accuracy, order discrepancy handling, and complaint handling) that significantly explain the outcome variable (satisfaction) (Fidell, 2013; Joseph F. Hair Jr., 2014; Yockey, 2018). The regression outputs are depicted hereafter:

Table 18: *Model summary of LSQ attributes and customer satisfaction*

Model	R	R-Square	Adjusted R^2	SEE	Durbin-Watson
1	.840[a]	.700	.689	1.76592	1.845

a) Predictors: (Constant), all LSQ attributes entered; SEE = Std. Error of the Estimate

The above *Model Summary* table gives the multiple correlation coefficient (R), its square (Coefficient of determination –R^2), adjusted R^2, and standard error of the estimate (the predicted score) as summary measures for assessing the overall fit of the model. The multiple correlation coefficient ($R = 0.84$) shows there is a positive strong correlation between the independent variables and customer satisfaction in the regression model. In terms of variability ($R^2 = .70$), a 70% variation in the customers' satisfaction can be explained by the explanatory variables included in the model. Since by definition, R^2 increases even if non-significant independent variables are added, the *adjusted R^2* is an improved estimation of R^2 in the model. From the above Table 18, the changes in logistics service quality attributes accounted for 68.9% of the variations in customer satisfaction and the rest (31.1%) remain unexplained. The Durbin-Watson value of 1.845 – below two (2) – indicates the probable absence of autocorrelation among the independent variables regressed.

ANOVA - Testing the Overall Regression for Significance: Analysis of Variance (**ANOVA**) and **F**- statistics generated by the regression of explanatory variables and customer satisfaction indicates the relationship was highly significant at F (8, 215) = 62.751, p < 0.001. Certainly, the *F*-test for the null hypothesis that none of the explanatory variables are related to customer satisfaction (R is zero) was rejected, and it is concluded that the regression model (with the eight predictors included) significantly predicts customer satisfaction.

Table 19: *Significance level for multiple correlation coefficient - ANOVAa*

Model	Sum of Squares	Df	Mean Square	F	Sig.
Regression	1,565.508	8	195.688	62.751	.000[b]
Residual	670.475	215	3.118		
Total	2,235.982	223			

a. Dependent Variable: Satisfaction   b. Predictors: (Constant), all LSQ attributes

Testing the Individual Attributes for Significance: To examine the effect of the LSQ attributes (Explanatory variables) on customers' satisfaction level, the regression coefficients were analyzed. The output shown in Table 20 provides the regression coefficients at 95% confidence intervals (CI) according to the estimated contribution of predictors to the dependent variable.

Table 20: *Significance tests of Regression coefficients*

Explanatory Variables in the model	*Unstandardized Coefficients* B	*Standardized Coefficients* (Beta - β)	*t*	*95% CI for B*	*Sig.*
Order Discrepancy Handling	.280	.240	5.455	[.179 - .381]	.000
Product Availability	.309	.237	4.825	[.183 - .435]	.000
Timeliness	.249	.182	4.393	[.137 - .360]	.000
Complaint Handling	.289	.177	3.763	[.137 - .440]	.000
Order Accuracy	.219	.157	3.465	[.094 - .343]	.001
Personnel Contact Quality	.209	.142	2.920	[.068 - .350]	.004
Information Quality	.138	.090	1.979	[.001 - .276]	.049
Ordering Procedure	.098	.079	1.988	[.001 - .196]	.048
(Constant)	-3.030		-3.085	-4.97 to -1.09	.002

(Source: Study Data, 2020; CI = Confidence Interval)

Unstandardized regression coefficients represent the estimated change in the dependent variable for a unit change of the explanatory variable (keeping other explanatory variables constant in the model), while ***standardized coefficients (β)*** aid to compare directly the relative effect of each independent variable on the dependent variable. A high beta value with p-value (<.05) indicates the explanatory variable has made a statistically significant contribution to the model and vice-versa (Fidell, 2013; Joseph F. Hair Jr., 2014). As presented in the above Table 20, all logistics service quality attributes entered namely: information quality, ordering procedures, personal contact quality, product availability, timeliness, order accuracy, order discrepancy handling, and complaint handling have a positive significant effect at 95% confidence interval with customer satisfaction. This implies that increases in these attributes increase customer satisfaction. This result is consistent with studies of (Baffour-Awuah, 2018; Gang Xie, 2011; Giovanis, 2013; Kulyk; et al., 2017; Lúcia et al., 2015; Paper, 2016), they agreed that service quality dimensions

lead to customer satisfaction. That is improving overall service quality is likely to enhance customer satisfaction. Based on the regression output, the four (4) hypotheses discussed as follows:

1) **Ho1: Pre-transaction logistics customer service attributes (Information quality, ordering procedure, and Personnel contact quality) have no positive significant effect on customer satisfaction in the agencies.**

With respect to the regression coefficients, information quality (β=0.090, CI = [.001 - .276]), Ordering procedure (β=0.079, CI = [.001 - .196]) and Personnel contact quality (β=0.142, CI = [.068 - .350]) affected customer satisfaction positively and significantly ($p < .05$) at 95% confidence interval. From pre-transaction LSQ attributes, Personnel contact quality - the interface point that often marks the overall impression to the customer – has the highest significant contribution of 14.2%. Personnel contact quality becomes one of the most important predictors in delivering services as most logistics services involve personnel who often take orders, deliver products, and handle discrepancies. Thus it is evident that the quality of contact personnel plays a major role in determining customer satisfaction in pre-transaction logistics service delivery. The regression coefficient indicates that each additional change (for example moving from 13 to 14 in personnel contact quality) of knowledgeable personnel who give due emphasis to customer's needs and experienced to perform specific logistics services would result in a 0.209 predicted increase in customer satisfaction scores by keeping other predictors constant. Therefore, when perceptions and experiences of customers towards pre-transaction LSQ attributes are high, customer satisfaction will also be high and vice versa. These results are consistent with the findings of (Daniel J. Flint, Tomas M. Hult, 2001; Giovanis, 2013; Harlina Suzana Jaafar A, 2006; Thai, 2014). As a result, the null hypothesis was rejected and concluded that pre-transaction LSQ attributes have a positive significant effect on customer satisfaction.

2) **Ho2: During-transaction logistics customer service attributes (Product availability, Order condition, and Timeliness) have no positive significant effect on customer satisfaction in the agencies.**

As indicated in Table 20, product availability (β=0.237, CI = [.183 - .435]) and Timeliness (β=0.182, CI = [.137 - .360]) have affected customer satisfaction positively and significantly ($p < .001$) at 95% confidence interval. However, product availability (23.7%) presents a stronger

effect on satisfaction than timeliness (18.2%) as indicated by the coefficients. Accordingly, the health facilities' satisfaction level will increase by 3.09 for a 10 units increase (e.g., moving from 10 to 20) in product availability. It can also be inferred from the result that customers will be most satisfied when they can obtain desired quantities and received them at the promised timeframe. This emphasis logistics operations relating to stock availability and timing to focus on the needs of customers to satisfy on the products/services rendered to them. Indeed, the more product availability and timely delivery and response, the more satisfying health facilities on the agency's logistics service quality. So, product availability and timeliness are significant predictors of Customer Satisfaction and the results can be generalized to the entire population. This result is supported by (Bienstock, 1997; Daniel J. Flint, Tomas M. Hult, 2001; Giovanis, 2013; Trzęsiok, 2019).

Order condition variable, measured as products received after order placement is undamaged, conveniently packaged, and damages rarely occur as a result of transportation, was removed during factor analysis due to significant cross-loading, and it was not included in the further multivariate analyses. Thus, as per the respondents' rating, the variable has no statistically determinant effect on customer satisfaction that changes in order condition were not associated with changes in customer satisfaction. This may be during receipt of goods and services, customers will not receive damaged products, and they are also more responsive to transport products in good condition without damage than the agency for purchased products. This result is supported by Jaafar A. (2006) of order condition does not drive customers' satisfaction, but only serve as the order qualifiers. However, a research conducted by (Giovanis, 2013) stated that order condition as sub-dimension to outcome quality was significant to customer satisfaction. Therefore, it was failed to reject the hypothesis.

3) *Ho₃: Post-transaction logistics customer service attributes (Order accuracy, Order discrepancy handling, and complaint handling) have no positive and significant effect on customer satisfaction in the agencies.*

As expected, significant effects ($p < .001$) were obtained for Order Discrepancy handling ($\beta=0.240$, CI = [.179 - .381], Complaint handling ($\beta=0.177$, CI = [.137 - .440], and Order accuracy [$\beta=0.157$, CI = [.094 - .343] with customer satisfaction. The more complaint and order discrepancy handling as well as order accuracy, the more satisfying health facilities are. The Order Discrepancy handling has the highest significant contribution of 24% of all attributes

included in the analysis. From the table, for instance, the customer satisfaction will increase by 0.28 for every additional change on the Order discrepancy handling attribute at 95% confidence interval for the coefficient [0.179, 0.381], (i.e., by 2.80 for an increase of 10 units on the complaint handling at an estimated range of 1.79 to 3.81). This result is in line with similar findings from earlier research, such as in (Daniel J. Flint, Tomas M. Hult, 2001; Giovanis, 2013). Therefore, the null hypothesis posited was rejected and concluded that post-transaction LSQ attributes have a positive and significant effect on customer satisfaction.

4. *Ho4: All transaction logistics customer service attributes have no positive significant effect on customer satisfaction in the agencies*

As a final step of testing hypotheses, this hypothesis was rejected because the result of regression of the overall transaction LSQ attributes and customer satisfaction indicates the relationship was highly significant at $F_{(8, 215)} = 62.751$, $p < 0.001$.

Model specification: Multiple regression equation

As indicated in the methodology part, the study used regression coefficients to establish the statistical significance of the independent variables (IQ to CH) on the dependent variable (Y) as:

$$Y = -3.03 + .138IQ + .098OP + .209PCQ + .309PA + .249T + .219OA + .28ODH + .289CH + \varepsilon$$

Where: Y = the predicted customer satisfaction and ε = Error term - the unexplained variation in the model. All the variables have positive coefficients, meaning that more positive perceptions of customers on LSQ attributes (higher values) increase customer satisfaction. For example, a coefficient of .309 implies an increase of 1 point in the customer's perception of product availability (PA) will result in an average increase of at least three-tenths (.309) of a point on the 5-point customer satisfaction scale. The constant value (a = -3.03) represents the level of customer's satisfaction expected if the effect of all LSQ attributes were eliminated. However, it is highly unlikely that any respondent would have zero agreement (ratings) on all the logistics service attributes, thus it provides no insight for interpretation.

In summary, the results indicated the level of customer satisfaction is significantly improved firstly by order discrepancy handling followed by product availability, timeliness, complaint handling, order accuracy, personnel contact quality, information quality, and ordering procedure for each customer's perception of the attributes.

4.5.7 Relationship between Demographic Variables and customer satisfaction

The significant constant value (-3.03) of the intercept confirms that other factors may affect customer satisfaction. Indeed, further analysis was conducted to test whether the means of groups formed from demographics variables differ significantly on customer satisfaction. Thus independent-samples t-test and univariate analysis of variance (ANOVA) were conducted to test the respondent's gender, age, profession, experience, and recent purchase/receipt time on customer satisfaction. There was no statistically significant difference at $p < 0.1$ for the means of the groups for gender, health facility type, age group, number of years of customer experience, and recent purchase/receipt time of respondents on satisfaction.

With regard to profession, the respondents were categorized as pharmacy, nurse, and laboratory technician representing health professionals managing and acquiring products at the facility. The result showed statistically significant difference at $p < 0.05$ level (F (2, 221) = 3.557; p = 0.03) with eta squared (effect size) of 0.031. Post-hoc comparisons employing the Tukey test showed that the mean level for Pharmacy professionals (M = 17.38; SD = 3.15) was significantly different from nurses (M = 16.127; SD = 3.156). However, Laboratory technicians (M= 16.45; SD = 2.892) were not significantly from either pharmacy professionals or nurses. This demands different approaches that should be adopted in the agencies to improve logistics service quality attributes to satisfy pharmacy and nurse professionals, but approaches that may be adopted for the pharmacy or nurse professionals could also be applied for Laboratory technicians.

Table 21: *ANOVA Tests of Between-Subjects Effects*

Source	Sum of Squares	Df	Mean Square	F	Sig.	Eta Squared
Between groups	69.728[a]	2	34.864	3.557	.030	.031
Within groups	2,166.254	221	9.802			
Total	66,904.000	224				

R Squared = .031 (Adjusted R Squared = .022)   Dependent Variable: Satisfaction

CHAPTER FIVE

5   SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

The final part of the study provides the summary, conclusion, Managerial Implications, and recommendations of the study as well as limitations and suggestions for future research.

5.1   Summary of Findings

Employing a systematic sampling method, this paper processed data from 224 professionals (with a response rate of 95%) who acquire and manage health commodities in the health facilities. With regards to respondents' agreement of Logistics service quality attributes, the highest mean score was order condition (M = 3.60) and the least score by timeliness (M = 2.93), which is below the neutral point on the 5-point Likert scale.

In line with the first objective of the study, the level of customers' satisfaction with the logistics service attributes shows that 62.1%, 37.1% and 49.1% of respondents expressed that they were satisfied with pre-transaction, during-transaction, and post-transaction phases in that order while from dissatisfied customers, the largest percentage (21.4%) was during-transaction as every 5th customer rated the level of logistics service as dissatisfied, and every 56th very dissatisfied. Generally, the majority (composite mean =3.398 = 68%) of customers were satisfied with the overall logistics services delivered by the agencies.

Factor analysis using VARIMAX rotation revealed a significant factor loading with high convergent and discriminant validity. Thus, all constructs extracted from the analysis showed high Cronbach α's (.708 to .868) and measurement scale reliability of 91.6%.

The study aimed to examine the effects of Logistics service attributes on customer satisfaction in the agencies. Based on the Pearson's correlation analysis result, all LSQ attributes have revealed a positive significant correlation [$0.32 \leq r \leq 0.62$, $p <0.001$] with customer satisfaction. Furthermore from regression analysis, all logistics service quality attributes namely: information quality, ordering procedures, personal contact quality, product availability, timeliness, order accuracy, order discrepancy handling, and complaint handling have positive significant effect at 95% confidence interval explaining 68.9% variation in customers' satisfaction.

Based on the regression coefficients, all pre-transaction attributes; both during-transaction phases - Product availability (β=0.227, p < .001) and Timeliness (β=182, p < .001); and all post-transaction logistics elements - Order Discrepancy handling (β=0.24, p < .001), complaint handling (β=0.177, p < .001), and Order accuracy [β=0.157, p < .01) have affected customer satisfaction positively and significantly at 95% confidence interval. Thus, enhancing logistics service quality attributes will positively contribute to customer satisfaction.

The respondents profession showed statistically significant difference (F (2, 221) = 3.557; p = 0.03) with effect size of 0.031 with customer satisfaction. ANOVA test with Post-hoc comparison indicated that the mean level for Pharmacy professionals (M = 17.38) was significantly different from the nurses (M = 16.127). However, Laboratory technicians (M= 16.45) were not significantly from either pharmacy or nurse professionals.

5.2   Conclusions

The study aimed to investigate the effect of logistics service quality attributes on customer satisfaction, the case of Ethiopian Pharmaceutical Supply Agency of Jimma, Nekemte, and Gambella branches. The result of the descriptive analysis indicated order condition was the most agreed and timeliness the least agreed logistics customer service attributes. The composite mean score for all logistics service attributes were less than four (4), yet the maximum possible score of five (5). This implies despite the provision of conveniently packaged damage-free products, the agencies might not be performing well in delivering products on time as promised and the order cycle-time was not as expected. Thus, customers expressed their disagreement towards timely delivery and order cycle-time. This result has clearly shown that health facilities expected more in the accomplishment of logistics service attributes.

The majority of customers were satisfied with the provision of the pre-transaction services, followed by post-transaction phases. The majority of customers were either dissatisfied or neutral during-transaction phases. More than two-third of customers satisfied with the overall logistics services delivered by the agencies when the composite mean score of satisfaction level computed.

The correlation result shows that all LSQ attributes had a positive significant correlation with customer satisfaction. The finding also revealed that the highest strong correlation was found between product availability and customer satisfaction, while the weakest correlation by ordering

procedure. Similarly, the multiple regression results showed that all logistics service quality attributes have a positive and significant effect on customer satisfaction. Finally, it is worth pointing out that the higher logistics service quality is likely to enhance customer satisfaction.

The analysis of variance test revealed that to improve customer satisfaction in the study area, the agency contact person should consider the type of professions of customers in the delivery of services. This is because the profession of customers may influence their satisfaction level.

5.3   Implication of the Study

The results of this study have some managerial implications for Jimma, Nekemte, and Gambella branches in particular and to the distribution and inventory management office at most. The study has revealed the eight (8) variables information quality, ordering procedures, personal contact quality, product availability, timeliness, order accuracy, order discrepancy handling, and complaint handling as the most significant attributes impacting logistics customer services in the agencies. Thus, managers and coordinators at respective levels need to pay attention to these attributes to enhance customer satisfaction even by far better than its current performance. Other strategies the agencies should assess include ways to improve stock availability and shorten lead times.

5.4   Recommendations

Based on the major findings and conclusions, the following recommendations were forwarded:

Logistics service quality attributes are the main features available in the agency to create a highly responsive and seamless pharmaceutical logistics system that satisfies the ever-increasing demand of the health facilities. To enhance customer satisfaction, the Ethiopian pharmaceutical Supply agency should provide complete, credible and accurate information; should make ordering procedure flexible, convenient, simple and effective; should assign experienced knowledgeable contact person who understands customer's needs; should ensure order accuracy; should maintain stock availability; should supply products timely as promised; should handle order discrepancy satisfactorily, and listen to customer complaints willingly and respond timely.

Having strongly correlated with customer satisfaction, Product availability, and timeliness had the mean score around the neutral point of measurement, thus emphasizing the significance of

their implementation. As a result, Branch managers should strive to ensure customers get the desired products and services dependably with a high level of requested quantities with delivering on-time to health facilities to close the existing gaps between customers' expectations and perceptions.

The agency contact person should consider the type of professions of customers in the delivery of services. This demands different approaches that should be adopted in the agencies to improve logistics service quality attributes to satisfy pharmacy and nurse professionals, but approaches that may be adopted for the pharmacy or nurse professionals could also be applied for Laboratory technicians.

Therefore, the study recommended that the agency should measure the customers' expectations and perceptions of the logistics service quality attributes and work more to enhance its customer's satisfaction even by far better than its current performance.

5.5 Limitations and directions for future research

This study has only been able to examine the effect of logistics service quality attributes on customer satisfaction of the Ethiopian Pharmaceuticals supply agency of Jimma, Nekemte, and Gambella branches, this may affect the generality of the results. Further studies are needed to understand whether the results reported herewith are generalizable across different branches and logistics companies such as wholesaling, retailing, and distributors.

It is also important to note that the results obtained from this study were based on a survey, which captures a situation or an event at a point in time. This shortcoming may be fixed with the data gathered from a more qualitative approach, such as a longitudinal study in future research.

REFERENCES

Alan Rushton, P. C. P. B. (2010). *The Handbook of Logistics and Distribution Management*. (P. B. Alan Rushton, Phil Croucher, Ed.) (4th Editio). London, Great Britain: Kogan Page Limited.

Alemu, H. (2016). *Implication of Logistics Service Quality on Customer Satisfaction: The Case of Jumia Online Market (Unpublished Master Thesis), Addis Ababa, Ethiopia*. Retrieved from http://etd.aau.edu.et/bitstream/handle/123456789/6589/Hana Alemu.pdf?sequence=1&isAllowed=y

Babu, D. D. S. S. (2018). Methods to detect different Types of Outliers. *Proceedings of International Conference on Data Mining and Advanced Computing*, 23–27. https://doi.org/10.1109/SAPIENCE.2016.7684114

Baffour-Awuah, E. (2018). A Primary Examination of SERVPERF Dimensions and Customer Satisfaction Relationship in the Automotive Electrical Maintenance Service Industry. *International Journal of Innovative Science, Engineering & Technology*, *5*(3), 88–104.

Bienstock, M. M. B. J. T. M. C. C. (1997). Measuring Physical Distribution Service Quality (PDSQ). *Journal of the Academy of Marketing Science*, *25*(1), 31–44. https://doi.org/10.1007/BF02894507

Černá, S. Z. V. O. L. (2016). Methodology for Measuring the Customer Satisfaction with the Logistics Services. *Nase More*, *63*(3), 189–194. https://doi.org/10.17818/NM/2016/SI21

Christopher, M. (2011). *Logistics and Supply Chain Management: Creating Value-Adding Networks*. (T. Stickells, Ed.) (Fourth Edi). London, United Kingdom: Pearson Education Limited.

Cohen, K. M. L. M. L. (2017). *Research Methods in Education* (sixth Edit). London, United Kingdom: Routledge. https://doi.org/10.4324/9781315456539

Collett Miles, P. (2013). Competitive strategy: The link between service characteristics and customer satisfaction. *International Journal of Quality and Service Sciences*, *5*(4), 395–414. https://doi.org/10.1108/IJQSS-03-2013-0007

Creswell, J. W. (2012). *Educational Research: Planning, Conducting, and Evaluating*

Quantitative and Qualitative Research. (C. R. M. B. Smith, Paul A., Ed.) (4th Editio). New York, USA: Pearson Education Limited.

Creswell, J. W. (2014). *Research Design : Qualitative, Quantitative, and Mixed Approaches*. (V. K. and J. Y. Editorial, Ed.) (4th editio). University of Nebraska - Lincoln: SAGE Publications India Pvt. Ltd. B.

Cronin, S. T. J. (1992). Measuring Service Quality: A re-examination and extension. *Journal of Marketing*, 55–56. https://doi.org/10.1108/03090569610105762

CSCMP, C. of S. C. M. P. (2018). Supply Chain Management Terms and Glossary (p. 117). Kate Vitasek. https://doi.org/10.1007/978-1-349-94186-5_366

Daniel J. Flint, Tomas M. Hult, J. T. M. (2001). Logistics Service Quality as a Segment-Customized Process. *Journal of Marketing*, *65*(4), 82–104. https://doi.org/10.1509/jmkg.65.4.82.18390

Danovičs, J. Š. R. N. V. (2014). Marketing and Logistics Cooperation Problems in Latvian Companies. *Procedia - Social and Behavioral Sciences*, *110*, 390–397. https://doi.org/10.1016/j.sbspro.2013.12.883

Ensermu, M. G. D. (2015). *Outbound Logistics Module*. Addis Ababa.

EPSA, E. P. S. A. (2018). *Ethiopia: National Survey on the Integrated Pharmaceutical Logistics System (IPLS)*.

Fidell, B. G. T. L. S. (2013). *Using Multivariate Statistics*. (C. C. J. M. S. Frail, Ed.) (6th editio). Boston, USA: Pearson Education LTD.

Florez-Lopez R., R.-J. J. M. (2012). Managing Logistics Customer Service under Uncertainty: An Integrative Fuzzy Kano Framework. *Information Science*, *47*, 41–47. https://doi.org/10.1016/j.ins.2012.03.004

FMOH, F. D. R. of E. M. of H. (2015). *Ethiopian Health Sector Transformation Plan (2015/16 - 2019/20)*.

Fuller, W. A. (2009). *Sampling Statistics*. (C. S. Robert M. Groves, Graham Kalton, J. N. K. Rao, Norbert Schwarz, Ed.), *Current Practices in Survey Sampling* (1st ed.). New Jersey, USA: John Wiley & Sons, Inc. https://doi.org/10.1002/9780470523551

Gajewska, T., & Grigoroudis, E. (2015). Importance of Logistics Services Attributes Influencing Customer Satisfaction. *2015 4th IEEE International Conference on Advanced Logistics and Transport, IEEE (ICALT)*, 53–58. https://doi.org/10.1109/ICAdLT.2015.7136590

Gang Xie. (2011). Quality Improvement in Competing Supply Chains. *International Journal of Production Economics*, *134*(1), 262–270. https://doi.org/10.1016/j.ijpe.2011.07.007

Gaur, A. S. G. S. S. (2009). *Statistical Methods for Practice and Research* (2nd editio). New Delhi: SAGE Publications Inc.

Ghobadian et al. (1994). Service Quality: Concepts and Models. *The International Journal of Quality and Reliability Management*, *11*(9), 43–62. https://doi.org/10.1108/02656719410074297

Ghoumrassi, A., & Țigu, G. (2017). The Impact of the Logistics Management in Customer Satisfaction. *Proceedings of the International Conference on Business Excellence*, *11*(1), 292–301. https://doi.org/10.1515/picbe-2017-0031

Gil-Saura, I. . F. D. S. . C. G. B. . B. M. F. (2010). Antecedents and Consequences of Logistics Value: And Empirical Investigation in the Spanish market. *Industrial Marketing Management*, *39*(3), 493–506. https://doi.org/10.1016/j.indmarman.2008.11.007

Giovanis, A. N. E. T. (2013). On the Relationships between Logistics Service Deliverables, Customer Satisfaction and Loyalty in Industrial Supply Chains. *Journal for International Business and Entrepreneurship Development*, *7*(1), 63. https://doi.org/10.1504/jibed.2013.052132

Gronroos, C. (1984). A Service Quality Model and its Marketing Implications. *European Journal of Marketing*, *18*(4), 36–43.

Harlina Suzana Jaafar A. (2006). *Logistics Service Quality and Relationship Quality in Third Party Relationships*. Loughborough.

Huang, Y. Y. K. X. S. (2012). Applying Importance Performance Analysis to Evaluate Logistics Service Quality for Online Shopping among Retailing Delivery. *International Journal of Electronic Business Management*, *7*(2), 128–136.

Jack R. Fraenkel, N. E. W. and H. H. H. (2012). *How to Design Research in Education*. (M. R.

B. M. A. McNamara, Ed.) (8th editio). New Delhi: McGraw-Hill Companies, Inc.

James, G. K. J. (2004). Service Quality Dimensions: An Examination of Gronroos's Service Quality Model, *14*(4), 266–277. https://doi.org/10.1108/09604520410546806

Joseph F. Hair Jr., W. C. B. B. J. B. R. E. A. (2014). *Multivariate Data Analysis* (Seventh Ed). London, Great Britain: Pearson Education Limited.

Jurgen Rudolph; Christopher W. Harris. (2018). Journal of Applied Learning & Teaching, *1*(1), 35–37.

Kamble, S. S. (2011). Validating the Logistics Service Quality (LSQ) Scale in Indian Logistics Industry. *International Conference on Business and Economics Research*, *1*, 81–85.

Kothar, C. R. (2004). *Research Methodology: Methods and Techniques. New Age International (P) Ltd.* (2nd revise). New Delhi.

Kotler, P. (2010). *Marketing Management , Millenium Edition* (10th Editi). Boston: Pearson Custom Publishing.

Kotylak, S., Michalowska, M., & Kulyk, P. (2017). Assessment of Customer Satisfaction with Logistics Service in the Light of the Results of the Research. *Management*, *21*(1), 205–222. https://doi.org/10.1515/manment-2015-0089

Kułyk;, P., Michałowska;, M., & Kotylak, S. (2017). Assessment of customer satisfaction with logistics service in the light of the results of the research, *21*(1), 205–222. https://doi.org/10.1515/manment-2015-0089

Kumar, R. (2011). *Research Methodology: A Step-by-Step Guide for Beginners* (3rd editio). London, United Kingdom: SAGE Publication Ltd.

Kushwaha, S., Sohani, N., & Kumar, S. (2017). Effectiveness of Logistics , Distribution & Customer Satisfaction in Courier Company. *International Journal for Scientific Research & Development|*, *5*(05), 1832–1834.

Lee, M.-C. C. C.-L. H. L.-H. (2019). Service Quality and Customer Satisfaction in Pharmaceutical Logistics : An Analysis Based on Kano Model and Importance-Satisfaction Model. *International Journal of Environmental Research and Public Health*. https://doi.org/10.3390/ijerph16214091

Leeuw, D. A. D. J. J. H. E. D. de. (2012). *International Handbook of Survey Methodology. Behavioral Sciences, Education* (1st editio). The European Association of Methodology (EAM). https://doi.org/10.4324/9780203843123

Looy, G. P. . R. V. D. B. V. (2013). *Services Management: An Integrated Approach*. (R. V. D. Paul Gemmel, Bart Van Looy, Ed.) (3rd editio). Poland: Harlow, England Pearson.

Lúcia, A., Carvalho, De, J. C., Ramos, Tânia, & Joana, F. M. (2015). Assessing Obstetrics Perceived Service Quality at a Public Hospital. *Procedia - Social and Behavioral Sciences*, *181*, 414–422. https://doi.org/10.1016/j.sbspro.2015.04.904

Meidutė-Kavaliauskienė, ; Aranskis Artūras; Litvinenko Michail. (2014). Consumer Satisfaction with the Quality of Logistics Services. *Procedia - Social and Behavioral Sciences*, *110*, 330–340. https://doi.org/10.1016/j.sbspro.2013.12.877

Mentzer, J. T., Flint, D. J., & Kent, J. L. (1999). Developing a Logistics Service Quality Scale. *Journal of Business Logistics*, *20*(1), 9–32.

Oliver, R. L. (2015). *Satisfaction: A Behavioral Perspective on the Consumer*. (T. & F. Group, Ed.) (2nd Editio). New York, USA: Routledge. https://doi.org/https://doi.org/10.4324/9781315700892

Paper, C. A. M. (2016). Logistics service quality impact on customer satisfaction and loyalty.

Parasuraman, A., V, Z., & Berry, L. (1985). A Conceptual Model of Service Quality and its Implication for Future Research. *Journal Marketing*, *49*(4), 41–50. https://doi.org/10.2307/1251430

Parasuraman, A., V, Z., & Berry, L. (1998). SERVQUAL: A Multiple-Item Scale for Measuring Consumer Perceptions of Service Quality. *Journal of Retailing*, *6*(1), 12–37.

Perry R. Hinton, Charlotte Brownlow, I. M. & B. C. (2004). SPSS Explained. New Jersey, USA: Routledge.

PFSA. (2017). *Ethiopian pharmaceuticals Supply Agency: Integrated Pharmaceuticals Logistics System (IPLS) in Health Facilities of Ethiopia.*

Polyakova, O., & Mirza, M. (2015). Perceived Service Quality Models: Are They Still Relevant? *The Marketing Review*, *15*(1), 59–82. https://doi.org/10.1362/146934715x14267608178721

Querin, F., & Göbl, M. (2017). An analysis on the impact of Logistics on Customer Service. *Journal of Applied Leadership and Management*, *5*, 90–103.

Rahman, N. A. A., Mohammad, M. F., Rahim, S. A., Hassan, R., Ahmad, M. F., & Kadir, S. A. (2018). Shipper's perceptions of aviation Logistics Service Quality (LSQ) of air freight provider. *Journal of Engineering and Applied Sciences*, *13*(1), 1–6. https://doi.org/10.3923/jeasci.2018.1.6

Render et al. (2012). *Quantitative Analysis For Management* (11th editi). New York, USA: Pearson Education LTD.

Richard A., S. E. F. H. I. (2009). *Research in Organizations: Foundations and Methods of Inquiry* (1st ed.). San Francisco: Berrett-Koehler Publishers, Inc.

Sampaio, A. F. G. S. M. (2012). The Impact of Logistics Service Performance on Customer Satisfaction and Loyalty in Brazilian Chemical Industry. *International Conference on Industrial Engineering and Operations Management*, (1998), 1–6.

Sekaran, U. (2003). *Research Methods for Business: Skill Building Approach*. (J. Marshal, Ed.) (4th editio). New York, USA: Malloy Lithographing, Inc. https://doi.org/10.1017/CBO9781107415324.004

Taye, A. (2014). *Assessment of Service Delivery and Customer Satisfaction at Ethiopian Shipping and Logistics Service Enterprise (Logistics Transport Sector)*. Retrieved from http://repository.smuc.edu.et/bitstream/123456789/1496/1/ASFAW TAYE.pdf

Thai, V. V. G. T. W. J. . T. R. and L. (2014). Defining Service Quality In Tramp shipping Conceptual Model and Empirical Evidences. *The Asian Journal of Shipping and Logistics Vol,30*, *30*(1), 1–29. https://doi.org/10.1017/CBO9781107415324.004

The Chartered Institute of Logistics and Transport UK. (2019). Glossary of Terms and Dictionaries. Retrieved June 12, 2020, from https://ciltuk.org.uk/knowledge/knowledge-bank/resources/other-resources/useful-glossaries

Trzęsiok, M. S. M. C. J. (2019). How to Achieve Customer Satisfaction? Perspective of Logistics Outsourcing Performance. *LogForum - Scientific Journal of Logistics*, *15*(1), 39–51. https://doi.org/10.17270/J.LOG.2019.316

Vrat, N. S. S. . D. P. (2014). Service Quality Models : A Review. *International Journal of Quality & Reliability Management*, 22(9), 913–949. https://doi.org/10.1108/02656710510625211

Wang, L. (2015). Research on the Impact of e-Commerce to Logistics Economy: An Empirical Analysis based on Zhengzhou Airport Logistics. *International Journal of Security and Its Applications*, 9(10), 275–286. https://doi.org/10.14257/ijsia.2015.9.10.25

Wang, M. (2016). *Logistics Capability, Supply Chain Uncertainty and Risk, and Logistics Performance : An Empirical Analysis of the Australian Courier Industry*. RMIT University.

Yockey, R. D. (2018). *SPSS Demystified: A Simple Guide and Reference* (Third edit). New York and London: Routledge. Retrieved from www.routledge.com/cw/yockey

APPENDIX

Jimma University

College of Business and Economics

Department of Management

Masters of Logistics and Transport Management

Appendix A:

This questionnaire is part of a thesis paper required by the Jimma University, College of Business and Economics as a partial requirement for the award of a Master of Logistics and Transport Management Degree. The questionnaire is designed to solicit your independent views on *"the effect of Logistics Service Attributes on customer satisfaction in Western EPSA cluster".* All information provided shall be treated as confidential and used strictly for Academic purposes. Please answer the following questions freely without indicating your name and label your response with tick"✓" mark. If you have any questions, please don't hesitate to ask the principal investigator [Tafesse G. – 0910550003].

Thank you for your cooperation in advance.

Part I: Background Data

1) Type of Health facility: [1] Health center   [2] Hospital

2) Gender: [1] Male   [2] Female

3) Age (in years): [1] 20 - 24   [2]25 – 29   [3] 30 - 34 [4]35-39 [5]40-44   [6] >45

4) Your profession: [1] Pharmacy   [2] Nurse   [3]Lab technician   [4] others

5) Your experience (in years):   [1] <2   [2] 2 to 4   [3] >4

6) How long it has been since you make the last purchase/receipt of products from EPSA?

[1] <3 months   [2] 3 to 6 months   [3] 7 to 10 months   [4] >10 months

Part II: Logistics customer service attributes

Please rate EPSA on the following attributes of the logistics customer services provided to your health facility on a scale of five points with tick "✓"mark where 1= Strongly Disagree, 2= disagree, 3=Neutral, 4= agree and 5= Strongly Agree

Code	Logistics Customer service attributes	Level of agreement				
		1	2	3	4	5
IQ_1	The EPSA communication platforms (website, Viber group or telegram group) provide the most current information					
IQ_2	The information about the products or services is complete					
IQ_3	The information communicated by the agency is adequate					
IQ_4	The information communicated by the agency is accurate					
IQ_5	The information communicated by the agency is credible					
OP_1	Requisitioning procedures are effective					
OP_2	Requisitioning procedures are convenient					
OP_3	Requisitioning procedures are flexible (can be sent online)					
OP_4	Requisitioning procedures are simple					
PC_1	Distribution officer makes an effort to understand your needs					
PC_2	The knowledge of the officer to handle your request is adequate					
PC_3	The officer has the required product experiences to process your request					
PC_4	The employees show real interest in solving a problem when you have					
PA_1	Ordered products are available in the inventory					
PA_2	Ordered quantities are not challenged due to stock shortages					
PA_3	Ordered quantities are not challenged due to maximum release quantity					
PA_4	Difficulties never occur due to experiences of stock out					

	items					
OC_1	Products received after order placement are undamaged					
OC_2	Orders are packaged conveniently					
OC_3	Damages rarely occur as a result of the transportation					
T_1	Ordering and receiving products is provided at an appropriate timeframe					
T_2	Orders delivered within the promised timeframe					
T_3	The agency gives timely response for emergency/urgent orders.					
OA_1	The products requested delivered, not unordered products					
OA_2	The products delivered rarely contains the substituted item					
OA_3	The product delivered rarely contains incorrect quantity					
OA_4	The Invoices (cash, credit or STV) matches with orders delivered					
OD_1	In a case discrepancy occurred, item return is accepted					
OD_2	Store manager willingly provides exchanges to be replaced					
OD_3	Correction of delivered quality discrepancies is satisfactory					
OD_4	Response to quality discrepancy reports is satisfactory.					
CH_1	The employees are willing to listen to your complaint					
CH_2	The office/help desk is accessible to handle your complaint					
CH_3	The agency is willing to respond to your complaint					
CH_4	The agency gives a quick response to your complaint					

Part Three: Level of Customer Satisfaction

Based on your experiences and perceptions in the Logistics services of EPSA, please put a tick"✓" mark for your level of satisfaction in each statement depicted below (1=Very dissatisfied, 2=Dissatisfied, 3=neutral, 4=Satisfied, and 5=Very satisfied).

Code	Statements	1	2	3	4	5
Sat_1	How satisfied are you with the EPSA logistics customer services before the actual transaction takes place?					
Sat_2	How satisfied are you with the logistics customer services during the actual transaction stage of EPSA?					
Sat_3	How satisfied are you with the EPSA logistics customer services after delivery has taken place?					
Sat_4	As per your experiences and perceptions, Which word best describes your feelings toward EPSA?					
Sat_5	Overall, how satisfied with the EPSA logistics customer service quality?					

Part IV: Open-ended Questions to accommodate additional suggestions

If you would like to give additional suggestions for logistics customer services at EPSA, please...

_____

_____

If you could solve one problem with logistics services, what would it be?

_____

_____

Thank you very much!!!

Appendix B: Factor Loadings and Component Transformation Matrix

Rotated Component Matrix[a]

	Component							
	1	2	3	4	5	6	7	8
Order Discrepancy Handling 3	.808							
Order Discrepancy Handling 2	.768							
Order Discrepancy Handling 4	.731							
Order Discrepancy Handling 1	.696							
Ordering Procedures 3		.833						
Ordering Procedures 2		.771						
Ordering Procedures 4		.730						
Ordering Procedures 1		.672						
Order Accuracy 2			.809					
Order Accuracy 1			.779					
Order Accuracy 3			.756					
Personnel contact quality 2				.828				
Personnel contact quality 1				.720				
Personnel contact quality 3				.675				
Product Availability 3					.665			
Product Availability 4			.417		.652			
Product Availability 2			.414		.649			
Product Availability 1					.580			
Information Quality 4						.857		
Information Quality 5						.754		
Information Quality 3						.646		
Complaint Handling 2							.740	
Complaint Handling 3							.737	
Complaint Handling 1							.650	
Timeliness 1								.872
Timeliness 2								.850
Timeliness 3			.435					.497

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 7 iterations.

Component Transformation Matrix

Component	1	2	3	4	5	6	7	8
1	.413	.266	.306	.431	.377	.372	.366	.254
2	.315	.419	-.710	.120	-.395	.099	-.036	.198
3	-.415	.825	.252	-.225	.055	.024	-.173	.021
4	.365	-.113	.193	-.513	.028	.014	-.376	.641
5	.592	.242	.057	-.197	.199	-.544	.006	-.462
6	-.259	.021	-.221	.164	.324	-.660	.258	.500
7	.035	.034	.319	-.236	-.620	-.142	.650	.113
8	.075	.025	.383	.604	-.411	-.317	-.452	.090

Extraction Method: Principal Component Analysis, and Rotation Method: Varimax with Kaiser Normalization.

Appendix C: Regression Weights from AMOS output