The Impact of E-logistics on Customer Satisfaction and Loyalty:

"An-Post" E-logistics End-users in Ireland as a Case Study.

A Thesis Submitted in Partial Fulfilment of the Requirement for the Award of MSc. in International Business

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Abstract.

As the sustainability of any business depends on the effectiveness of their supply chain amongst other factors, it is important to note that final delivery is crucial. In today's world, technology has made rapid steps in constantly modifying the online shopping experience for customers allowing retail businesses to run new models and strategies. The study focuses on finding the relationship between effective e-logistics (ICT and delivery) and customer loyalty. The current study used a systematic review of peer-reviewed journal articles to find a relationship.

The main aim of the research is to identify the impact of E- transportation on customers satisfaction and their loyalty in the E-logistics industry using "An-Post" as case study. As a result, in assessing the importance of e-logistics service quality issues influencing consumer satisfaction when shopping online, the researcher proposes a questionnaire-based analysis of the influence of these elements, presuming that effective e-logistics can increase consumer satisfaction leading to consumer loyalty and retention. This was conducted using SPSS 27 to analyze the descriptive and inferential statistics with sample size of 205 respondent. Therefore, it became clear by comparing the findings of these hypotheses to the literature research that there are existing gaps between E-logistics impacts and customers satisfaction and loyalty. The study findings will benefit retail practitioners who are also in the online retail business and researchers contributing to the academia to further research opportunities.

Key Words

Logistics, customer loyalty, customer satisfaction, E-Transportation.

Declaration

Submission of Thesis and Dissertation

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Acknowledgement

All glory to God, the father who has made it possible for me to embark on the journey in pursuit of a master's degree. I sincerely appreciate Him for the wisdom, provision, strength, and guidance throughout my master's program.

I want to appreciate my supervisor in the person of Dr. Kesiena Ebenade, who worked tirelessly to ensure that I understood every correction and made the best of my time. She encouraged me and showed me the road maps to success. Ma'am, I am indeed grateful. Your efforts, invaluable guidance, and dedication to ensuring I produced outstanding work will not be forgotten.

I am incredibly blessed to have impeccably caring, understanding, and supportive friends and family who inspired me to achieve my potentials to the fullest and have been there for me in my formative years.

Table of Contents

List of Tables

List of Figures

List of Abbreviations

CRM: Customer relationship management.

LED: Light-emitting diode

LSQ: logistics service quality.

EDI: Electronic, data interchange.

E-LSQ: E-Logistics Service Quality.

ELM: Electronic logistics marketplace.

ERP: Enterprise resource planning.

ICT: Information and communication technologies.

IMS: Inventory management systems.

JIT: Just in time.

LSP: Logistics service provider.

MRPi: Material equipment planning.

MRPii: Manufacturing requirements planning.

PDSQ: Physical distribution service quality.

SC: Supply chain.

SCM: Supply chain management.

SPSS: Statistical Package for Social.

TMS: Transport management systems.

WWW: World wide web.

List of Appendices

Appendix A: Letter of Consent

Appendix B: Survey Questions

CHAPTER ONE: INTRODUCTION

1.1 Background of the study.

The internet and digital technologies have significantly reduced the gap between companies and consumers and have led to the dynamic growth of e-commerce (Gajewska and Zimon, 2018). With continuous advancements and innovation of new technologies, technology has become prominent as a growth engine and an important competitive tool in the service industry (Metcalfe and Miles, 2000). Most businesses that sale products and offer services, involve consumer interaction have integrated information communication and technology (ICT) into their operations, capitalising on the numerous benefits of engaging customers using the tools provided by the vast World Wide Web.

Despite this growth, it is essential to note that customer satisfaction and loyalty still determine the increase of new and potential customers and the retention of existing customers, which are essential for any business to grow and succeed (Srinath, 2016). Many vendors since the internet bubble have attempted and are still attempting to create innovative strategies to build and retain customer loyalty and increase online sales. As such, a logistics service provider (LSP) must find a way to generate a competitive advantage in such an environment to establish and maintain a leading role (Hartmann and De Grahl, 2011). The concept of logistics emerged between 1960 and 1970, although short-lived due to the high cost (Gruenwald, 2013). It was stated that logistics cost the United States more than 14% of its gross national product (Gruenwald, 2013). Recently, the implementation has proven to be cost-effective for companies and the nation in general (Gruenwald, 2013).

This study is based on the premise that a consumer's satisfaction with online purchasing results in their loyalty and retention. Thus, the current relationship is thoroughly examined. The research concept concentrates on consumer satisfaction, particularly emphasising the effects of high-level e-Logistics Service Quality (e-LSQ) on satisfaction. This study, in particular, examines the effect of Ease-of-use of websites, Physical Distribution Service Quality (PDSQ), the influence of product delivery time, and e-transportation on total customer loyalty. Along with these characteristics, a context-specific variable about the use of e- transportation in the delivery of customers' products is of key interest in this study.

Furthermore, customers' familiarity with e-commerce is expanding, as is their willingness to share their online shopping experiences and thoughts by "word of mouth", providing comments and reviews on items purchased. As a result, e-retailers consider customer satisfaction a crucial factor to research (Cristobal, Flavián and Guinalíu, 2007). Thus, this research focuses on the relationship between e-logistics performance and customer loyalty from the customers' viewpoint.

1.2 Objectives and aim of the study.

This research aim is to explore customers' views on their overall experience using the e-logistics system of "An Post", the Irish state-owned postal services provider. In other words, research their diverse online platform systems and customer interactions. As the growth of any firm depends a lot on its relationship with its customers, the study aims to deeply understand this interaction and identify the impact on the firm in relation to the logistics system.

The aim and objectives of the study are as follows:

1. To examine the impact of effective firm e-logistics on customer satisfaction and how the firm creates value for its customers.
2. To evaluate the impact of e-logistics to gain a competitive advantage and improve the firm's overall performance.
3. To demonstrate the impact of e-logistics firms' interaction with their customers on the overall satisfaction of their customers.
4. To explore the impact of e-transportation on customer satisfaction.

In summary, this research aims not only to extend and address the gap in the literature but to buttress the impact of effective e-logistics practices on e-logistics end-users and their effect on their level of loyalty and satisfaction. This will lead to the overview of the research questions stated in this work regarding customer retention, repeat purchase, and referrals.

1.3 Statement of the Research problem

Most previous e-logistics research has theoretically suggested models to tackle issues surrounding e-logistics (Andrejić, 2013; Cristobal *et al.*, 2007; Davis, 2006). However, very little research has been carried out on e-transportation, that is, the use of environmentally

sustainable friendly cars in delivering goods and services to customers, as researchers suggest that further research be done on e-transportation (Ullah *et al.*, 2021).

This thesis intends to tackle this gap in the literature concerning the impact of e-transportation on customer loyalty and satisfaction. A "mono-method quantitative" methodological approach was adopted to address this problem, where questionnaires were distributed to the users of "An Post" services.

1.4 Research Question

Following the problem identified, the research questions seek to identify the relationship and the impact of e-logistics practices from the customer's perspective. From the premise of e-logistics and customer loyalty, the research seeks to answer the following questions:

1. Is there a relationship between a website's Ease-of-use and customer satisfaction?
2. What is the relationship between (PDSQ) and repeat purchase?
3. What is the impact of time of delivery on customer referrals?
4. Is there an impact of e-transportation on customers' purchases?

1.5 Research Hypotheses

The research hypotheses in this study include:

Hypothesis one

H_0: There is no significant relationship between websites' Ease of use and customer satisfaction.

H_1: There is a significant relationship between websites' Ease of use and customer satisfaction.

Hypothesis two

H_0: There is no significant relationship between (PDSQ) and repeat purchase.

H_1: There is a significant relationship between (PDSQ) and repeat purchase.

Hypothesis three

H_0: There is no significant impact between the time of delivery and customer referrals

H_1: There is a significant impact between the time of delivery and customer referrals

Hypothesis four

H_0: There is no significant impact between e-transportation and customer purchases.

H_1: There is a significant impact between e-transportation and customer purchases.

The research objectives, questions, and hypothesis will guide the researcher in exploring the views of customers who purchase and send goods using “An Post” in Ireland towards understanding the impact of their experiences on their satisfaction and loyalty level.

1.6 Organisational context

This research is focused on an e-logistics company that operates in Ireland, “An Post”. “An Post” is a major player in the logistics industry in Ireland. As stated in their 2021 sustainability report, “An Post” is the first postal service worldwide to attain the zero-emission delivery status (An Post, 2020a). With Ireland's largest private electric vehicle charging network, the firm avoided a €1.5m in fuel cost in 2021(An Post, 2020a). As a result of the changes to their delivery fleets, robust online service and other e-logistics activity, the researcher has chosen to use “An Post” as the key study in this research work to identify the impact of “An post” in Ireland in relation to their e-logistics practices and the impact on their customers.

1.6.1 Case Study - "An Post".

“An Post” is an Irish postal/mail service established in 1994. The state-owned company provides a universal postal service to all parts of Ireland with a population of over 5 million (An Post, 2020a). Their services include parcel delivery, letters, and offers (including postal stamp and mail marketing). This national mail service has over 11,832 employees and David McRedmond is the current CEO since October 2016 (An Post, 2020a).

In 2007, traditional mail volumes fell to 40 percent following internet penetration. “An Post” incurred significant losses in 2014, 2015, and 2016 due to indirect competition following a global change in how people post things and communicate. These tendencies have been hastened by the Covid-19 pandemic, which has resulted in a significant increase in e-commerce activity and familiarity with digitally-enabled communication. The latter may have hastened the ‘e-substitution’ of letters in the market, while the former has significantly enhanced parcel deliveries (An Post, 2020a). Like many companies, “An Post” suffered significant financial impact before and during the 2019 Covid-19 pandemic. The company had to evolve into a competitive parcel delivery service giving rise to the zero-emission goal.

However, following the imposed restrictions caused by Covid-19, “An Post” implemented various strategies to understand their customers’ problems and how to solve them. Therefore, in 2020, "An Post" conducted surveys on various actions surrounding punctuality and fast delivery, safe transportation, supply chain transparency, individual solutions, and environmentally friendly transport. The result of the study indicated that delivery time punctuality is a significant factor in customer satisfaction. Consequently, the national mail service has partnered with various established logistics providers and e-commerce enterprises (such as Amazon and Alibaba) in a fast-changing business climate. The organisation increased revenue by 2.6% (€916m) from €892m in 2019 (An Post, 2020a). This is attributed to the increase in parcel volumes and other aspects of eCommerce delivery despite the impacts of the Covid 19 pandemic (An Post, 2020a).

The rapid global climate change has propelled the organisation to take urgent action to combat these changes from their end. They are Ireland’s most extensive vehicle fleet operators and would significantly impact the environment. They recognise the role of the delivery fleet and the change that can happen due to the use of hybrid or electric vehicles. “An Post” has continuously demonstrated its commitment to promoting environmental sustainability in its operations over time. In 2015, “An Post” rolled out the Light-emitting diode (LED) smart lighting system across their mail centres to reduce power consumption (An Post, 2020b). In addition, “An Post” has set out a net-zero carbon emission target for its operations by 2030 and a decarbonization strategy with renewable energy at its core in its transition to e-transport fleets (An Post, 2020b).

For these reasons, this thesis examines “An Post” as a case study in which the e-logistics provider activities influence customers’ behaviour.

1.6.2 "An Post" e-transportation system.

The growing need for environmental-friendly solutions has compelled An Post to create customised solutions such as the An Post 100% renewable electricity used in their building, private electric vehicle (EV) charging networks, and developing a two-way reusable 100% recyclable gift bag. By decarbonising their fleet, they will positively impact the environment, although this has been challenging over the years (An Post, 2020a).

As pioneers of the green logistics system in Europe, “An Post” offered climate-neutral road freight services because they believe it would benefit their customers and their supply chain process. Figure 1.0, pictures the various zero-emission fleet categories of “An Post”.

Figure 1.0: “An Post” zero-emission fleet (An Post, 2020b).

Their aim is to become greener with their transportation system, improve their fleet efficiency metrics by 3% per year up till 2025, and find more ways to reduce the firms’ environmental footprints (An Post, 2020b).

1.6.3 Significance of the study.

The study will significantly contribute to international business knowledge by analysing the impact of e-logistics as it can affect management decisions, the income of the firm, and the customer base. Most importantly, this research answers how firms should determine their e-logistics process and respond to customer feedback.

1.7 Study limitations

This study has certain limitations. This research employs a convenience sampling technique without a completely matched profile of respondents. Nonetheless, the satisfactory fit of the estimated model allows the study to serve as a foundation for future research.

1.8 Outline of chapters

This thesis report contains six chapters, including the introduction, sub-chapters and subsections where necessary. An overview of each chapter has been provided below.

Chapter one – Introduction: This section introduces the research topic, research aim and objectives, research hypothesis, rationale for the study, outline of the chapters as well as the literature gaps. The limitation of the study has also been discussed.

Chapter two - Literature review: Here, an in-depth assessment of academic and industry literature relevant to the chosen area of study is carried out.

Chapter three - Research methodology: This chapter thoroughly explains this study's research objective and the selected research methods for the primary data collection.

Chapter four - Data findings, discussion and analysis: This chapter presents the study results of the primary research study and the multiple regression analysis results using the Statistical Package for Social Sciences (SPSS). It also aims to synthesise the results from the primary research and similar works in the literature review to develop a persuasive discussion from this research. Furthermore, the tested hypotheses are examined and compared to information from existing literature about the topic. Results are interpreted based on theories, and the inclusion of actual customer views is based on data analysis outcome.

Chapter five – Conclusion and recommendations: In this chapter, the researcher starts by providing a summary and conclusion from the primary research conducted, then examine its link with the research aims and objectives.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

The key milestones and findings around the phenomenon under study must be reviewed to understand the existing knowledge in this area in academia (Saunders, Lewis and Thornhill, 2019). In this research, the existing knowledge cuts across the principal concepts of the efficiency of e-logistics and quality of services, customer satisfaction, and loyalty. Hence, these concepts drive the literature review. Based on findings from the literature, it is evident that a wide range of research has been done on customer satisfaction and loyalty in the online retail industry and logistics. Several of these areas include pre-purchase effects, transaction activities as well as post-purchase effects on customers' loyalty (Otim and Grover, 2006; Jiang and Rosenbloom, 2005), the impact of service quality, the impact of order procurement, and the final fulfilment process (Heim and Sinha, 2001).

This literature review begins by exploring the fundamental concept of logistics and then moves on to consider e-logistics, examining its evolution from its history. Next, customer satisfaction and loyalty are discussed to find a relationship between the two, if any. Furthermore, four conceptual frameworks based on reviewed literature are introduced as tools to critically determine and measure the satisfaction and loyalty levels of customers who employ the services of e-logistic firms. Finally, theoretical frameworks relevant to the study are examined.

2.1.1 Logistics

Davis and Manrodt (1991), define logistics as the process of planning, preparing, enforcing, and managing procedures for the effective and dependable transport and storage of goods and services in the supply chain that includes relaying information from an origin point to the point of delivery for conforming customers requirement.

Closs and Savitskie (2013), define logistics management as the art and science of management, and technological activities regarding resource specifications, design, application, and maintenance to support objectives, plans, and operations related to logistics. According to Ghoumrassi and Țigu (2017), several researchers have concluded that logistics management can assist an organisation in achieving a competitive advantage both in cost and value and in attaining customer satisfaction. One important factor to consider in logistics management is logistics efficiency. Andrejić (2013), defines logistics efficiency as the ease with which an

enterprise or business conducts its operations. As such, the emergence of e-commerce and the internet has opened new markets for actors in the field of logistics. It has also created global market opportunities. Logistics is now critical to success in the retail industry (Umair *et al*., 2019).

According to Masudin, Fernanda and Widayat (2018), logistics activities include five stages, from the origin point to the stage of consumption in which the organisation must monitor all levels. Masudin *et al.* (2018), further demonstrated that logistics performance and its perceived service value could affect customer satisfaction, further explored in section 2.4.
Mentzer, Flint, and Hult (2001), highlight the fact that the introduction of ICT and transferring the whole process to an e-logistics process makes logistics, in general, a lot easier. This is why the researcher in this study will be looking at e-logistics instead of the former**.**

2.1.2 E-logistics

E-logistics, fully as electronic logistics, can be described as the influence of the internet on the process of supply chain management from planning, implementation, flow, and storage of goods to the point of delivery and meeting the requirements of customers (Imran *et al*., 2019). In other words, the logistics handled electronically via the internet is known as e-logistics (Imran *et al*., 2019). Traditional logistics services focused on measures and customer requirements considered hard to assess, such as fill rates, order cycle time, and on-time delivery, making delivery follow-up difficult (Mentzer *et al.*, 2001). However, ICT is crucial in this new logistics process to enhance customer satisfaction levels and gain profit. Understanding the customer's perspective on the service is necessary to develop "customer-focused" logistics service quality (LSQ), which can improve service offerings and act as a strategy for differentiation (Mentzer *et al.*, 2001).

Although the above-stated definitions fail to include service providers and transportation networks, Gunasekaran, Ngai, and Cheng (2007) further define e-logistics as a logistics community network comprised of third-party logistics service providers. This includes warehousing and transportation networks equipped with appropriate information technologies such as electronic, data interchange (EDI), the Internet, and mobile communication technologies, wireless, the world wide web, and radio frequency identification (RFID). The

sole aim is to offer customers with one-stop value-added services (Gunasekaran *et al.*, 2007). E-logistic firms improved customer satisfaction by making all logistics processes real-time, traceable, and transparent (Luhur Prianto *et al.*, 2020).

2.1.3 The history of e-logistics

It is important to understand the totality of e-logistics and its historical development to better appreciate its impact on businesses today (Wang and Pettit, 2016) and to fully understand the industry's future. According to Wang and Pettit (2016), the use of e-business technologies in logistics and supply chain management dates back to the 1960s. The concepts of materials requirement planning (MRP), inventory management systems, distribution resource planning (DRP), and billing systems are all common examples.

Table 1.0 summarises the history of e-logistics, beginning from the 1960s when it was first introduced through transaction automation. This led to an observable development of e-logistics over the next decades, from unconnected applications to interconnected systems, smart responses, and online chat systems, improving the distributed storage capacity, shortening processing time, and increasing connectivity between e-logistics end-users and the firm (Wang and Pettit, 2016).

Table 1.0: History of E-logistics systems (Wang and Pettit, 2016).

Evolutionary Stages	1960s	1970s	1980s	1990s	2000s	2010+
Typical E-Logistics Systems	Accounts receivable, inventory management and control	Transport planning application; MRPI	TMS, WMS, MRP II	ERP DSS CRM	ERP II, internet-based ELM or e-logistics network	Internet-based community systems, mobile apps
Emergent IT Trends	Stand-alone applications	Siloed functional applications	Applications portfolios	Integrated systems	Service-oriented architecture and web-based services	Multi-scale ecologies, cloud computing, Web 2.0, mobile and social media
Integration Focus	Functional	Functional	Functional	Internal end-to-end integration in a company	External integration, extended value chain	Multi-enterprise, collaborative value network
Business Applications	Transaction automation	Business function automation	Desktop and workgroup automation	Enterprise-wide automation	Industrial system automation	Cross-industry automation, loosely coupled flexible configuration
Supporting Computer Technology	Mainframe computers	Minicomputers	Personal computers and local area networks	Enterprise-wide computing	Internet and web platform	Internet and web, mobile platforms

Acronyms: MRPI = material requirements planning; MRP II = manufacturing requirements planning; ERP = enterprise resource planning; ERP II = extended ERP; TMS = transport management system; WMS = warehouse management system; DSS = decision support system, CRM = customer relationship management; ELM = electronic logistics marketplace

2.2 Conceptual Framework

The development of the conceptual framework for this study was influenced by the previous studies carried out in the area of e-logistics. Early research on electronic service quality (e-SQ), a component of e-logistics, focused largely on the consumers' interaction with the website and the information available (Lee and Lin, 2005; Rabinovich and Baily, 2004; Liljander, van Riel and Pura, 2002; Novak, Hoffman and Yung, 2000) whilst paying little attention to customer fulfilment and consumer service quality. More recent research, such as Hammad *et al.* (cited in Masudin *et al.*, 2018) in their study on the determinants of e-logistic customer satisfaction and the intermediary role of ICT, introduced four variables: e-payment, e-traceability, website design, and ICT used in the development of their hypothesis (Figure 2.1). The study's results indicated a remarkable positive link between these variables and ICT and a positive relationship between ICT and customer satisfaction (Hammad *et al.*, 2018).

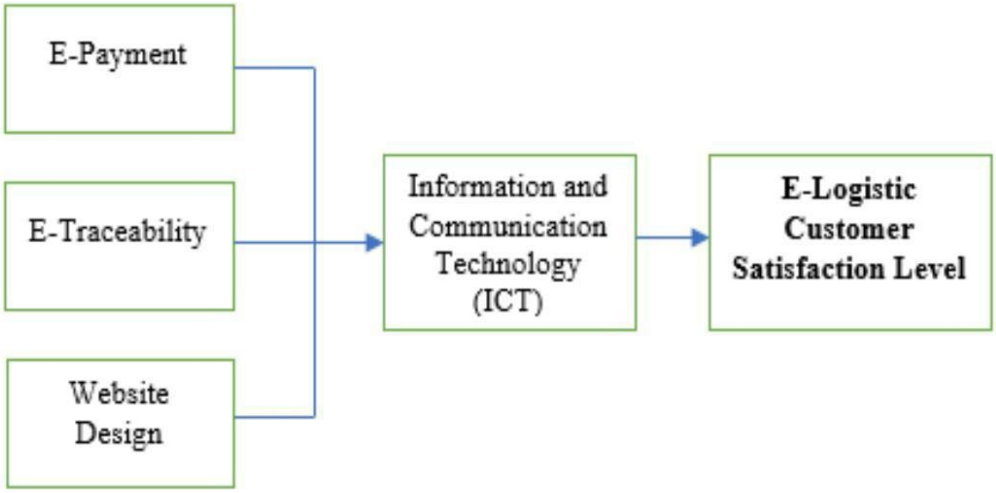

Figure 2.1: Conceptual framework of factors influencing customer loyalty (Hammad *et al.* (cited in Masudin *et al.*, 2018)**.**

It has already been established that ICT is a core component of e-logistic. Therefore, this research study adopts some of the components of these conceptual frameworks while developing its own, introducing physical distribution service quality (PDSQ), time of delivery and e- transportation to further explore their impact on customer satisfaction and loyalty. The conceptual framework developed for this study is depicted in Figure 2.2. the components of this framework are further explored.

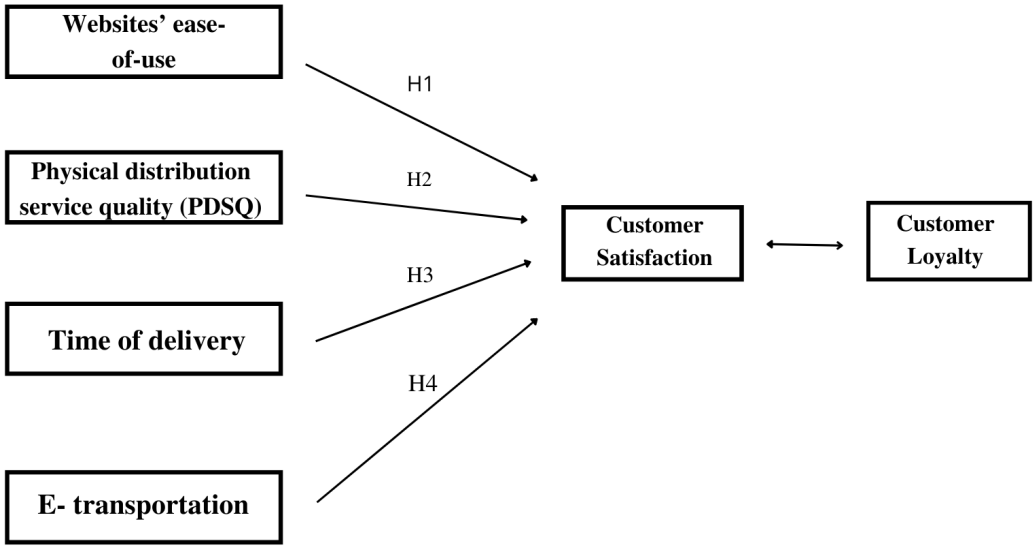

Figure 2.2: The researchers' conceptual model.

2.2.1 Websites' ease-of-use.

The researcher intends to use "ease of use of the website or online platform" to determine customer satisfaction. The ease-of-use of an e-commerce site is defined by previous scholars as the Ease with which a customer can use a store's site or online purchasing platform, as well as the customer's perception that online shopping requires very little effort (Chiu *et al*., 2009; Lin and Sun, 2009; Collier and Bienstock, 2006). Ease of website use includes website navigation, ease of search and overall website performance (Coker, 2013).

2.2.3 Physical distribution service quality (PDSQ).

According to the majority of researchers, PDSQ is a significant element that determines the level of satisfaction and loyalty of online retail consumers (Xing *et al.*, 2010). As a result, researchers make PDSQ one of the variables to measure customer satisfaction and customer loyalty. The two components of PDSQ - physical distribution and service quality are discussed below.

2.2.3.1 Physical distribution

Physical distribution (PD) is typically considered a component of a general logistics concept that also encompasses customer service and marketing (Mentzer *et al.*, 2001). According to Christopher, Magrill, and Wills (1998), PD handles finished goods and is a component of a company's outward logistics, which also takes into account the link between the firm and its clients (Christopher et al, 1998).

According to Brown, Cowles, and Tuten (1996), who studied the history and development of PD, the condition has become more significant over time. The ability to deliver the appropriate quantity of the appropriate product at the appropriate place at the appropriate time in the appropriate condition at the appropriate price with the appropriate information is vital in providing satisfactory customer service. Attendant features of physical distribution service (PDS) can provide a competitive advantage by differentiating companies with superior service levels (Mentzer *et al.*, 2001).

2.2.3.2 Service quality.

Since the development of the conceptual model by Parasuraman, Zeithaml and Berry, (1985), service quality (SQ) has been a significant research issue in literature focused on marketing. Delivering high SQ builds company brands and improves customer happiness.

2.2.3.3 Physical distribution service quality (PDSQ).

In light of the growth of online retail, the researcher considered whether traditional PDSQ components used in business-to-business (B2B) research still hold in the business-to-customer (B2C) space. PDSQ has been the subject of numerous online studies by researchers. Heim and Sinha (2001) carried out an empirical study on the eB2C activities of food retailers. They looked at the order buying, order fulfilment, and customer loyalty practices of e-retailers from the consumer's perspective. In contrast to other studies, Rabinovich and Bailey (2004) used economic and search cost theories to assess the accessibility, timeliness, and dependability of online channels' PDSQ. In the meantime, Xing *et al.*, (2010) developed a relatively mature e-PDSQ framework that includes four dimensions: availability, condition, timeliness, and return, and they also added the return dimension to the online retail PDSQ research framework. Many frameworks created provide significant dimensions and insights for a study of e-PDSQ in B2C contexts and serve as a foundation for creating an e-PDSQ B2C framework.

2.2.1 Time of delivery

Time of delivery is the duration between the order time and delivery time. It also includes the promised delivery time from the website or point of order to the customer. A freight system can ensure that the parcel is delivered on time to the customer by ensuring timely delivery.
Over 26 years ago, researchers depicted the positive relationship between customer satisfaction, its requirement, and logistics delivery and solutions (Beamon, 1999; Sharma, Grewal and Levy, 1995).

Current studies have shown that efficient delivery time and strategies have ensured customer satisfaction (Luhur Prianto *et al.*, 2020). Certain factors that affect transit time and cause late delivery of goods will in general, lead to customer dissatisfaction (Agigi, Niemann, and Kotzé, 2016). Few studies examined the impact of delivery time on a customer’s satisfaction, leading

to referrals or non-referrals of online retail stores, products, or services to other prospective customers. Therefore, this is seen as the gap in the literature as this study seeks to determine whether time-based strategies lead to customer referrals.

2.2.4 E- transportation.

E-transportation is the use of environmentally sustainable friendly cars in the delivery of goods and services to customers. Transportation activities generate externalities such as noise, air, and traffic congestion, which are rarely considered in current city planning strategies. Since transportation accounted for more than a quarter of global energy consumption and that energy production contributes to air pollution, these externalities must be considered to ensure the sustainable growth of transportation globally (McNeil, 2007). As a result, many organisations are looking into using EVs in their delivery fleet. However, the success of EVs depends on the location of recharging stations, recharging speed, and battery life (Juan *et al.*, 2016).

Currently there is very little literature linking e-transportation to customer perception, that is satisfaction and loyalty creating a gap in literature. It is stated that customers are becoming more sustainability conscious and are more concerned about climate and the environment. (Sheth, Sethia and Srinivas, 2011). As a result, the researcher researches this area to contribute to the research body and also to explore the impact of e-transportation on customer loyalty, if any.

2.3 Customer loyalty and satisfaction

2.3.1 **Customer loyalty**

According to early research, loyalty is described as a long-term commitment to repurchase certain goods and services that include repeat patronage and a positive attitude during purchase (Dick and Basu, 1994). Customer loyalty development, maintenance, and enhancement is a critical marketing approach for gaining a competitive edge (Gould, 1995).

In recent times, customer loyalty is still seen as the repetition of purchased goods and services from organisations after the customer has had a certain level of satisfaction with the already purchased goods (Idrees *et al.*, 2015). Customer loyalty is crucial for a business because it boosts revenue, enhances sales performance, and enables sustainable expansion (Bhat and Darzi 2016). Because it demonstrates a competitive advantage, customer loyalty has recently

received much attention (Shafiee and Bazargan, 2018). A devoted customer regularly buys from a brand and recommends it to others (Sirdeshmukh *et al.*, 2002). According to studies, devoted customers are less price-sensitive and more likely to seek out their preferred brand, which lowers distribution, competition, and marketing costs (Shilbury, Westerbeek, Quick, Funk and Karg, 2020). As seen in previous researchers' arguments, customers repurchase is an indicator of consumer loyalty (Chang and Fong, 2010).

2.3.1.2 Types of customer loyalty

Before any firm can combat the issues surrounding customer loyalty; it needs to identify the types of loyalty each customer exhibits. This does not deny the fact that there are issues surrounding identifying a customer's loyalty type. There are several approaches and views on the types of customer loyalty. The first view is based on the length of interaction and the customer's repeat purchases with the company (Bandyopadhyay and Martell, 2007). This is known as transactional or behavioural loyalty (Bandyopadhyay and Martell, 2007).

In the second view, loyalty is seen as a customer's preference or attitude toward a company and their brand based on generational opinions and emotions (Bandyopadhyay and Martell, 2007). This type of loyalty is known as perspective-based or attitudinal loyalty (Bandyopadhyay and Martell, 2007).

The third view combines attitudinal loyalty and behavioural loyalty. Dick and Basu (1994) define this form of loyalty as the level of the relationship between customer's attitude and repeated patronage. It recognises four dimensions: true loyalty, latent loyalty, spurious loyalty, and no loyalty.

Figure 2.3 shows the different types of customer loyalty using behavioural and attitudinal loyalty matrix (Fedotova, Kryvoruchko and Shynkarenko, 2019). The matrix is constructed in a two-dimensional plane using attitudinal and behavioural loyalty indicators applied to the coordinates of the final indicators that characterise each consumer's loyalty. Five new categories of loyalty are included to the four types of consumer loyalty previously outlined in the various loyalty views.

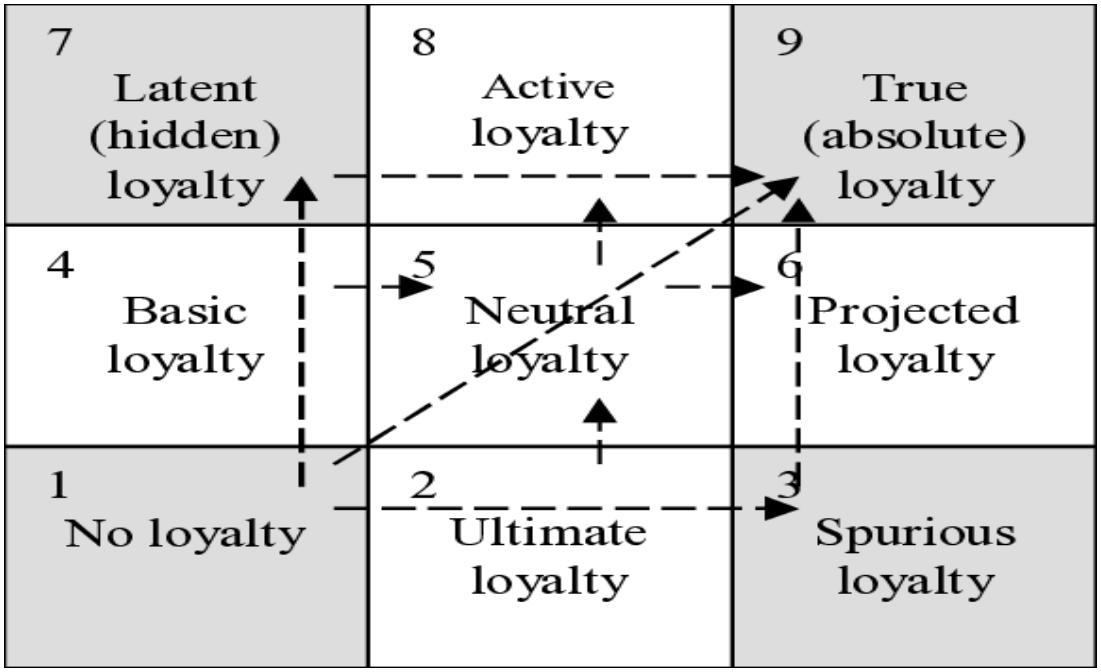

Figure 2.3: Matrix of customer loyalty types (Fedotova *et al.*, 2019).

Based on the understanding of customer loyalty and its matrix, e-logistics firms and other organisations can create better strategic moves to increase the loyalty of their customers. This can be achieved when the firm's marketers can categorise their customers based on the loyalty they exhibit and, as a result, build effective loyalty programs to expand and improve existing loyalty.

Table 2 summarises the different types of loyalty. This angle of research is essential in gaining a better understanding of loyalty. The table shows the varying levels of customer loyalty ranging from zero to absolute.

Table 2: Loyalty types and explanation (Fedotova *et al.*, 2019).

Loyalty type	Explanation
1. No loyalty	Customers have no emotional attachment or purchase with the organisation
2. Ultimate loyalty	Very average level of behavioural loyalty, the appearance of false loyalty. Customers are only interested in discounts and offers and will move if competitors' offer is better.
3. Spurious Loyalty	A low level of attitudinal loyalty. Here, customers are still not attached to the enterprise. Their purchase is due to the lack of awareness of competitors' offers.
4. Basic loyalty	Here, the level of purchase from the firm by the customer does not change. It remains low.
5. Neutral loyalty	The customer is interested in interacting with the enterprise. Here, a medium level of attitudinal and behavioural loyalty is identified.
6. Projected loyalty	There is a high purchase and service consumption level.
7. Latent (Hidden) loyalty	They are loyal to the enterprise but cannot purchase more than a certain level. this may be due to low income, high prices or legal barriers.
8. Active loyalty	There is an emotional attachment between the customer and the enterprise. They clearly prefer the enterprise to its competitor and have a high consumption level.
9. True (Absolute) loyalty	Here, the highest level of attitudinal loyalty can be seen. The customers have very high consumption/purchases, interact with the organisation and rate the enterprise as their favourite.

2.3.2 Customer Satisfaction.

Customer satisfaction refers to how a customer feels about a service or product after making use of the product or service Solomon, Russell-Bennett and Previte (2012). It is widely understood as when the consumer's perceived value for a particular product or service provider matches their transaction and/ or the ongoing relationship with the retailer of the person the service or product is purchased (Heskett, Sasser, and Schlesingler, 1997). Although the level of satisfaction can vary from one customer to another based on individual judgment, even if the service or product remains relatively the same (Machleit and Mantel, 2001).

2.3.3 Customer loyalty and satisfaction in general.

Customer satisfaction is a key determinant of customer loyalty. According to previous studies, there is a substantial correlation between customer satisfaction and customer loyalty (Parasuraman *et al.,* 1985). The more customers are satisfied, the more loyal they become and the more competitive advantage an organisation will gain (Gould, 1995). Thus, this research links and further explores the link between satisfaction and loyalty.

Logistics providers must improve their performance to increase customer satisfaction and loyalty (Liang, 2008). According to Davis (2006), good logistics performance can generate a competitive advantage through stronger customer relationships. The determinants used in this research to determine consumer satisfaction in online shopping are website ease of use, physical distribution service quality (PDSQ), and delivery time efficiency.

2.4 E-logistics, Customer Satisfaction and Customer Loyalty - Establishing a link

Researchers in logistics and supply chain management have proposed that customer loyalty has an economic and social impact on businesses (Mimouni-Chaabane and Volle, 2010). Ngobo (2017) highlights that loyal customers contribute to the company's market position, as loyal customers are willing to buy even high-end products of their favourite brands and products. Therefore, loyalty is an important milestone in all service delivery (Cooil *et al.*, 2007; Gustafsson *et al.*, 2005). As a result, many early researchers attempted to identify factors contributing to loyalty (Zeithaml, Bitner and Dremler 1996). One of them is the efficiency and performance of logistics. The link between the efficiency and performance of logistics and customer loyalty has been explored by Hartono *et al.* (2017). They collaborated that an improvement in the the product quality through an improvement in its logistics promotes

customer satisfaction. In extension, this shows that improving logistics performance, a key variable in customer satisfaction, will directly affect customer loyalty (Aktepe *et al.*, 2015; Kaura *et al*., 2015).

Masudin *et al.* (2018) conducted a study on accessing and developing a framework for the Halal logistics performance on customer loyalty. Halal logistic was examined as 'halal' approved products play a crucial part in the choice of product consumption in Islamic countries. In this study, five variables were considered: halal logistics performance, halal suppliers' service quality, perceived service value, customer satisfaction, and customer loyalty as shown in Figure 2.4. The study concluded that good halal logistics performance will enhance the product quality of halal meat, which will increase customer satisfaction and loyalty.

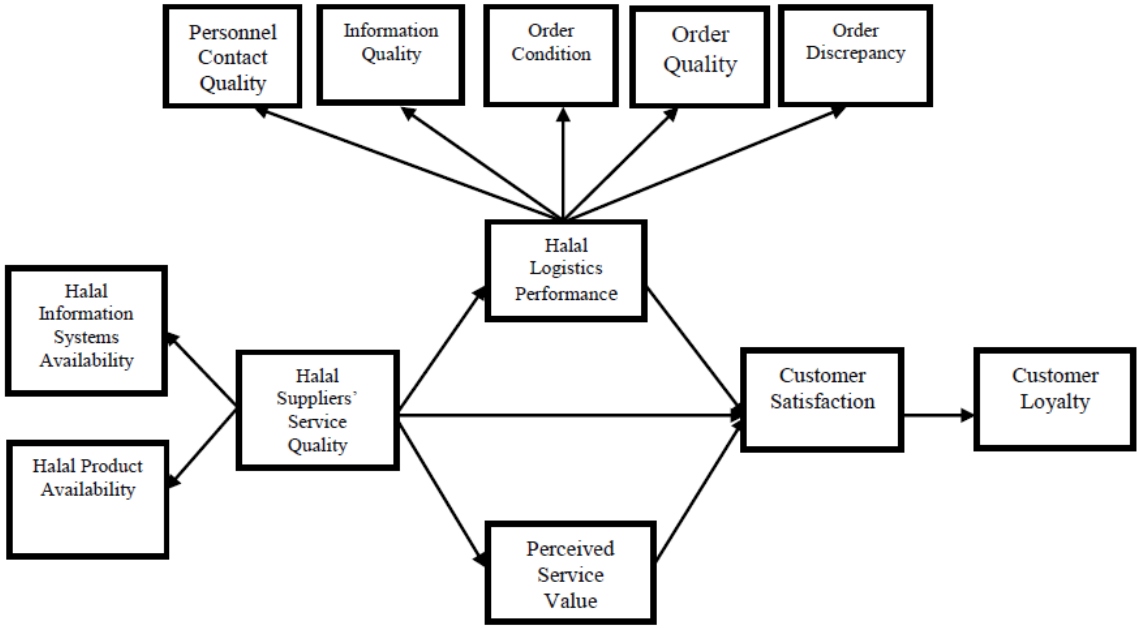

Figure 2.4: Developed conceptual framework for halal logistics and customer loyalty (Masudin *et al.*, 2018).

From established reviewed literature, it is clear that a link exists between logistics, customer satisfaction and customer loyalty. However, with the advent of technology and the digitalization of processes, it will be interesting to understand what impact e-logistics has on customer satisfaction and customer loyalty using the established conceptual framework discussed in Section 2.2.

2.5 Theoretical framework.

This section explains the different theoretical frameworks that the researcher explored. It includes the disconfirmation theory and the theory of competitive advantage.

2.5.1 Disconfirmation theory:

According to this theory, customers tend to compare the standards of various services. It holds the belief that they make various purchases based on their expectation, intention, and attributes (Luhur Prianto *et al*., 2020). Figure 5 below shows that the disconfirmation theory revolves around the expectation of the customer about certain goods or services and the quality of performance, which can affect customers' perception and satisfaction.

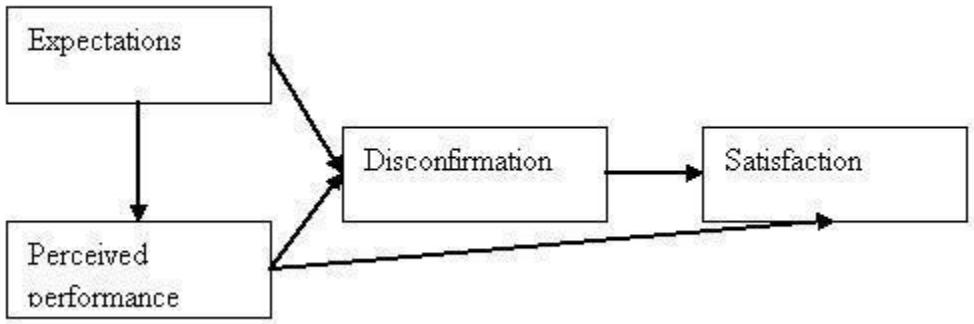

Figure 2.5: Disconfirmation theory (Luhur Prianto *et al*., 2020).

2.5.2 Theory of competitive advantage.

This theory implies that a firm can have leverage over a business and over its competitors. According to this theory, competitive advantage occurs when a company develops a set of characteristics that allows it to outperform its competitors (Barney and Clark, 2007). In relation to this research work, the e-logistics factor is a competitive advantage that helps in the development of positive customer satisfaction and combat rivals in the industry (Luhur Prianto *et al*., 2020).

2.6 Summary

The study sought to gain a better understanding of the link between customer loyalty and customer satisfaction as well as the effects of e-logistics on both. Since there is a dearth of research on E-transportation in relation to logistics in Ireland, this study deepens our

understanding of the subject. The literature was chosen to include the less significant E-logistics dimensions such as website usability, delivery time, physical distribution service quality, and e-transportation to examine the impact of e-logistics on customer satisfaction and customer loyalty. As a result, many contributions have been made to management theory and practice as a result of this research. Firstly, the conceptual framework highlights the flow of thoughts of numerous researchers which improves the understanding of the impact of E-logistics services on consumers satisfaction and loyalty. Secondly, the researcher further to looks into the theoretical framework

Table 3 shows the main publications upon which the research work was formed. The literature review consists of the conceptual framework and theoretical areas to show the impact of e-logistics factors such as the likes of Ease of use of website, service quality and delivery time and its impact on customer satisfaction and if it can influence the customers' behavior (referral, repeat purchase or satisfaction).

Table 3: Main themes of publication

Literature	**Component**	**Antecedents**
Masudin *et al.* (2018)	Logistics performance	Customer Loyalty
Liang (2008)	Logistics Performance	Customer Satisfaction and Loyalty
Davis (2006)	Logistics Service Quality	Customer Loyalty
Russo, Confente and Masorgo (2019)	E-logistics service Quality	Customer Satisfaction and Loyalty
Hameed *et al*. (2018)	ICT and Logistics	Customer Satisfaction.
Luhur Prianto *et al*. (2020)	ICT and Logistics	Customer Satisfaction.
Otim and Grover (2006)	Web – Based services	Customer Loyalty.
Wang and Pettit (2016)	E- logistics	Supply chain management

CHAPTER THREE: METHODOLOGY

3.1 Introduction

To address the research objectives outlined in chapter one, the researcher uses a variety of procedures and measures, which are described in this chapter. The following sections make up this chapter's structure: research design, study population, sample size and sampling techniques, data collection strategies, instrument validity, instrument reliability, model definition, and data analysis methodologies.

3.2 Research philosophy

The research philosophy is the first layer of Saunders *et al.*'s (2019) research onion. It is the foundation upon which certain beliefs for research are built on (Saunders *et al.*, 2019). The research philosophy reflects crucial assumptions about the researcher's opinion, beliefs, and understanding of the world in a specific study (Simpson, 2009). Positivism, critical realism, interpretivism, postmodernism, and pragmatism are the key philosophical positions used in management research (Saunders *et al.*, 2019).

The research was conducted using a positivism philosophy, which indicates that knowledge is either true, false, or meaningless, with reality existing independently of the observer. The researcher can observe reality objectively. In this research work, the philosophy will enable the acquisition of specific and previous knowledge about various technological phenomena and their impact on the success factors of E-logistics operations initiated by organisations segmenting them into true and false statements.

The Positivist approach was adopted in this study due to the following reasons:

- Positivism is more suitable for business-related research due to its built hypothesis from existing theories (Saunders *et al.*, 2019).
- Incorporating the positivism philosophy into this research would have an impact on the result by vigorously identifying the false and true statements and examining the impact that technology has on E-logistics operations while also measuring the purchasing intent of customers.

- Previous research work has made use of the positivism philosophy to observe reality independent of the researcher.

Figure 3.1 below shows the pictorial description of a research onion. Research onion is the reference framework for the research design adopted. It describes the different levels of decision the research adopted while developing the research methodology which proceeds from the outside of the onion inwards (Saunders *et al.*, 2019).

Deductive approaches start with a theory with the aim of testing the theory through the research work. The deduction method was used as the researcher's approach to theory development as the starting point of research is based on pre-existing and established body of research.

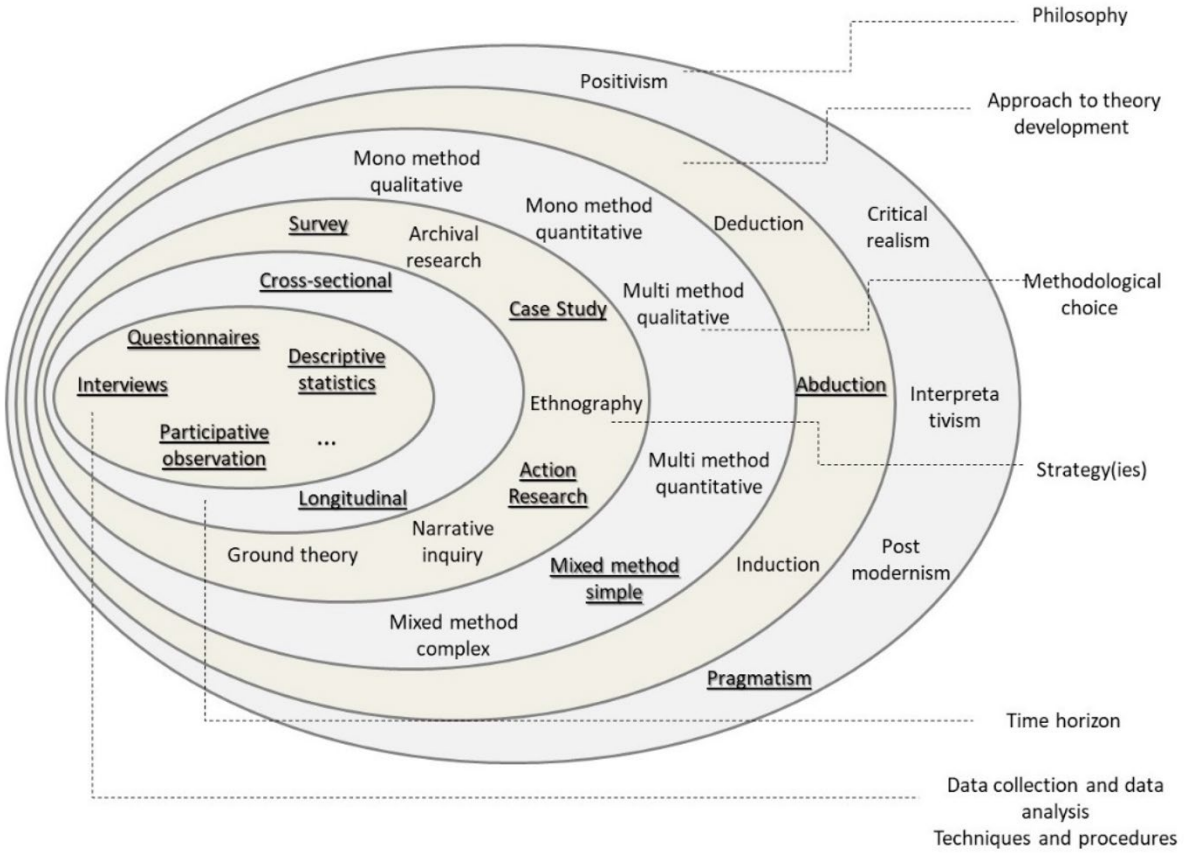

Figure 3.1: The research Onion (Saunders *et al.*, 2019).

3.3 Research design

The research design is the framework that addresses the research questions when developing a research study. It establishes the study parameters and assists in determining the sort of data required, the location and schedule, participants, variables and hypotheses, as well as data collection and analysis procedures (McCombes, 2019).

Quantitative research is described as a sort of study that aims to explain facts by collecting numerical data, which is then analysed using statistical or mathematical methods (Sukamolson, 2007). It is vital to note why a quantitative method was chosen over a qualitative approach, as well as the logic behind that choice. As proposed by other studies, the use of a quantitative approach is the best means for accepting or rejecting a hypothesis was applied (Creswell and Creswell, 2018).

The survey strategy was adopted due to the deductive approach used. The survey intents to answer the who, what, where and how in this descriptive research. Collecting data from a sample size via questionnaire. The cross-sectional studies often employ the survey strategy (González, 2018). As a result, the methodology choice adopted is the mono quantitative method and a survey strategy was administered to obtain data among other strategies as shown in fig 6. To obtain numerical individual responses and experience to test hypotheses.

3.4 Time horizon

In this section, the research methodology deals with the duration of time in which the research work was conducted. There are two types of time horizons as seen above in the research onions figure 3.1. It includes longitudinal and cross-sectional time horizons. The cross-sectional address a problem based on a specific time in order to answer a particular research question. While longitudinal consists of data collected from the same or similar population at different points in time over a long period of time (Saunders *et al.*, 2019).

Thus, this research work uses the cross-sectional time horizon method due to the following reasons:

- In line with previous studies on logistics and customer loyalty, the empirical analysis aims to analyse the relationship between effective logistics and customer loyalty from the perspective of the customer while collecting data at one point in time. The research

questions were carefully developed and designed to fit logistics end-users who utilise these services and the entire E-logistics system.

- The research aims and objectives also indicate that cross-sectional the questionnaire asked questions designed to test the already stated hypotheses. The aim was to access how a specific group of persons as data is collated at one point in time via a questionnaire at once from each respondent.
- Due to the time frame of completing the research work, the use of a cross-sectional time horizon is appropriate, unlike the longitudinal approach which could take several months and was not available to the researcher.

Table 4: Linking research objectives to literature/ research protocol

Theme	Question topic	Link to objectives
Demographic	Gender	All objectives
	Age range	
	Marital status	
	Level of Education	
	Ethical background	
Ease of website	AN POST platform navigation	Research objectives 1
	Sending and tracking	
	Website interface	
	Home page and other page distinction.	
Physical distribution service quality (PDSQ)	Responding to customers' needs and complaints	Research objectives 2
	Willingness to assist customers	
	Goods packaging	
	Online platform experience	
Delivery Time	Estimated delivery time	Research objective 3
	Customers' decision to purchase based on delivery time	
	Online tracking system integrity.	
	Personalised service of online platform.	

E-transportation	Customers concerned on kind of transportation.	Research objective 4
	Determining if customers are environmentally conscious.	
	E-logistics firm means of transportation.	

3.5 Data collection method

In this research, 300 questionnaires were distributed and collected via email means to e-logistic users in Ireland using the convenience sampling technique. The final research questionnaire was done using Google forms. This section will collect the respondent's details regarding their gender, age, income, and level of education. Furthermore, questions in the questionnaire will use the five-point Likert scale for measurement, from "Strongly Disagree (1)" to "Strongly Agree (5)".

Questions were asked concerning the Ease of website use for online retail stores, quality of service of logistics providers to end-users, and customers' perception based on the time of delivery of their ordered product and how it affects their behaviour afterward. Data collected via Google forms will be saved securely and discarded once the research work is concluded. Participants will be informed of the nature of the study and their consent will be requested in the first section of the questionnaire. Participants will be free to withdraw their participation at any time with no penalty.

3.6.3 Ireland as a case location.

Various modes of e-commerce businesses (e-logistics) are functioning in Ireland and in Europe at large. This includes the likes of online retail stores both small, medium and large-scale businesses. It also includes online service agencies, the banking industry and the manufacturing industry, as many firms are rapidly adopting the e-commerce mode rather than the traditional model. Very few studies have used Ireland alone as a case study. The case study of Luhur Prianto *et al.* (2020) was on the food sector in Thailand in regard to e-logistics customer satisfaction, and as such the researcher intends to use e-logistics end-users within Ireland as the research focus.

3.7 Statistical Analysis Techniques

Due to the quantitative nature of the research work, the descriptive Stats (the mean, median, mode, standard deviation etc,) were analysed using the SPSS software version 27. The aim is to analyse the reliability of the instrument Cronbach's alpha (α). Furthermore, the relationship between the dependent and independent variables was tested using regression analysis.

3.8 Pilot Survey and Data Reliability.

Prior to the main data collection, a pilot survey was conducted and sent out to volunteer participants to test the research instrument, and the results were subjected to a reliability test. This was done to confirm that the questions were measuring what they were supposed to measure and that the results had some internal consistency. Cronbach's alpha (α) is employed to accomplish this, as it proved particularly effective for the survey's Likert scale components. Cronbach's alpha of.966 (α =.966) was obtained as a result of the reliability tests, indicating a good level of internal consistency.

3.9 Reliability of instruments.

It is vital to check the validity of instrument used in the research work most especially when data is gathered via questionnaires (Andrade, 2018).

A pre-study study was conducted on a small number of An-Post E-logistics customers in Ireland as 22 questionnaires was distributed to confirm the consistency of the instrument and test its the instrument's reliability. Furthermore, the data was encoded using Statistical Package for Social Sciences for dependability procedures, in addition to professional validation of the instruments. Cronbach's alpha is greater than 0.9. The instrument's reliability was determined using the reliability coefficient obtained. However, according to Cronbach (1951), for reliability and statistical consistency of the data, the coefficient of the tool should not be less than 0.75 correlation coefficient.

Table 5: Reliability Statistics

Cronbach's	Cronbach's	N of Items
.966	.969	22

Furthermore, the data was encoded using Statistical Package for Social Sciences for dependability procedures, in addition to professional validation of the instruments. Cronbach's alpha is greater than 0.9. The instrument's reliability was determined using the reliability coefficient obtained. However, according to Cronbach (1951), the coefficient of the tool should not be less than 0.75 correlation coefficient for the data to be reliable and statistically consistent.

3.10 Ethics

According to Leavy (2017), ethics refers to a person's morals, honesty, fairness, and level of truthfulness. Individuals learn the difference between right and wrong as a result of these ethical considerations. Adams *et al.* (2007), states that the project will not be considered successful if ethical duties are not applied during the research cycle.

As a result, ethical issues are critical in research, especially when research participants are included because they preserve the safety, mental health, and privacy of participants (Albon, 2007). Prior to starting the primary research, an ethics form was prepared and submitted to the National College of Ireland (NCI) for ethical assessment, along with a research proposal explaining the topic and planned methodologies to be used.

The essence of this study is to find out the impact of e-logistics on customer satisfaction and loyalty in fulfilment of academic pursuit. Hence, the questionnaire was used for academic purposes only.

3.10.1 Informed Consent.

According to Albon (2007), researchers must present participants with clear information on the study, as well as an outline of what they can expect if they participate. As a result, before agreeing to participate in this research project, participants were informed about the nature of the study, the topics that would be covered, and given instructions.

Every participant was able to make an informed decision about whether or not they wanted to participate in the study as a result of this. When a participant clicked on the survey link online, they were taken to a permission form page that explained the research topic, aims, and estimated length (Appendix 1). They were then given the choice to consent to participate, and if they did, they were able to continue with the survey. Participants were also told that they might opt out of the study at any moment.

3.10.2 Data Storage and anonymity of participants.

In addition to ensuring participants' data confidentiality, their responses were stored safely in the researcher's computer which will then be converted to a transcript. The files are password-protected, and the researcher is the only person with assess to the password. As a result, these safeguards contribute to the participants' confidentiality.

Furthermore, participants were told that their comments would only be used in this research project. All responses will be erased after the research is completed, in accordance with NCI's data retention policy.

3.11 Limitations

Every research methodology has limitations, which the researcher must be aware of. This can also be seen as the research restriction and constraints involved in research methodology that will have an effect on the findings.

The researcher experienced the following limitations:

1. **Time constraints:** Firstly, the researcher experienced time constraints as the time frame for the completion of the destination was limited to just three months which was challenging during the pandemic period. This is seen as a limitation as a longer research time to complete research dissertation, the researcher would have obtained more feedback from participants, and had a larger sample size which would have resulted in a more conclusive finding following data analysis.
2. **Global pandemic and Online survey**: In addition, restrictions and quarantine guidelines for Covid-19 scuppered plans to do a physical (in-person) data collection, which would have been perfect given the high completion and return rate associated with this method.

As a result, the study used an online data gathering strategy, which comes with its own set of constraints which included delay in obtaining the result and feedback from the participants.

Using an online survey for data collection had several drawbacks. This form of data gathering allows participants to complete the survey at their leisure. However, there is a greater chance that individuals conducted the survey in a distracting location, affecting their ability to concentrate fully.

3. **Participation decline:** Previous research indicates that some potential respondents would most likely decline to participate in the study. This may be due to personal reasons, lack of time by the participant to fill the questionnaire or lack of interest in the research topic. Also, a few persons prefer the traditional means of answering questionnaires such as paper and pen questionnaires, personal interviews, etc. This is seen as a limitation because the researcher experienced a few setbacks with getting back responses from participants.
4. **Sampling issues:** Reduced representativeness as data obtained via the questionnaire tilted heavily towards certain demography.

3.12 Conclusion.

The table 6. below highlights the overall importance of the research methodology as it plays a major role in the entire research process. As a result, this chapter examined the methodology adopted in this study. It highlights the different levels in the research onions including sample frame, sampling methods, and Research design.

Table 6. Methodology summary.

Stages		Quantitative analysis					
	1	1	2	3	4	5	6
Research Methodology process.	Philosophy	Theory developments	Methodology choice	Strategy	Time horizon	Data collection	Interpretation
	Positivism	Deductive method	Mono Method quantitative	Survey, Convenient sampling.	Cross-sectional	Closed ended Questionnaire	SPSS Version 27 & Excel.

The quantitative design was employed due to the nature of the study to gain a better grasp of the framework using the survey approach. As a result, the researcher concentrated on the use of primary data to acquire information on the research topic in this chapter.

Despite research's limitations, the research work still provides value in the academic and business field. Lastly, ethical considerations were also discussed in this chapter.

CHAPTER FOUR: DATA ANALYSIS AND FINDINGS

4.1 Introduction.

This result chapter will commence with a presentation of the sample descriptive statistic in sections A, B and C with data retrieved from questionnaires and interpreted systematically. Section A which is the descriptive analysis, consists of participants demographics, such as gender orientation, age, ethnicity, educational background which are imperative to determine the impact of E-logistics on customer locality. Furthermore, Section B is the inferential statistics which was used to test the research hypothesis using "SPSS, statistics 28". This was achieved using data from the descriptive sample to make decision about the population. Although due to the restrictions mentioned in the previous chapter, the actual sample for this research were 205 respondents rather than the original target sample of 400 respondents. Virtual representations of the analysis are displayed in tables, graphs and figures. The last section C discusses the findings of the analysis.

4.2 Section A: Descriptive Statistics.

This section summarises the responses from the respondent using tables and charts. The aim is to tackle the objectives of the research by providing major backgrounds to the participant involved in this study. These are presented in the following sub-sections.

4.2.1 Respondents' awareness of the case study: An Post.

To ensure that the participants filling the questionnaire are aware of the case study in question (An Post), the research included a 'Yes', 'No' or 'Maybe' in the questionnaire.

Table 4.1 indicates that most willing respondents are aware of "AN POST" and have used their service. In other words, participants who picked the option 'Yes' or 'Maybe' are allowed to forge ahead with the questionnaire. The researcher intends to allow all participants to move on and respond to the rest of the questions in the questionnaire, obtaining data from those who have used "An Post" services.

Table 4.1 indicated that 187 respondents are aware of "An post" and have used their services. It also showed that 9 of the total respondents are unsure if they have used "An Post" while 9 have not used An Post as a service at all.

Table 4.1 Respondents' awareness of case study: “An Post”.

		Count	Column N %
If respondents have used “An Post” before.	Yes	187	91.2%
	No	9	4.4%
	Maybe	9	4.4%

4.2.2 Demographic profile of the participants.

This section highlights the different demographics of the respondents. These include 1) Gender, 2) Age, 3) Marital status, 4) academic qualification and 5) Ethnicity. These five demographics were selected to ascertain the influence each variable would have on customer loyalty for "An post" services.

The demographic data, as shown below, summarises 156 respondents within Ireland.

1. **Gender:** For this variable, four multi-choice options were given to allow the respondents to select what best describes them. Thus, the researcher asked the gender or sexual identity of the participant in four categories: 'Male' or 'Female' or 'Transgender' or 'Prefer not to say'. This variable was included taken into consideration the role diversity plays in shaping the personality of the respondents.

Table 4.2 below reveals that the majority of the sample research participants were females (107), followed by males (94) , with 4 persons who chose not to reveal their gender and no one identifying as transgender.

Table 4.2 Gender Description.

		Count	Column N %
Respondents Gender	Male	94	45.9%
	Female	107	52.2%
	Transgender	0	0.0%
	Prefer not to say	4	2.0%

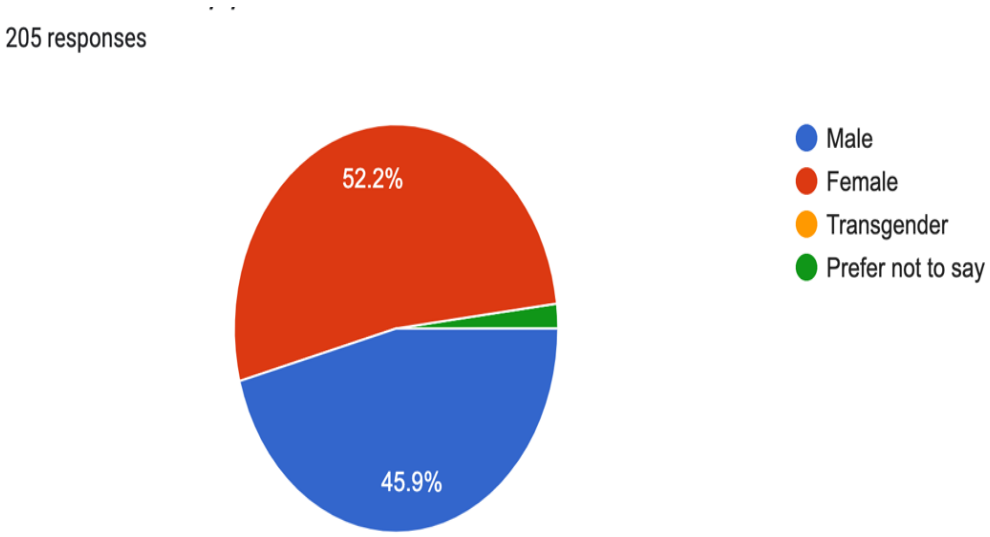

Figure 4.1: Gender Pie chat.

The pie chart above indicates the representation of each gender in percentage; It shows that the participants in the survey are majorly women, with about 52.2% of the entire survey.

2. **Age:** This variable was created as a multiple-choice question, classified by age groups of 18 to 25, 26 to 35, 36 to 45, 46 to 55, and 56 and above, and prefer not to say. According to Table 4.3's findings, the majority of respondents (56.5%) fell into the 26–35 age range, followed by the younger demographic of those between the ages of 18 and 25 (24.9%). People 56 years of age and older were the demographic with the lowest participation rate (2.9%).

Table 4.3 Respondents' age.

		Count	Column N %
Respondents Age	18-25	51	24.9%
	26-35	116	56.6%
	36-45	32	15.6%
	46-55	0	0.0%
	56- and above	6	2.9%
	I Prefer not to say	0	0.0%

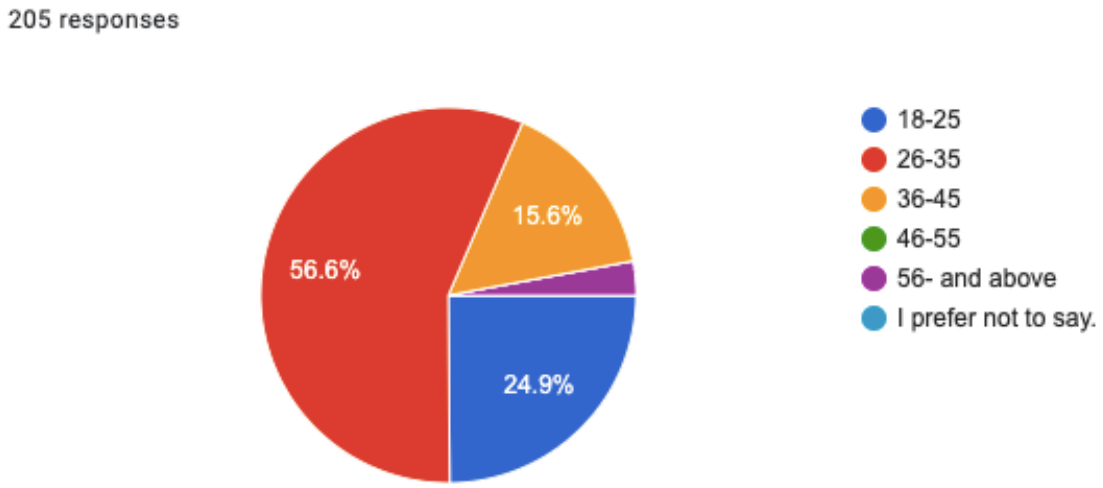

Figure 4.2: Pie chart of respondents' age.

The pie chart above shows the respondents' age graphically. It indicates that 56.6% of participants age 26 – 35 years.

3. **Marital status:** This was included as a variable to ascertain the marital status of the respondents, which might play a role in gaining a better understanding of their frequency of using "An Post" services. For example, a married couple living together might decide to leave the responsibility of handling and receiving posts or deliveries on their partner. This

question was designed as a multiple-choice question, allowing participants to pick the option that best described their marital status.

In table 4.4, The results indicate that 134 participants are single, 63 participants are married, 6 are Divorced, 1 is widowed, and just 1 participant preferred not to state their marital status.

Table 4.4 Marital Status with Percentage.

		Count	Column N %
Marital Status of Respondents	Single	134	65.4%
	Married	63	30.7%
	Divorced	6	2.9%
	Widowed	1	0.5%
	I prefer not to say	1	0.5%

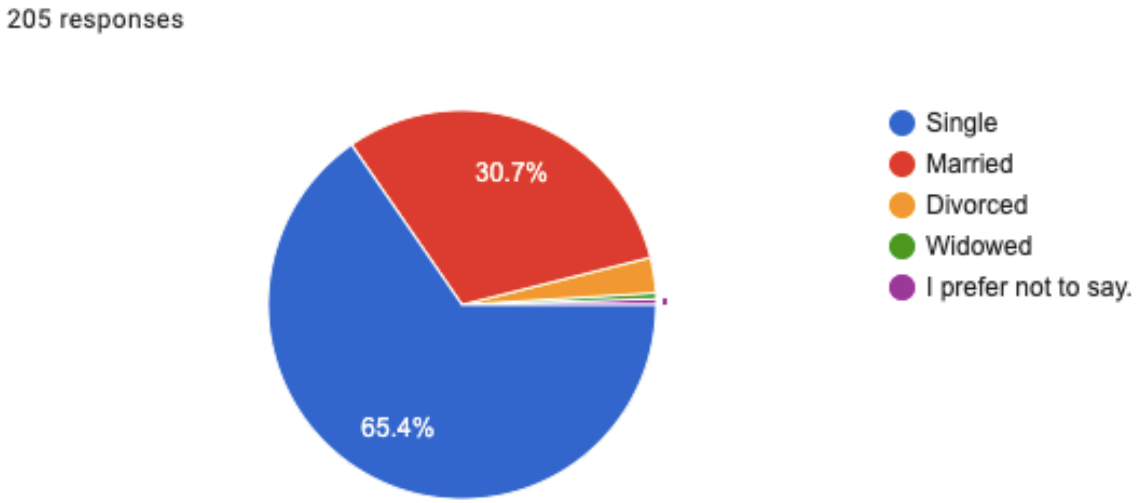

Figure 4.3: Marital Status of respondent.

The pie chart above indicates the representation of each gender in percentage; It shows that the participants in the survey are majorly women, with about 52.2% of the entire survey.

4. Educational Background:

The educational background was considered. This is significant as the researcher intends to know if there is an impact in respondents' response based on their educational background. The results shown in Table 4.5 shows that the greatest number of respondents were master's degree holders (63.1%), with bachelor's degree holders forming 29.6% of the respondents, whilst the least percentage of respondents decided not to reveal their educational qualification.

Table 4.5 Educational Background of respondent.

		Count	Column N %
The educational qualification of respondents	High School Diploma	7	3.4%
	Bachelor's Degree	60	29.6%
	Master's Degree	128	63.1%
	PhD	5	2.5%
	Others	3	1.5%

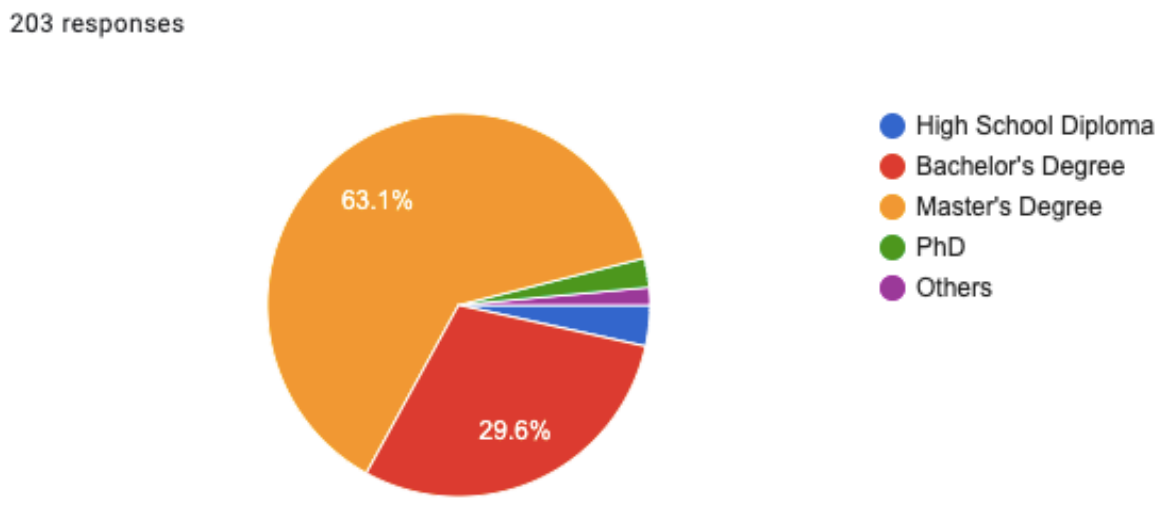

Figure 4.4: Educational background of respondent.

The Pie chart above shows the majority in the educational background as Masters' Degree holders with over 63.1% of the total participants and the next as the Bachelor's degree holders with 29.6% of the total percentage.

5. **Ethnicity:** This variable was considered to ensure diversity. It was designed to be of multiple choice to allow the respondents the opportunity to choose what best describes them. The results as seen in Table 4.6 show that the largest number of respondents (74.1%) were of the Black African/American ethnicity, (12.7%) identified as Caucasian/White, respondents of Spanish origin were the least (0.5%).

Table 4.6 Ethnicity.

		Count	Column N %
The Ethnic group of respondents	white/Caucasian	26	12.7%
	Black African / American	152	74.1%
	Asian – Central, North, East, South East, West	16	7.8%
	Spanish	1	0.5%
	Mixed	7	3.4%
	Prefer not to say	3	1.5%

4.3 Section B: Reliability Test and Validity.

In this section, the reliability of a composite score as it relates to the dependent and independent variables: Ease of website use, Physical distribution service quality (PDSQ), Delivery time, and E-transportation are tested. The reliability level was determined using the Cronbach's alpha score (Table 4.7.1). For each of these independent variables, the questionnaire consisted of 15, 5-point Likert-scale shown in table 4.7.2.

Table 4.7.1: The Cronbach's Alpha Score for determining reliability level (Streiner, 2003).

Cronbach's Alpha Score	Level of Reliability
0.0 – 0.20	Less Reliable
> 0.20 – 0.40	as Rather Reliable
>0.40 - 0.60	Quite Reliable
>0.60 – 0.80	Reliable
>0.80 – 1.00	Very Reliable

Table 4.7.2: Qualitative representation of 5-Point Likert Scale Measurements (Likert, 1932).

Likert-Scale Description	Likert-Scale
Strongly Disagree	1
Disagree	2
Neutral	3
Agree	4
Strongly Agree	5

The researcher aims to gain insight into the views of the customers regarding the following:

- The impact of effective firm e-logistics on customer satisfaction and value creation for their customers.
- The impact of e-logistics' firm interaction with their customers on the overall satisfaction of their customers.
- The impact of e-transportation on customer satisfaction.

Cronbach's alpha has acceptable values between.70 and.95. Values in this range and lower are considered to have low dependability levels, potentially as a result of the limited sample size and few items analyzed (Cronbach, 1951).

A. Independent variables: Ease of use of the website.

Table 4.8.1 Case procession summary "Ease of use of website".

Case Processing Summary

		N	%
Cases	Valid	202	98.5
	Excluded[a]	3	1.5
	Total	205	100.0

a. Listwise deletion based on all variables in the procedure.

Table 4.8.1 above shows that 3 cases got excluded due to missing data**.** Over 205 participants in the study, but only 202 had valid responses on the total scale items.

Table 4.8.2 Reliability Statistics.

Reliability Statistics

Cronbach's Alpha[a]	Cronbach's Alpha Based on Standardised Items	N of Items
.000	.520	4

a. The value is negative due to a negative average covariance among items. This violates reliability model assumptions.

The Cronbach's alpha value for the reliability of "Ease of use of website" was .000 showing a low alpha score based on the 5-point Likert scale questions for 4 items. The score for this scale leads to an error, thus proving that the reliability of this scale is unacceptable. As a result, the researcher scrapped one of the individual measures.

Table 4.8.3 below shows the individual measures that the researcher should scrap using the inter-item correlation matrix. The individual measure to be eliminated was "Satisfied with An Posts' websites interface", showing a score of -.075.

Table 4.8.3 Inter- Item Correlation matric.

Inter-Item Correlation Matrix

	Find it easy to navigate and find things on the An Post platform	The e-commerce platform makes sending and tracking products easy	Satisfied with An Post's websites interface	An Post does not take too long to respond to customers' needs/complaints (on-call/ online)
Find it easy to navigate and find things on the An Post platform	1.000	.515	-.075	.422
The e-commerce platform makes sending and tracking products easy	.515	1.000	-.010	.397
Satisfied with An Post's websites interface	-.075	-.010	1.000	.027
An Post does not take too long to respond to customers' needs/complaints (on-call/ online)	.422	.397	.027	1.000

Table 4.8.4 Item total statistics.

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Finds it easy to navigate and find things on the An Post platform	61.01	494604.950	-.074	.328	7.749E-5
The e-commerce platform makes sending and tracking products easy	60.78	494529.577	-.009	.305	.000[a]
Satisfied with An Post's websites interface	11.63	3.845	-.022	.010	.697
An Post does not take too long to respond to customers' needs/complaints (on-call/ online)	61.23	494483.692	.028	.225	.000[a]

a. The value is negative due to a negative average covariance among items. This violates reliability model assumptions.

Table 4.8.5 Case Processing Summary – Ease of use of website.

Case Processing Summary

		N	%
Cases	Valid	203	99.0
	Excluded[a]	2	1.0
	Total	205	100.0

a. Listwise deletion based on all variables in the procedure.

Table 4.8.6 Reliability Statistics – Ease of use of website.

Reliability Statistics

Cronbach's Alpha	No of Items
.698	3

The Cronbach's score, based on a 5-point Likert scale, was.698 when the internal consistency or reliability for the independent variable "Ease of use of websites" was examined. This demonstrates that the scale's reliability score is satisfactory. This was after getting an error with the 4 number item as seen in tables 4.8.2; Tables 4.8.3; Tables 4.8.4. As a result, question 3 was dropped. The Cronbach's Alpha becomes .698 for three items instead of the initial four.

Table 4.8.7 Descriptive Statistics for Ease of use of website.

Descriptive Statistics

	N	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Find it easy to navigate and find things on the An Post platform	205	3.88	.822	-.464	.170	.082	.338
The e-commerce platform makes sending and tracking products easy	205	4.11	.722	-.409	.170	-.245	.338
Satisfied with An Post's websites interface	204	52.77	699.806	14.283	.170	203.999	.339

An Post does not take too long to respond to customers' needs/complaints (on-call/ online)	203	3.66	.933	-.109	.171	-.709	.340
Valid N (listwise)	202						

B. Independent variable: Physical distribution service quality (PDSQ).

Table 4.9.1 Case Processing Summary - Physical distribution service quality (PDSQ).

Case Processing Summary

		N	%
Cases	Valid	202	98.5
	Excluded[a]	3	1.5
	Total	205	100.0

a. Listwise deletion based on all variables in the procedure.

Table 4.9.2 Reliability Statistics - Physical distribution service quality (PDSQ).

Reliability Statistics

Cronbach's Alpha	N of Items
.721	4

The dependability of physical distribution service quality (PDSQ) was measured using 5-point Likert scale questions, and the alpha value for four items was.721. This is greater when

compared to the two earlier variables that were used to assess the dependability scale, showing that it has very excellent and acceptable reliability.

Table 4.9.3 Descriptive Statistics - Physical distribution service quality (PDSQ).

Descriptive Statistics

	N	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
An Post logistics delivery team/staff are always willing to assist you	203	3.81	.767	.001	.171	-.677	.340
An Post logistics delivery team/staff do not take too long to respond to customers' needs/complaints (physically)?	204	3.67	.863	-.132	.170	-.417	.339
Satisfied with the form in which goods are delivered to you (packaging)	205	4.13	.684	-.730	.170	1.795	.338
Happy with the overall experience of the online platform	205	3.97	.723	-.341	.170	-.046	.338
Valid N (listwise)	202						

C. Independent Variable: Delivery time.

Table 4.10.1 Case Processing Summary – Delivery Time.

Case Processing Summary

		N	%
Cases	Valid	204	99.5
	Excluded[a]	1	.5
	Total	205	100.0

a. Listwise deletion based on all variables in the procedure.

Table 4.10.2 Reliability Statistics – Delivery Time.

Reliability Statistics

Cronbach's Alpha	N of Items
.683	4

Based on the 5-point Likert scale questions on delivery time reliability, the alpha value was .683 for four items. Thus, the reliability scale is acceptable.

Table 4.10.3 Descriptive statistics – Delivery time.

Descriptive Statistics

	N	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
The estimated delivery time affects my decision to make a purchase	204	4.19	.815	-.906	.170	.760	.339

I am satisfied with the estimated delivery time and the actual time of delivery of my goods by An Post	204	3.98	.830	-.589	.170	-.072	.339
I can trust An Post's online tracking system	204	4.15	.805	-.731	.170	.384	.339
The online platform provides personalised services to customers regarding time and place of delivery	205	4.00	.757	-.607	.170	.761	.338
Valid N (listwise)	204						

D. Independent Variable: **E-transportation.**

Table 4.11.1 shows that in over 205 participants in the study, only 200 participants had valid responses in the total scale items while 5 cases got excluded from the data analysis due to omitted questions in the questionnaire**.**

Table 4.11.1: Case Processing Summary – E-transportation.

Case Processing Summary

		N	%
Cases	Valid	200	97.6
	Excluded[a]	5	2.4
	Total	205	100.0

a. Listwise deletion based on all variables in the procedure.

Table 4.11.2 shows that the Cronbach's Alpha value was found reliable and acceptable for E-transportation composite (variable) at .762 which is =>0.70. as shown in table 4.7.1.

Table 4.11.2: Reliability Statistics – E-transportation.

Reliability Statistics

Cronbach's Alpha	No of Items
.762	3

Table 4.11.3 Descriptive Statistics – E-transportation.

Descriptive Statistics

	N	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
I am bothered about what kind of vehicle my goods are transported in? (for example; fossil-fuel cars, hybrid or electric cars)	201	3.04	1.248	-.138	.172	-.997	.341
I consider myself an environmentally-conscious customer	203	3.61	.956	-.341	.171	-.223	.340
Have seen An Post delivering goods with environmentally friendly vehicles (eg; Hybrid or electric cars)	205	3.32	1.058	.013	.170	-.543	.338
Valid N (listwise)	200						

E. Dependent variable: Customer loyalty.

The table 4.12.1 depicts that in the customer loyalty section of the questionnaire, of over 205 participants in the study, only 201 had valid responses on the total scale items and 4 cases got excluded due to missing data**.**

Table 4.12.1 Case Processing Summary – Customer Loyalty.

Case Processing Summary

		N	%
Cases	Valid	201	98.0
	Excluded[a]	4	2.0
	Total	205	100.0

a. Listwise deletion based on all variables in the procedure.

Table 4.12.2 Reliability Statistics – Customer Loyalty.

Reliability Statistics

Cronbach's Alpha	N of Items
.883	5

Table 4.12.2 above shows the result of the Cronbach analysis, indicating that the scale has internal reliability of .883 relative to the demographic the researcher is interested in. The 5-point Likert scale was used.

Table 4.12. 3 Descriptive Statistics – Customer loyalty.

Descriptive Statistics

	N	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
I will say positive things about An Post to others	203	3.95	.733	-.221	.171	-.365	.340
I will recommend An Post services to those that seek my advice	205	4.00	.741	-.438	.170	.037	.338
I will encourage friends and family to do business with An Post	205	3.90	.757	-.375	.170	.312	.338
I will consider An Post as my first option for future transactions	205	3.61	.914	-.324	.170	-.161	.338
I will continuously do business with An Post	203	3.79	.777	-.252	.171	.061	.340
Valid N (listwise)	201						

4.4 Scale variables:

This section shows the level of interaction between the independent variable scale (**Indi_composite**) and the dependent variable scale (**Dep_composite**).

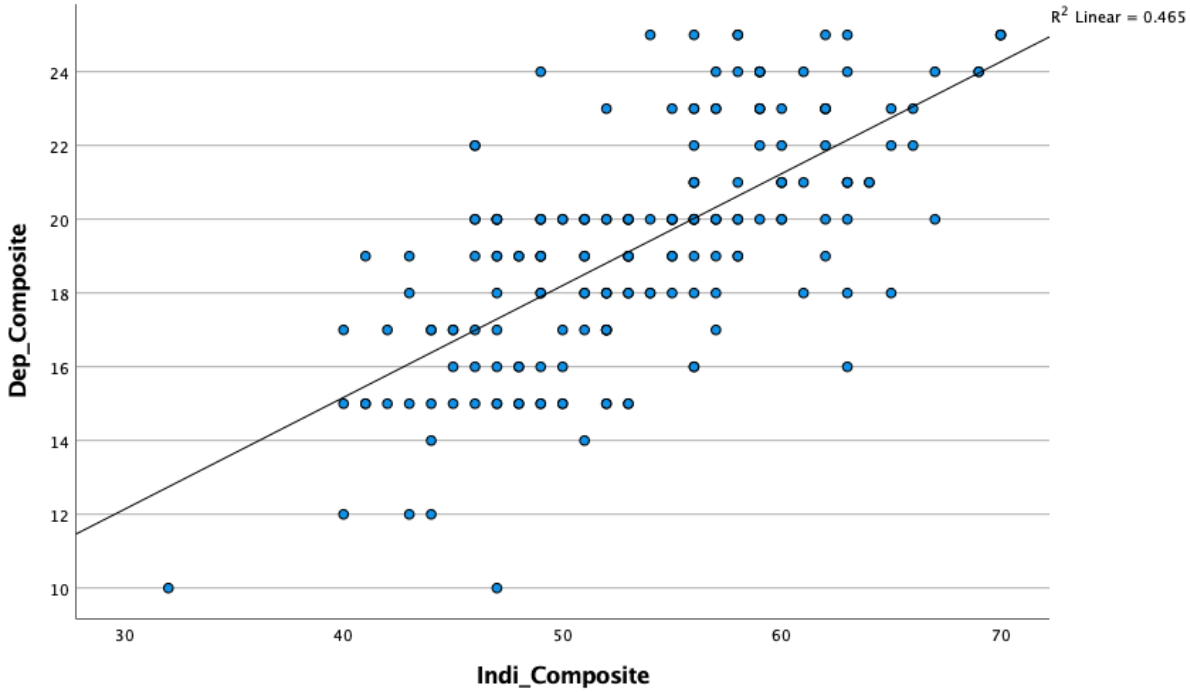

Figure 4. 5: The General scale variable of both male and female respondents.

The graph (figure 4.5) shows that the dependent variable, customer loyalty and satisfaction, is influenced by the independent variables: Ease of use of website, Physical distribution service quality (PDSQ), delivery time, and E- transportation. It shows the trend in an upward direction, showing a positive association between the Ease of use of website, Physical distribution service quality (PDSQ), delivery time, and E-transportation on customer satisfaction and loyalty. This shows a linear relationship, stating that the dependent variable increases if the independent variables increase.

- The R^2 Linear = 0.465 (multiplied by 100).

The value of the coefficient of determination (R^2 linear) indicates that 46.5% of the variation in customer loyalty and satisfaction is accounted for through the variation in the independent variable. Thus, the graph above shows a positive relationship.

The effect on males and females

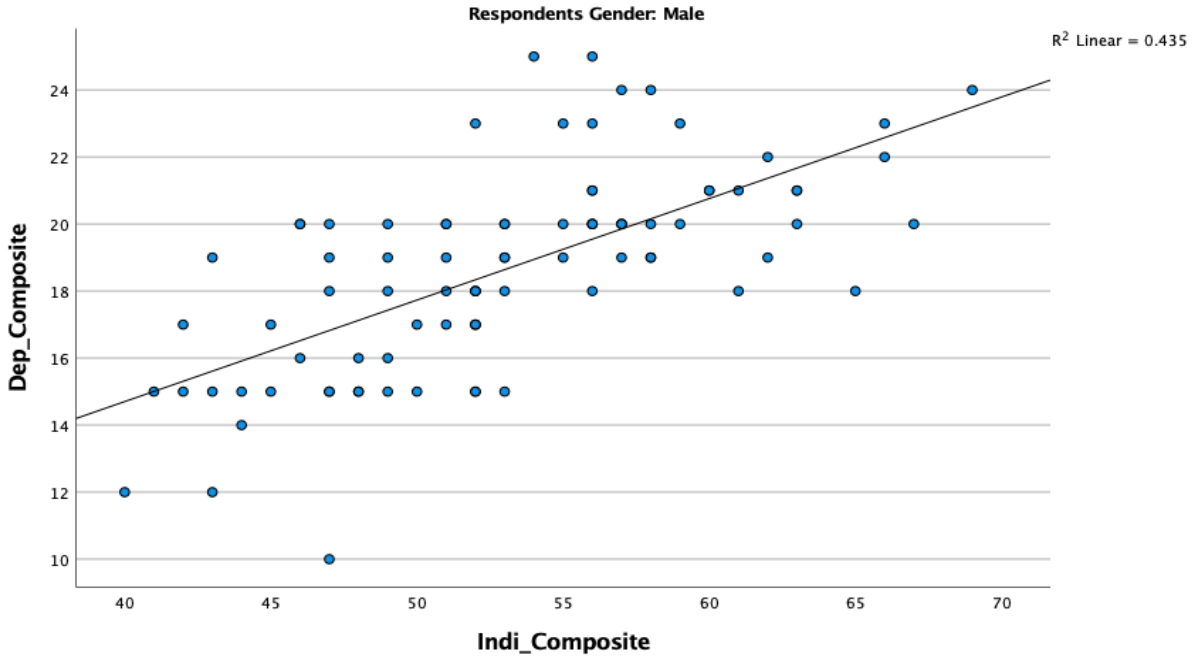

Figure 4. 6: The scale variable of male respondents.

For male respondents, the independent variable influences the dependent variable by 43.5.%. where R^2 Linear = 0.435

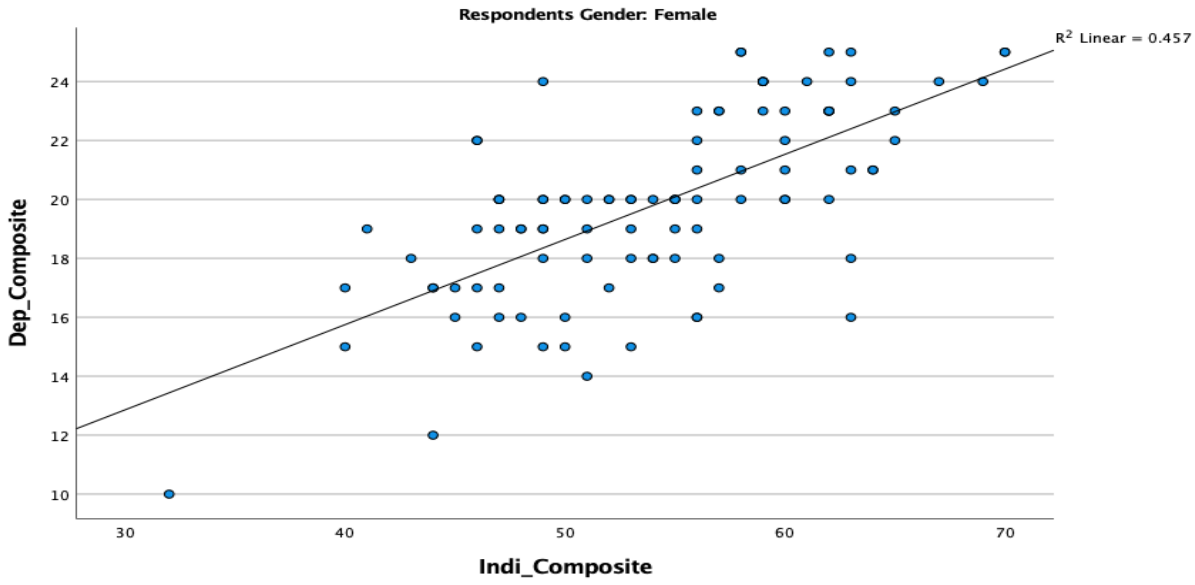

Figure 4.7: Scale variable of female respondents.

For female respondents, the independent variable influences the dependent variable by 45.7%. where R^2 Linear = 0.457

Explanation:

Figures 4.6 and 4.7 indicate the impact of the independent variable on the dependent variable when considering the gender of the respondents. This shows that Female decisions are impacted more than males based on the increased propensity of the independent variables, although we see a similar relation between the level of impact.

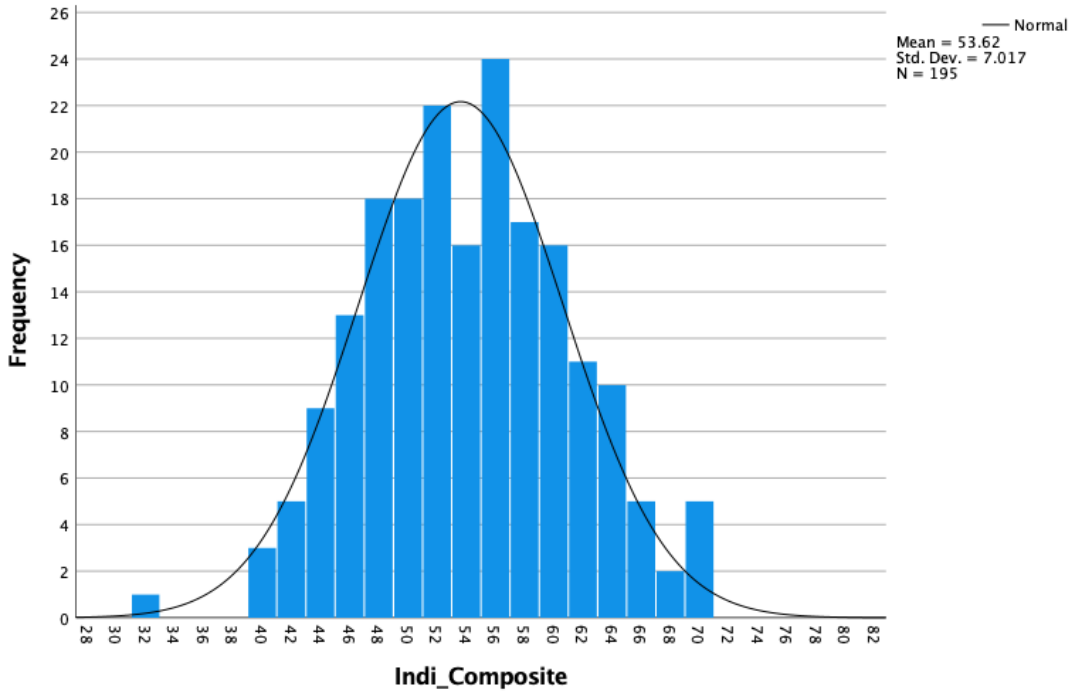

Figure 4. 8: Bar chart indicating the nominal curve of the independent variables.

There were 195 valid responses. The height of the bar indicates how many people on the x-axis have the score on the y-axis.

- The x-axis and y-axis have a scale of 2 in increment.
- A high score within the x-axis indicates higher satisfaction
- Low scare within the x-axis indicates a lower level of satisfaction.
- The Y-axis (Frequency) indicates the number of respondents
- The normal curve is used, showing that the distribution is normally distributed.
- Mode: 24 respondents with a score of 58.00

- The standard deviation of 7.017
- Mean of 53.62.
- Minimum score 31.
- Maximum score 71.

The graph depicts the distribution of the overall customer loyalty across the total sample used in this study.

Given the mean and standard deviation, the empirical rule states that the graph's 7.017 (+/-) indicates the common percentage. The number is stated as 195 with 53.62 as the mean and the standard error mean as .502

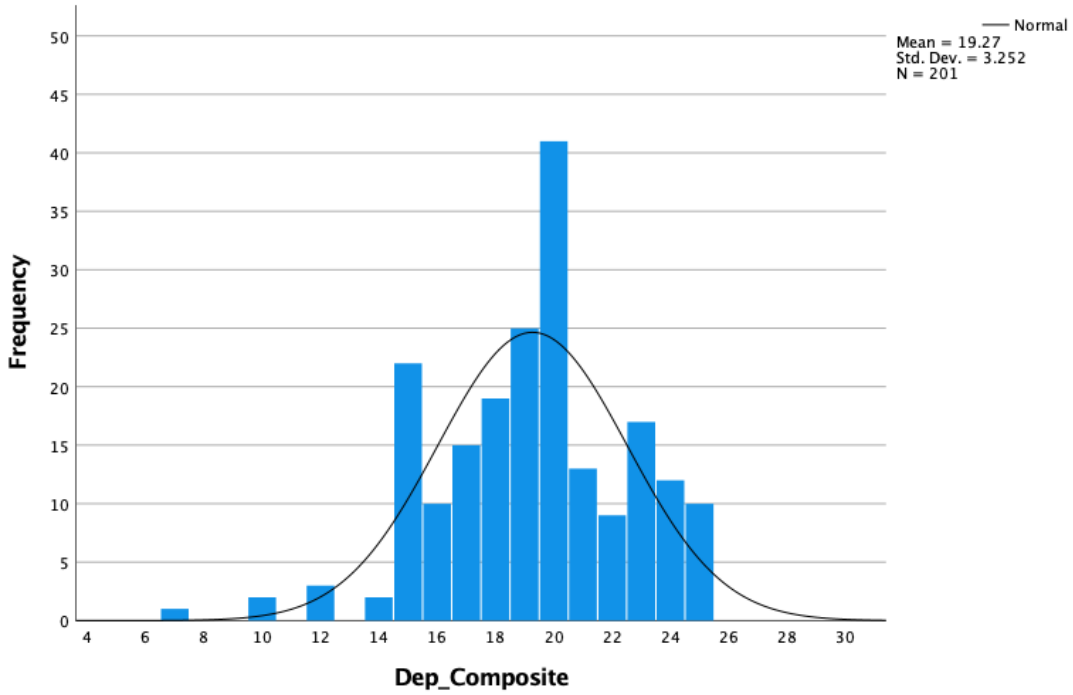

Figure 4. 9: Bar chart indicating the nominal curve of the dependent variables.

There were 201 valid responses. The height of the bar indicates how many people on the x-axis have the score on the y-axis.

- the Y-axis as an increment of 5 scale
- the x-axis has an increment of 2 scale
- A high score within the x-axis indicates higher satisfaction
- Low scare within the x-axis indicates a lower level of satisfaction.
- The Y-axis (Frequency) indicates the number of respondents.

- The normal curve used shows that the distribution is not normally distributed.
- Mode: 41 respondents with a score of 20.00
- The standard deviation of 3.252
- Mean of 19.27
- Minimum score 7.
- Maximum score 25.

The graph depicts the distribution of the overall customer loyalty across the total sample used in this study.

Section C: Regression Test and Summary of Analysis.

4.5 Regression test

Explaining the impacts of changes in the independent variables on the dependent variable is the goal of regression analysis. The relationship between the dependent variable and changes in the independent variables is made clear. The differences between two or more independent variables will be analyzed using regression analysis to test the hypotheses of this study. In this study, the delivery time, ease of website navigation, physical distribution service quality, and e-transportation score are the independent factors, while customer loyalty is the dependent variable. The dependent variables will be assessed independently under each independent variable in order to evaluate the hypotheses.

The hypotheses to be tested are the following:

1. H_0: There is no significant relationship between websites' Ease of use and customer satisfaction.

H_1: There is a significant relationship between websites' Ease of use and customer satisfaction.

2. H_0: There is no significant relationship between physical distribution service quality (PDSQ) and repeat purchase.

H_1: There is a significant relationship between physical distribution service quality (PDSQ) and repeat purchase.

3. H_0: There is no significant impact between the time of delivery and customer referrals.

H_1: There is a significant impact between the time of delivery and customer referrals.

4. H_0: There is no significant impact between E-transportation and customer purchase.
H_1: There is a significant impact between E- transportation and customer purchase.

These hypotheses were tested to answer the following questions:

1. Is there a relationship between websites' Ease of use and customer satisfaction?
2. What is the relationship between physical distribution service quality (PDSQ) and repeat purchase?
3. What is the impact of time of delivery on customer referrals?
4. Is there an impact of e-transportation on customers' purchases?

In the following parts of this section 4.4.1, the T-test was used to determine if there are statistically significant differences between two or more independent variable groups (Laerd Statistics, 2021). Depending on the level of significance, in this example p = > 0.05, the hypotheses will either be accepted or rejected.

Table 4.13.1 Entry on Dependent Variables.

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	ET_Composite, DT_Composite, EOU_Composite, PDSQ_Composite[b]	.	Enter

a. Dependent Variable: Dep_Composite

b. All requested variables entered.

In table 4.13.1 shows the entry of each dependent composite (**four variable in one**).

- Ease of use of website – EOU_Composite
- Delivery time – DT_Composite
- E-Transportation – ET_Composite
- physical distribution service quality – PDSQ_Composite

Table 4.13.2 Composite Model Summary.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.692[a]	.479	.468	2.297

a. Predictors: (Constant), ET_Composite, DT_Composite, EOU_Composite, PDSQ_Composite

Table 4.13.3 ANOVA test

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	896.670	4	224.168	42.490	<.001[b]
	Residual	976.009	185	5.276		
	Total	1872.679	189			

a. Dependent Variable: Dep_Composite

b. Predictors: (Constant), ET_Composite, DT_Composite, EOU_Composite, PDSQ_Composite

Table 4.13.4 Composite Coefficients.

Coefficients[a]

Model		Unstandardised Coefficients		Standardised Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	2.758	1.323		2.084	.039
	EOU_Composite	.356	.088	.292	4.040	<.001
	PDSQ_Composite	.262	.116	.185	2.258	.025
	DT_Composite	.315	.098	.230	3.204	.002

ET_Composite	.183	.068	.160	2.707	.007

a. Dependent Variable: Dep_Composite

This section shows the coefficient of each dependent composite. As shown on Table 4.13.4, the independent variable regression analysis shows the Sig. value of each composite with p value all < 0.05. which means that the null hypothesis should be rejected for all four of the dependent variables (EOU_Composite, PDSQ_Composite, DT_Composite and ET_Composite).

4.6 Summary of Analysis

In conclusion, this quantitative analysis was conducted to see the relevance of the dependent variables on "An Post" customers loyalty. A composite of each independent variables was chosen as the main focus in order to test the hypotheses, as these play an integral role when it comes to customer loyalty. The hypotheses were tested using regression analysis.

As a result of testing the hypotheses, for website ease-of-use, it was found that the null hypotheses were rejected. This means that customer loyalty is indeed affected by the ease of use of website of "An Post". The second null hypothesis were also rejected as the researcher found a significant relationship between physical distribution service quality and customer loyalty. When the delivery time variable was applied to test the hypotheses, the results showed that the null hypotheses were rejected as the values were less than the p value of 0.05. Thus, implying that delivery time do affect customers loyalty. Lastly, with the last hypothesis tested, the null hypothesis was rejected as research also show that "An post" customers do worry about the nature of vehicle used in delivering items to them.

Therefore, the answers to the research questions based on the hypotheses are as follows:

1. *Research Question 1:* there a relationship between websites' Ease of use and customer satisfaction.
2. *Research Question 2:* there is a relationship between physical distribution service quality (PDSQ) and repeat purchase.
3. *Research Question 3:* Delivery times do affect customers referrals.
4. *Research Question 4:* There is an impact of e-transportation on customers purchases.

Table 4.14.1 highlights the summary of the different research hypothesis showing which hypothesis was accepted or rejected. This was created based on the result of the qualitative analysis done by the researcher.

Table 4.14.1 Hypotheses assessment summary.

S.no.	Propositions	Results
1 H_0	There is no significant relationship between websites' Ease of use and customer satisfaction.	**Reject**
H_1	There is a significant relationship between websites' Ease of use and customer satisfaction.	**Accept (partial mediation)**
2 H_0	There is no significant relationship between physical distribution service quality (PDSQ) and repeat purchase.	**Reject**
H_1	There is a significant relationship between physical distribution service quality (PDSQ) and repeat purchase.	**Accept**
3 H_0	There is no significant impact between the time of delivery and customer referrals	**Reject**
H_1	There is a significant impact between the time of delivery and customer referrals	**Accept**
4 H_0	There is no significant impact between E-transportation and customer purchase	**Reject**
H_1	There is a significant impact between E- transportation and customer purchase	**Accept**

In the next chapter, the finding of the data base on literature review will be further analysed to review agreement and disagreements in respect to the research study.

CHAPTER FIVE:

SUMMARY, CONCLUSION, RECOMMENDATIONS AND PERSONAL LEARNING STATEMENT.

5.1 Introduction

This chapter will discuss the research analysis findings on the impact of e-logistics on customers satisfaction and customer loyalty. It will also discuss how the aim of the research was achieved. The outcomes of the original investigation were contrasted using primary gathered information to determine whether what the literature says about the connected topic is true from the participants' point of observation. In this case, the researcher distributes questionnaire to individuals residing in Ireland who have made use of "An-Post". The findings from the data will be compared to the material that has been read. The thesis' accomplishment of the research goals will be discussed in this section, along with any consequences for those involved in the entrepreneurial process.

The study set out to meet four objectives:

1. To examine the impact of effective firm e-logistics on customer satisfaction and how the firm creates value for its customers.
2. To evaluate the impact of e-logistics to gain a competitive advantage and improve the company's overall performance.
3. To demonstrate the impact of e-logistics firms' interaction with their customers on the overall satisfaction of their customers.
4. Explore the impact of e-transportation on customer satisfaction.

5.2 Discussion

This section discusses the finding the researchers data analysis, correlating it with the literature review. It includes all four objectives.

5.2.1 Objective 1 - The impact of effective e-logistics practices on customer satisfaction and the creation of value to the customers.

This research's first objective is to understand the impact of effective firm e-logistics website on customers satisfaction and what the firm does to create value for their customers. The result

demonstrated that e-logistics firm practices have impact on customers' satisfaction. In this scenario, the researcher uses the ease-of-use of website as a variable to determine how the case study ("An Post") creates value for its users online. The results of the data analysis did reveal that the vast majority of the participants were. The result of the hypotheses (1) tests the null hypothesis was rejected and the alternative hypotheses accepted. This indicated that from the customers point of view effective e-logistics firm practices can influence their loyalty. This is in line with current research work (Tu, Fang and Lin, 2012).

Therefore, a positive correlation was established amongst effective online practice (such as quick response to queries, item tracking), easy navigation of "An Post" website and customer satisfaction.

5.2.2 Objective 2 - The impact of e-logistics to gain a competitive advantage and company's overall performance improvement.

The second objective aimed to identify the impact of e-logistics to gain a competitive advantage and company's overall performance improvement. The component Physical distribution service quality (PDSQ). Previous findings stated that the impact of PDSQ is significant which is in line with the result of this study (Su *et al.*, 2021). The researcher evaluated the impact of e-logistics to gain a competitive advantage and improve the company's overall performance. Here, the focus of e-logistics was geared toward PDSQ. The result showed that there is a level of customer satisfaction that comes with the delivery of goods and services by e-logistic firms.

5.2.3 Objective 3 - The impact of e-logistics firms' interaction with their customers on the overall satisfaction of their customers.

In this study, the researcher found that firms constant interaction with customers was significantly related to consumers loyalty and satisfaction based on the result from the qualitative analysis carried out. Hence, the purpose of the research was determined as there was a significant impact of the online and offline interaction of e-logistic companies with users on updates regarding logistic activities such as matching the estimated delivery time and the actual delivery time (Roy Dholakia and Zhao, 2010). It was discovered that this significant impact of e-logistic firms' swift delivery and response to queries to customer satisfaction was quite similar to previous studies as some researchers stated that there was no impact and some

indicated in their research work that there is to some extent a significant impact of firm interaction with their customers and the overall customers satisfaction.

5.2.4 Objective 4 - The impact of e-transportation on customer satisfaction.

To explore the impact of e-transportation on customer satisfaction. Whilst previous research showed that there is little or no significant impact of e-transportation on customer satisfaction, the quantitative analysis of this research shows that there exists a relationship and an impact on customer satisfaction using e-transportation by e-logistic firms (Rahman *et al.*, 2020). This might be attributed to a higher consumer awareness on subjects related to environmental sustainability and the need for a global clean energy transitioning.

5.3 Implication of findings.

The different implications of the study are divided into various subheadings: Customers, Management practices, industry and society.

5.3.1 Customers.

As already established, customers will tend to be more satisfied and loyal to an e-logistic firm that have an easy website navigation (ease-of-use), delivers goods on time, have a high service quality, and most preferably uses a hybrid or electric powered vehicle.

5.3.2 Management Practices.

The study of management in terms of logistics system and customer loyalty is emphasised as a means of growth within the organization. According to certain research findings, buyer-seller relationships are dynamic processes that are influenced by social factors including meaning and emotion. As is common knowledge, marketer profitability and market share are positively correlated with consumer satisfaction and loyalty (Tu *et al.*, 2012). This research analysis shows that management practices can influence performance in setting competitive advantage, delivery of service and the firm's overall development. It should be highlighted that academics and management professionals can incorporate the study's findings into their teachings. For management, e- transportation system fosters adaptation and lowers transportation costs.

5.3.3 Industry: The industry at large will benefit by adopting “An Post’s” model especially regarding the inclusion of e-transportation and other environmentally friendly strategies like

the use of smart LED lightings in their offices. Moreover, in this era of the European energy crisis due to the Russia-Ukraine war, e-transportation (electric vehicles) will reduce the dependence on petrol/gasoline for powering delivery vehicles, possibly driving down the cost of delivery.

5.3.4 Society and the environment: The Irish society in which the research was carried out will become a better place for its residents and the European society at large will benefit from a cleaner environment that results from the adoption of e-transportation and the creation of new government policy.

5.4.1 Conclusion

This section outlines the research study's objectives. Given the rising level of rivalry among businesses in the e-logistics sector, a thorough investigation of the elements that have a substantial impact on customer loyalty is required. Website usability, perceived website quality, delivery time, and e-transportation are a few of the explanatory aspects that may be particularly pertinent.

First, the "ease-of-use of website's" dimension highlights the need for establishing user-friendly websites that make it easier for consumers to shop and do online searches. This will help build a foundation for increased customer satisfaction and loyalty. The second component, "perceived quality of a website," advises the website management to improve customer loyalty, get feedback from customers and a prompt resolution of complaints. Third, logistics firms maintain time of delivery for goods and services alongside maintaining communications and updating customers on delivery status. Finally, the researcher further considered the impact of e-transportation on the firm’s sustainability in the distribution and delivery of goods and services. This study established the broad objective from previous studies analysing the data collected resulting to a conclusion that there is an impact of e-logistics on customer satisfaction. The tested hypotheses had a range of outcomes, although they were mostly accepted and not rejected. There are still gaps and opportunities for development in the management of E-logistics in an inclusive environment, and it is simply unavoidable to identify, adapt, and implement these gaps, in order to reach the maximum impact, it will positively have on customers, employees and the business.

5.4.2 Recommendations.

This study has been able to determine the impact of E-logistics on the loyalty and satisfaction of "An Post" customers. The following suggestion for further research includes:

1. There are several E-logistics companies in Ireland and Europe at large. Out of these companies, the researcher focused on "An Post". Further research should focus on other E-logistics companies. However, there are still suggestion for further research.
2. The literature review highlighted different component used to measure customer satisfaction. While four of the main components were examined in this study further research is essential to have a holistic view the impact of E-logistics on customer loyalty.
3. The researcher had limited time and as a result only had 205 respondents were used for the analysis. Thus, further research should make use of a larger number of respondents so determine whether the current research generalized.

5.4.3 Suggestions for further research.

Future models can be created using the models that have been shown in figure 2.2. Future study should focus on incorporating other performance indicators (such as C2C delivery, environmental, government regulations, and social factors) into efficiency measuring models. Additionally, in this study, the researcher also suggests that a combined perception from e-logistics firms and e-customer be employed as a construct for further research.
Thus, further research done on the topic E-logistics impact on customers satisfaction and loyalty despite the industry focus, it is very vital for the researcher before analysing data to undertake the research with a very large number of sample size in other to get a more convincing and reliable result.

Outlined are the practical recommendations for improvement of the current research findings:

- Research that compares the result of analysis from different end users of e-logistics instead of just "An post" but all other E-logistics firm to see if there is a difference in the result.
- Lastly, research on E-logistics with major focus on E-transportation should be done on a larger sample size and to other geographical location.

- The methodology used was the quantitative research method was used in this research work. Future work can make use of qualitative research method in order to more subjective and wholistic feedback from E-logistics customers or end users.

5.4.4 Limitation of the study

This study examined the impact of E-logistics on customer loyalty. Despite the knowledge that was added, the study had the following limitation. First, just 205 customers of "An Post" responded to the questionnaire because there wasn't enough time for the dissertation. This was dues to the covid 19 pandemic and also the unwillingness or lack of time for some respondents to fill up the questionnaire. Second,

5.4.5 Personal learning Statement.

The researcher has acquired knowledge about the E-logistics industry which made it easier for the researcher to understand the research findings. These findings have been found to differ slightly from what is contained in previous literature. The researcher was able to link newly acquired gained academic knowledge before and during the whole research process.

Unexpected events that happened during the research process increased the pressure and difficulty of finishing it, this includes the covid 19 pandemic and the researcher actually contacting the covid 19 twice during the space of this project and other health emergency issues but research continued, and goals were met at the end of the day.

This research was indeed challenging to conduct because it was difficult to choose which factors to emphasize given the broadness of the topic from the proposal revolving to what it final became in upon submission. Furthermore, since the researcher had never used analysis tools before, particularly the SPSS Statistics analysis tool, selecting compatible research tools and data analysis was challenging. This turned out to be a huge learning curve for the researcher as in-depth study was undertaken and huge progress was made within a very short time.

Finally, if the researcher was to conduct the same study, unquestionably the researcher will opt for qualitative research over quantitative to obtain a more trustworthy source of data because the questions would be addressed based on actual experience rather than by analysing data. Additionally, if there is anything to be learned from this experience, it is to not take the process of conducting research, typing up the information, and analysing the data collected, which is the most important step and requires the most time and attention, for granted.

The recommendation of this study will be beneficial in future studies on the different dimension of E-logistics and its impact on customer, companies and the society in general.

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Appendices

Appendix A: Letter of Consent.

Dear participant,
At the National College of Ireland, I am pursuing a Master's degree in International Business. I'm reaching the completion of my master's degree and working on my dissertation research.

The aim of my research is to investigate the impact of E-logistic firm practices on customers satisfaction and loyalty
Additionally, I intend on discovering the level of awareness customers have concerning the availability of e-transportation in the logistics sector.
The questionnaire is open to all participants and is entirely voluntary. There are three sections to the questionnaire.

Data will be collected anonymously and used only for the purpose for which it was obtained.
The data will be kept safe and secured for the duration of my master's program.
The survey will take approximately 5- 10 minutes to complete.

Many thanks for your participation in this study.

Warm regards,
Gift Angela Ifeyi.

Appendix B: Questionnaire

Section A: Demographics

Instruction: please tick a single appropriate response

1. Sex

Male	Female	Transgender	Prefer not to say.

2. Age

18-25	26-35	36-45	46- 55	56- and above	Prefer not to say

3. Marital Status

Single	Married	Divorced	Widowed	Prefer not to say

4. Educational Qualification

High School Diploma	Bachelor's Degree	Master's Degree	PHD	Others (please state)

5. Ethnic background

What Ethnicity do you belong to:

white/Caucasian	Black African / American	Asian – Cdntral, North, East, South East , West	Spanish	Mixed	prefer not to say

Section B: Customer Satisfaction survey.

SA-Strongly agree, **A**-agree, **N**-Neutral, **D**-Disagree, **SD**-Strongly Disagree

Instruction: please tick a single appropriate response

S/N	**Ease of website**	SA	A	N	D	SD
6.	Do you find it easy to navigate and find things on the AN POST platform?					
7.	The e-commerce platform makes sending and tracking products easy?					
8.	Are you satisficed with the website interface					
9.	It is easy to distinguish between home page and other pages within their site					

S/N	**Physical distribution service quality (PDSQ)**	SA	A	N	D	SD
10.	The E-logistics firm does not take too long to respond to customer needs/complain?					
11.	The logistics team always willing to assist customers					
12.	I am satisfied with the form in which goods are delivered to you (packaging)?					

13	I am very pleased with the overall experience of the online platform.					

S/N	**Delivery time**	SA	A	N	D	SD
14.	Does the estimated delivery time affect your decision to make purchase?					
15.	Are you satisfied with the stated time of delivery and the actual time of delivery of goods?					
16.	You can trust the online tracking system?					
17	The online platform provides personalised services to customers in terms of time and place of delivery.					

S/N	**E-transportation**	SA	A	N	D	SD
18	Are you bordered about what kind of vehicle your goods are transported in? (Fuel cars, hybrid or electric cars)					
19.	Do you consider yourself an environmentally conscious customer?					
20.	Has the E-logistics firm ever delivered your goods via an environmentally friendly car?					

Section C: Consumer Loyalty

SA-Strongly agree, **A**-agree, **N**-Neutral, **D**-Disagree, **SD**-Strongly Disagree

Instruction: please tick a single appropriate response

S/N	**Consumer Loyalty**	SA	A	N	D	SD
21.	I will say positive things about the E-logistics firm to others					
22.	I will recommend the E-logistics firm to those that seek my advice					
23.	I will encourage friends and family to do business with the E-logistics firm					
24.	I will consider the E-logistics firm as my first option for future transactions.					
25.	I will continuously do business with the E-logistics firm					