DEVELOPING A FRAMEWORK OF REVERSE LOGISTICS SERVICE QUALITY IN B2C E-COMMERCE SECTOR IN UAE

A thesis is submitted to the
University of Petroleum and Energy Studies

For the Award of
Doctor of Philosophy
in

Logistics & Supply Chain Management

By

Leena Wanganoo

June 2022

Supervisor(s)
Dr Rajesh Tripathi
Dr L. R. Thapar

Department of Transport Management (Core Cluster)
University of Petroleum and Energy Studies,
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(SAP ID: 5000048418)

June 2022

Internal Supervisor

Dr Rajesh Tripathi
Assistant Professor (Selection Grade)
Department of General Management
University of Petroleum and Energy Studies
School of Business

External Supervisor

Dr L. R. Thapar
Managing Director – Rail Operation
Hind Terminal Pvt. Limited

Department of Transport Management (Core Cluster) University of Petroleum and Energy Studies,
Dehradun -248007; Uttarakhand

JUNE 2022

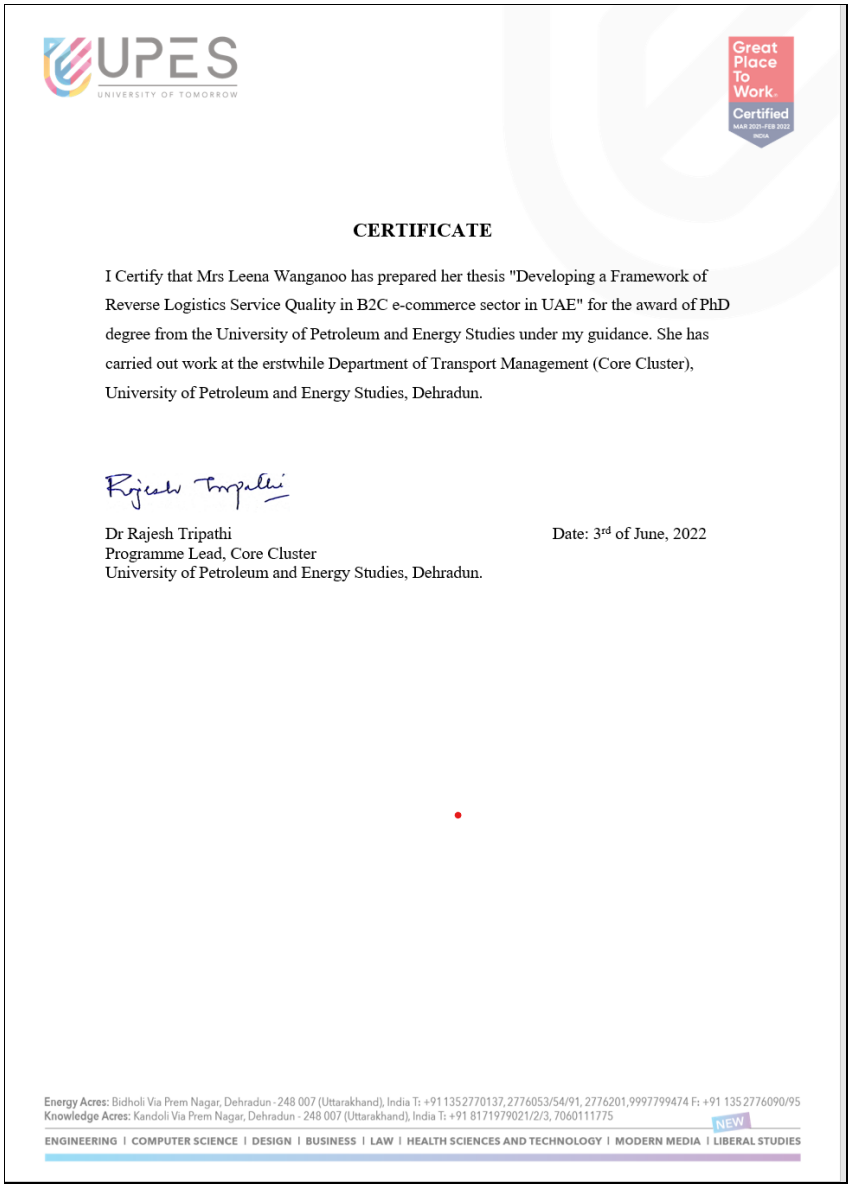
DECLARATION

I declare that the thesis entitled "Developing a Framework of Reverse Logistics Service Quality in B2C E-commerce Sector in UAE" has been prepared by me under the guidance of Dr Rajesh Tripathi, Associate Professor - General Management, University of Petroleum and Energy Studies. Dehradun, Uttarakhand. No part of this thesis has previously formed the basis for awarding any degree or fellowship.

Leena Wanganoo

Department of Transport Management
University of Petroleum and Energy Studies
Dehradun
Date

CERTIFICATE



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Dr Rajesh Tripathi
Programme Lead, Core Cluster
University of Petroleum and Energy Studies, Dehradun.

Date: 3rd of June, 2022

Energy Acres: Bidholi Via Prem Nagar, Dehradun - 248 007 (Uttarakhand), India T: +91 1352770137, 2776053/54/91, 2776201,9997799474 F: +91 1352776090/95
Knowledge Acres: Kandoli Via Prem Nagar, Dehradun - 248 007 (Uttarakhand), India T: +91 8171979021/2/3, 7060111775

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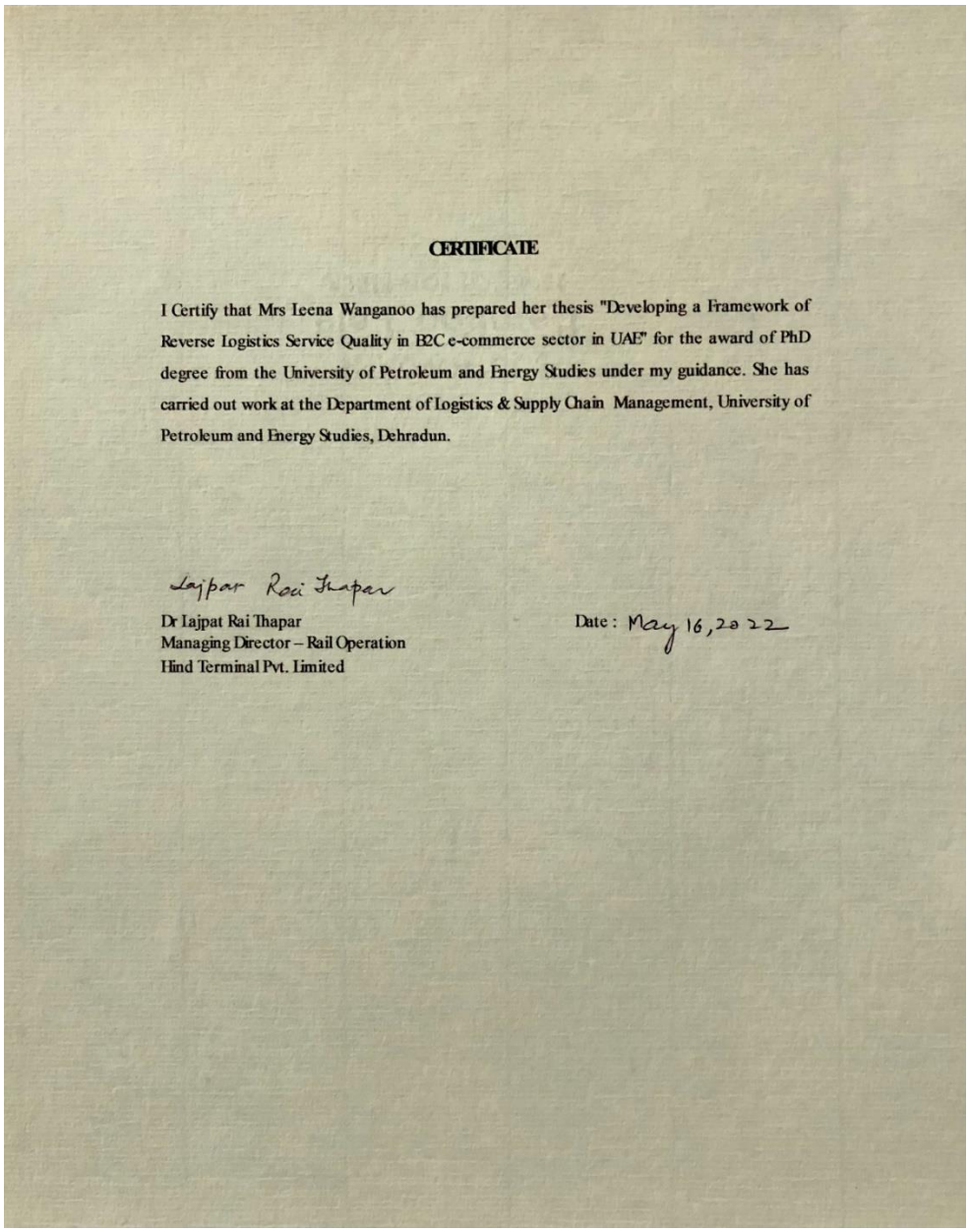

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Lajpat Rai Thapar

Dr Lajpat Rai Thapar
Managing Director – Rail Operation
Hind Terminal Pvt. Limited

Date : May 16, 2022

ABSTRACT

In the prevalent digital world, B2C online shopping has gained popularity worldwide and witnessed accelerated growth during the last two years. Even the UAE, a country that relies on the retail economy, has seen a surge in the ecommerce business. But, along with the rise in customer order patterns, the industry also witnesses product returns. Today, online free returns are ubiquitous to increase revenue and meet customer demands. As per (Kohan, 2020), free and hassle-free returns are the two most important factors in online purchasing, and customer rates them ahead of product price while loading the online cart.

According to an industry report, consumer returns in E-commerce exceed USD 573 billion in value and around 13 billion units worldwide. As per industry estimates, the average return is approximately 25% to 30% of total sales, around 8% to 10% higher than an in-store retail return. The customer initiates the returns, but the logistics provider orchestrates the entire returns process. Thus, Reverse logistics (RL) is indeed the catalyst to enhance the customer experience. So, for a sustainable online B2C business, retailers should comprehend the customer's perspective and co-create the RL Service Quality.

Thus, a cross-function topic thematic literature review was undertaken to identify the research gaps and address the reverse logistics service quality gaps from the customer perspective.

The literature review revealed prominent gaps - In the customer behavior domain area, most academic literature emphasizes the return policy. Secondly, cross-function studies in the reverse logistics area are scanty. On the other hand, past research in Reverse logistics capabilities focuses optimization, cost reduction and network designing. Lastly, a dyadic link between customer and logistics provider capabilities to enhance reverse logistics service quality is a

new topic, and academic research is scanty. Hence, there is a need to conduct a study to understand customer expectations towards Reverse Logistics service quality.

The scope of this study is limited to UAE's catalogue B2C Retail e-commerce market, encompassing two major stakeholders in the RL operations – the customers and logistics providers (3PL l). The research objectives are as follows -

1. Understand the demographic traits of consumers returning goods online and experiencing RL service.
2. To analyse the relationship between the RL service quality on customer satisfaction.
3. Explore the link between the RL Capability and RLSQ and develop a framework to improve the RL Service Quality.

The study draws theoretical premises from the “Service-Dominant Logic" theory, which states that the customer is the co-producer of service. Additionally, the expectancy-disconfirmation paradigm and the resource-based theory are two ancillary theories that support this study.

For the quantitative survey, two questionnaires were developed based on the identified variables. The first is to measure the customer expectation, and the second is to explore the logistics capability of the provider. For the inferential analysis, i.e., the co-variance SEM path Model was used to examine the relationship of RLSQ factors to customer satisfaction. And to explore the correlation between the capabilities and RLSQ performance, ANOVA was applied.

The statistical analysis reveals the demographic traits of the customer who return products frequently and a linkage between service quality factors – Communication, IT systems, and RL processes to customer satisfaction. Specifically, the Path analysis describes items like -RL real-time visibility, chat-box facilities, and a hassle-free RL process that play a vital role in customer satisfaction. Furthermore, the studies revealed that a robust linkage between IT

and RL operations is the key to customer satisfaction. The reverse logistics capability of the 3PL also reveals a significant correlation with the service quality factors.

A customer segment matrix was developed from the demographic traits cross-tabulation results. Further, based on the SEM Path Model and ANOVA, results for the RLSQ framework were derived. This framework offers drivers and enablers of RLSQ to improve service quality. The service quality factors were categorised as the "Drivers" in RLSQ, while logistics factors resulting from the ANOVA analysis were categorised as "Enablers" in the RLSQ performance.

The study contributes to the Service-Dominant theory (SD-Logic theory) in a novel way; applying it to reverse logistics is a unique expansion of this theory. Moreover, this study contributes to customer-centric business solutions by highlighting the importance of cross-function integration by providing a new dimension to the current research by showing a dyadic relationship between service quality and logistics capability impact on customer satisfaction in the B2C sector.

However, this study, like any other, has limitations. In this research, only five factors of service quality are studied. Other factors of Logistics Service Quality and customer behaviour in different geographical locations, so future studies in a multicultural environment can offer a new comparative dimension to this study.

Finally, this novel RLSQ framework would benefit B2C e-retailers, and logistics providers since customer-oriented reverse logistics may be a real-service differentiation and retain customer loyalty. This framework will benefit e-commerce and logistics companies striving to enhance customer satisfaction and deliver a competitive edge in the marketplace by customizing the service.

Keywords: Reverse Logistics, service quality, customer satisfaction, logistics capability, B2C e-commerce.

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Finally, my pillar of strength, my cheerleaders and my life's twosome — Rajinder and Anusha – thank you so much for your support and encouragement in fulfilling my life's dream.

This thesis is dedicated to my beloved father (Bapi), my core strength, who instilled in me the virtues of perseverance and learning.

Leena Wanganoo

TABLE OF ABBREVIATION

Abbreviation	Full form
API	Advance Programming Interface
B2B	Business to Business
B2C	Business to Customer
BN	Billion
CAGR	Cumulative Average Revenue
CEO	Chief Executive Officer
CC	Communication Capability
CS	Customer Satisfaction
CFA	Confirmatory Factor Analysis
CFI	Comparative Fit Index
DED	Department of Economic Development
E-commerce	Electronic commerce
E-LSQ	Electronic Logistics Service Quality
EDI	Electronic Data Interface
EFA	Exploratory Factor Analysis
GDP	Gross Domestic Product
LLC	Limited Liability Company
LSP	Logistics Service Provider
LTL	Less than Truckload
IS	Information System Quality
ISC	Information System Capability
IIOT	Industrial Internet of Things
KMO	Kaiser-Meyer-Olkin
KPMG	Klynveld Peat Marwick Goerdeler
MENA	The Middle East and North Africa
NFI	Normed Fit Index

Abbreviation	Full form
PwC	Price Waterhouse Cooper
RBV	Resource-based View
REL	Electronic Reverse Logistics
RB	Reverse Logistics Barriers
RFID	Radio -frequency Identification device
RP	Reverse Logistics Process
RPC	Reverse Process capability
RL	Reverse logistics
RLSQ	Reverse Logistics Service Quality
RMSEA	Root Mean Square Approximation Error
SQ	Service Quality
SERVQUAL	Service Quality Model
SERVPERF	Service Performance
SC	Supply Chain
SD LOGIC	Service-Dominant Logic Theory
SEM	Structural Equational Model
SQ	Service Quality
TLI	Tucker–Lewis Index
TN	Trillion
USA	United States of America
UK	United Kingdom
UAE	United Arab Emirates
UPS	United Parcel System
USD	United States Dollar
3PL	Third-party Logistics
4PL	Fourth -Party Logistics

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CHAPTER 1: INTRODUCTION

"Always keep in mind the old retail adage: Customers remember the service a lot longer than the price."

– Lauren Freedman

With the accelerated growth in online shopping, the B2C e-commerce sector faces unprecedented challenges – a high level of competition, rising customer expectations, faster delivery, and high product returns. In this dynamic landscape, not the product but logistics services are the real differentiators in elevating customer satisfaction and experiences. Retaining a customer, brand image, and lost revenue are the real challenges with soaring product returns. So, companies need to shift the strategic lens from an operational fulfilment mindset to a customer-centric approach in managing the reverse logistics strategy.

This chapter encapsulates growth in the B2C e-commerce sector and product returns. Further, this chapter provides insight into why product returns are becoming a menace to e-commerce businesses globally and in United Arab Emirates (UAE). The chapter also explores the provider's logistics capabilities that act as a catalyst for service quality. Thus, establishing the need for a customer-oriented service in reverse logistics.

1.1 BACKGROUND

1.1.1 Overview and Importance of Retail B2C E-Commerce Sector

E-commerce is a term used for performing a business transaction using the internet, which is categorised as business-to-business (B2B) and business-to-

consumer (B2C)(Tsur et al., 2001). B2B is an internet-based business transaction between two business organizations (Manufacturer- distributor or retailer), whereas B2C e-commerce is when the customer uses the internet for product and service transactions. B2C is increasingly gaining popularity, and customers are buying digitally locally and globally from e-retailers. (Drigas & Leliopoulos, 2014)

The B2C retail sector has grown exponential. The estimated growth rate is 17 per cent (in CAGR) between 2021 to 2024 (Forbes.,2021), despite the shrinkage in global GDP by 3.1 per cent in 2020. Figure (1.1) shows the manifold growth from USD 2.4 trillion in 2017 to USD 4.280 TN in 2020, which is 10.4 per cent up from 2017 and is forecasted to grow & reach 6.388 trillion by 2024 (Global Ecommerce Forecast., 2021). Around 50 per cent of the customer willing to continue shopping online post covid (Bain & Company, 2019), raising the market share from 18 % in 2020 to 21.8 % in the total global retail market in 2024.

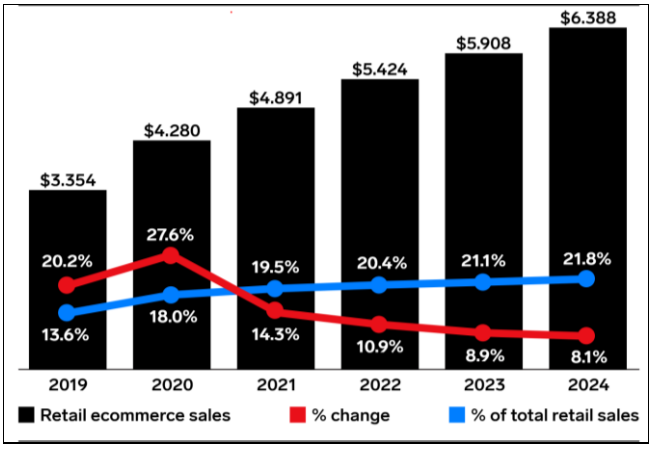


Figure 1. 1 Global Retail E-commerce sales

Source: e-marketer.,2021

Not only globally, but the region-wise value of e-commerce sales and customer spending has increased rapidly. Based on critical matrices such as average revenue per customer, total sales revenue, per cent of the online population shopping online, percentage of cross-border shoppers, CAGR (2018 – 2022) and logistics infrastructure, ranked top five countries - USA, China, UK, Japan

and Germany in the world. Table 1.1 shows the ranking based on the per-customer spending and sales revenue in 2018. (*Global Retail E-commerce Market .,2019*).

Table 1. 1 Top 5 e-commerce markets of the world

Ranking based on e-commerce shoppers' spending	Value of spending / Customer (US $)	Order based on total e-commerce Value	Sales Revenue (Billion US $)
USA	$1951.11	China	$ 636.09 BN
Norway	$1719.96	USA	$ 504.58 BN
UK	$1639.23	Japan	$104.04 BN
Denmark	$1383.15	UK	$86.45 BN
Austria	$1249.62	Germany	$70.35 BN

1.1.2 Overview of UAE Retail B2C E-Commerce Sector

Like the rest of the world, the Middle East is experiencing a similar growing trend in online shopping. In this region, the UAE is considered a "Shopper's Paradise" with numerous malls and is popular among thousands of tourists every year for its "Dubai Shopping Festival". But the non-store (B2C e-Commerce sector) has witnessed a massive shift of customers over the last decade.

This thesis focuses on the B2C retail e-commerce sector in U.A.E., which shows tremendous growth potential. Fig 1.2 illustrates the growth of the sector in UAE from USD 5.05 Billion in 2015 to 19.77 billion in 2020. It is estimated to grow by 23 per cent between 2018 and 2022. (Statistica, 2021.) With an e-commerce penetration rate of 4.2 per cent, UAE is ranked as the most progressive retail market, closely followed by Saudi Arabia at 3.8 per cent.

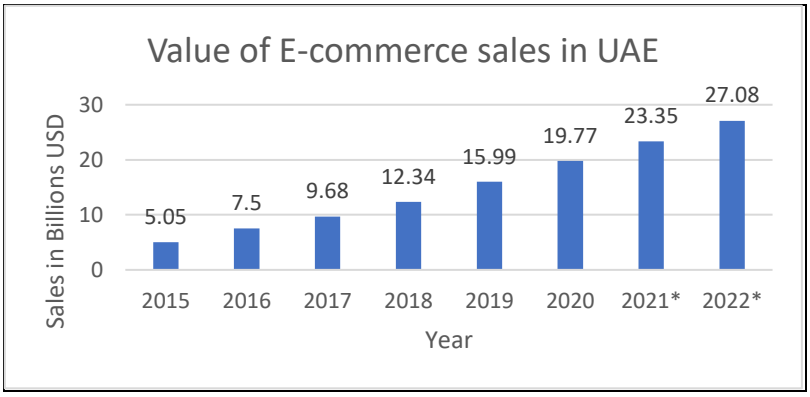


Figure 1. 2 Value of e-commerce sales in UAE (Statistica.com)

MENA regions, which include (the Middle East and North Africa) region, around $1,648 annual spend per online shopper is the highest in UAE(Menasa e-commerce Landscape, 2018), which is equivalent to matured e-commerce countries. A country with 100 per cent internet penetration (World Bank., 2021) with a young, internet-savvy population, yet only 63 per cent of the population are active online shoppers. Compared to developed nations like the USA, UAE customers still hesitate to shop online, which is why the low penetration. (UAE Economy, 2019). The market share of UAE in the total global market is just 1.9 per cent, with high dependence on cross-border e-commerce, which is approximately 56 per cent of the e-commerce sales.

The Government intends to promote a strategically important pillar of economic growth by developing a dedicated "E-commerce hub" in Dubai and issuing licences to around 196 new start-ups in 2020 (Khaleej times, 2021). A yearly increase in sales revenue per customer implies the industry will be growing faster than the traditional brick–and–mortar sector. Moreover, a technology-savvy young population (Figure 1.3) shows that the average revenue per customer is forecasted to be $ 1768.22 by 2025 (Statistica, 2020)

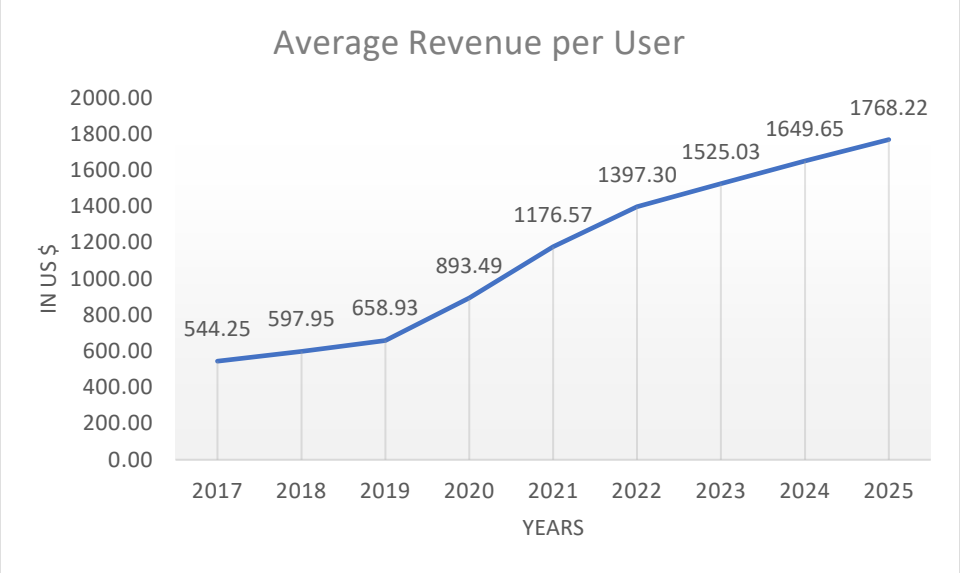


Figure 1. 3 Average Revenue per User in UAE (Source: Statistica, 2020)

But the per-customer frequency of online shopping is much lower than the counterparts in the USA, UK or India. The customer in this region is always sceptical about the quality, size, colour, texture, damages, and services while ordering online. Reports from various consulting firms also provide an insight into the low acceptance and averseness of shopping online in the UAE. (KPMG, 2017)

1.1.3 Overview of B2C Retail e-commerce Returns

1.1.3.1 - Global Product Returns

So, along with low prices and a strong web presence (Parasuraman et al.,2005), "Free Returns "is a powerful tool adopted by the retailer to build trust and reliability and retain the customer. (Hjort, 2013). This has led to major challenges of high "Returns" of goods from the customer.

In B2C e-commerce, Product returns are categorized based on their origin. Figure (1.4) illustrates categories of product returns from various supply chain participants or stakeholders. (Brito & Dekker, 2002).

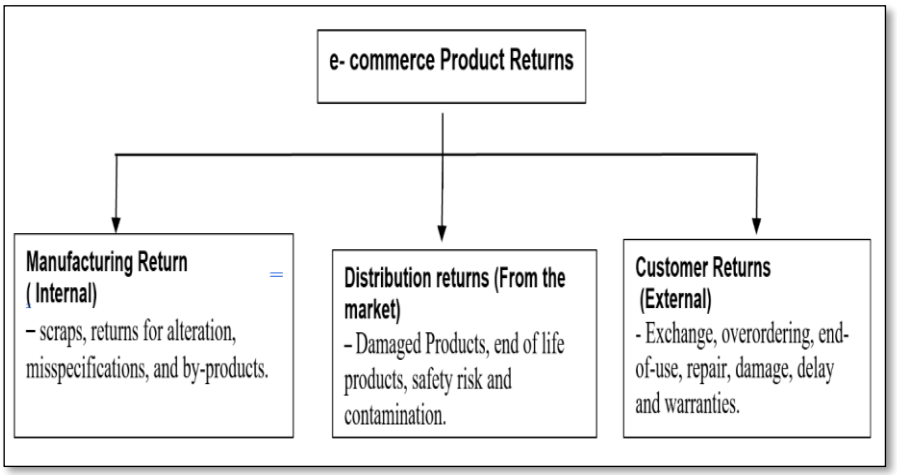


Figure 1. 4 Various Categories of Returns

The returns from the manufacturer and distributor are internal returns mainly for rework and recycling purposes. In contrast, the external returns from the

customers (B2C) are for repair, exchange, end of use returns, overorders and warranties (H. Han, 2019). Customer return is the largest returns category. (Rogers et al., 2002).

Further, Industry experts have observed that with the exponential growth, the product return has also blown up alongside. Recent studies show that the B2C returns in 2022 (expected to be worth $ 573 Billion), almost four times the online total sales in 2008. The industry projects around 13 BN units of returns with an additional $ 4 BN in units of logistics pipeline by 2022. (Davidavičienė & Al Majzoub, 2021).

Returns, specifically from the user or customer, are always a grave issue. (Vlachos & Ip, 2016; de Araújo et al., 2018). Lenient return policy leads to around 30 per cent of the shoppers ordering more, with the thought of "return anytime", and about 19 per cent of the customer buy multiples of the same product to later decide at home and return the rest of the product. (Retail & People, 2020).The average returns range between 25 to 30 % of the total sales and are almost 8-to 10 % off in-store purchases. (Kohan, 2020) which soars around 40- 45 % during the holiday and mega sales seasons. Returns from the customer are not specific to a particular region but a universal problem. Table (I) below shows the region-wise percentage of returns from the customer compiled from various internet sources.

Table 1. 2 Percentage of Products returned by B2C e-commerce

Region	Percentage of Return (2018)
USA	10.6 -12 %
UK	40%
Germany	53%
Spain	43%
India	18-20%
UAE	15-40%

Fig (1) reveals that the total global reverse logistics market has also gained momentum with the rise in online purchases. The market statistics show an

average CAGR of 4.67 % from 2017 to 2025 and is expected to be $ 821 BN by 2025 (Reverse logistics - statistics., 2021). It's an ugly truth of online buying that can be curbed to an extent but cannot be eliminated.

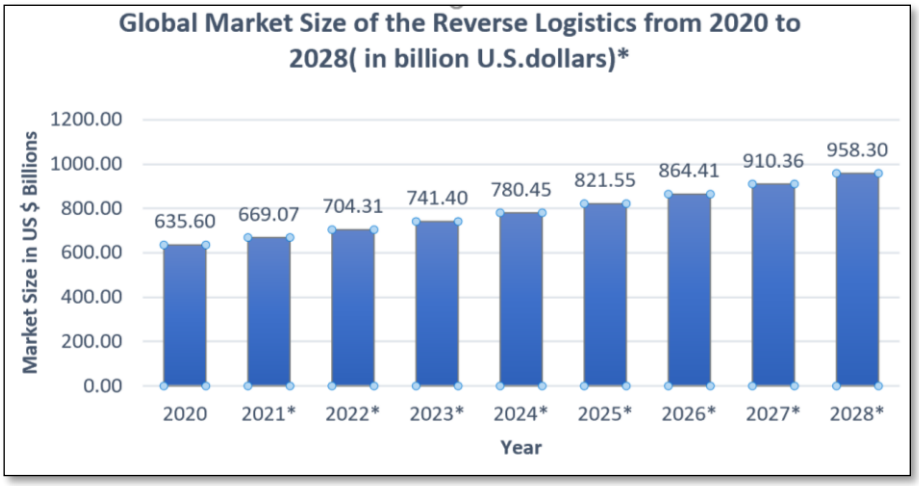


Figure 1. 5 The Reverse Logistics Growth Trend – *Source Statistica.com*

1.1.3.2 UAE - E-commerce returns

The rate of returns from the UAE is much higher relative to other countries globally. Surveys conducted by Dubai Chambers of commerce and other leading newspapers found that returns range between 15 to 40 per cent of online buying, which is almost 5 to 10 per cent higher than in-store buying. (Dubai Chamber of Commerce.,2020; Gulf Business News., 2020) Figure (1.6) shows the board reasons for returns from the customer and can be categorized based on the reasons for return into the following (Retail & People, 2020)

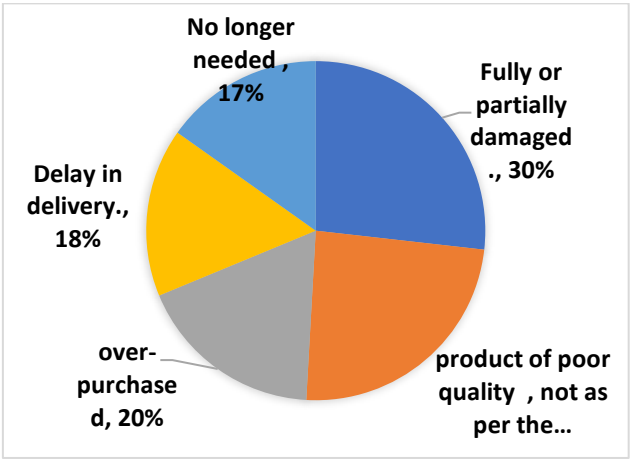


Figure 1. 6 Reasons for Product Return (Source: Retail & People, 2020)

In the current scenario, minimising the returns volume in the online sector is beyond the control of the retailer and manufacturer. Product category wise, apparels rank among the top, with a rate of return as high as 40 per cent, followed by electronics, footwear, fashion accessories and books.

On the one hand, high returns erode the retailer's profitability which is evident from an industry study conducted by UPS which states that a retailer spends between 9 to 15 % of the total revenue to manage returns(KPMG, 2017). Customers value a seamless return process. According to KPMG reports, 40% of consumers browse through the return policy and process before placing items in the cart. (Walker Sands, 2016). Around 51% of the customer based in the USA and Europe states that ease of returns is vital for repurchasing from a particular website. (Kats, 2021). A poorly managed returns supply chain impacts customer retention and satisfaction. Thus, it is concluded that return handling as part of the post-purchase experience is a critical component of an organisation's success. (Coyle, Langley, Novack, & Gibson, 2012). It is an activity evoked from negative sentiments, demanding excellent service support to lower dissatisfaction.

1.1.4 Significance of Customer Oriented Reverse Logistics Services

Though the RL component is considered relatively trivial in the overall supply chain performance by the practitioners, poor execution impacts the organisation's overall profitability and market share. Table (1.3) illustrates the articles published in various online newspapers, research articles, and consultancy reports highlighting the business problem and the need for customer-oriented reverse logistics.

Table 1. 3 Importance of RL in E-commerce

Author/ Source	Customer Returns Experience
CNBC (2019)	Customers in the US find "returns as a battleground". Keeping the customer happy is harder to quantify for a retailer but extremely valuable.

Times of India (2018)	Product returns are a crucial challenge in online purchases for Indian customers due to poor logistics services. In a study published by (the *Times of India, 2018) of (the Zebra technologies survey* report, 93) % of the customers responded that product returns remain a challenge for the industry.
Gulf Business (2017)	The rise in delivery failures increases the cost of business and, eventually, disappoints customers.
Gulf News (2017)	Four out of ten complaints are about services, followed by product defects.
KPMG (2020)	Customer experience is a new reality in e-commerce returns, and the customer expects responsive operations.
The Guardian (2016)	Both retailers and customers are negatively affected by poor returns handling.
Lysenko- Ryba (2020)	Retailers need to redesign returns handling and policy to improve customer satisfaction.
IMRG Consumer Delivery Review, 2019/20)	Sixty-nine per cent of the customer specified that the quality of the reverse logistics impacts the choice of the e-retailer. And 92% of customers who received a good return experience make repeat purchases.

According to a customer survey(Narvar, 2019), roughly 51% of consumers are dissatisfied with the complexities of the return process, while 35% complain about the process's delay. It is observed that 95 per cent of customers will make a repeat purchase only if their post-buy experience is positive. The report published by (KPMG. 2017) provides an insight into customer reluctance to shop online. The data reveals that around 14 % of consumers find the returns services complex, nearly 13% do not trust the online security system, and 11 % would like personalised treatment while returning the goods.

The latest research(Newman & Mcclimans, 2019) found that 55% of consumers now value customer service more across the Middle East Region. Failure to do so could result in the loss of business, with nearly half (47%) claiming that they

would ditch a brand after just one to two poor experiences. Hence, companies must focus on customisation and customers' individual preferences.

Additionally, retailers face further challenges as 62 per cent of customers in the region prefer cash against document (COD) compared with less than 5% in the UK and France. This payment model has led to higher return rates on delivery failures. The preference for COD is attributed to a general inconsistency in the consumer experience when shopping online and the confidence level in the return process. An additional challenge is an ineffective RL and high trade barriers that block logistics for global e-retailers. These barriers affect small e-commerce players more than the big giants. (KPMG, 2017).

The recent reports by the Department of Economic Development (DED), Dubai, focus on consumers' rights, including - products, processes, and services. The information obtained from the website of DED shows that customer complaints against poor online services increased annually. The DED dealt with 13,770 complaints in 2017-18 from online customers. (Society – Gulf News,2018.). These complaints include –

Table 1. 4 Types and Number of consumer complaints

Complaints (Description)	No Complaints	Percentage
Contract Non-compliance	6,458	47 %
Product Defects	2,938	21%
Refunds	890	6 %
Warranty Non-compliance	846	6 %
Others	829	6 %
Fraud in Online Purchase	609	4 %
Retailers adding additional charges	452	3 %
Pricing Non-compliance	441	3 %
Repairs & Exchange	307	2 %

(Source: Department of Economic Development (DED) in Dubai,2017- 2018)

In the product category, the reasons for returns were highest due to the poor service of the provider. This also includes the logistics service provider handling delivery and return of goods.

Table 1. 5 Product categories and number of complaints

Types of complaint	No. of Complaints
Poor Service	5708
Damaged Electronics	3558
Automotives	1785
Textile and other necessities:	1558

(Source: Department of Economic Development (DED) in Dubai,2017- 2018)

The UAE shopper has very high demand and expectations, ready to pay any price if the product and service meet expectations. But at the same time, earning loyalty is not easy. According to (PwC 2020), 75 % of consumers would preferably shop from the same website and remain loyal if the company meets its service standards. Hence, with the growing e-commerce sector in the country, it is essential to understand the gap in the service quality offered while returning the goods.

Further, according to the customer survey report published (Narvar. 2017), around 51% of the customers found it difficult to return the package and coordinate with the logistics provider. Similarly, 35 % of the consumers complained about the delay in the process. It is established that 95 % of consumers make a repeat purchase only if the post-purchase experience is satisfactory. Across the globe, returns have been the undesired contributor to online logistics, with shoppers consistently rating their satisfaction with returns lower than their contentment with the first-mile delivery. (Retail & People, 2020), stated that only 40 % of customers are satisfied with the service quality of returns compared to 75 % satisfaction level in last-mile delivery.

"*It's important to remember that e-commerce is not only about selling products - around 30 per cent of orders are returned. If you want customers to return, creating a smooth return experience is an essential component,"* - says DeVere

Forster, chief operating officer at Dubai Commerce City, discussing the regional e-commerce sector's explosive growth and how the industry can build a more equitable ecosystem. (Dubai Commerce City: The UAE e-commerce equation; Arabianbusiness,2020) .Hence, it is crucial to inspect the reasons for poor service, customer expectations, and how companies can provide seamless service.

Further, the specific company reports, articles, and customer reviews highlight the client's distress levels resulting from the returns services. The below-mentioned are local and cross-border companies, and relevant customer reviews are collected from websites.

- **Namshi.com** is a renowned online B2C retail commerce company in the UAE region. In 2018, the company released a report on customer satisfaction with reverse logistics. According to the report, 25% of customers are dissatisfied with the reverse/return service. The company examined and refined the process, but it still needs to improve the returns process and other factors influencing customer happiness. (Alzoubi, 2018)
    - Furthermore, the reviews from numerous websites that published customer evaluations and complaints about the return process discovered that Namshi.com's return handling process continues to disappoint customers. (“Namshi Reviews - Sitejabber,” 2020)

- ***SHEIN.***com is a global B2C casual fashion retailer. A Women's clothing company is primarily catering to consumers globally. Shein entered the Middle East market in 2015, and as of 2017, it is one of the most widespread e-commerce shopping platforms in the region. Despite this, customer feedback on the website indicates that the "Refund and Return process" is still onerous and "needs improvement." (“SHEIN Reviews - Sitejabber,”2020)
    - According to reports published on supplychainbrain.com and Shopify.com, 58 per cent of customers are dissatisfied with returning

process. Customers may permanently abandon a brand due to poor returns processes and a lack of clarity about the returns policy.

- Furthermore, with a customer-friendly returns process, 72 per cent of buyers are willing to order more frequently and higher value per transaction. Making the returns procedure simple, quick, and adaptable is crucial to a positive customer experience. (Kohan, 2020)

- The customer shares similar experiences and reviews from Myntra.com, Jabong.com (now merged with Myntra), Limeroad.com in India, and Jollychic.com, Noon.com in UAE.

Additionally, (Babu, 2021) Splitit, a Global payment solution company based in New York, surveyed many customers in the US and concluded that – 52% of buyers had abandoned online carts, fearing the process of returns the complexities.

"Whether it's a fear of buyer's remorse or uncertainty about fit, our research shows that today, returns are a top consideration for consumers even before their purchase is completed," said Brad Paterson, CEO of Splitit. (Marianne Wilson, 2021) And ccustomer survey suggests that the return process lacks the agility and responsiveness seen in the last-mile delivery process. (Barclays Report, 2020). Hence, firms need to focus on reverse logistics strategies to improve the RL services.

Consequently, return issues influence the cost and time of companies and increase customer dissatisfaction(Petersen & Kumar, 2015).In e-commerce, logistics performance is crucial for satisfying customer expectations and repurchase behaviour (Ramanathan, 2011**;** Quynh-vo & Hong-Vo, 2015**;** Jalil.,2018)**.** The ease of return includes convenience, timeliness, recovery process, service, and exchange (Ramanathan, 2011**;** M. Chen, Hu, & Wei, 2017)

In the retail environment, customer expectations and demands are ever evolving. The key drivers to retaining the customer are convenience, experience, privacy, and security in the current times. Service quality plays a

substantial role in enhancing the value proposition in e-commerce apart from the cost of the product. For any firm, the goal is to achieve customer satisfaction (Banomyong et al.,2008). Post-purchase satisfaction is vital from a marketing and brand-building perspective and retaining the customer, which is only possible through superior service quality. Logistics plays a key role in laying the foundation of seamless, tailored, responsive and consistent customer experience. (KPMG, 2017) and maximising customer satisfaction in the dynamic and fast-evolving e-commerce environment (Huang, 2011**;** Sajjanit & Rompho, 2019; Euchi et al., 2019)**.** An effective Reverse Logistics management can bring profitability to the company and build customer equity. Thus, successful collaboration within functional units such as marketing and logistics(Bowersox et al., 2003) is key to success for an e- retailer.

1.1.5.1 Significance of RL Capabilities

In the B2C e-commerce environment, competitive differentiation is derived from services offered by the e- retailer. (Collier et al.,2018)**.** But, the operational complexities, consumer expectations, limited information, and fragmented process are challenges in Reverse logistics. (McKinsey's global Retail Practice,2020; Daugherty et al.,2019; Petersen & Kumar, 2015)**.** Thus, managing the reverse logistics capability is gradually recognised as a strategically vital activity in the B2C e-commerce environment**,** which requires decisions and actions within and across organisations (Mollenkopf et al.,2010; Sajjanit & Rompho, 2019) to maximise customer value. The capabilities of doing so determine the level of success of any given business(Christopher,2011, p29.).

Though firms allocate the resources for logistics management, the reverse logistics service capabilities are developed to meet the customer's changing demand (which usually involves third-party service providers). The logistics capability of the provider directly influences the service quality of logistics(Fernandes et al., 2018). The logistics capability includes communication, information technology, process, and customer service ability to improve the organization's performance per the customer's desired level.

(Vlachos, 2016). The RL accuracy and timeliness of information are the determinants of seamless process and integrated internal and external communication(Jack, Powers, & Skinner, 2010). To develop the same, management needs focused attention(Waqas et al.,2018;Lechner & Reimann, 2020; Govindan & Bouzon, 2018; Rubio & Jimnez-Parra., 2014). Additionally, the company must focus on the logistics provider's capabilities improvement to enhance the service quality because the logistics capability influences the quality of service. (Fernandes et al., 2018;Subramanian et al.,2014). The logistics provider can improve the customer experience only if the operational and relational capabilities are developed and continuously improved. (Masudin et al., 2017; Zhou et al., 2018). Although most businesses understand the significance and have the necessary knowledge and infrastructure to perform the function, coordination between multiple partners to provide superior service remains problematic.

But the high cost of RL's operation is because of the lack of systems, knowledge, and collaboration among the participants in the supply chain (Prajapati et al.,2020). Internal fragmented logistics processes contribute to longer lead times, increased freight and storage costs, and dissatisfied customers (Gupta et al., 2012). This factor essentially involves the capability to communicate the resources to all relevant stakeholders efficiently and accurately in the context of RL. (Huscroft et al. 2013). For profitability and enhanced customer experience, integrating logistics should be a top priority to sustain the competitive e-commerce environment. (Vlachos, 2016). Firms need to build advanced system capabilities to collaborate and integrate the system. Secondly, because it's a non -revenue-earning activity, mostly it's outsourced to a 3PL (Third Party Logistics), so it is essential to evaluate the providers' capability.

For building the IT capabilities, resource allocation is critical for innovative reverse logistics capabilities for competitive differentiation and enhancing reverse logistics service efficiency.(Chouinard et al.,2005; Richey et al ., 2007) Additionally, retailers should adopt and digitize and embrace new technologies

to satisfy evolving consumer needs, shifting away from the typical standardized reverse logistics "Fit for all" process approach. (Mehta & Bhandari, 2018)**.** The need to the hour is to build logistics competence in the advancing times to meet the demand and remain competitive for the new market entrants, meeting customer expectations, and new business models are becoming necessary. (PwC, 2020)

Existing studies show that firms lack focus on the recovery process as it is not the revenue earning side; hence capital and knowledge investment is low for the reverse logistics**.** (Peña-Montoya et al.,2020;Pham & Ahammad, 2017; sBendenhorst, 2013)**.** Therefore, researchers should study the capability and barriers that influence reverse logistics service quality (RLSQ) in e-commerce (Yang & Hao-Yu, 2012; Panigrahi et al., 2019)**.**

1.1.5.2 Focus on UAE RL capabilities

Moving away from the existing service quality brick-and-mortar sales approach, the UAE e- retailers need to fine-tune logistics to support considering the growth envisaged in the future. When compared to in-store service, the e-commerce supply chain has a unique range of requirements and challenges. (Visa Confidential UAE, 2020) . Table 1.6 shows the existing inefficiencies in reverse logistics services and highlights the need to understand the current capability gap and improve the same to enhance the quality of service.

Table 1. 6 Existing RL capability gap

Author/ Source	Inefficient Reverse Logistics in B2C E-commerce
Inbound Logistics.com, (2014)	RL activities necessitate different processes, capabilities, technology, and expertise in Reverse Handling.
UPS, 2014	Determining the status of your reverse logistics capabilities is the first step in improving business operations, increasing customer satisfaction, and ensuring future success.
KPMG, 2018	Traditionally, a low-efficiency process, which in the future needs to be driven by technological innovation and customer analytics, among other things.

KPMG, 2021	A relevant initiative for the retailer is to establish an integrated supply chain to balance demand, resources, and supply
Khaleej Times (2021)	Reverse logistics needs solutions to optimize its return management and sales channel capabilities.
Deloitte, 2020	The increase in returns has exposed the existing vulnerabilities in weak reverse logistics processes in the current pandemic.
Vida Davidavicine, Mohamad Al Majzoub (2021)	In the Middle East, Reverse logistics is still premature for local SMEs and full of operational challenges.
Construction & Business News (cbnme., 2021)	The reverse logistics ecosystem is an overarching bedrock of a thriving 'circular economy' to enhance such a sustainable ecosystem. It needs to be integrated into an inventory management system, logistics, after-sales services, and marketing for an overall smooth flow.
(Mouchawar 2017).	Infrastructure is poor in Middle Eastern countries –many countries still lack postal codes and locations, and IT integration is essential for e-commerce business.
(Zaidan 2017).	Specific skill sets for e-commerce logistics are still primitive in most countries in the Middle East.

Several business reports conclude that RL service performance and improvement lay the foundation of a seamless, responsive, and consistent customer experience. (KPMG, 2020) .The company must prioritize agility, visibility, flexibility, and convenience during product returns or exchanges. (Yan & Cao, 2017). If the return process is more flexible and convenient, the customer's tolerance zone may be lowered, resulting in positive satisfaction. Hence, based on the above, published in various reports, newspapers, and websites, the researcher can conclude that – "Returns are high and inevitable, and customer expectation of logistics has evolved, specifically in the e-commerce industry."

Further, in e-commerce, the challenge in RL services management can be divided into the following (Jović et al., 2020) –

1. Customer negative perception of the returning product & service
2. High cost of services
3. Uncertainties regarding associated return handling.

4. Lack of capability and integration between the SC partners.

For RL service improvement, there is an absolute need for research to understand the gap in service quality and identify the opportunities for improvement and reduce the inefficiencies in the B2C context. (Davidavičienė et al., 2020)**.** Service quality is a critical aspect of success in the new ecosystem, so companies need to focus on RL service quality (KPMG, 2020) and provide a holistic customer-oriented Reverse Logistics solution. Logistics is the key driver in e-commerce, specifically in returns, which starts with the customer. Interface and integration between RL service quality and logistics capability can provide customer satisfaction. Thus, this relationship deserves special attention because it is essential for a customer-centric solution.

This thesis aims to identify gaps in existing RL service and develop a customer-oriented solution to enhance the service experience. This study (Figure 1.7) illustrates the concept of this research. The idea is adapted from the gap model (Parasuraman et al.,1985), wherein the endeavour focuses on the service gap and provides a customer-centric solution to a business issue.

In a digital retail ecosystem, wherein the customer is still hesitant to embrace online transactions full due to service and technical challenges. The RL service is a key differentiator for e-commerce companies. The focus should be on the service quality and logistics provider capability while a customer is returning the goods. Hence, knowing the customer's expectations and upgrading the existing provider's capability is essential for e-commerce companies.

In this research, both sides of the business are considered. There are two stakeholders in Reverse Logistics (RL) management - one who consumes the service – The customer, and the other who provides the service – the logistics provider (3PL). The goal is to resolve the gap between what customers expect from a service and what the logistics provider provides.

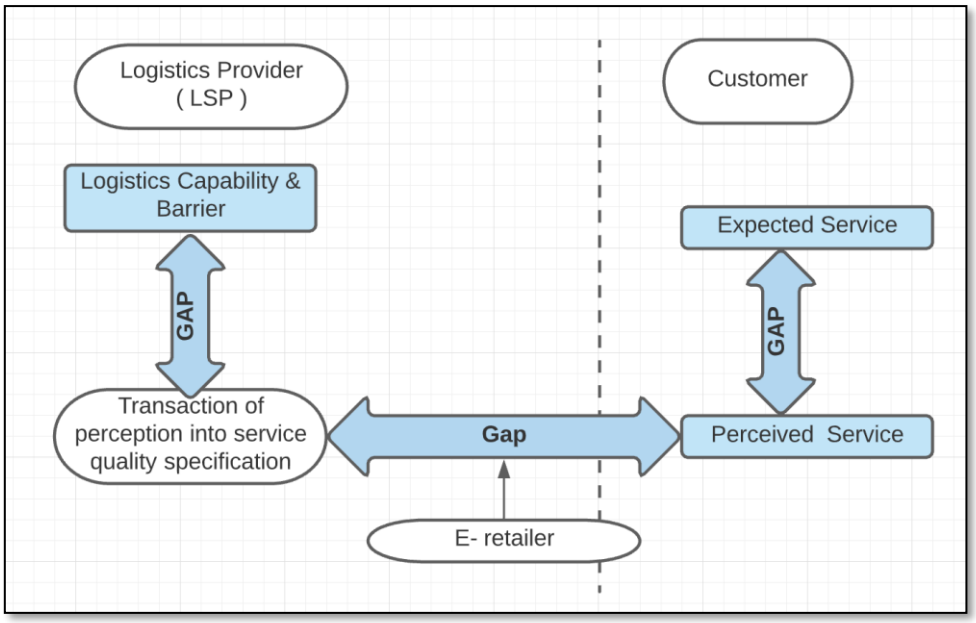


Figure 1. 7 Basic ideas behind the Research

1.2 Rationale of the study

UAE is considered the most advanced in the Middle East e-commerce market and ranks no 2 (after Saudi Arabia) in the adoption and revenue generation for the e-commerce sector. Value-wise, it will be approx. —$ 27.08 Bn by 2022. (Statista., 2020). UAE customers have extremely high service expectations, which the new and existing e-commerce players need to consider as the top priority. Though the UAE has the highest internet penetration rate globally and is traditionally a shopping hub of the Middle East, e-commerce is still nascent stage. In the dynamic and competitive e-commerce, service excellence is vital to building customer confidence and deriving satisfaction. For the e-retailer to attain the same, there is a need to understand the customer expectation and perceived risk. Customers often hesitate to buy online for service reasons, so improved service quality retains existing customers and attracts new customers. Therefore, there is a need to understand customer expectations and perceived risk and determine the scope of improvement by enhancing logistics capability. RL is the most ignored area in the e-commerce sector, and efficient resource allocation to improve service quality has become essential. Therefore, it necessitates the need to improve service quality factors and logistics capabilities

to guarantee consumer satisfaction. This thesis focuses on developing a framework to improve RL service quality. The study is based upon the empirical analyses of customer expectations and the existing logistics capabilities of the logistics provider.

1.3 Business Problem

Poor Reverse Logistics service quality and Logistics capabilities are impacting customer satisfaction in the B2C retail e-commerce sector in UAE.

1.4 Research Questions:

To understand customer expectations and logistics providers' capabilities in Reverse Logistics services, the researcher has framed important research questions for the customer and the LSP (Logistics service provider).

Questions for the customers (Path -1)

1. What are the demographic characteristics of the online shopper engaged in frequent return of goods?

2.1 What are the customer expectations of reverse logistics service quality?

2.2 Is there a linkage between the quality of Reverse Logistics services and consumer satisfaction?

Questions for the LSP (Path -II)

3.1 What are the existing barriers to the RL process?

3.2 Is there a link between the lack of RL service capability and RL service quality.

1.5 Objective of the study

The research aims to fulfil the following objectives –

1. To understand the demographic traits of consumers returning goods online and experiencing RL service.

2. To analyse the relationship between the RL service quality on customer satisfaction.

3. Explore the link between the RL Capability and RLSQ and develop a framework to improve the RL Service Quality.

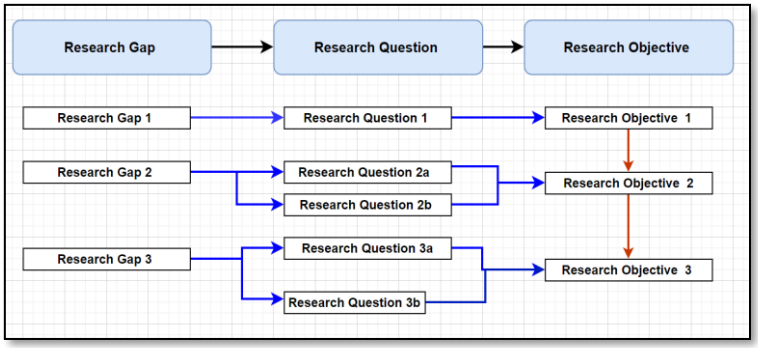


Figure 1. 8 Linking Research Gap, RQ and Research Objective

1.6 Scope of Study

This thesis focuses on determining the impact of RL service quality on customer satisfaction in a B2C e-commerce environment." Returns Management "and "Reverse Logistics" refer to the management of goods flowing downstream from the customer to the manufacturer or retailer. Hence the researcher has used the word "Reverse Logistics "in the research. In the study, the customers using the service and LSP providing the reverse logistics services are both based in United Arab Emirates (UAE). UAE is a very high potential retail market, and e-commerce has grown rapidly over the last few years. It is also considered as the region's logistical hub due to its unique geographical location.

1.7 Summary

This section summarises the Business Problem, Research Problem, Research Gap, Research Questions, and Research Objectives.

Table 1. 7 Summary of the chapter

Business Problem	Poor RL service quality and Logistics providers' capability is impacting customer satisfaction in the B2C e-commerce sector in UAE.
Research Problem	Although various studies have been conducted in Reverse Logistics in the literature, there is hardly any study to the researcher's knowledge based on the customer-oriented approach of RL and suggests a framework for improving the RL service quality.
Research Gap	Though various studies are available on post-purchase customer satisfaction in online shopping, hardly any study to the researcher's knowledge is available on RLSQ and customer satisfaction in B2C Retail e-commerce. Also, the weak link between RL capabilities and service quality barriers is hardly discussed and researched. Further, based on a limited literature review by the researcher, it is found that there is a dearth of specific studies suggesting a solution for improving the reverse logistics service quality.
Research Questions	1. What are the demographic characteristics of the online shopper engaged in frequent return of goods? 2.1 What are the customer expectations of RL service quality? 2.2 Is there a linkage between the RLSQ and consumer satisfaction? 3.1 What are the existing barriers to the RL process? 3.2 Is there a link between the RL service capability and RL service quality?
Research Objectives	1. To understand the demographic traits of consumers returning goods online and experiencing RL service. 2. To analyse the relationship between the RL service quality on customer satisfaction. 3. Exploring the link between the RL Capability and RLSQ and developing a framework to improve the RL Service Quality.

1.8. Structure of the Thesis

The research work carried out in this thesis is organized in chapters mentioned below –

Chapter 1: Introduction

Chapter 2: RL Overview and Challenges

Chapter 3: Review of Literature

Chapter 4: Hypothesis Development

Chapter 5: Research Methodology

Chapter 6: Data Analysis and Findings

Chapter 7: Framework to Improve Reverse Logistics Service Quality

Chapter 8: Conclusion and Recommendation

CHAPTER 2: RL OVERVIEW AND CHALLENGES

"The line between disorder and order lies in logistics...."

–Sun Tzu

With the "Free & Liberal Return Policy" becoming an essential element to earning revenue and retaining customers in Online retail, reverse logistics acts as a catalyst in differentiating service experience in the B2C e-commerce sector. This chapter discusses reverse logistics/return management, its objectives and process, and the challenges in meeting customer service satisfaction levels. It also throws light on the logistics service providers' capabilities and barriers to service quality. Additionally, this chapter describes the retail e-commerce environment, key market players and infrastructure in the B2C sector in UAE.

2.1 Introduction to Reverse Logistics

To leverage the benefits of the growing customer shift to online shopping, the organization needs to pay attention to many issues. Product return has been one of the most complicated and challenging processes for e-commerce retailers (Davidavičienė & Al Majzoub, 2021). Due to a surge in customer returns, RL has recently gained significance among industry practitioners and academicians. (Jayant et al., 2012).

2.1.1 Defining Reverse Logistics

The reverse logistics (RL) process is not a new concept in the business environment. Academic research in RL focuses mainly on sustainability, concentrating on three primary areas – social, economic, and environmental issues in the B2B sector. However, reverse logistics (RL) is becoming an essential business function with the rise of product returns from the user.

The concept of RL is not new. As per (Rogers & Tibben-Lambke, 1998), it is the process of recovering the product's value by efficiently handling and moving the goods from the consumer(point of consumption) in the upstream direction toward the supplier or retailer, i.e. toward the origin. Unlike the forward logistics, in RL, the flow of information is backwards, i.e., from customer to retailer. Similarly, for refunds, capital (funds) moves from the supplier to the consumer (Rogers & Tibben-Lambke,1998,1999,2001; Stock & Mulki, 2009).

Over the period, the industry practitioners and researchers have alternatively or synonymously used the term " Returns Management" and " Reverse Logistics" to describe the collection, processing, and movement of the returned goods from the consumer towards the upstream direction. (Sajjanit & Rompho, 2019). In this thesis, the term "Reverse Logistics" is consciously used as the study empirically examines the entire service operation, involving both customer and logistics provider to find a holistic customer-oriented service solution in the B2C e-commerce context. Table 2.1 summarises the e-reverse logistics definitions proposed in B2C e-commerce. The summary table below indicates that RL's definitions have evolved and have slowly embraced the customer product returns as an integral part.

Table 2. 1– Summary of RL description in B2C e-commerce context.

Author	Description of RL in the e-commerce context
(Tang & Gu, 2010)	Return of goods purchased as part of an online transaction due to poor quality or other reasons from the consumer to the retailer.
(Powers & Jack, 2015)	The term RL is related to dissatisfaction with goods and induces emotional dissonance, proportional to product returns.
(Abdul-Kader et al., 2017)	E- logistics support the movement of goods from the consumption point to the origin point.
(Morgan et al., 2018)	The inverse flow of information and product from the origin to the customer through integrated ICT systems.
(Emy Ezura A Jalil, 2019a)	RL is a process wherein the online retailers organize, retrieve, and determine the outcome of the returned product and arrange shipments for the exchanged item to the customer.

Source: Compiled by the author

The complexities of the RL process increase many folds in comparison to the last-mile delivery in the online sector. The customer wants effortless and quick product returns at the minimum possible cost (Emy Ezura A Jalil, 2019). RL and forward logistics are two sides of the same coin. Hence, it is essential to understand the difference before pursuing operational improvement.

2.1.2 Distinctive characteristics of Reverse Logistics

The volume uncertainty, driven by exception and the movement of goods from the customer towards the origin, distinguishes the RL processes from the Forward Logistics. (Rogers et al., 2002). Table 2.2 shows the unique characteristics of reverse logistics compared to last-mile logistics.

Table 2. 2 Comparison between Forward & Reverse Logistics

S.no	Characteristics	Forward Logistics	Reverse Logistics
1	Planning & Processing	Faster & Accurate	Slow & Complex
2	Forecasting	Comparatively uncomplicated	Difficult
3	Movement of Goods	One location to Multiple locations	Various locations to a single location
4	Packaging	Uniform	Damaged with varied sizes
5	Channels of Distribution	Standardized	Exception driven
6	Speed	Recognized as priority	Often not a priority
7	Cost	Well Monitored	Less Prominent
8	Marketing strategy	Known	Complex and non-standard
9	Track and trace	Visible and available to all in the supply chain	Fragmented and slow
10	Process	Standard	Non- standard

Source- (Tibben-Lembke & Rogers, 2002)

The RL program poses a challenge because of its complicated operational nature, low volume, unpredictability, and high cost. Other parameters that lead to the operational difficulties in RL are the followings –

1. *Internal Negligence* – Though returns are an essential part of online marketing strategy. However, many companies consider the Reverse Logistics process a “Burden "or a "subsidiary" activity and often exclude it from the central business objective. Mostly, RL is managed by third-party logistics (3PL) with limited resources and innovative technology support.

2. *Highly Complicated Network* – The high degree of uncertainty of value and volume, complexities of location, network from multiple locations to one, and poor management attention reflects on the service quality's efficiency. This complicated network results in poor forecasting, high recovery cost, and low customization, eventually leading to customer dissatisfaction. (Xu & Jiang, 2009)

3. *Lack of Capabilities*: In B2C e-commerce, most companies are still figuring out how to optimize return services. The 3PL companies lack skilled people and management experience, dedicated RL technologies and infrastructure that integrates all the participants and provides visibility. (Xu & Jiang, 2009;Nel & Badenhorst, 2020)

2.2 Challenges in Reverse Logistics Management

Returns from customers are a major impediment for online retailers. Table 2.3 summarises the challenges of online returns and indicates how a company may handle each obstacle internally and a general strategy for dealing with it.

Table 2. 3 Challenges of B2C Reverse Logistics

Challenges	Impact Factor	General Strategies
Impact on profitability	Low	Lower the impact by reducing the returns.
Uncertain in Volume /Value	Low	Improve forecasting and enhance real-time visibilities
Cycle time complexities	Medium	Reduce cycle time & complexities in RL
Lack of Resources.	High	Explore the existing capabilities and invest in technology and process.
Action from Competitors	Low	Formulate customer-centric return processes and policies.

Challenges	Impact Factor	General Strategies
Customer buying Behaviour	Low	Identify the factors impacting customer behaviour and address them.

(Sources: Compiled by Author)

Firms should map the activities in the online returns process to address online returns challenges. It can enable them to control and manage the issues associated with online returns. More so, in the e-commerce environment, RL is an essential business link, representing the credibility and brand image of the company. So, the firms need to focus on the customer's expectations and align their RL strategy accordingly.

2.2.1 Key Initiators and components in RL

According to (Brito & Dekker, 2002), the RL process's key activities involve preparation, collection, receiving of goods, exchange shipping, credit issues, sorting, and asset recovery. It includes restocking, repackaging, etc., returns to vendor, disposition, and scrape. Figure 2.1 below illustrates the two significant outcomes of the RL process, i.e., customer satisfaction and corporate satisfaction. Customer satisfaction in the B2C online environment is attained through an effective returns service and the internal capability/ preparation of the provider to manage the returns.

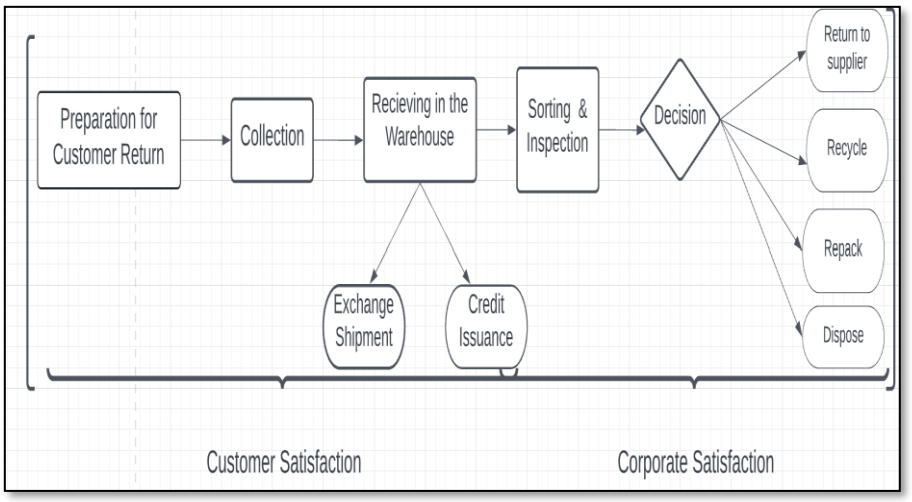


Figure 2. 1 Various components of Reverse Logistics in E-commerce

When inspection and sorting, including restocking, repackaging, return movement, and disposition, are seamless and attained at minimal cost and effort, corporate satisfaction is accomplished. But due to a lack of management attention towards RL, inefficiencies are high in this process, which is visible from the number of complaints and reviews posted by the customer on the e-retailer web page. There are considerable opportunities to improve the overall profitability if there is a functional integration between marketing and logistics. (Saxena et al., 2020). To achieve customer satisfaction (CS), a seamless reverse logistics movement and flow of information from the user's location to origin is essential. Responsive, real-time information and service are imperative to meet customer demand in the new age.

In the traditional process, information about the return order from the e-retailer via email or web EDI interface to the 3PL, whereas the customer gets a notification for the expected pickup. The 3PL picks up the product from different customer locations, consolidates the goods into LTL, and drops the same into regional warehouses for inspection, sorting, and aggregation. Lack of coordination and integration among the key participants in reverse logistics is a key concern that often delays the entire operation. (Mollenkopf.,et al., 2007). If the offered service is effective, it helps in many ways.

2.2.2 Key Benefits of Reverse Logistics Service

The retailers offer an attractive return policy to retain the customer. And if the process of return of goods is effective, the retailer can derive many benefits. Benefits are mentioned below

1. Improve customer satisfaction and retention.
2. Increase profitability and sales revenue.
3. Improve efficiency and effectiveness of e-commerce operation.
4. Improve cycle time of buying.
5. Establish a long-term partnership with customers and improve the brand presence.
6. Supports competitive differentiation and business sustainability.

So, the retailer should formulate objectives to avail the benefits.

2.2.3 Objective of Reverse Logistics

Moreover, as per (Banomyong et al.,2008), RL's goal in e-commerce operations is to boost customer experience. And achieving this aim is only possible if the firm can successfully satisfy the customer by identifying the expectations and creating a Lean and Agile (Leagile) approach to attain operational excellence.

2.3 RL Service perspective

In the online B2C sector, one negative return experience can lose the customer forever. It is evident from figure 2.3 below that shows customers across the age group would refrain from buying from the same e- retailer if the returns experience is poor. (Charleston., 2020)

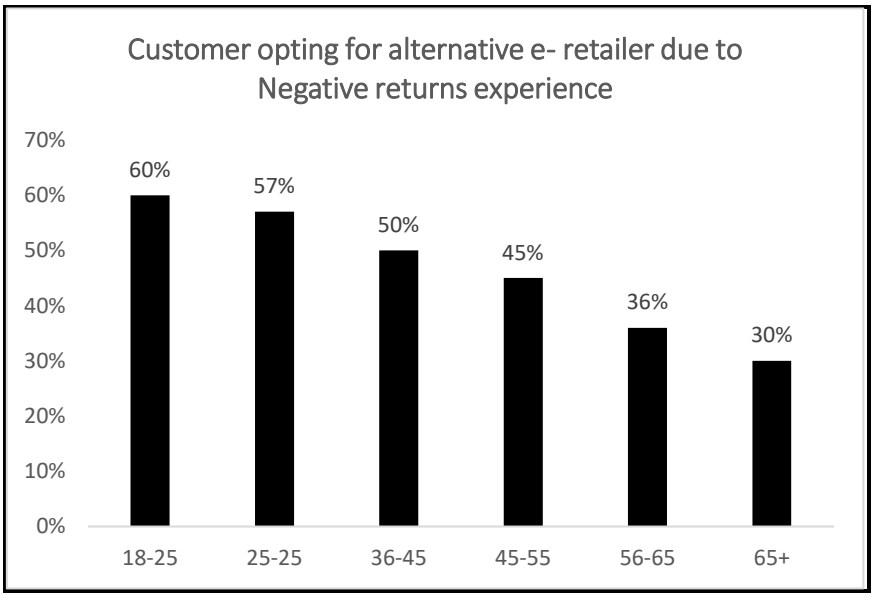


Figure 2. 2 – Age groups opting for the alternative e- retailer

Source: Sales cycle. com,2020

The e-commerce returns rates are almost three times higher than the in-store returns, and it costs more than 4.4 per cent of the total revenue per year to the retailer to either dispose of or resell the product. Overall, 89 per cent of the customer would buy again if the returns experience is good. (|ReBOUND Returns, 2019). Figure 2.3 below shows that service experience has become a

vital part of the RL operational strategies, and the quality of the services should be a priority for the e- retailer.

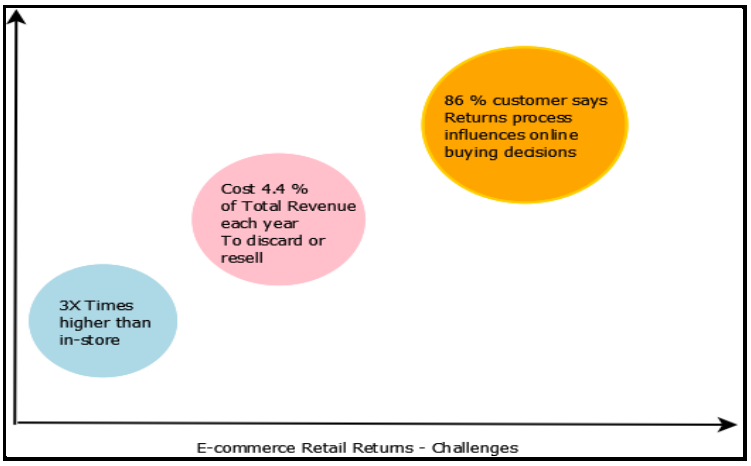


Figure 2. 3 – Importance of RL Service (Source: PR Newswire, Vox, CNBC, CBRE, Business Insider)

Providing flexible return options to consumers may lead to repeat purchases. Still, the reverse logistics process must be efficient and effective, as it is an essential aspect of customer satisfaction (de Leeuw et al., 2016). Reverse logistics reliability is an opportunity to build a partnership with the consumer. (Griffis et al.,2012; Ertekin, 2017). Therefore, service excellence at the post-purchase stage either adds value to customer relations or destroys them. (Vakulenko et al., 2018).

In the case of customer returns, RL has distinctive qualities. As the RL process begins primarily with customer dissatisfaction, the service aspect needs marketing and logistical integration to formulate a customer-centric strategy that should be used to improve services. In B2B environments, prior research has looked into the relevance of logistics service quality (LSQ) in improving customer satisfaction.(Mentzer et al., 1998,2001; Bienstocket al, 1997; Davis - Sremek et al., 2008,2009). In logistics, like any other sector, service quality measures the customer's expectation of what a business is offering versus the actual service performance (Sajjanit & Rompho, 2019; Parasuraman et al.,1985). But with the growth of e-commerce, performance is measured in logistics using various scales – such as SQ, PDSQ (Physical Distribution Service Quality), LSQ, and e-LSQ. (Xing et al. 2010).

Specifically in logistics service quality, according to(Tamang 2014), there are two-dimensional aspects to perceived LSQ (Logistics Service Quality). The operations deal with what and how the product must be delivered. At the same time, the relational dimension refers to how the service offered, and customer interactions be maintained. Further, the operational element includes – responsiveness, tracking and web efficacy. The relational side of service quality is communication, information and service customization, and innovative forms of consumer service access. The existing literature highlights that LSQ focuses mainly on the company's internal processes and its integration with another commercial entity, i.e., participants in the forward logistics. Because RL is unique in many aspects, established scales such as LSQ, SERVQUAL, and SERVPERV cannot be used directly to assess service quality and gaps. The RL service embraces –

1) marketing and logistical integration.

2) reverse flow value propositions.

3) A process that frequently begins with consumer discontent are all aspects that distinguish RL.

Understanding the customer perspective and developing a customer-oriented strategy for RL is gaining traction. Thus, recently, (Sajjanit & Rompho, 2019) developed a scale based on SERVQUAL and LSQ to measure the RLSQ performance. The study by the author was specific to electronic in-store returns. Hence, there is a need to study the RLSQ relations on customer satisfaction in the e-commerce sector as there is a void of academic research in this domain area.

2.4 Operational Capabilities in RL Services

The customer experience of service reflects the background operations in any sector. RL service also involves complex operational challenges, such as managing customers' expectations, returns movement, process ownership, multiple participants, and data constraints. In RL operations, the Supply Chain

(SC) fragmentation increases costs between 10- 42 %, depending on the route and packaging. Secondly, inefficiencies can lead to customer dissatisfaction, so retailers should utilize consumer experiences to inform shopping decisions. (Mckinsey.Co, 2021).

So, according to (Lamba et al., 2020), resources and appropriate capabilities are critical for an effective RL implementation. Lack of management attention, coordination among SC partners, policy, infrastructure, and capital allocation are significant barriers to RL implementation. Integration and coordination are impediments in RL, and an organization needs to develop adequate coordination and infrastructure capabilities to cope with returns successfully. (Jack, Powers, &, 2010). This highlights that industry practitioners should examine their information correctly to minimize costs and address customer service expectations. (Grifoni, 2021).

Industry statistics show that 62 per cent of the organizations believe in traditional RL management as per the survey conducted by statistica.com. Figure 2.4, for example, shows that (Logistics Managers) think that existing RL processes need improvement, 53% believe that the RL process needs drastic improvement, and 44 % per cent feel customers are becoming more demanding, so there is a need to look at operational capabilities. Additionally, the increased volume of returns is a key driver for the need to improve operational infrastructure.

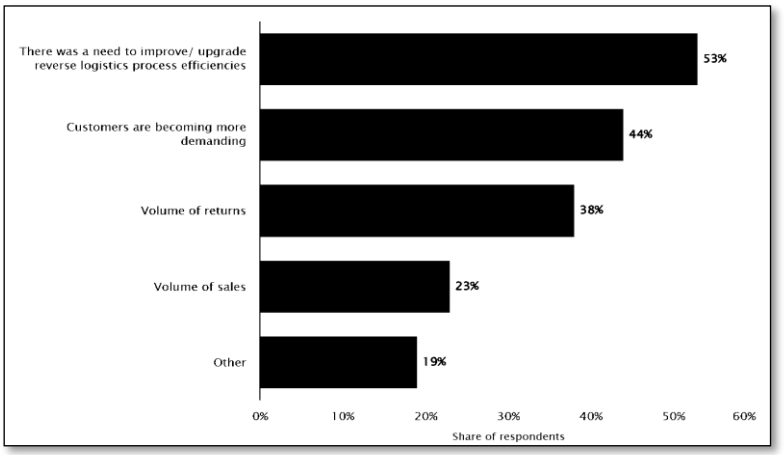


Figure 2. 4 - Need for improvement in the RL process (Source: Statistia.com)

Most firms still look at RL from a warehouse management perspective rather than recognizing customer expectations and improving integration and collaboration in the supply chain. As shown in Fig 2.5, RL investment focuses mainly on increasing warehouse space and adding new labour.

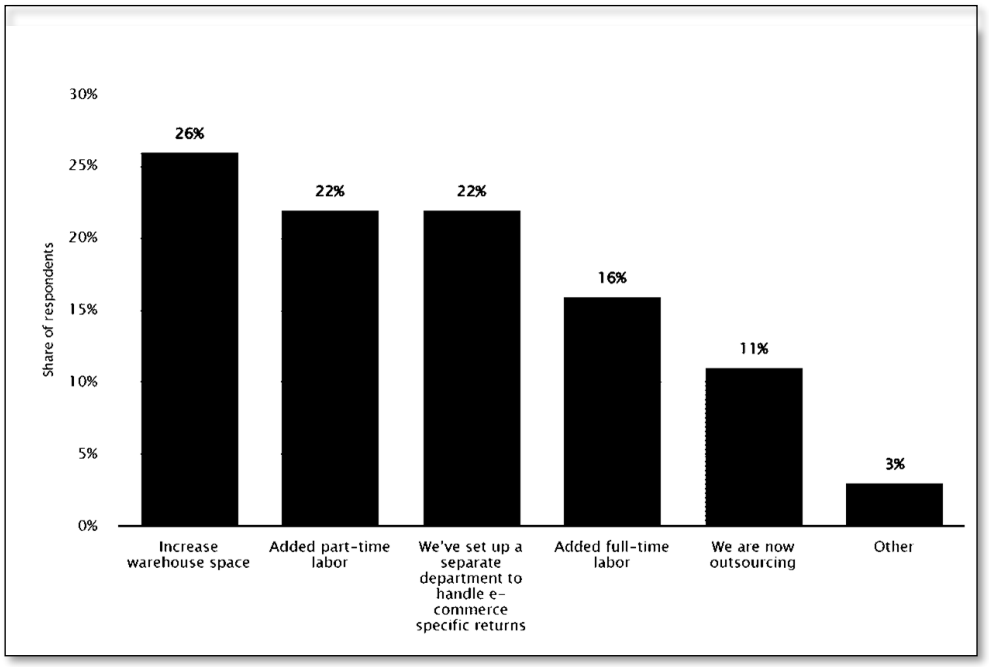


Figure 2. 5 - RL investments in 2020

(PwC.2020)

The above two statistics show RL needs robust strategies for the increased importance of the capability. In the current era of digitization, the traditional RL process and procedure need up-gradation and technology adaptation to enhance customer satisfaction. Over the period, the information technology-enabled reverse logistics is termed "e-reverse logistics"(REL), wherein the processes are performed electronically (Morgan et al., 2018). REL reduces resource utilization and brings effectiveness and efficiency to the entire supply chain (Ankit Mahindroo & Harsh Vardhan Samalia, 2016). IT-enabled reverse logistics with Web EDI or cloud-based interfaces through advanced programming interfaces (API) to exchange information will create more value and add to customer satisfaction. In the current system, the manual, paper-based

system is running intermittently with the e- system, which challenges logistics providers and retailers. Lack of specialized knowledge and customization reduces the actual service quality to the customer. As a result, a properly executed and monitored RL operation could lower costs while enhancing customer satisfaction. Internal resources and process capabilities play a crucial role in boosting customer retention and service quality. The literature study reveals that in the B2C area, there are need to study the RL capabilities of the logistics provider in B2C e-commerce. (Lamba et al., 2020)

2.5 E-commerce in UAE

2.5.1 Challenges in UAE's e-commerce Retail Sector

Online purchases have risen year after year, accounting for a modest fraction of overall retail sales in the UAE. E-commerce has been vastly accepted in developing countries and evolved over the period. Online buying is emerging in UAE as an alternative to retail therapy in a big way. (R. P. Saxena, 2019). The future appears promising for e-commerce companies. Amid the current pandemic, this sector displayed a sharp increase but got exposed for its lack of logistics capabilities and difficulties in managing the rise in demand.

Shifting customer preferences and convenience are playing a prominent role in reshaping the retailing industry in the UAE. (Ahmed et al., 2020). The bottlenecks for e-commerce companies are supply chain inefficiencies.

- The main concerns are sourcing challenges, late deliveries, return volumes, and lack of integration amongst vendors, fulfilment centres, and logistics providers. (Mukerjee et al.,2020).
- Apart from that, there is a lack of understanding about consumer expectations and how to enhance reverse logistics services' (RLSQ) effectiveness in the (B2C) e-commerce domain.
- According to published reports, quick delivery, packing, and reverse pickup are vital for retaining consumers.

2.5.2 Major Players in Retail B2C e-commerce in UAE

Few of the major companies engaged in retail B2C e-commerce in the UAE are as follows –

1. Amazon. ae (Global e-commerce company)
2. Noon. ae (Local company – Noon AD Holding LLC)
3. Namshi. ae (Local company – Emmar Properties LLC)
4. Mumzworld.com (Local company – Owner Mona Ataya)
5. Sharaf DG (Local company dealing in only Electronics – Omnichannel Presence)
6. Ubuy.com (Kuwait based company)
7. Sivvi.com (Local Company – Al Abbar Enterprise)
8. Letstango.com (Local Company)
9. Doduae.com (Local Company – Al Waqt al Haqiqi Gen. Trading)
10. Ounass.ae (Local Company for Luxury brands owned by Al Tayer Insignia LLC)

Apart from the above mentioned, many cross-border, global companies have footprints in the UAE retail e-commerce sector. This study considered e-commerce companies dealing in clothing, electronics, footwear and accessories, and daily essentials.

2.6 Concluding Comments

This chapter concludes the discussion on RL specific to the B2C e-commerce sector, key drivers, and the process. It also discusses service perspective, customer orientation, and logistics capabilities associated with reverse logistics. Finally, it presents an overview of the UAE's e-commerce sector's evolution and the industry's major companies. The next chapter reviews the literature on RL in the B2C E-commerce sector, using the keywords like - RL challenges, service quality factors, customer service expectation, logistics capabilities and barriers associated with RL service quality. The next chapter also identifies the research gap in RL service in the B2C e-commerce sector.

CHAPTER 3: REVIEW OF LITERATURE

The chapter reviews the existing literature on Reverse Logistics to explore the approaches for improving RL Service Quality (SQ)and achieving customer satisfaction. The literature review helps identify the research gaps that are the base for developing a holistic solution. A comprehensive literature review is undertaken by reviewing articles from relevant journals, divided into themes and sub-themes in each domain area. The detailed literature review supports the framing research design, selecting the variables and developing a questionnaire. It also reviews the appropriateness and applicability of the theoretical premises to address the research objective, research problem and research question.

Introduction

Establishing new research in any field and associating it with the prevailing knowledge is considered the foundation of academic research, irrespective of the subject domain. (Snyder, 2019). A literature review is a method by which the researcher systematically gathers, organizes and critically examines the previous research to draw an inference and identify the gaps in the relevant area of study. (Tranfield et al., 2003). An extensive literature review builds a robust foundation and helps the researcher establish the study's conceptual framework. (Webster & Watson, 2002).

This study used academic publications from Science Direct, Scopus, Ebsco, ProQuest, conference papers, and industry reports. Since the research is multi-disciplinary and encompasses marketing and logistics academic data, a thematic literature review has been conducted.

Following are four main themes identified for the extensive literature review and divided into sub-themes that are based on keywords.

1. Role of RL in e-commerce.

2. Understanding customers & their RL service expectations.

3. Analysing Logistics Service Quality (LSQ) and customer satisfaction (CS).

4. Significance of logistical capabilities in RL.

The sub-themes mentioned in each theme are shown in Figure 3.1 to determine gaps in the existing literature.

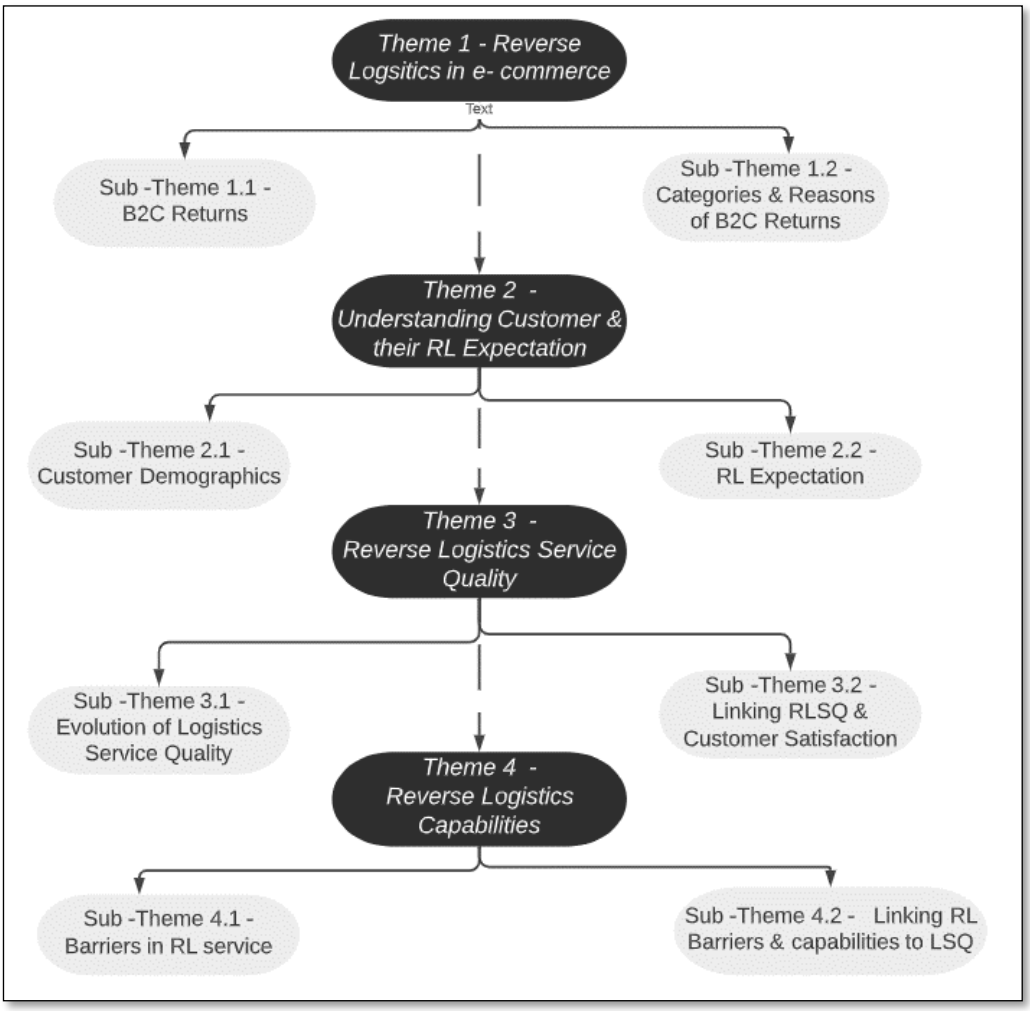


Figure 3. 1 Themes & Sub-themes for Literature Review

3.1 Theme 1: Role of RL in E-commerce*:*

3.1.1 Defining Reverse Logistics

'Free – Returns' is always endorsed as the strategy by the retailer to build customer confidence in online shopping. And it has also led the customer to impulsive and compulsive shopping, as returns are easy to do. Though firms are using "free – returns" to satisfy the customer's requirements, the outcome is a significant increase in online returns. (Badenhorst et al., 2020; Sonntag, 2019).A high percentage of product returns undoubtedly impacted the profits, and academic evidence shows that returns can cost retailers anything from ten per cent to twenty per cent of their earnings. (Sangwan, 2017). Returns are also causing increased environmental concerns, such as more returns mean more carbon footprints.

As per (García-Dastugue, 2006), RL has been a research topic for many decades and has been defined by several authors. (D. M. Lambert & Stock, 1981) used the phrase "reverse logistics" for the first time in one of the earliest explanations of the concept, which highlighted the movement of the product flow in a backward direction by defining it as "going oppositely". In the 1990s (Dale S. Rogers & Tibben-Lambke, 1998) described RL as - " *The process of planning, implementing and controlling the efficient, cost-effective flow of raw materials, in-process inventory, finished goods, and related information from the point of consumption to the point of origin to recapture value or proper disposal".* But, this definition limits the flow; the products don't need to continually return to the point of origin; there are several other recovery points (Brito & Dekker, 2002) in the supply chain in the reverse cycle.

The concept evolved further, and the definition by (Rogers et al.,2002) extended the approach by including - returns avoidance and gatekeeping as a part of the Reverse Logistics (RL) system. Later, (Rogers et al., 2002) modified the description to include customer returns and suggested returns as a subset of reverse logistics defined as *"processes associated with returning or receiving returned products for any reason. These processes extend into post-delivery customer support*". (The Supply Chain Council, 2001), and stated that "*if no*

goods or material are being sent "backward," *the activity is not a reverse logistics activity."*

However, in the e-commerce era, the RL term was further modified (Rogers et al., 2002) but did not effectively capture the B2C e-commerce business (Hjort & Lantz, 2016). The definition incorporated e- product flow and related IT support from the consumer location to the point of origin. Table 3.1. summarizes the available description of reverse logistics and shows the modification in the concepts over the period.

Table 3. 1 Summary of Evolution of RL definition

(Source- Rubio et al., 2016)

Year	RL concept / definition	Authors
1980's	The concept & definition emphasised the backward flow in contrast to the traditional forward movement of good.	Lambert & Stock (1981); Murphy (1986); Murphy & Poist (1989)
1990's	A formal definition of RL was established and published by the Council of Logistics (REVLOG)	Stock et al 1992; Pohlen et al 1992
2000's	RL become part of the business process.	Croxtion et al (2001); Rogers & Tibben-Lembke (2002)
2004-2010	RL is a set of programs/activities to move goods in the reverse direction. Also, RL became part of SC, and a new concept of a Closed Supply Chain (CLSM) emerged.	(Savaskan & Corbett, 2001) ; (Lebreton & Tuma, 2004); (Horvath et al., 2005)
2010-2018	RL included the processes and procedures related to returns from the consumption point. It also included e-management of information and product flow in the inverse direction and technology to maximise value.	(Millen & Maggard, 2010) (W. Wang, Liu, & Wei, 2013);(Subramanian et al., 2014) (Chileshe et al., 2018);(Sankara et al., 2017); (Yan & Cao, 2017); (Morgan et al., 2018)
2019 - 2021	In online shopping, RL is an activity wherein the e-retailers systematically organize the movement of the product in the backward direction.	(Panigrahi, et al ., 2018); (Jalil, 2019b); (Krishnamoorthy & M, 2021)

In E-commerce, RL activities comprise gathering, inspection, disposition (re-marketing, remanufacture, recycling), and further moving the goods (Agrawal et al. 2016). Most often, authors have used the terms – "Returns Management" and "Reverse Logistics" synonymously used to describe the collection from customers and all the activities related to moving it upstream in many previous studies. (Sajjanit & Rompho, 2019). In this thesis, "Reverse Logistics" (RL) is referred to the entire process of movement starting from the consumer to the logistics provider's warehouse in B2C e-commerce. The activities such as sorting, repackaging, storage and consolidation are not part of this study. Hence, all the definitions and concepts related to recycling, reuse, and other terms used in disposition or environmental purposes considered in RL have been excluded in this study.

3.1.2 Types of Returns

In the case of e-commerce, according to (Stock & Mulki, 2009), customers return more products than they would in traditional face-to-face sales due to a deficiency of information before buying. Customer Returns are among the largest and most significant in the e-commerce context. Table 3.2 summarizes the various return categories of the product return categories identified by (Rogers et al.,2002). Generally, there are five types of product returns, and customer returns are the most common type of return in the supply chain.

Table 3. 2 Categories of Product Returns (Source: (Rogers et al., 2002)

Type of Returns	Description
Consumer	Returns from the customer because of defective items from the retailer.
Marketing Returns	Returns due to poor sales, quality, or stock repositioning.
Asset Returns	Companies' assets that moved back to recapture and reposition.
Product Recalls	Returns that the producer often implements due to quality problems or safety concerns
Environmental Returns	Returns of hazardous waste disposal in compliance with environmental regulations.

Because of the high returns from the customer, e-commerce reverse logistics is gaining popularity in both academics and practice(Nel & Badenhorst,2020). However, with low volume and wide variety in returns, reverse logistics is the most challenging operational function for companies/retailers.(W. Wang et al., 2013). As a result, online merchants should create strategies and develop approaches to improve their reverse logistics processes. The retailers' hesitation toward RL implementation has been one of the critical challenges in the online retailing business (Walsh et al., 2017). But, with the customer, adoption of internet shopping is increasing, and the expectations at the post-purchase stage are changing. The retailers should identify and comprehend the reasons for online returns.

3.1.3 Reasons for Returns in E-commerce

Retailers can determine trends by identifying the reasons for returns which will help firms anticipate the volume and categorise the returning products (Mukherjee et al.,2018). Reasons for returns are classified into four main categories.

a) Insufficient product information - In online shopping e-commerce, customers cannot physically try and touch the products and do not get to see them in person. Thus, they frequently must rely on their imagination (or guesswork) to make product feature decisions, which leads to the product failing to fulfil the consumer's needs. Also, there is a mismatch between the online catalogue description and the actual product, or the information is obsolete. (Badenhorst et al., 2020; Wang et al., 2013).

b) Order fulfilment Problems – Many order- fulfilment issues lead to product return. The customer often receives a technically defective product, i.e., an off-specification product or a damaged item. (Badenhorst et al., 2020). For example, the customer returns an inoperable product immediately after receiving it from the vendor (Genchev, 2009). Similarly, customers might receive a damaged item transported across long distances. (Badenhorst et al., 2020). Lastly,

occasionally customer returns the product because products are shipped late to the customer or wrong shipment.

c) Unplanned and erroneous buying - Customers may purchase the incorrect product, make errors when placing online orders, or buy the faulty product (i.e., order sizes too large or small. (Joshi et al., 2018) (Subhashini, 2016). Sometimes, customers might change their minds about buying a different product or make impulsive or unplanned purchases, subject to returns assurance (Solanki, 2018). (Mukherjee, 2017). Moreover, during the holiday seasons, customers often purchase more than required and hope to return it later if not needed. Table 3.3 briefly describes the reasons for returns and the category. The categorization helps the retailers to focus on specific causes and formulate the right strategy to customize the service.

Table 3. 3 Main categories for Product Return Reasons

(Source – Compiled from various Literature)

Reasons of Return	Categories of Online Return	Description
Defective Product	Reclamation Driven	Product received with defects and damage.
Delivery of wrong product	Order fulfilment Driven	Erroneous product delivery – wrong colour, size or product
Cheaper products on other websites	Competition driven	Customers found the same product cheaper and faster on another website while waiting for the delivery.
Misleading product description or product different from expected	Specification driven	The product does not meet customer expectations.
Size Mismatch	Size Driven	Product not matching the size chart mentioned on the website.
Style not matching customer expectation	Feeling Driven	The style of the received product is not up to customer expectations.
The customer's desire for the goods waned.	Fashion faded	Fashion style disappeared too soon
Overordering	Just trying driven	The customer ordered more than required for fittings at home.

Even though reverse logistics significantly impact business finances, customer relations and competitive differentiation are underestimated. The retailer still considers commercial product return necessary evil and nuisance (Blackburn et al., 2004;2006), and it's also reflected in academic research. Although growth in the returns has surged in e-commerce yet, academic focus on understanding customer behaviour in RL has not gained attention. (Bernon et al., 2016)

3.2 Theme 2: The RL Process

To design and manage an efficient RL program, the company needs to analyse the relationship between customer satisfaction and the logistical services offered. (Rintamäki et al., 2021). RL process is exceptionally critical and poses challenges for online retailers as the process of returns handling, or RL, is extremely complex. (Ryder, 2010); Brohan, 2005).

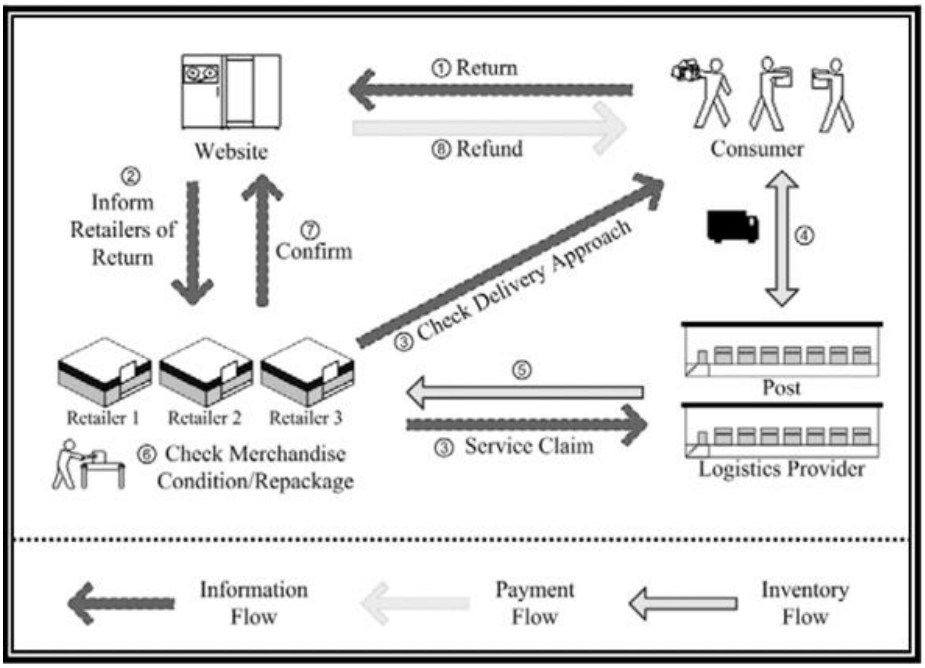


Figure 3. 2 Reverse Logistics Process

The RL process involves interdepartmental coordination and integration among people, processes, and information to successfully handle the customer's returns. Figure 3.2 shows all the activities in the Reverse supply chain.

- Transport and Logistics – Provider need to validate and authorise the returns, pick up from collection point, recovery, sorting, inspection, reshipping, and, if required, disposition)
- Warranty and Repair – The activities are carried out in the warehouse or repair centre, including repair and repacking.
- Marketing or Sales – The task involved in this stage is communicating with the customer, remarketing, or resale the product.
- Customer service – The responsibilities of the customer service dept is to receive the notification from the customer, file the complaint, contact the service provider, commit to lead time and monitor the progress. And lastly, monitoring the performance and the resources of the RL service provider. (Ryder, 2010).

Though RL is a strategic tool for competitive advantage (Jack et al., 2010), existing processes and research (Hall et al., 2013) do not comprehensively understand consumer expectations as an essential component in a reverse logistics process and deals with RL from an organizational perspective. (Sajjanit & Rompho, 2019) . Previous studies in the RL area have also focussed on the operational framework and efficiency, and in the case of Returns, the core area of discussion has been returns policies. Table 3.4 highlights the research conducted in RL based on the literature review.

Table 3. 4 RL themes reviewed by Authors

Related themes	Authors
Return policy in E-commerce	(X. Wang, 2009); (Yan et al., 2014);(Yalabik et al., 2005); (J. Zhang et al.,2017)
Return pattern	(Foscht et al., 2013); (Peterson et al., 2005);(Petersen & Kumar, 2015)
Returns Forecasting	(Amit Potdar, 2009) (Agrawal et al., 2015)
Minimizing Returns	(Hess et al ., 1996); (Scariotta, 2003); (Blackburn et al ., 2004); (Powers & Jack, 2015)
Collaboration in RL	(Bernon et al.,2016); (Frasquet et al.,2015) ; (Badenhorst, 2017)(C. Prakash et al.,2015)
Enhancing efficiency	(Banomyong et al., 2008); (Al Majzoub et al.,2020); (Ramanathan, 2010)

Optimizing Returns Process	(Srinivasan et al.,2002); (Jiang et al., 2013);(Samir K. Srivastava &Srivastava.,2006)
Measuring RL performance	(Semeijn et al., 2005); (Genchev, 2007) ; (Richey et al., 2007); (S. Lambert, Riopel, & Abdul-Kader, 2011) ; (de Araújo et al., 2018)(Chiarini & Douglas, 2015)
Closed – Looped Supply chain	(Fleischmann, 2001);(Richey et al.,2007) ; (V. Daniel R. Guide, Jr., 2009); (Rubio et al .,2014); (Sangwan, 2017); (Difrancesco Huchzermeier, 2016)

From the above table, it is evident that most researchers have emphasized the operational side of the RL, but recently few authors have highlighted the importance of a customer-oriented RL approach(Petersen & Kumar, 2015) (Foscht et al., 2013; Petersen, 2008; Petersen and Kumar, 2010). Further, in most of these studies, the reasons for product return products and return policy implications have gained academic attention.

However, scanty information academically is available on how RL experience influences customer satisfaction and retention. (Griffis et al., 2012). Hence, there is a need to explore the influence of RL from a customer-oriented lens, which is a cross-functional study that includes a Marketing and Logistics interface.

3.2.2 Marketing and Logistics Integration -

As RL in e-commerce has a customer interface, for the effective and successful handling of the returning products (Sajjanit & Rompho, 2019), integrated marketing and logistics framework is suggested (D. Mollenkopf & Closs, 2005) and further emphasises coordination among the various functional areas of the supply chain in terms of information, material and financial flows (Russo et al., 2012)

Integration is referred to as interaction/communication within departments through information flow(Mollenkopf et al., 1989). Marketing necessitates consumer engagement and information (Murphy et al.,1992), similarly to logistical that ensures - availability, responsiveness (Mentzer et al. 1999), material planning and resource requirements addressed in designing marketing strategies and assuring customer satisfaction (Walters, 1999). This shows that marketing and logistics are increasingly intertwined and could improve the

success probability of a product and service. The literature in marketing, logistics, and operations has often addressed coordination and integration and its related advantages (Kahn & Mentzer, 1998; Ellinger, 2000; Menon et al.,1997; Piercy, 2009).

Integration and collaboration across functional and organizational boundaries are usually required to ensure the effective development of the process to co-create consumer experience (Esper et al., 2010). Providing outstanding service depends on a highly integrated logistics system that connects marketing, technical, and supply chain operations. (Porter, 2001; Olson et al., 2005).

Post-sale services directly influence consumer perception of value (Chen et al., 2017). Though the customers will become more acquainted with the online shopping ecosystem, their demands and expectations regarding online services are still developing (Frasquet et al ., 2015). As a result, RL (after-sales activities) is still in its infancy in understanding online customer behaviour. (Moriuchi et al.,2016), hence, to provide a customer-centric solution, it is essential to grasp customers' expectations.

Customer understanding and experiences with services before, during, and after consumption and relational exchanges with companies contribute to RL. In the digital era – the relational aspect of the service is the basis of competitive differentiation.(Vargo & Lusch., 2004; 2008).Therefore, organizations should strategically use the information to make value addition in RL for competitive advantage.

Academics have paid less attention to post-sale services and satisfaction than last-mile delivery despite its significance. (Cao et al., 2018); (Lamba et al., 2019);(Javed & Wu, 2020). It is observed that customers struggle with post-sale procedures, even while companies provide greater accessibility. (Lai et al.,2014) . By integrating marketing objectives with the reverse logistics process, the current research emphasizes an interdisciplinary approach in RL.

This study expands on the previous research to investigate the relationship between customer expectations and reverse logistics service. Relationship with the customer could co-create value in service.

3.2.3 Value creation through RL service

According to (Grönroos 2008), customers utilize both products and services, but the service process ultimately provides value. Further, "*Value is perceived by customers in their internal processes and in interactions with suppliers or service providers when consuming or making use of services, goods, information, personal contacts, recovery and other elements of ongoing relationships"*(Gronroos, 1984). Thus, marketing services and the logistics distribution processes form the part of services(Vargo & Lusch, 2004). This is the core concept of service-dominant logic or SD Logic Theory (Vargo & Lusch, 2004; 2008), wherein the customer is the co-creator of the service.

RL process is accountable for creating consumer experiences with the services after consumption. It's a service that creates value in the e-commerce sector. (Sajjanit & Rompho, 2019). Moreover, (Russo & Cardinali, 2012) explain that the RL process is a value creator with marketing and logistics working together to co-create services that create a superior customer experience. (Frankel & Russo, 2014).

But the fact is, (Mollenkopf et al.,2007) state that companies often focus on reducing the operational cost in RL while ignoring the opportunity to maintain consumer relationships and establish customer loyalty. Furthermore, according to (Ogunleye.,2013), the RL experience might impact customers' perception of the service they receive. When customers are unhappy with a product since it did not fulfil their requirements and expectations, it will further aggravate the dissatisfaction level if the RL process is inadequate. Most companies struggle to manage their RL networks. Due to the complicated process and limited resources, many companies outsource the services to streamline the RL process to third-party organizations. (Wang et al.,2021). But, online retailers should perceive RL and product returns as a way to recuperate service and maintain the customer. (Jalil, 2019; Wang et al., 2013). To manage it well (Gattorna.,2010), organizations must understand competitiveness and their consumers' traits, especially when it comes to RL supply chains.

3.2.4 Role of Customer demographics

Demographic traits need to be analysed in the customer segment to understand customer behaviour. The study of people and their characteristics in society is known as demography. Demographic characteristics such as region, gender, and profession influence the value perception of customer satisfaction with logistics services. (Y. Han & Xie, 2018). According to (Potdar.,2009), customer discontent is frequently the starting point for the returns process. The quality of services provided by online merchants (e-tailers) is seen differently by each consumer because of diverse demographic backgrounds such as age group, gender, literacy level, earnings, occupation and marital status. (Adamkolo et al .,2018). Online merchants and logistics service providers can develop and deliver effective, efficient, and superior service by considering customer expectations. (Y. Han & Xie, 2018)

Returns or replacements are an unfavourable aspect of online purchasing that may influence buyers' expectations of eLSQ(Jain et al., 2021). Customer expectations are significant reference points for consumers evaluating a service provider's performance (Rust & Oliver, 2012). It is critical to comprehend the aspects influencing the customer's perception of reverse logistics service quality.

Many studies in the marketing area have proposed that demographic characteristics impact consumer decision-making by altering customer perceptions and attitudes toward various concepts and strategies. (Bashar et al., 2012);(Lal et al., 2014);(Pitchayadejanant & Nakpathom, 2016);(Al-jazzazi & Sultan, 2017). But only a few authors have emphasised the link between LSQ and satisfaction. (Zeglat et al., 2016);(Al-dweeri et al., 2017). Demographically, (Mittal & Kamakura, 2001) concluded that males had a stronger correlation between satisfaction and repurchase behaviour than women, meaning that males are likely to find alternatives if dissatisfied. As per (Ganesan-Lim et al., 2008), retailers always believe that “One-size does not fit all” but customise logistics services to customers' demands considering the demographic features. Failure

to recognize how gender differences impact perceptions of service quality have ramifications for how services must be offered to the consumers in a particular situation.

Previously published literature on SQ are either overall logistics of e-commerce or relationships among overall e-commerce service and customer satisfaction. Few studies have examined the effect of demographics on the RL service quality in e-commerce. (Y. Han & Xie, 2019). The authors explore logistics service quality as part of overall e-service(Parasuraman et al., 2005). Research content also involved overall PDSQ (physical distribution service quality). (Xing et al., 2010). Table 3.5 below summarizes related studies highlighting the customer demographics and service quality in various sectors.

Table 3. 5 Summary related to SQ and customer demographics in e-commerce

Author & Year	Description
(Chen et al ., 2011)	The Kano Model analysed the customer perception for five service quality attributes and gender.
(Lal et al., 2014)	The study emphasises the SQ of the banking sector and their service quality perceptions across six demographic characteristics
(Abu-Shanab et al., 2014)	A study was conducted to investigate the impact of e-service quality on demographics for private online shopping clubs
(Zeglat et al., 2016)	The researcher studied the impact of electronic service offerings on customer satisfaction and intentions.
(Pitchayadejanant & Nakpathom, 2016)	Study on the overall impact of service quality on customer loyalty.
(Fang et al., 2016)	The perceived value of gender and age to understand online consumers repurchase decision-making processes.
(Al-jazzazi & Sultan, 2017)	The study focussed on the impact of demographic factors on banking service quality.
(Adamkolo et al., 2018)	The study focuses on demographic characteristics and online shopping SQ in Nigeria
(Sheth, 2020)	How, in the post -covid era, customer demographics will play a big role in e- commerce
(Jain et al., 2021)	The study investigates the mediating role of logistics service quality (e-LSQ) towards repurchase intention and gender.

(Makkonen et al., 2021)	The research looks at the impact of demographic factors such as payment method and preference on Finland's product return frequency and reasons.

3.2.5 The implication of Customer Demographics on Product Returns

Reverse logistics management is not deemed strategic by the organization, and hence there is an operational approach by the logistics provider and the retailer. The retailer should create a personalized experience as no two customers are the same. A tailored approach with proper segmentation will lead to high customer satisfaction. (ReturnLogic.,2019). Academic research to understand the customer perceived value associated with reverse logistics in the e-commerce segment is new. Very few studies have emphasized the customer-centric RL approach by focussing on the customer demographic characteristics. (Makkonen et al.,2021). According to (Y. Han & Xie, 2019), consumers have different expectations for the same service; recognizing the customer's characteristics can help organizations design strategies. Various consumers have diverse expectations for the same service and knowing the customer's traits may help firms build strategies. While studying the customer demographics in online fashion retail, (Stöcker et al., 2021) concluded that the customers' expectations had risen sharply over the period, and poor service performance can lead to discontentment. Hence, it is prudent to monitor more closely in terms of early strategic identification. If the group expands significantly over time, service quality-related investment will become desirable and necessary for customer satisfaction.

Table 3.6 below summarises related academic research to understand the demographic characteristics.

Table 3. 6 Customer Demographics in Product Return in E-commerce

Author / Year	Year	Description of RL Related Research
(Rintamäki et al., 2021).	2021	The researcher examined the customer return behaviour in the online fashion industry and customer demographic characteristics—only females aged above 45 yrs. The study is in Germany were part of the study.

(Stöcker et al,.2021)	2021	The study focuses on the fashion sector's returns, looking at current developments in return management and the critical drivers.
(Makkonen et al ., 2021)	2021	The researcher studied the demographic characteristics and preference of the credit return payment method as a part of online returns.
(Anand, 2022)	2022	A small cohort of Afro-American customers was surveyed to investigate online customers' post-purchase satisfaction levels.

3.3 Theme 3 - Customer Expectation and Reverse Logistics Service Quality (RLSQ)

Service expectations is defined as the customer's anticipation of service performance that might be delivered by the company while offering services. (Habel et al.,2016). According to (Teas, 1993), "expectations" can have four different meanings. “ideal” expectations refer to the expected degree of performance. An “expected" expectation refers to future outcomes based on past experiences. The user's "minimum tolerable" expectation is the lowest level of performance that the user will accept. And lastly, "deserved" expectations refer to a performance review based on a customer's time and money investment.

Logistics services have evolved as a critical component in improving the online buying experience and achieving customer expectations. To manage RL effectively, the retailer should consider consumer product returns as service offerings and handle them based on customer expectations. Thus, to meet the customer demands, it is critical to understand expectations which are the purpose of reverse logistics and services marketing. (Sajjanit & Rompho, 2019). Further, customer expectations are significant criteria for consumers evaluating a service provider. (Oliver, 1980). Customer satisfaction is a barometer of expectations being satisfied or excelled. (Grisaffe, 2001)

The expectancy disconfirmation theory forms the ancillary base for this research to understand customer expectations better. According to it, the current performance of the firm's services is assessed based on the expectations (Oliver,

1980; Fernandes et al., 2018). Following the expectation-disconfirmation paradigm, consumers assess a company's actual performance to their expectations. (Oliver, 1980). Similarly, to meet or surpass consumer expectations, the first challenge is to analyse them. Logistic capability is regarded that one of the essentials of B2C organizations is customer satisfaction in logistics services.

According to (Hall et al., 2013), previous research in Reverse logistics (Lambert & Stock, 1981; Stock & Mulki, 2009) presents reverse logistics research ignores the significance of critical components of consumer demands in the reverse logistics process.

The literature review shows a void in RL, so this study aims to explore and study customer expectations of RL services provided by e-commerce companies. In this respect, the main research topic in this study is the customer's expectations of reverse logistics service. In other words, the study topic indicated the attributes of services that companies should target to enhance their RL service quality and meet consumer expectations.

3.3.1 Relation between RLSQ (Reverse Logistics Service Quality) and Customer Satisfaction

(Gronroos, 1984) pioneered the concept of service quality and identified functional and technical dimensions of service quality (SQ). Technical quality states the outcome of the operational process. In contrast, the functional quality reveals the customer's perception of the service process and their communications with the service provider.(Arora & Stoner, 1996;Pranic, 2009). But SQ gained further popularity in the marketing literature by introducing the GAP model developed by (Parasuraman et al.,1985), which states that service is appraised by both the outcome of the service and the process that led to that end.

Mid 1980s, Service quality (SQ) has been a significant research issue in marketing and logistics, highlighting the importance of quality and performance to achieve long-term business goals. (Fisk et al.,1993; Mentzer, et al.,2001;

Richey et al.,2007; Millen & Maggard, 2010), identified that Logistics Service quality (LSQ) is pivotal in improving customer satisfaction. With the development of e-services,(Collier et al., 2018) suggested a framework with three main categories – e- process quality (Web interaction), delivery quality and recovery quality.

LSQ is vital for both customers and the Logistics Service Providers (LSPs) (Mentzer, 1999; Rahman, 2006; Sharma et al., 2011). A superior LSQ performance ensures customer satisfaction and competitive differentiation profitability. (Huiskonen & Pirttilä, 1998; Franceschini & Rafele, 2000; Zhao et al., 2001; Baki et al., 2009)

Unfortunately, the relevance and functions of LSQ in RL are often neglected. As a result, research in this area of logistical services in e-commerce has been relatively limited. (Semeijn et al., 2005; Xing et al., 2010). Further, very few published articles examine the dimensions and attributes of LSQ and variations between industries and adaptations over time(Kilibarda, Andrejić, & Popović, 2020).

Because RL in the B2C e-commerce context is considered service offerings, companies need to understand customer expectations and perceived quality to develop strategies for delivering value (Suresh chandar et al.,2002). Prior research (Jeong & Hong, 2007); (Tien et al., 2009) argued that RL service should focus on the user and increase satisfaction with those who experienced e-LSQ. (Jain et al.,2021). Customer-focused services such as service range, accessibility, timeliness, and constant improvement also influence the customer-firm relationship and logistics. However, only limited research on RL service quality, focusing on customer satisfaction, has been published. The table below not only provides the summary but also justifies the need to explore the RLSQ.

Table 3. 7 Summary of Customer focussed Research in RL

Year	Author	Inference
2020	(D. Lin et al., 2020)	The study examines the potential impacts of return logistics as one of the variables to infer customer behaviour in China
2019	(Jalil, 2019)	Focus on the impact of advertisement and social media in product returning.
2018	*(Li & Lu, 2019)	The developed the B2C RLSQ evaluation system based on the LSQ parameters. The study is based in China.
2016	(Zehir & Narcıkara, 2016)	Explores E-SQual and E-RecSQual and Loyalty intentions. The study does not consider the variables of RLSQ
2015	(Tiwari, 2013)	The study examines different dimensions of reverse logistics, its performance which led to customer satisfaction. The study focuses on the RL process and does not consider the dimensions of service quality.
2015	*(Sajjanit & Rompho, 2019)	The study developed the constructs and variables specific to Reverse logistics service quality in the B2C sector. The study is based in Thailand.

Table 3.8 shows that there are only a few studies specific to RL SQ in B2C e-commerce. But none of them has explored the relationship between RL service quality and logistics capability. Hence, it justifies the grounds to conduct exploratory research on the said topic.

Finally, to develop a comprehensive business solution, the RL service quality can be achieved when the logistics provider does have the resources and capability to execute the process efficiently. Lastly, it's essential to the relationship between logistics capabilities and service quality.

Theme 4: Logistics Capability & Reverse Logistics Quality

3.4.1 Significance of Logistics Capabilities in RL

To expand and survive in the competitive e-commerce industry, a supply chain must have operations agility and a strong customer relationship.(Agarwal et al.,2006; Braunscheidel & Suresh, 2009).With the increase the number of market players, the condition becomes more competitive and demanding, which leads to a higher expectation for customized services(Eisenhardt & Brown, 1998; Kumar & Deshmukh, 2006; Swafford et al.,2008). At this stage, the companies must identify and overcome current barriers or constraints, and there is a need to create capabilities.

According to (Jack et al., 2010), since the customer initiates the RL process, the retailer must focus on the RL capabilities that implement the return policies and move the returned goods in the upstream direction seamlessly. Many authors have defined capability in the context of logistics over the years. Logistics capability is defined as that essential component of a company's resources comprising all the assets, abilities, processes, firm qualities, information, knowledge, and so on – that allows it to create, develop, and implement measures to boost efficiency and effectiveness. Furthermore, capabilities are the tangible and intangible subset of its resources (Barney, 1999).

RL capabilities include reliability, availability of information, process and responsiveness. Internal and external connections and the usability of such information are all part of reverse logistics capabilities. These capabilities are information-related procedures that help an organization efficiently manage its RL operations and save costs. It includes - information-related operations that allow a company to integrate and collaborate in RL activities. (Jack et al., 2010)

RL resources and internal systems are two challenges mentioned as roadblocks to creating top-notch reverse logistics initiatives. (Daugherty et al., 2001) concluded that resource commitment and performance are directly propositional to RL performance. Based on a survey of catalogue retailers, it is supposed that management's commitment to resources substantially impacted the success of

RL goals. (Richey et al., 2007; Daugherty et al., 2009) However, various barriers to reverse logistics implementation, such as high transportation and logistics cost, processing cost, lack of strategy, lack of technology, poor operational process, and top management's lack of interest in RL and treating it as an essential element of business growth. (Gunasekaran & Ngai, 2012; Jindal & Singh Sangwan., 2011; V. Daniel R. Guide, Jr., 2009).

Despite several studies highlighting that diverse logistics capabilities are related to logistical or economic performance (Bowersox et al., 2003), capabilities and service performance of e-tailers' reverse logistics are rarely addressed. (S. L. Hsu & Pacis, 2005)

According to (S. L. Hsu & Pacis, 2005), reverse logistics capabilities are categorised into– Proactive and reactive capabilities. Reactive capabilities include RL formalities and Information system support capabilities, impacting service quality and customer satisfaction. Figure 3.2 below shows the link between capabilities and service quality in RL

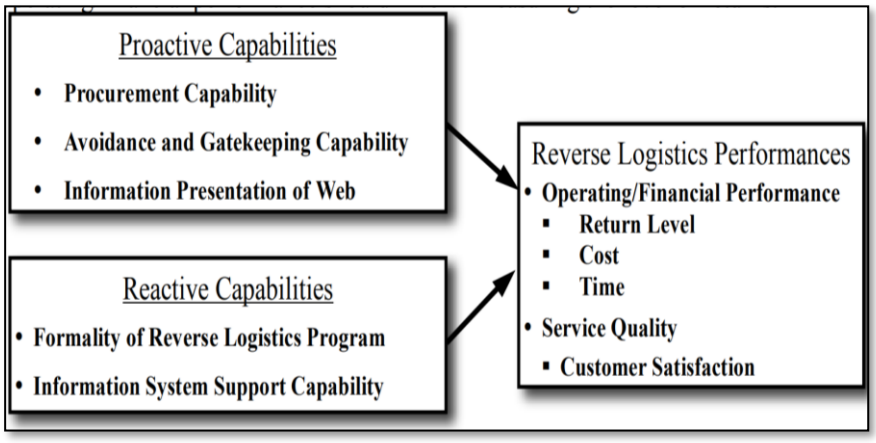


Figure 3. 2 Categorization of RL capabilities

Because resource allocation directly impacts the organization's infrastructure and capabilities, it plays a critical function in assisting a company in constructing efficient RL procedures and allocating essential resources.

Information connectivity, both internal and external, is considered a means of building linkages between the various partners to render better performance.

(Daugherty et al.,2001). Indeed, information is highlighted as a critical input in designing a RL system and is a significant role in the formation of effective operations. By providing accurate and timely information, logistics managers can forecast returns and can thus handle RL effectively (Tan et al.,2003). Additionally, determining customer preferences is critical to aligning RL processes to fulfil consumer expectations, which may differ from what the organization initially expected.

Further, it also proposed to examine the capabilities of the logistics provider (3PL) because outsourcing logistics services is a growing trend among e-retailers. The terms "logistics outsourcing" and "contract logistics," "3PL," and "logistics-services providers" are frequently used interchangeably. (Joong, Cho et al., 2008).

Though most studies have established that logistical capability positively contributes to performance quality, it has not been empirically investigated RL specific to the B2C e-commerce sector. (Jack et al., 2010;Kilibarda et al., 2020) Consumer perceptions of the LSQ are based on the provider's service capability. (Fernandes et al., 2018). Table 3.8 summarises the literature review in the context of RL capabilities.

Table 3. 8 Summaries (RL – Capabilities)

Author	Year	Inference	Gap
Daugherty et al. (2004)	2004	The study concluded three key drivers in RL handling: information technology, knowledge sharing, and relationship networks in B2B Setting.	This does not include the B2C sector
Jayaraman et al. (2008)	2008	The researcher discusses issues related to handling product returns.	The study focuses on the B2B sector.
Cho et al., (2008)	2008	Focused on integrating logistics capability with other functional areas	The focus industry in the study is the electronics retailing industry.

Author	Year	Inference	Gap
Jack et al. (2010)	2010	The study concluded that the RL process and capabilities enable retailers to improve overall costs.	Industry electronics.
Hsiao, (2014)	2014	The research focuses on short life-cycle products and RL	The study used a case study methodology,
Lamba et al. (2019)	2019	This paper concluded that lack of understanding of the process and innovative practices barrier RL of E-commerce companies.	The study focuses on lack of capabilities, i.e., barriers to poor RL performance.
Memon et al., (2020)	2020	The findings conclude the significance of RL capabilities on performance in manufacturing.	The study focused only on manufacturing industries based in Pakistan.

3.5 E-commerce & RL studies in UAE

In the UAE region, the e-commerce sector is still developing. Hence, the review of relevant literature shows that academic research in RL is on CSR, network design and B2B aftermarket. Hence, there is a need to explore the RL customer orientation of the e-commerce companies towards RL management.

The academic research in the domain area of RL is limited in UAE, and many aspects of e-commerce sectors are untapped by researchers. Table 3.10 summarises the published research work in RL and the e-commerce domain area in UAE.

Table 3. 9 Published articles related to E-commerce in UAE

Author (Year)	Context	Inference	Gap
(Abdeldayem, 2010)		This study examined Lee and Joshi's integrated model of consumer satisfaction with online buying.	In most studies, the researchers have mentioned the importance of returns management for customer satisfaction,

Author (Year)	Context	Inference	Gap
(Khalid & Sabry, 2009)	E-commerce adaptation Challenges	This study explores the issues that e-commerce faces by analysing internal and external factors.	but none have discussed and examined it empirically.
(Muhannad & Ahmed, 2014)		This report explores UAE customers' attitudes toward e-commerce purchases.	
(Shoaib & Sayani, 2016)		The focus of the study is web vendor characteristics, online security, and privacy.	
(Seetharaman, Niranjan, Saravanan, & Balaji, 2017)		The author analysed transaction costs, lack of trust, lack of understanding, culture, and local laws	
(Saxena et al., 2018)		This study looks at the nature and breadth of online commerce features and adaption.	
(Jaradt, 2018)		The author captures a comparative study of different online regulations between the UAE and the UK	
(Baskaran, 2019)		This study intends to uncover the obstacles UAE customers face in online buying.	
(Ahmed et al., 2020)		This study provides a comprehensive analysis of economic indicators, focusing on e-retail.	
(P. Rao et al., 2021)		The study analysed the environmental impacts of e-commerce.	RL in B2B Context. Customer-oriented RL is still unexplored.

Author (Year)	Context	Inference	Gap
(Younis, Sundarakani, & Vel, 2016)	Reverse Logistics	Focuses on performance of Green Supply chain.	
(Rodrigues & Mathew, 2011)		Through a case study, the author discussed the recycling activity that encompasses recovery, reuse, and recycling scheme in manufacturing aftermarket.	
(Dharmarajan, 2018)		Study of recycling in Tire industry in UAE.	Have only focussed on the Tire aftermarket and the importance of recycling
(Alshamsi & Diabat, 2015)		The research presented Logistics network configuration in the B2B RL network.	The research lacks customer orientation

3.5.1- Customer-oriented RL Research in UAE

Similarly, a review of the literature in the UAE region reveals that almost all the studies conducted in the region focus on the web experience and the benefits and drawbacks of e-commerce in the UAE (Seetharaman et al., 2017; Muhannad & Ahmed, 2014; Devkishin et al., 2015; Alrawi & Sabry, 2009; Abdallah & Jaleel, 2014; Alrawi & Sabry, 2009). According to a few researchers(Saxena et al., 2018; Singh & Singh, 2014), customer service has a significant impact on the performance of online shopping.. They determined that critical hurdles to the adoption of e-commerce include poor trust levels and a lack of after-sales support. In an e-commerce environment, significant factors are trust, time, security, and convenience to achieve customer satisfaction (Lodorfos et al.,2006). Also, demographic characteristics are vital for e-commerce. (Chen & MacRedie, 2010)

With the significant rise in online shopping and returns within the Middle East, understanding the customer demographic characteristics of the e-commerce returning behaviour is scarce in the B2C context. There is a need to explore the demographic characteristics of the group dissatisfied with the overall RL process to design a customer-oriented strategy and improve the service quality. This study will delve into the consumer demographic characteristics and, after that, understand the expectation as its critical to comprehend the aspects influencing the customer value perception of reverse logistics service quality.

Further, the researcher could only find one study based in the Middle East (AL Majzoub et al., 2020) evaluating the RL in the B2B context. But this study is conducted in the electronic industry in Lebanon and Syria. Hence, there is a need to develop a customer-oriented RL framework to provide a complete solution. (Rogers et al., 2002) This study addresses a research need in the region by emphasizing on consumer returns, which is critical for enhancing RL's efficacy and impacting long-term organizational goal like as customer satisfaction. Additionally, e-commerce experience highlights the importance of RL services. Hence, the study will fill the void in the academic research area by empirically examining the customer expectation and logistics providers' RL capabilities to provide a framework to improve service quality.

Past research has focussed on managing RL from the B2B or firm’s perspective. The research aims to strengthen the customer-oriented philosophy for RL by performing the marketing and logistical cross-function empirical study in UAE.

3.6 Relevant Gaps in the literature

Based on a review of published relevant research, the study identifies the theoretical gaps that need to be addressed to manage the RL of customer returns from the customer effectively in the B2C context.

- Gap -1: Previous research related to RL has not included marketing principles and concepts, even though academic scholars advocate integrating marketing and logistical efforts to enhance RL or returns handling systems.

- Gap -2: Most research in RL is company oriented (B2B), whereas the first step of reverse flow begins with customers. Customer returns also encompass the most significant volume in e-commerce.
- Gap-3: The focus of RL research is mainly to enhance the process and operational efficiency. Customer value enhancement through service is still unexplored.
- Gap-4: Previous research has mainly focussed on Return Policy, RL service expectation and the demographic profile of the customer returning the product is still unexplored.
- Gap-5: Even though the relevance of e-LSQ on customer satisfaction has been recognized in the literature, empirical research on RL service quality and its impact on customer satisfaction is still scarce.
- Gap-6: Many scholars have studied the RL capabilities to analyse the process effectiveness, but only a few studies in the B2B sector have highlighted its linkage with the service quality performance.
- Gap-7 In the UAE region, existing studies in e-commerce have analysed the challenges and barriers in e-commerce adoption-related studies. RL related studies have focussed on green SC. Customer expectations related to logistics service has not still unexplored.

The first three gaps involve RL general characteristics. An extensive literature review on RL primarily focused on the RL process and operational strategies. RL related studies have rarely focused on marketing and logistics integration to enhance the services. However, the recent studies (Sajjanit & Rompho, 2019; Al Majzoub et al., 2020; Emy Ezura A Jalil, 2019b; Jain et al., 2021) have pointed out the significance of RL in customer satisfaction. The theoretical gaps- Gap 4 and 5 are specific to customer returns and the importance of return policy in the e-commerce sector which makes returns from the customer legitimate. (Stöcker et al ., 2021), and the customer expects seamless and effective RL service (Hjort & Lantz, 2016). Hence, the e- retailer needs to provide a high-quality RL service to enhance customer satisfaction. (AL

Majzoub et al., 2020). It also fulfils the objective of RL and service marketing in meeting customer expectations, involving concepts such as relational and functional integration, recovery services, and a customer-oriented approach to managing customer returns in e-commerce. The theoretical gap of 6 involves the logistics capabilities of the provider to provide effective service. The literature review reveals that the existing understanding of RL capabilities and determinants of service quality and customer satisfaction is somewhat limited. Recent studies by (Sajjanit & Rompho, 2019) developed the RL service quality variables, but the analysis was performed for onsite retail in Thailand. Another study (Wei et al., 2021) explored service quality broadly in China. Lastly, in the geographical region of the UAE, there is a need for academic studies both in RL and customer satisfaction derived from the service.

The study is based on the expectancy-disconfirmation paradigm and service-dominant logic theory. It proposes a framework for RL service quality improvement based on actual customer expectations and existing logistics providers' capabilities.

3.7 Theoretical Premises

The research has used three major theoretical approaches. According to the study, consumer product returns constitute service offerings, and logistics need to provide adequate services throughout the entire process to fulfil customer expectations. Therefore, understanding customer expectations is crucial to maximizing customer satisfaction, which RL and marketing management strive for long term business sustainability. As consumers compare their actual performance to their expectations (Oliver 1980) to surpass consumer expectations, the first step is to understand them. Furthermore, S-D Logic proposes that the client defines and co-creates service based on consumer-determined advantages.

The current study also applied the Resource-Based View (RBV) and its primary components to the provider's reverse logistics capacity in the B2C scenario. The organization and execution of logistics operational activities are critical for the

service quality of the RL. A company's success is determined by its available resources and its resource transformation into capability. The current study examines the relationship between capabilities and service quality.

Service-Dominant Logic Theory: (SD Logic)

The service-dominant approach in service marketing developed by (Vargo & Lusch, 2004) laid the basis of customer-oriented services by emphasizing the customer rather than the firm. In case of returns from the customer, the retailer should shift the focus away from the product and strive to provide better service for customer satisfaction. According to the S-D Logic, consumers define service and co-create based on customer-determined benefits. Users might actively contribute suggestions for enhancing service, which was previously considered a business activity. (Karpen et al., 2016; Vargo & Lusch, 2004). Competing on the premise of services demands involving consumers in the co-creation of service offerings and an emphasis on knowing the customer as a resource integrator in creating value for the customer.

Product returns are unique in that they demand both marketing and logistical integration. Unlike other forward logistics services, the process starts with dissatisfied customers Potdar, 2009), who return the product for various reasons. Service failure is deduced from the customer's assessment.

Customers perceive what they want from services since they are the ultimate user of the services. As a result, return mechanisms should be considered as consumers cocreate service offers. Therefore, the consumer is considered input and cocreator of service as a temporary member (McColl-Kennedy et al ., 2012). As concluded by (Brown et al., 2006), revolutionary marketers must provide recovery services when service failures occur. Apologies, clarification, reassurance, reliability, employee engagement and responsiveness (Gilbert & Wong, 2003) are essential components of successful service recovery(Krishna et al.,2011). Managing customer information for maintaining relationships with consumers is a substantial competitive advantage for customer-oriented firms.

The expectancy-disconfirmation Paradigm: As customer expectations have become more personalized, the expectation-disconfirmation paradigm has

become the prevailing narrative in customer satisfaction literature (Myers,1991). According to the theory, the consumers compare the firm's actual performance and expectations (Oliver, 1980). However, on the other hand, when the perceived performance surpasses expectations, it leads to consumer satisfaction. According to this theory, companies must consider customer expectancy when providing RL service to meet and exceed customer expectations.

As a result, this study aims to examine customer expectations for company-provided RL services, i.e., what service attributes do customers expect when customers engage in the RL service? The study pinpointed the features of services that companies could focus on to improve their returns service and meet customer expectations. The expectation disconfirmation hypothesis sheds light on this asymmetrical relationship and how expectations influence logistical service perceptions. Finally, it focuses on logistics service quality.

Resource-Based View (RBV)*:*

Organizational resources and capabilities, according to resource-based theory, determine corporate performance. (Ramírez & Morales, 2011). Companies should improve the RL approach to cut costs and enhance value (Ellinger, 2000; Ramírez & Morales,2011),(Vlachos.,2016). A Reverse logistics capabilities are indeed a company's internal capabilities and methods for performing efficient reverse logistics operations.

Reverse logistics capabilities are categorized into IT management and Process (or service) capabilities. Reverse logistics information management capabilities may use existing assets (Chouinard et al.,2005). However, the RL service request is frequently unpredictable and demands specialized knowledge. (Ramírez & Morales, 2011).

Many researchers in logistics have frequently used the RBV theory. However, it is directly or indirectly connected to logistics providers' performance, wherein technology capabilities have been identified as one of the key success elements for 3PL (Gunasekaran & Ngai, 2012; Lai et al., 2014; Aldin, 2004; Lai et al., 2005. According to the theory, capabilities enhance the long-term competitive

advantage (Ramírez & Morales, 2011). As a result, enterprises should build reverse logistics skills(Tian et al.,2010); (Jack et al., 2010); (Ramírez & Morales, 2011);(Vlachos, 2016).

Further, RBV presumes that the business has the resources and ability to drive a corporate strategy. Also, outline the steps a logistics provider should take regarding available resources and capabilities. This study addresses a resource-based theoretical paradigm for decision-making in B2C marketing reverse logistics activities. Firstly, RL's service should be based on logistical service quality aspects. Given this, the 3PL's capabilities and barriers should be investigated to see whether there is a link between lack of capabilities and service quality performance. After the extensive literature review, only a study conducted in the B2B sector in Brazil used the RBV to evaluate the logistics capabilities of the provider and linkage with the service quality. This study is carried out specifically in the B2C e-commerce sector to examine the logistics provider capabilities in RL operations. RBV is an ancillary theory for the research work.

3.8 Summary

The chapter comprises broadly four major themes. The first theme reviews Reverse logistics (RL) in general and include the evolution of definition, reasons and challenges in RL arising in the e-commerce sector due to customer returns. RL process and unique features are also discussed in this section. In the second section, the researcher has discussed the marketing – Logistics integration, RL as a service and customer demographic, and product return. Service can be customised when the retailer understands the customer expectation and the perceived risk. The third section discusses the customer expectation and relation to the service quality. The fourth part reviews the literature on logistics capabilities essential for delivering service quality performance to provide a holistic solution. Lastly, the previous academic work in the UAE region is analysed to understand the gap and need for a customer-oriented RL study in the e-commerce sector. Finally, the theoretical gap in each section creates a need for this study.

CHAPTER 4

HYPOTHESES GENERATION AND MODEL DEVELOPMENT

The chapter deals with generating the hypotheses and developing the research framework. The relevant literature review is conducted to develop hypotheses and construct the research model. This chapter supports answering the research questions by describing how service quality affects consumer satisfaction. And how do logistical capabilities relate to service quality in E-commerce?

Since the Reverse logistics service quality concept and performance measurement scale are relatively new concepts. The service quality determinants/constructs in analysing the customer expectation in e-commerce returns are used by very few researchers (Sajjanit & Rompho, 2019) and (Li & Lu, 2019) in evaluating the RLSQ performance. This study chooses the variables related to service quality, logistics service quality, recovery services and physical distribution service quality to identify the variables that impact the RL service quality through a comprehensive literature review.

4.1 Determinants of Reverse Logistics Service Quality (RLSQ)

From the extensive literature review, as not many specific studies have been carried out, the study picks up the variables for measurement from the RLSQ performance scale variables. Recently, to study the RLSQ factors for the electronic industry, (Sajjanit & Rompho, 2019) developed the service quality scale to understand customer satisfaction for in-store electronic goods returns. The performance variables suggested by (Sajjanit & Rompho.,2019) are an extension of the SERVQUAL model and E-SQUAL (Parasuraman et al.,2005;

Parasuraman et al.,1998) and E-LSQ (Mentzer et al.,2008.) variables of service quality. The scale measurement for RLSQ by (Sajjanit & Rompho, 2019) considered the variables specific to in-store returns for electronic goods, such as repair and warranties. Based on the review of the literature and content analysis by the experts, five major factors (determinants) were examined in this thesis to measure the customer expectations for RLSQ. The description of the variable is mentioned below -

4.1.2 Communication Quality in RL

Quality of communication refers to the level or degree of information and interaction each party receives to understand the process or activity (Sengupta, Krapfel, & Pusateri, 2000). Several studies (Parasuraman et al., 1988);(Berry et al., 1990); (Headley & Choi, 1992) revealed that the quality of communication has a critical influence on improving the service experience. Specifically, in B2C returns (Olorunniwo & Li, 2010), the interfaces with the CRM are significant as it simplifies communication and enables the customer to complete the returns process with ease. The clarity of communication, ease of navigation, navigation speed, and chatting with the customer service or chat-bots are principal elements in communication quality. Customer satisfaction is high when complaints/return goods are handled promptly and accurately. (Li & Lu, 2019)

Furthermore, the measurement scale (E-Recs-Qual) developed by (Parasuraman et al., 2005) for service recovery includes recovery response, payment, and communication. Thus, Communication is important for return service quality, especially for the online platform.

4.1.3 Information Technology Quality

Information quality is a significant factor in increasing SQ and is an essential variable in LSQ(Bienstock et al.,1997; Mentzer et al ., 2001; Rafiq & Jaafar, 2007; Bienstock & Royne, 2010). Mainly, in the RL (Olorunniwo & Li, 2010), the service performance depends on information integration and collaboration

between the key supply chain partners. Several studies(Daugherty et al.,2019; Lysenko-ryba,2017) concluded that information system quality impacts customer satisfaction, and companies need to enhance the synchronization of information processes and actions (G. Sharma & Lijuan, 2015)

4.1.4 Reverse Logistics Process Quality

RL process is critical in improving customer experience and recovery service quality (Mollenkopf et al., 2007). A well-executed return processing can serve as a service opportunity in the competitive e-commerce environment. (C.Sajjanit.,2015; Shaharudin et al.,2017). The interdepartmental collaboration between marketing and logistics may also impact reverse logistics efficiency, particularly in handling returns. (Jain et al.,2021) and concluded that availability, timeliness, and return processing relate to customers' shopping happiness and repurchase intent in e-commerce.

4.1.5 Convenience

Convenience is one of the most important factors in e-commerce, and it has been extensively researched in services, particularly in internet shopping. Convenience is an operational characteristic of the buying process and a service that saves consumers time and effort. (Heitz-Spahn,.2013). According to (Kaswengi & Lambey-Checchin, 2020), the convenience variable is a measure of Logistics value. Timeliness and convenience are considered under one variable by a few researchers in recent times to measure the RL service quality. (Sajjanit & Rompho, 2019;Li & Lu,.2019). Specifically, in RL, the convenience of location, time, and channels can be vital to customer satisfaction in the recovery service.

4.1.6 Empathy

Understanding the customer and giving personalized service are examples of empathy (Parasuraman et al.,1985). Empathy reinforces the idea that the consumer is one-of-a-kind and unique. According to (Law et al. 2013), the empathy component of service excellence comprises responsiveness(Berry et al.,1988) and communication with kindness in a given situation, recognizing

customers' expectations, and demonstrating a caring attitude while delivering customized service. In the case of RL, as the customer is starting from the point of disappointment and complains about the product/ service and empathetic approach by the retailer is crucial for customer satisfaction.

While discussing the return management and returns policies in e-commerce, many authors considered key components based on SERVQUAL (Berry et al., 1988; (Parasuraman et al., 1985) and SERVPERF(Cronin et al., 2000) scale for customer satisfaction, such as - tangibles, assurance, dependability, responsiveness, and empathy. Additionally, (Berry et al., 1988) suggested that knowing customer expectations and delivering care and personalised service impact customer satisfaction. Accessible working hours, personalised attention, and knowledge of consumers' unique demands positively influence customer satisfaction in e-commerce. (Ananth et al., 2010)

Table 4.1 shows the service quality variables considered by the previous researchers while describing the customer-oriented service quality in marketing and logistics areas. It also highlights the recent inclusion of service quality constructs in RL. The variables discussed below were extracted from logistics service quality and recovery services. Further, the variable will be ranked and chosen for this study based on the commonalities. In the table below, only significant studies and relevant studies are discussed –

Table 4. 1 Constructs for Reverse Logistics Service Quality (RLSQ)

	Significance in RLSQ	The authors used the construct in Recovery service & Logistics e-service
Communication Quality (Responsiveness)	Communication is the medium to reach and help customers and respond promptly. Effective handling of return requests and complaints is essential to regain customer satisfaction.	(Bienstock et al.,1997); (Boshoff, 1999); (Gilbert & Wong, 2003); (Hu, 2009); (Parasuraman & Grewal, 2000; 2005);(Jeong & Hong, 2007); (Krishna et al., 2011)

Information System	The information system includes – Internal and external information systems related to service.	(Y. Lin et al., 2014); Jing et al., 2016; (Krishna et al., 2011)
Return Process (RL Process Quality)	The return process is defined as handling the retailer's return of goods from the customer: the accuracy and recovery experience.	(Mollenkopf et al.,2007); (Lin et al., 2016); (Martin, 2016)
Convenience	The flexible returns process should be easily accessible.	(Tax & Brown, 1998); (Morash & Ozment, 1994) (Kaswengi & Lambey-Checchin, 2020)
Empathy	Empathy refers to the firm's level of sympathy and customized attention to its customers. In this regard, the company must understand the concerns of its consumers from their perspective.	(Parasuraman et al., 1985; 1988) (Berry et al., 1990);(Abu-Shanab et al., 2014) (Krishnamoorthy & M, 2021) (Bienstock et al., 1997); (Tax & Brown, 1998); Lai et al., 2007; (Krishna et al., 2011)
Customer Satisfaction	"Customer Satisfaction" is when the perceived quality of service is notably better than the company's expectation of service.	(Parasuraman et al., 1985); (Mollenkopf et al., 2007); (Lin, 2007); (Palupi Restuputri et al., 2017)
To measure the RL SQ specifically (Sajjanit & Rompho, 2019),(Li & Lu, 2019) (P.Rita,2019) used the above constructs to evaluate the returns services in the retail and customer expectation in Thailand and China.		
(Difrancesco & Huchzermeier, 2016);(Li & Lu, 2019) *used the above variable in B2C reverse logistics.*		

4.2 Determinants for Path II: Reverse Logistics service capability

Resources, processes, service qualities, IT, skill set, adaptability, and flexibility significantly contribute to a company's ability to manage logistics. These resources eventually facilitate the creation of logistical competence, which is described as the capabilities to boost efficiency and customer satisfaction. (Barney, 1999). Logistics expertise has been widely studied in the Supply chain

and operations in B2B and B2C contexts. In the RL, previous researchers have identified the variables and explored the correlation between logistics capability and sustainable performance (Zhao et al., 2001; Ellinger et al., 2010; Bowersox et al., 2003; Stank et al., 2001). According to (Jack et al. 2010), RL capabilities are "the internal capabilities and processes the company uses to conduct their reverse logistical operations effectively." The accessibility to any information, timely and accurate information, intra and inter-organizational communication, and the quality of information are all facets of RL capabilities. (Jack et al., 2010)

In today's e-commerce scenario, effective and efficient use of resources and capability develops agile logistics service. (Gligor & Holcomb, 2012a). However, few studies evaluate the logistics provider's RL capabilities. (Fernandes et al., 2018). For the demand lead e-commerce process, planning and allocating resources are equally important and substantial challenges.

According to (Vlachos 2016), RL capabilities are the internal processes and skill-sets that are used to optimize the RL operations. RL capabilities are classified as – servicing and information capabilities. (Jack et al., 2010) determined that reverse logistics competencies include information accuracy and availability, agile processes, and timeliness are a few examples of reverse logistics capabilities. All components of RL capabilities enable the company to manage its RL implementation more efficient and reflect on service performance.

In this thesis, communication, Information systems quality and Reverse Logistics Process capabilities are regarded as variables to analyse the logistics provider (LP). The RL process capability is the operational capability to manage the RL implementation for e-commerce companies.

4.2.1 Communication capability

The firm's internal capabilities and processes for interacting with the SC. Stakeholders during the shipment, delivery, and exchange of returns are the organisation's communication capabilities. The effective implementation of these capabilities is vital for e-commerce sustainability (Davidavičienė & Al

Majzoub, 2021). In the previous study, (Huscroft et al., 2013) used this as a construct to uncover the key issues of logistics and SC professionals acknowledged its significance in managing RL processes. The literature review shows that the practitioners ranked communications as one major capability impacting the performance of the service offered to the customer.

4.2.2 Information Capability

Most companies use existing information systems and product/market expertise available to manage the RL information management, which means there are no dedicated capabilities designed exclusively for RL (Chouinard et al., 2005)(Chouinard et al. 2005). But, the rising volume growth trend and customer demand for return service necessitate specialized and dedicated service resources (Ramírez & Morales, 2011). Technically, due to the high level of codification in multiple standards for each item, the integration (forward & returns)of data at the information level can be challenging(Vlachos, 2016). The study results indicated that the most significant variables linked to customer satisfaction are the information quality in RL, and it significantly influences the service performance. (Hafez et al., 2021)

The barrier to information technology capability is related to a lack of infrastructure, technical skills, and adaptation to new technology to enhance visibility across the supply chain. (Govindan & Bouzon, 2018). The RL inform capability can be categorized into the internal and external capability of the firm to integrate and collaborate with the SC partners for the operation. (Govindan et al., 2012). According to (Subramanian et al., 2014; Bernon et al., 2016; Abdul-Kader et al., 2017; Sharma et al., 2011; Anderson et al.,2006; Wang & Sun 2005), a lack of internal IT system can cause connectivity issues, inefficiency in information and technology visibility and incompatibility of IT systems with the external partners. Secondly, the lack of adoption of advanced IT systems can be a barrier to real-time visibility and connectivity with external SC partners. (Subramanian et al., 2014; Govindan & Bouzon, 2018; Shaharudin et al., 2015; Lau & Wang 2009 ; Pampinyo & Nitivattananon 2014)

With the help of advanced technology integration, firms can store information in databases and systematize tracking to improve reverse logistics management. Specifically for RL, this could help to create a customized solution by compiling data for each return and tracking the RL process, conducting inspection and control of service errors (W. Wang et al., 2013)

Firms need to develop RL-related competencies such as return operations, information and technology (IT), knowledge transfer, and collaboration with stakeholders owing to the increased investment and the peculiarities of RL processes. (Olorunniwo & Li, 2010) ; (Daugherty et al., 2019) looked into three essential aspects of IS support in RL: capability, interoperability, and innovation.

4.2.3 RL Process Capability

A reverse logistics process capability is defined as a firm's competency in the procedures required to successfully use to manage returns (Autry et al., 2001). RL processing may be expensive for e-commerce companies, but internal barriers affect effective management (Rogers et al., 2002), so paying attention to the process is essential.

Leveraging the reverse logistics process can increase the speed of returns processing, reduce costs, and improve the consumers' perspective on overall service quality(Hao, 2014). As the concept of dynamic control and integration of the RL process is gaining momentum, effective operations scheduling may become more critical. Fulfilling service requirements is a vital component of operations timeliness, and it has a direct influence on customers. Several facets of the returns process, including accuracy, timeliness, processing of exchange (Autry & Richey, 2001) and collaboration, have influence on logistics service quality (Stank et al., 2001); (Hall et al., 2013).

Table 4. 2 Variables for RLSQ

Variables	Definition	Highlighting the importance of the variable in RL
Communication Capability	Communication Capability refers to real-time, transparent, open interaction with the SC partners for decision making.	(Morash & Ozment, 1994);(Joong et al., 2008); (Gil-Saura et al.,2010);(Powers & Jack, 2015) (Hall et al., 2013); (Fernandes et al., 2018)
Information System Capability	Information capability refers to real-time visibility, capturing internal and external data and information, and adopting advanced technology to build a collaborative and integrated system.	(Daugherty et al., 2005; 2019) (Frasquet et al., 2015)(Joong et al., 2008); (Vlachos, 2016) (Fernandes et al., 2018)
RL Process Capability	The return process capability involves - return initiation, determining to route, receiving returns, crediting customers, and measuring performance. It also encompasses building relationships with the customer.	(Morash & Ozment, 1994);(Daugherty et al., 2005) ;(Hall et al., 2013);(Vlachos & Ip, 2016) (Fernandes et al., 2018); (Daugherty et al., 2019)s
Most authors have concluded that lack of capabilities acts as a " **Barrier" to effective RL operation and implementation by the LP.** (Waqas et al.,2018)(Bajwa et al., 2020)(Nel & Badenhorst.,2017 , 2020)(Starostka-Patyk & Starostka, 2021)		

To close the gap, create a comprehensive solution by analysing consumer expectations for the RL service and exploring the logistics provider's service capacity. The research is divided into two parts. The first path (Path I) is the **"Customer Path,"** which is linked to the second path (Path II) – the **"Providers Path"** – to achieve customer satisfaction via service quality.

4.3 Hypotheses Development

a) Research Objective 1 –

To understand the demographic traits of consumers returning goods online and experienced RL service.

Customers are the primary users of the RL service, so should companies develop "customer-centric" or "customer-focused" strategies for competitive differentiation. To create a customer oriented approach, it is essential to understand the customer demographic profile.

This study emphasises understanding the online customer, i.e., consumer's personal, social, and demographic characteristics, and the consumer's online buying and returns behaviour and preferences, category, and frequency of product returns. These sociodemographic characteristics may support formulating a customised solution to enhance the quality of online RL services for consumer satisfaction.

The demographic characteristics of the online customer and return experience are gauged through the customer's demographic profile. Personal traits identified for understanding the customer are - Gender, age, internet usage, frequency of buying online, frequency of online returns, and type of goods returned, among the sociodemographic and personal factors. The demographic components in this thesis do not proceed with hypothetical assumptions because the goal is to describe the characteristics of the consumer group engaged in returning the goods online, which could support a foundation for a customized strategy to improve RL service quality.

4.3.1 Customer Path (Path – I)

RL Service Quality and Consumers satisfaction

b) Research Objective 2 – To analyse the relationship between the RL service quality on customer satisfaction.

To answer the research questions and achieve the desired study objective, hypotheses are developed to analyse consumer expectations for the quality of online RL services and whether that impacts customer satisfaction.

RL service quality has five variables: communication, Information Technology, RL process, Convenience, and Empathy.

4.3.2 Communication quality and Customer Satisfaction

The value of communication is related to the method- the customer is contacted and interacts during the post-purchase stage. It's essential since, unlike traditional sales, e-commerce does not allow personal, face-to-face, and consistent engagement between the supplier and the consumer. As a result, customers expect more continuous contact, which will provide them with information regarding their transactions and prompt responses to their concerns (Li & Lu.,2019). Easing communication through the website is the most crucial component of consumer satisfaction in the e-commerce environment (Rogers et al.,2002). In RL service management, the communication medium between the customer and retailer remains the website. (Parasuraman et al., 1985; 1988; 2000) concluded that for the overall service quality performance, E-SQ communication quality is one of the most important determinants for the success of e-commerce. (Mentzer et al.,2001) supported the same and found that an empirical study positively related quality of communication and customer satisfaction. The customer assesses service quality based on how well the firm communicates with the customers. Strong communication (both personal and web systems) is a value driver in return management. (Mollenkopf et al., 2010; Difrancesco & Huchzermeier, 2016) concluded that the ease of communication in the product recovery phase is an essential aspect of online buying. (Li & Lu, 2019) also endorsed the above determinant, exploring the consumer based in China. While researching return policy,(Punekar et al., 2016) concluded that E-commerce communication should be a faster, result-oriented, and individual correspondence between the consumers and accomplices. However, the reviewed literature provides sufficient evidence on the importance of communication quality for documentation, complaints, delivery monitoring, timeliness, and reliability as part of service quality. But there is a dearth of empirically exploring the correlation between communication quality and service quality in B2C reverse logistics in e-commerce.

We assert that efficient communication is the key to customer satisfaction in the RL service. Hence, the retailer needs to focus on the ease of navigation, dropbox pages, promptness, accuracy, and system simplicity. Therefore, we propose the following hypotheses regarding RL service in the B2C e-commerce context.

H1: Communication Quality (CS) has a positive relationship with customer satisfaction.

4.3.3 Information Technology and Customer Satisfaction

Information technology is the core of internet business. It plays a vital role in all the facets of the e-commerce business. Over the period, the usage of ICT (Information and Communication Technology) in logistics has been highly impactful (Coyle et al., 2012); (Waqas et al., 2018);(Wanganoo et al., 2021), particularly in upgrading service quality and offerings to the customer. According to (Hogan et al., 2002), IT is a key to competing differentiation. Eventually, companies leverage by managing the information and maintaining customer relationships. The company allows customers to access information related to the returns process based on customer requirements (Jeong & Hong, 2007). Customer satisfaction with RL service depends upon the ability to provide real-time visibility and track and trace information about the merchandise. (N Subramanian et al., 2014; Wei Hua; Zhou Jing.,2015; Li and Lu., 2019) stated the need for dedicated technology for RL service, while studying the information technology dimension in RL satisfaction in reverse Logistics and emphasized. The recent RLSQ measuring scale developed by (Sajjanit & Rompho, 2019) highlighted that customers seek easy availability of information on a 24x7 basis with additional services of the customer service desk to take care of issues related to damages and product repair. But the scale has not been evaluated empirically, and an extensive literature review in B2C e-commerce reflects limited studies in this area. Hence, we hypothesize that information technology is significantly related to customer satisfaction in reverse

H2: Information Technology quality has a significant relationship with customer satisfaction.

4.3.4 Return logistics process and customer satisfaction

The seamless and timely physical movement of the product back to the origin is the main operation in the RL process. Here, the main stakeholders are – the customer. Retention and loyalty to the retailer will depend upon - how well the customer takes care while returning the goods. The significance of physical movement operation was first highlighted by (Mentzer et al., 2001) by creating the concept of logistics service quality (LSQ) in the B2B context. LSQ emphasized nine determinants- Information quality, return procedure, order release number, timeliness, order correctness, order quality, order status, error handling, and customer communication were among the nine dimensions.

Further, to empathically provide after-sales service -E-Rec-SQual evolved with an e-recovery scale containing 11 items within three dimensions - responsiveness, compensation, and contact. These dimensions measure the handling of returns. Therefore, the return process has the closest relationship with customers among all elements of RL service quality. The speedy handling and disposition of returns are critical for companies (Zhao et al., 2001);(X. Wang, 2009). Hence, it is critical to explore the impact of RL handling on customer satisfaction.

H3 Reverse Logistics process has a positive relationship with customer satisfaction.

4.3.5. Convenience and customer satisfaction.

Convenience has been defined as "any tangible goods or services that save consumers time and effort" (Berry et al ., 2002). The lead time of fulfilment of service delivery is a significant factor in customers' convenience and contentment (Gawor and Hoberg, 2018; Wollenburg et al., 2018). In reverse logistics, the customer needs extra attention, so convenience allows them to specify the location and time most appropriate for them. (Li & Lu, 2019). Convenience is perceived as an operational buyer decision process attribute, a

service that saves customers time and work and a major motivator for an online buying decision. (Heitz-Spahn, 2013). Timeliness is a crucial component in logistics service quality, impacting customer satisfaction. Retailers should improve their flexibility and agility to provide more convenience to their consumers. (Berry et al., 2002) ;(Kaswengi & Lambey-Checchin, 2020).

Several elements connected to organizations can impact service convenience, such as physical surroundings (Baker and Cameron, 1996; Bitner, 1992) and service system design (Metzer et al., 2000). A service provider wishing to improve its customer-perceived service quality must offer its consumers adequate convenience. (Berry et al ., 2002)

Convenience is also essential to return service delivery quality (Shainesh 2012). Therefore, a considerable research gap exists for research in the e-tailing industry about the impact of the service quality of convenience on customer satisfaction. (Khan & Khan, 2018). For the RL, specifically, (Sajjanit & Rompho, 2019) developed the service quality scale and emphasised the importance of convenience. Thus, it can be hypothesized that there is a substantial relationship between convenience in RL and customer satisfaction.

H4: Convenience has a positive relationship with customer satisfaction.

4.3.6 Empathy and customer satisfaction

When it comes to service quality, empathy is an essential factor. Based on SERVQUAL (Parasuraman et al., 1985), many researchers have explored the factor " empathy" in their research both in offline and online retail management. As a result, empathy must be addressed while evaluating the service quality of returns management. Empathy may give individualized services to consumers, such as flexible receiving hours, and it also relates to employee engagement through giving professional services to customers. This necessitates that firms develop their employees' professional knowledge and communication abilities (Hsiao et al., 2017). A customized interaction and expertise can boost service empathy. (Zehao Qian; 2020). Hence, it can be hypothesized that empathy positively correlates with customer satisfaction.

H5 Empathy has a positive relationship with customer satisfaction.

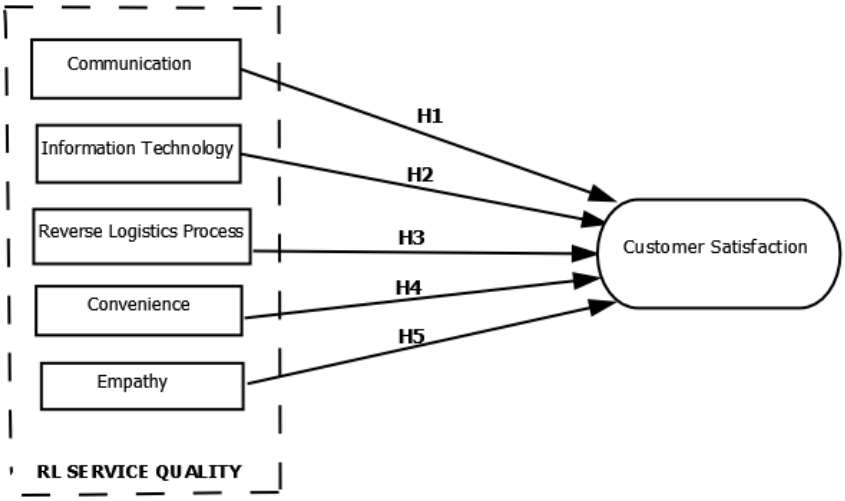


Figure 4. 1 Hypothesis for Customer satisfaction (Path 1)

4.4 Path II: Reverse Logistics Capability and RL Service Quality

While investigating the relationship between LC (Logistics capability) and a firm's performance quality(Joong et al., 2008), the capabilities have a positive linkage with the firm's service performance.

4.4.1 Linking Communication capability is RL service quality.

Communication (interaction with the customer) adds value to the reverse logistics system. (D. A. Mollenkopf et al., 2007;2011). According to (Morash & Ozment, 1994), communication is a key element of logistical capabilities in the pre-sale and post-sale stages. With the global e-commerce growth, a lack of effective communication capability between partners impedes service performance.(Davidavičienė & Al Majzoub, 2021).However, previous studies have only tested RL capabilities in the B2B context. (Cao, Ajjan, & Hong, 2018; AL Majzoub et al., 2020). Thus, we can posit that lack of communication capability influences the RL service quality performance.

H6: Lack of Communication capability (a barrier) is directly associated with Reverse logistics service quality.

4.4.2 Linking Information Systems Capability to RL service quality

Integrated information improves efficiency and yields a competitive edge (Zhao et al., 2001)(Braunscheidel & Suresh, 2009);(Choshin & Ghaffari, 2017); (Chileshe et al., 2018); (Wei et al., 2021) developed on the utilizing ERP MRP, Barcode, and new technologies to enhance the RL process. (Turrisi et al., 2013) (Wanganoo et al., 2021) also concluded that the lack of information could hinder RL service quality performance. Thus, we can formulate a hypothesis that -

H7: Lack of Information Systems capability (a barrier) is directly associated with Reverse logistics service quality.

4.4.3 Return Process capability is related to RL service quality

According to (Frei & Krzyzaniak, 2019), a prime area that presents itself as a focus is Reverse Logistics and emphasizes streamlining the return process: "Lean thinking in return handling," – which means that the process should be easy, quick, and customer friendly. Before that(Mollenkopf et al., 2007; 2011) also concluded that effective handling could be valuable and add quality to the service offered to the customer. Lack of capabilities in proper handling may lead to customer dissatisfaction and poor performance by the firm. (Waqas et al., 2018); (Frei et al.,2020). Therefore, we can very well formulate a hypothesis-

H8: Lack of Return process capability (a barrier) is directly associated with Reverse logistics service quality.

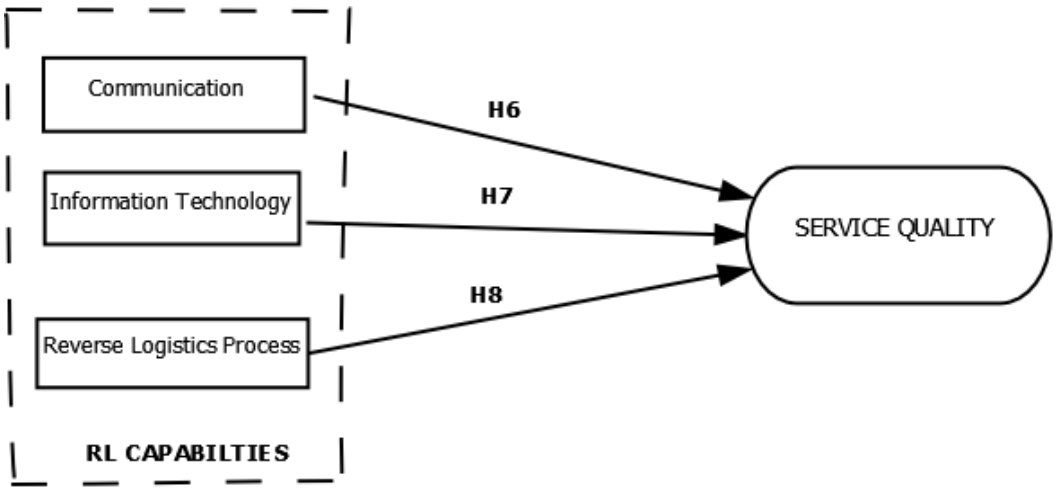


Figure 4. 2 Hypothesis for Reverse Logistics Capability

4.5 Conceptual Framework for the Study

This study was conducted to find a complete solution to the customer perceived risk and expectation from R L service and how the various service quality factors impact customer satisfaction. So, it is essential to understand the logistics providers' capability and explore whether lack of capability impacts the service quality. A comprehensive literature review was undertaken to determine the various service quality variables, customer post-purchase expectations, and reasons and challenges in product return. We reviewed the literature to find a complete solution to understand the various logistics capabilities that influence service quality. Based on the shortcomings and the apparent gaps in the past research of (Mentzer et al., 1997; 2001), (Fernandes et al., 2018) and (Sajjanit & Rompho, 2019), this study proposes a 2-way path to improve RL service quality. By integrating five elements (dimensions) of service quality – Communication, Information Technology, RL Process, Convenience, and Empathy as an input that influences customer satisfaction. This RLSQ performance is associated with the logistics capability of the provider.

It is imperative to involve the customer in the process, to develop a customer-oriented service which is the basis of the SD logic Model for a B2C e-commerce

company. Close collaboration between the customer expectation and the resources ensures excellence in the service offering. The main objective of this research is to evaluate the marketing and logistics interface and create value for customers by exploring customer expectations. The expectancy-confirmation paradigm also complements the primary goal of analysing a service's influence on customer satisfaction. Additionally, the Resource-Based View theory is also underpinned for support as logistics services include integrating and collaborating the resources internally and externally for value proposition. Thus, to improve the overall customer satisfaction in RL, which is the model's final output, a well-integrated pathway is proposed rather than developing a strategy in silos. The conceptual framework of the study is shown below.

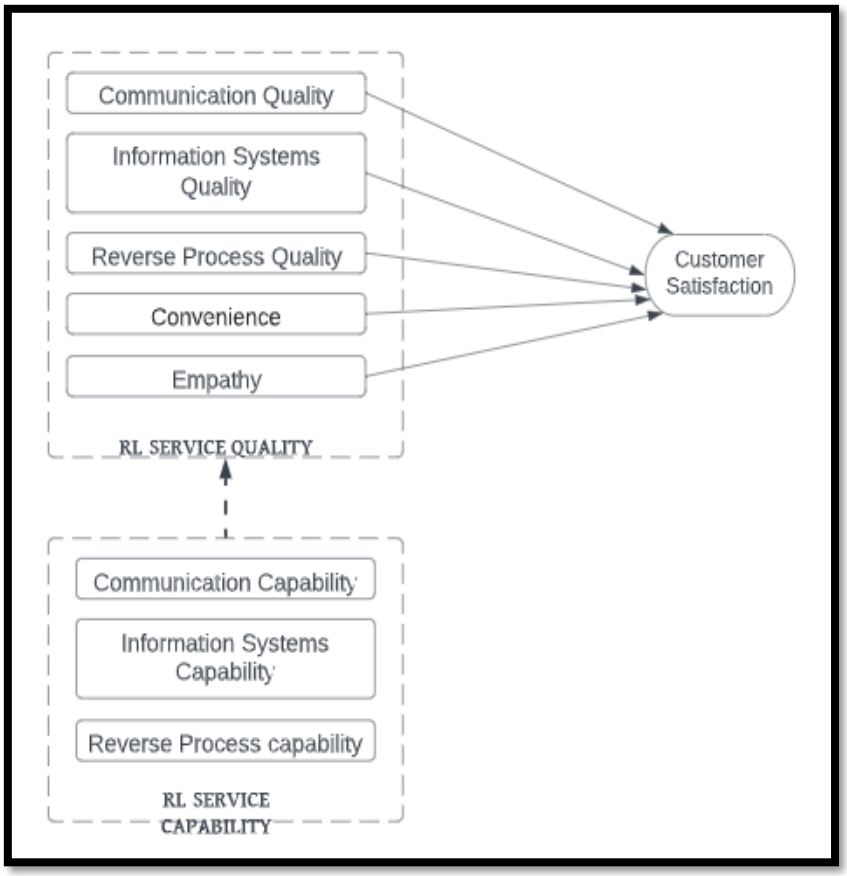


Figure 4. 3 Conceptual Model for Research (Base theory – SD Logic)

4.6 Concluding Remarks

This section entails hypothesis formulation, constructions and items, and the conceptual model. Specific past studies are rare in RLSQ, so the variables are selected from related and relevant studies in SQ, LSQ, PDSQ and recovery management. It also discusses the conceptual model. Further, the next chapter discusses the Research Design and Methodology.

CHAPTER 5

RESEARCH METHODOLOGY

Research methodology gives a systematic process (Blueprint) that begins with identifying a problem and proceeds through data collection, data analysis, and finding a conclusion that enables the researcher to go further toward viable solutions contributions to the theoretical framework. The chapter describes the methods used to gather and analyse data, sampling technique, measurement & instrumentation, data collecting, data analysis, model construction, and validation of research methodology.

5.1 Rationale of Research

The biggest challenge in the B2C e-commerce sector is managing the operational inefficiencies and customer dissatisfaction in online product returns. A poor reverse logistics (RL) service impacts the company's bottom line and leads to customer dissatisfaction. The UAE is a growing e-commerce market, and to earn customer equity in the retail sector, offering "service delight " to the customer is the success mantra.

Therefore, for sustainable e-commerce growth, there is a need for comprehensive research to understand the challenges in product returns from the customer perspective and to identify the opportunities for improving the logistics capability of the logistics provider to reduce the inefficiency in RL service quality. The RL service is highly customer-centric. It has become necessary to understand customer expectations before developing an agile and customer-oriented RL service program because the customer is the co-creator of product return in the e-commerce sector. Hence, there is an urgent need to

identify the factors influencing the RL services and develop a framework for improved and effective services.

The study emphasises identifying the cross-functional (Marketing and Logistics) SQ factors contributing to customer satisfaction. The approach to improve the SQ starts with understanding the demographic profile of customers involved in frequent product returns. Further, identifying and analysing the SQ factors playing a significant role in customer dissatisfaction and co-relating the logistics capability of the logistics provider has a role in service quality performance. Based on the identified expectation and correlating it to logistics capability barriers, a framework has been developed which provides a direction to improve the RLSQ in the B2C e-commerce sector in UAE.

5.2 Selection of Research Framework

Research is taken to explore new things systematically, thus enhancing knowledge. It's a logical and structured quest for unique and valuable information on a specific subject or issue. (Rajasekar et al., 2013). Further, in the social sciences, to gain a better understanding of a topic or issue, a researcher uses a stepwise approach to gather and evaluate information to gain an understanding (Creswell, 2012) as well as to describe, explain, comprehend, analyse, and new or previously existing knowledge or phenomena (Ghauri et al .,2020). Figure (5.1) below depicts the overall classification of research type based on its Application, Objectives, and Enquiry technique. (Kumar Ranjit, 2019).

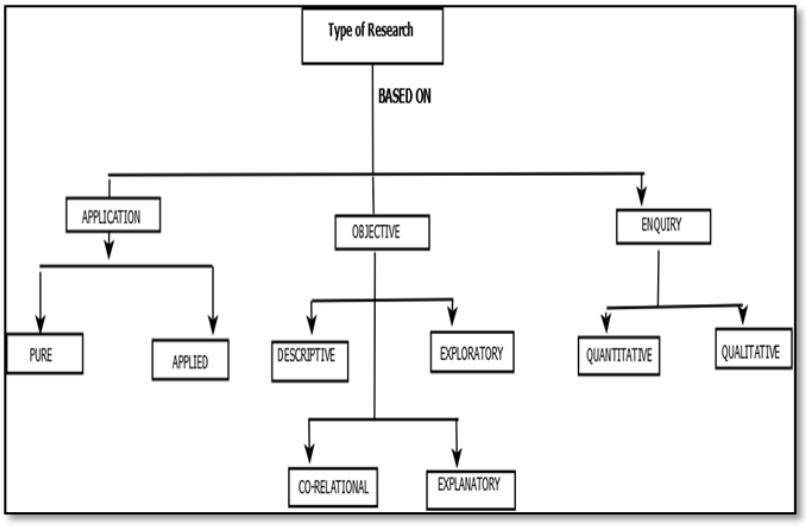


Figure 5. 1 Types of Research

Pure (also known as Basic or Theoretical) research and Applied research are two simple research classifications based on their application. A pure study investigates a particular phenomenon's fundamental principles and causes, whereas applied research addresses specific issues using theories and principles. Furthermore, research may be categorized into four groups based on its objectives such as - Descriptive research aids in identifying who, what, when, where, and how they are related to a particular study subject but cannot explain why. It also collects data on the present situation and characterizes "what already exists" in variables or conditions in a specific context. (Kumar Ranjit, 2019)

An exploratory research design is used when there are few or no previous studies to refer to or rely on to predict an outcome. And it is sometimes used to determine how to examine a problem or what approach would effectively acquire information about the issue. The purpose of correlation research is to determine whether or not there is a relationship, linkage, or reliance between two or more components of a scenario and whether or not they are changing. Explanatory research aims to elucidate ‘why’ and ‘how’ there could be a link between two components and strives to answer the 'why'.

Analytical and descriptive surveys are two types of survey research techniques(Oppenheim, 1994). A descriptive survey draws inferences from the study sample to represent the population, while an analytical survey investigates the relationships and links between research variables (C.R. Kothari, 2004). From the objective point of view in undertaking this research, it falls into descriptive and exploratory research. The survey techniques link the construct variables based on analytic survey methodology and demographic information extracted from the statistical sample.

5.3 Research Process

The research process that includes the underlying premises of the research to the technique of data collecting and analysis is referred to as research design (Creswel, 2013). According to (Welman et al.,.2001), the research design is the overall approach for choosing respondents for a planned study and data collecting or developing procedures. (Babbie & Mouton, 2010) describe research design as a framework or blueprint for research. Research design focuses on the end outcome and all stages involved in achieving that objective. In this respect, it's an operational plan in which research methodologies and processes are linked to providing a trustworthy and valid body of data for analyses, conclusions, and model development. (Kumar Ranjit, 2019)

The research processes shown in the figure below provide the details of the entire process followed to achieve the objective of this research. The study is divided into two Paths; # PATH 1 is to understand and analyse the customer expectation for the RL service. On the other hand, #PATH 2 evaluated the logistics capabilities of the provider.

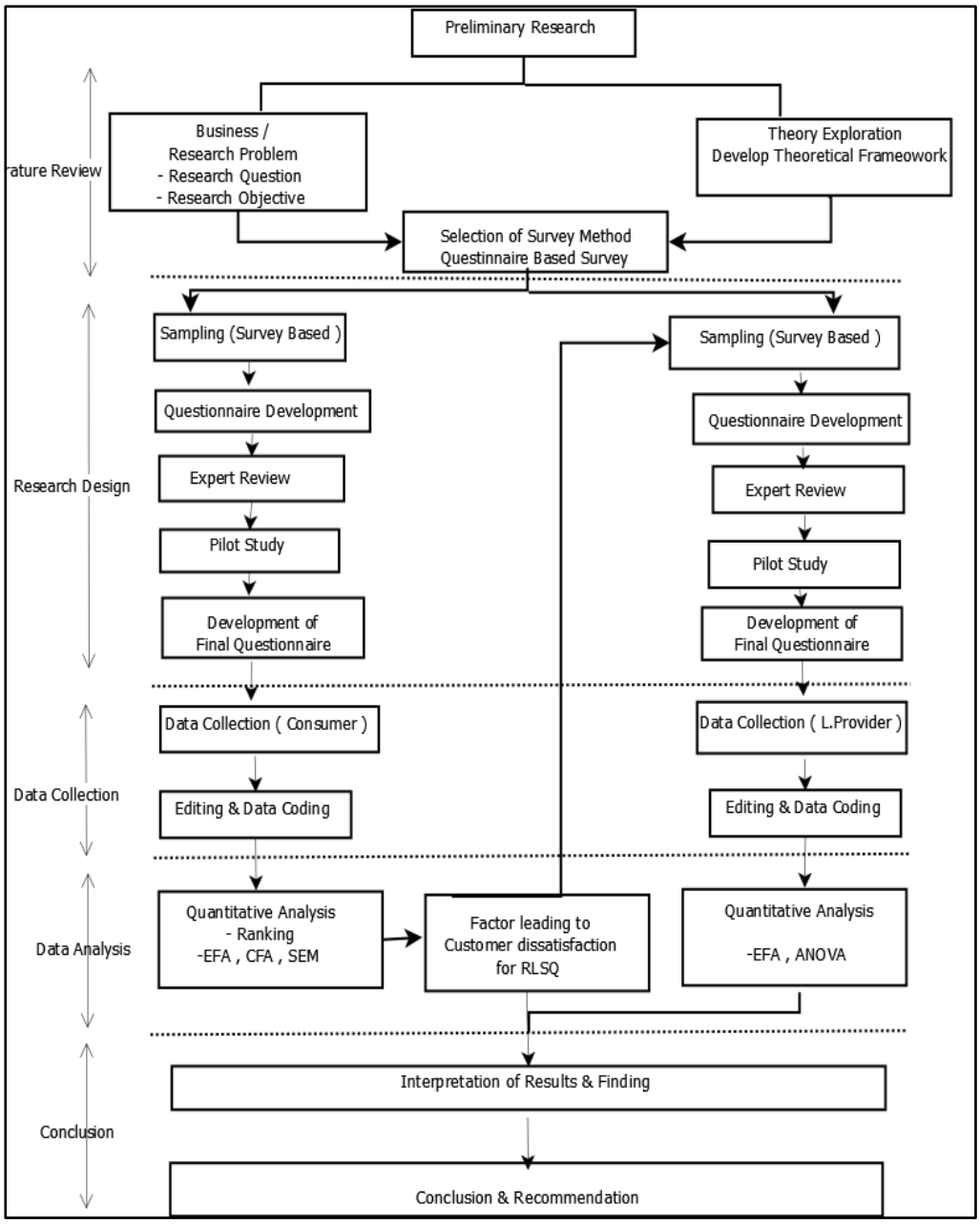


Figure 5. 2 Research Design for the study

Further, figure (5.3) shows all the detailed steps undertaken to answer the RO -1, RO- 2 and RO -3.

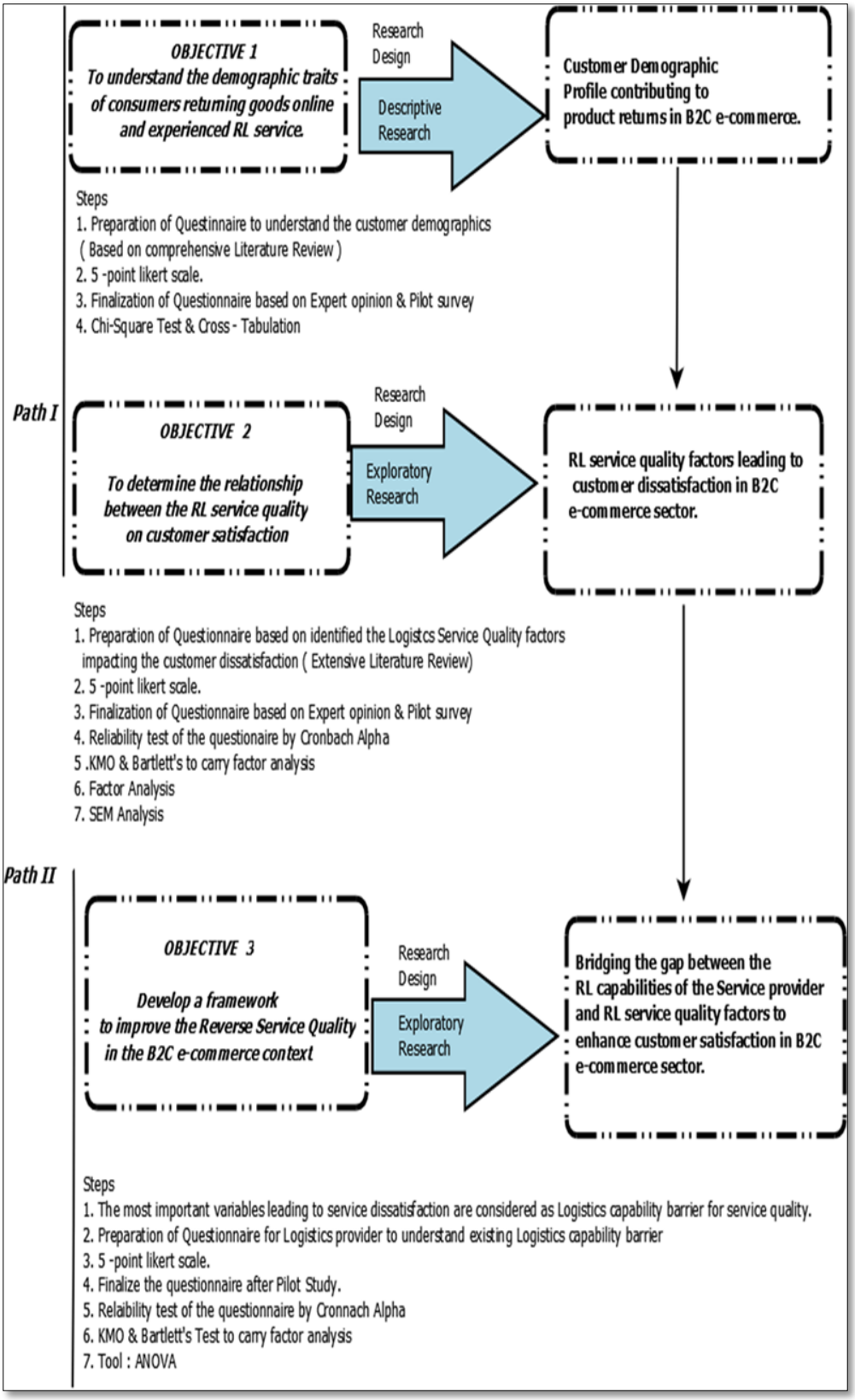


Figure 5. 3 Details of Research Design to achieve Research Objectives

5.4 Research Questions & Objective

5.4.1 Path 1 – Analysing Customer Expectation

This section examines the Research process highlighting the methodology adopted and specific instruments used to investigate research questions and objectives undertaken for Path 1. The following research question (RQ -1) and objective focus on customer demographics.

RQ 1 What are the demographic characteristics of the online shopper engaged in frequent return of goods?

RO # 1 To understand the demographic traits of consumers returning goods online and experienced RL service.

And to analyse customer expectations, RQ 2.1 and 2.2 are formulated to answer research objective RO 2.

RQ 2.1 What are the customer expectations of reverse logistics service quality?

RQ 2.2 Is there a linkage between the quality of Reverse Logistics services and consumer satisfaction?

RO #2 – To analyse the relationship between RL service quality and customer satisfaction.

The following section provides an insight into the research techniques and instruments selected to answer all the RQs and fulfil the ROs related to Path I and Path II to achieve the Research Objectives.

5.4.2 Survey-Based Research Technique

Survey-based research is a well-known method of gathering data, perspectives, or characteristics from a sample population. (Pinsonneault & Kraemer, 1993)(C.R. Kothari, 2004). In the current research situation, this method works well. It meets the requirements of both research objectives (RO #1, RO # 2) to analyse the impact of reverse logistics service quality (RLSQ) on customer satisfaction. And explore the influence of Logistics capability on RLSQ. The survey data assists the researcher in determining the strength of the hypothesis

links necessary to meet the demands of RO #3 and validate the conceptual framework in the current environment.

5.4.3 Survey -Instruments

The most frequent survey techniques cited in the literature include questionnaires, semi-structured structured, structured and focus group interviews and content analysis. (De Vaus, 2013) The "Questionnaire" was employed as the survey instrument in this investigation. The most common survey instrument used in research is the questionnaire. The most critical component of comprehending social science research is developing and constructing a comprehensive survey instrument (Hinkin, 1998). Questionnaire administration techniques include web-based surveys, email, electronic, and manual data collection(De Vaus, 2013)

In this research, there are two sets of a questionnaire prepared. The details are as follows –

1. Questionnaire #1 – Relates to RO1 and RO2 to study demographic characteristics and analyse customer expectations for RLSQ.

2. Questionnaire # 2 – Relates to RO3 to identify the logistics capability and barrier of LP in the RL context. customer

5.4.4. Questionnaire development

The questionnaire instrument is used to validate the hypothesis empirically. A questionnaire was developed after an extensive review of the literature and discussion with expert practitioners familiar with reverse logistics programs/applications and academicians.

Table 5. 1 Expert review panel for Questionnaire (Path 1)

Experts for Questionnaire review	
Academician	4
Logistics Industry Practitioners	3

A similar questionnaire approach was followed in the previous research conducted by(Autry & Richey, 2001) (Sajjanit & Rompho, 2019). A five-point Likert scale has been used to develop questionnaires designed accordingly (ranging from “strongly disagree” to “strongly agree”) regarding RL service quality. (J.D.Brown, 2010) The data collected through the questionnaire is subjected to SPSS for further analysis.

5.4.2 Questionnaire Design: Path -1

According to the literature, the ideal number of items per construct for a scale to test the intra-construct similarity ranges from three to six (Morrison, 2009; 1985; Hair et al., 2010). The total number of constructs per variable is limited to 4-6.

The table below provides the items considered in questionnaire #1.

Table 5. 2 No. of Constructs in the Questionnaire – Path I

S. No	Constructs	No. of Items
1	Communication Quality	5
2	Information Quality	5
3	Reverse Logistics Process	6
4	Convenience	5
5	Empathy	4
6	Overall Customer satisfaction	6
	Total	31

A closed-ended questionnaire-based survey was used to obtain the information. The questionnaire included demographic data from respondents who had gone through the E-commerce return process, reasons for returning products, feedback on the quality of reverse logistics provided by the e-trailer, and overall satisfaction with returning retail merchandise. It also included multiple-choice and scaled attitudinal questions such as awareness, contentment, and action linked with returning the goods on a 5-point Likert scale.

In this study, the first section of the questionnaire was prepared for RO # 1 with following parameters-

1. Demographic Profile
2. Awareness about E-commerce Returns services
3. Category of product bought and returned online.
4. Reasons for returning the apparel.
5. Actions associated with returning process.
6. Satisfaction level about RL services
7. Impact of Return Management (Reverse Logistics Process) on purchasing behaviour.

Diverse questions were compiled in the questionnaire to find out the result of this study.

- The examined variables were of different types, opinion, behaviour, attributes, and knowledge. In the questionnaire, *1st six questions (1 to 6) explain the demographic information of the respondents like gender, age, occupation, Internet usage, Frequency of online buying, and Type of device used in online buying.*

- Further, questions (7 to 12) *were intended to understand the online shopping and* returning behaviour of respondents towards the category of products and return websites, e.g., items purchased online in the past; items returned online in the past, frequency of return, reasons of return preferred websites, etc. In this research, all the categories of products returned online are considered.

- Section 2 of the questionnaire comprises the questionnaire to analyse the customer perception and feedback on the RL service quality. *The questionnaire is divided into five significant items or categories based on the literature review (SERVQUAL drawn up by the* (Parasuraman et al., 1985)*, e-LSQ developed by* (Mentzer et al., 2001)*, and E-Recs-Qual elaborated by the* (Parasuraman et al., 2005).

- Question numbers 1 to 5 reveal the communication system and the challenges respondents face before and during returning online goods.
- Question numbers 6 to 10 were about the information system experience while returning the products purchased online.
- Question numbers 11 to 17 captured the experience regarding the return process while returning the products purchased online.
- Question numbers 18 to 21 were regarding the convenience while returning the products purchased online.
- Questions 22 to 25 reveal the experience/ response towards the customer service (empathy) while returning the products purchased online.
- The overall consumer satisfaction depends on how easy and reliable, and questions from 26 -31 evaluated dependable the reverse logistics offered by e-retailers. The *questionnaire is attached as an annexure (A, B) in the appendix section*

5.4.3 Pilot Testing: Path -1

Based on the expert review, a final questionnaire was prepared and pretested on 60 customers from different parts of the UAE. UAE consist of the seven (Abu Dhabi, Dubai, Sharjah, Ajman, Fujairah, Umm Al Quwain and Ras Al Khema). College / University Students, Professionals, Self Employed and homemakers undertook the pilot testing as proposed by (Hair et al., 2010) and (Bryman, 2015). Ambiguous or confusing questions were eliminated, while more detailed and pertinent questions were introduced at the stage.

5.4.4 ***Administration of Survey: Path -1***

The questionnaire was administered to various customers who have experience and are frequently engaged in the online return of products across the UAE. During the Covid -19 lockdown phase, the researcher had no choice but to circulate the questionnaire through the google form and adapt a convenience sampling technique.

5.4.5 Questionnaire Structure*:*

The questionnaire comprised demographic factors of various organizations that have experience handling the returns from the customer and bringing them to the warehouse/supplier. Analysing the existing service capability in terms of communication, Information technology, Reverse logistics process, and Flexibility of the program is important for understanding the performance gap. The questionnaire contained scaled attitudinal questions such as awareness level of customer requirement and level of capability of each item associated with returning action using 5 points Likert scale and multiple-choice questions. The questionnaire also included questions regarding barriers that an employer identifies in the existing system.

The questionnaire was prepared considering the following parameters:

1. Category of product returned online.

2. Reasons for returning the product

3. Ranking the current level of capability in RL services.

4. Barriers in the RL Management

5. Area of Improvement in RL Services Quality.

The questionnaire was divided into various segments to make it more extensive and result oriented.

- 1st six questions (1 to 7) explain the demographic information of the organization like Turnover, Size, Job Responsibilities, Type of organization, Frequency of online return

- Further, questions (8 to 10) were intended to understand the significance of the return management program for the given organization.

- Section 2 of the questionnaire is dedicated specifically to understanding the reverse logistics capability of the organization as the focus of this

research is to understand consumer satisfaction with the return management of the goods purchased online. The questionnaire is divided into four major items or categories of the reverse logistics capabilities required to enhance the service quality.

- Question numbers 1 to 5 reveal the organization's communication capability and how well it can communicate with the customer before and during returning online goods.
- Question numbers 6 to 12 reveal the organization's Information Technology Capability before and during returning online goods and products purchased online.
- Question number 13 to 18 provide an insight into the return process of the e-trailer / Logistics provider for the online returning of the products.
- Question numbers 19 to 22 reveal the flexibility capability, i.e., how flexible the organization- Location, time, etc.- to provide superior customers.
- Questions 23 to 29 reveal the existing barrier in the reverse logistics program.

The last questions reveal the areas of current concern and whether employees would like to see improvement in the future

5.6 Population and Research Sample

The study's population is the number of UAE customers who have made an online purchase and returned it or are familiar with the process and plan to return it in the future. Because there are no statistics on the particular number of consumers who have returned goods, as per the report published by (Bain & Company, 2019), out of the total mobile / internet user in UAE, 60 % of the population buy online, i.e., 6.48 Mn; with an average of 105 returns rate of 15 % (Genchev, 2007). The results yield the approximate population of the region

is 0.92 MN as of Jan 2021. But not all online shoppers are exposed to product returns. The sample was chosen conveniently based on product return experience.

Computational Unit:

The unit analysed in the study was on an individual basis. The sample consisted of the consumer having prior experience of returning goods online or familiarity with the return process, intending to return in the future and understanding the online buying and returning process**.**

5.7 Path 1: *Sampling technique* & Sample Size

The sampling technique chosen for Path # 1 is -

- Non-probabilistic sampling – Convenience Sampling

The questionnaire (google forms) was mailed to the customers with the online shopping and product returns experience. Since customers who do not have product returns experience found it difficult to comprehend the challenges in Reverse logistics in the pilot test stage. UAE, with a 98 % internet penetration rate, the total number of the population buying through the internet is around 6.806 Mn, out of which 60 % of the internet users are active online shoppers. During the survey period (Oct'2020 – Mar'21), onset and severity of COVID -19 under the directive of the Ministry of Health, there was a complete lockdown across the UAE. (McQue, 2021). This led the researcher to decide upon convenience sampling, where participants were ad hoc based on their accessibility and proximity to the research.

Though our sampling procedure is not random, it followed all the possible features of random sampling, particularly the important one on "Representativeness" by the good representation of online returning experienced customers in UAE. According to (Bullen et al., 2013), more than 10% of the population is adequate for statistical analysis. The study followed the general rule for sample size. (Suhr, 2006),(Hair et al., 2010) suggested exploratory factor analysis, i.e., the sample-to-item proportion used to

determine sample size based on the number of items in a study. The ratio should not be less than 5-to-1.

The total number of questionnaires sent to the customer's counts to 500, out of which 400 filled surveys were filled by responded and submitted. The valid /Useable questionnaire for this study is 322. The sample size of 322 is a good representation for the generalization of the population.

Though the sampling procedure is not random, all the parameters of random sampling are considered to generalize this research - ***particularly the important one, "Representativeness" by the large sample size.***

The below-mentioned table provides the sample selection criteria and target population and a justification that though the sample was selected conveniently, it's a "representation" of the target population –

5.7.1 A Justification for Sampling

The sample size and sampling technique selected for this research were logical, and a valid justification for the same is mentioned below -.

- ***For justification for sampling size, the researcher adopted the following methods –***

a) According to (Hair et al., 2010), the number of items/constructs should be in a ratio of at least 5 to 1. The study included a sample of 400 consumers and was based on a model with 31 observed variables to account for refusals, as few respondents may decline to participate. The refusal rates, or the percentage of people contacted who declined to participate in a survey, range from 15 to 38 per cent (Churchill.,1995). Also, we needed to discard some returned questionnaires that might be unusable.

b) The sampling approach used was convenient sampling but carefully administrated to ensure that each emirate of UAE was well represented in the sample. This strategy enables the researcher to choose sample participants from the intended population who has experience with online returns and were willing to participate.

c) This research study was conducted during the unprecedented times of Covid 19, wherein collection of random data was not possible due to non - approachability norms worldwide. The data was collected from Aug'20 – to Feb'21 after a long wait for the lockdown to ease. Yet, due severity of COVID, 19, as per the directive of the Ministry of Education (MOE) and Ministry of Health (MOH), face-to-face meeting with people was prohibited. In an online survey, the entire population and difficulty performing sample-based investigations in contexts where dynamic factors affect operational reality. (Welsch, 2020). Thus, it was not feasible to access data to allow random sampling.

Additional, justification for choosing Convenience sampling techniques & use of SEM Path Model for analysis -

- Although probabilistic sampling is always preferable to generalize a study's findings to the population under study, *contextual factors must be considered when evaluating any research.* (Kedia, 2017) For example, in a study of online shoppers, a random sample might result in many respondents who aren't relevant to the study, particularly when examining returns / reverse logistics considering the complexity of purchasing online. In these situations, convenience sampling turns out to be the saviour.

- Real-world restrictions- This research found it challenging to determine customers with an online returns experience from the entire online shopper population. Further, as stated by (Salganik & Heckathorn, 2004) - **"***when there is a "hidden population" such as homeless people or society in crisis* (Tufekci & Wilson, 2012)*, or when a sample frame representative of the population under consideration is either unavailable or inadequate.".*(Weimann, 1982)**.**A convenience sample (Blaxter et al.,1997) was used as an alternative to a non-probability selection or gathering irrelevant data. Also, since early 2020, the world has gone through an unprecedented pandemic, which imposed

restrictions (such as lockdown and work from home) human to human contact has become impossible.

- Burns and Bush (2010) highlight that sample size significantly influences representational accuracy. The larger the sample size, the more likely generalizations will accurately represent the population (Bryman, 2015). A larger sample size reduces the possibility of inaccuracy (Vaus, 2002). Specific criteria, including time availability, cost, and access to those surveyed for data collection(Hair et al., 2010) and the statistical analytic technique the researcher plans to use, can impact sample size (Bryman, 2015). In this study, the chosen respondents are from seven different emirates of the UAE, providing an accurate representation of the overall population.

- *As per (J. W. Cadogan.,2014), SEM can be used for a convenient non-probability sample and would provide perfect results during SEM analysis.* In an exploratory analysis, according to (J. W. Cadogan., 2014) a researcher can conduct statistical analysis on a convenient sample- "*One can apply a slightly different logic if one is trying to test a theory about relationships between variables, and one does not have a random sample taken from the population. First, one can argue that one does not need a probability sample to measure the variables in a sample itself. Thus, one can undertake a traditional CFA analysis on a convenience sample and comment on the suitability or performance of those measures within the sample. Second, one can do the same with respect to theory testing. Specifically, if one has a theory that X causes Y and that the relationship is positive, and one does not have reason to expect that the theory only works in a subset of a population, then one is implicitly assuming that the theory works in EVERY part of the population. In which case, it should work on a sample that is convenient as well as in a randomly selected sample. If one then tests a theory that X causes Y in a convenient sample, and one finds that one can predict Y*

with X in the sample, then one is unable to reject the alternative hypothesis that X does not cause Y in the sample, and this is what one would expect given the wider expectation that X causes Y in the population. Some might argue that this is evidence in support of the population hypothesis."

- Based on the structural equation modelling (SEM) criterion,(B. G. Tabachnick & Fidell, 2012) said that "it is reassuring to contain at least 300 samples taken for factor analysis and just three or four indications for each factor." The total number of respondents considered in the study was - 322.

- Agreement exists among the statistical literature that the larger the sample size, the better to evaluate data analysis (Hair et al., 2010). (B. G. Tabachnick & Fidell, 2012), *which is based on a structural equation modelling (SEM) requirement, stated that "it is reassuring to at least 300 cases for factor analysis* and just three or four indicators for each factor". The total number of responses considered in the study was – 322.

- Fit indices with SEM Samples : (Hair et al., 2010) suggested a minimum proportion between the sample sizes and constructs should be at least five of those surveyed. Nonetheless, a ratio of 10 responders per construct is the most optimal. In the context of this study, this would imply that more than 310 respondents should be included, given this study consists of 31 constructs/parameters. Considering the model complexities of this study and the general standards from previous research, about 322 responses were assessed, which also fulfils the SEM analysis requirement.
- Diversity: The targeted population considers the variety of e-commerce consumers' profiles and features (e.g., educational qualification,

economic status, gender, online usage, social status). Convenience samples benefit from diversity as well.

Finally, some critical demographic aspects are considered to make the sample representative of the population. So, participants from UAE areas represent all age and income groups with a very close representation of age and gender (% male and % female) in the target population (i.e., customers who shop online / use the internet actively). Their habits represent people of the same age and income in similar UAE areas regarding technology, Internet usage, and online shopping behaviour.

As a result, using a diverse sample in the study reduces the variance impact. As previously stated, convenience sampling can be chosen due to the apparent homogeneity and relative randomness of data collection and the sufficiently large sample size (Leiner, 2014). In this study, 400 voluntary participants took the survey, out of which 322 were considered for the final study—this homogenous large sample size helped minimize the biases.

Lastly, convenience sampling was previously used by the following researchers for similar studies – Details are given below: (*- Doctoral thesis)

Table 5. 3 List of relevant studies supporting the use of Convenience Sampling

Year	***Author***	***Area of Study***
2014	Wei Hong, Changyuan Zheng , Linhai Wu and Xujin Pu	The study analysed relations between consumer satisfaction and overall e-commerce logistics.
2014	*Li, Ning	Study on Luxury brand buying behaviour (Doctoral thesis)*
2015	*Chonlada Sajjanit; Nopadol Rompho	Measuring customer-oriented product returns service performance. (Doctoral thesis) *

2020	Joseph Kaswengi, Christine Lambe y-Checchin	The study analysed the food drive-throughs' logistical service quality and product quality.
2020	*Azria Nhapulo	Factors Influencing consumers' Behaviour towards online shopping for consumer electronics in Gauteng, South Africa. (Doctoral thesis) *

5.8 Path II: Reverse Logistics Capability

This section examines the Research methodology adopted and specific instruments used to investigate research questions and objectives for Path -II to analyse the logistics capability of the Logistics Provider and further develop the framework to improve the service quality.

5.8.1 Path -II Research Question & Objective

The following research question (RQ – 3a & 3b) and objective for the study -

RQ 3.1 What are the barriers to reverse logistics operation?
RQ 3.2 Is there a link between the RL service capability and RL service quality?

In this research, to develop a framework to improve the RLSQ and increase customer satisfaction, it is essential to analyse the logistics provider's reverse logistics capability/barriers.

RO # 3 *Develop a framework to improve the RL Service Quality in the B2C e-commerce context.*

5.8.2 Questionnaire Design Path II (Logistics Provider's Capacity)

Like Path 1, a survey-based questionnaire was used to investigate the reverse logistics capability of the provider. The study followed two steps to identify the variables. One is based on a literature review. Secondly, the constructs used in this study are based on the highest impact identified variables from Path-1, as the service quality variables impacted customer satisfaction from the RL service quality perspective. The UAE'S logistics industry experts reviewed the variables and the questionnaire.

Number of Items in constructs: In this research, the number of constructs is between four and six. (Hair et al., 2010). Table 5.5 provides the items

considered in questionnaire#2. The table below provides the list of the constructs used in the questionnaire.

Table 5. 4 List of constructs for Path II

S.no	Constructs	No. of Items
1	Communication Capability	5
2	Information capability	6
3	RL Process capability	6
4.	Overall Capability Barriers	7
	Total	24

5.8.3 Sampling for Path-11

Reverse logistics is a niche area, so we have to select only those engaged in the Reverse Logistics process in the retail e-commerce sector. In UAE, the government does not provide any official directory for the e-commerce data of the companies. The google search shows that the major stakeholder in Amazon.com did not respond to any email or phone after repeated follow-ups. The researcher contacted Small and medium-sized e-commerce companies dealing with the retail sector through local contacts and social media sites. FIATA (International Association of Freight Forwarders) and NAFL (National Association of Freight Forwarders) provided the list of logistics providers (National Association of Freight and Logistics). Three hundred twenty-four individual freight forwarders registered on the site, but only 220 organizations had functional phone numbers. An initial phone call to each member to inquire about their participation in the reverse logistics exercise. Only 40% of the companies were involved in RL operations. (i.e., 88 companies).

The researcher included a cover letter explaining the research's purpose and privacy with the questionnaire. We contacted the business heads, managers, and executives in reverse logistics and operations in various locations. Employees are the most reliable respondents since they know internal operations and client expectations. From the 100 questionnaires in total (12+ 88) sent across along

with the introduction, we received 70 useable responses. Face-to-face (personal surveys) with companies are not permitted in U.A.E. (Saxena et al. 2018)

A questionnaire-based survey was conducted of e-commerce and logistics companies. We developed a questionnaire with four items to measure the reverse logistics capabilities. These include – Communication capabilities (Daugherty et al.,2009), Information Technology features (Jack et al., 2010; Daugherty et al., 2009), and Return Process Capabilities (Jack et al., 2010)(Daugherty et al., 2007).

The questionnaire was divided into two sections based on the RL capabilities and operational barriers concerning the service quality performance. Questions were developed on a five-point Likert scale ("1" as not significant to "5" as very significant. (J.D.Brown, 2010). *Refer to the appendix for reference.*

Pilot Test

Based on the identified variable's expert opinion, a pilot test was conducted with 25 logistics providers in the UAE. After the pilot test, ambiguous and repetitive questions were removed, and the final questionnaire for the field survey was developed.

Data Collection:

The data was collected using a google form, and the researcher circulated a link of the same through email.

5.8.4 Unit of Analysis:

The unit of analysis in the study was individual level was taken solely from the logistics provider, mainly focusing on Business heads, Logistics managers, Ope4ations Managers, Customer service executives, and Warehouse Managers responsible for the reverse logistics operations.

Table 5. 5 Details of the sample size

Sector	Reverse Logistics Service Provider

Geographical Region	UAE
Total No. of Registered Logistics provider	324
Valid Numbers and emails	220
Number of companies engaged in Reverse logistics activity	88
No valid response	72

From the above information, limited logistics providers in the UAE specialise in the RL activity. Therefore, the sample included 88 logistics organizations. The organization was contacted through email and sent along with the covering letter. A valid number of the responses included in this study is 72. Further, the data were analysed using ANOVA to find the correlation between logistics capability on service quality.

5.8.5 Sampling Technique:

For the Path II study, non –Probability, Judgemental sampling techniques were used. This sampling approach was also utilized by earlier researchers performing studies to understand the logistical competence of the provider in the B2B context (Fernandes et al., 2018; Servera-Francés et al., 2010). According to (Saunders et al., 2019), researchers can choose situations that will best enable them to fulfil their research objectives, such as responders who satisfied specified criteria to fit in a study. Respondents (organizational managers) were involved with reverse logistics, or 3PL specialized in reverse logistics.(Nel & Badenhorst, 2020b)

5.8.6 Sample Justification

This study of 3PL for the UAE region is based on the responses of 324 total registered logistics providers, with only 220 responses having valid numbers and emails. Deciding our sample size, we have cleaned, categorized, and selected 70 as the number of valid responses for the study. It's also a good sample size for the study according to the following finding:

Aiming at a confidence interval of 95 per cent, we have considered 2.5 per cent probability in each tail for z = 1.96 [obtaining for 95% confidence interval],

p=50% since p is unknown, the maximum variance is often used for sample size assessments and assuming the Margin of Error (MOE) = 10 per cent; n = sample needed and p = proportion for study; we use the formula -

n = N*X / (X + N – 1),

Where, $X = Z_{\alpha/2}^2 * p*(1-p) / MOE^{2.}$

The estimating equation applied in the study of the sample is;

$$n' = \frac{n}{1 + \frac{[z^2 * \hat{p} - \hat{p})(1]}{\varepsilon^2 N}}$$

We obtained a sample size of 57 for a 90% confidence interval with a 10% margin of error, the minimal number of valid observations that must be considered for the investigation. To obtain our ideal number of valid responses, we consider a Confidence Interval of 95 per cent and the Margin of Error to be 10 per cent, giving us the value - of 73, which provides us with the confidence to have good sample size responses, i.e., 72.

Furthermore, to ensure the validity of our sample size, we compute the allowable Margin of Error with a 95% confidence interval for a population of 322; we find the ideally acceptable MOE to be 10.39 per cent which complements our 10 per cent MOE used for the study. Negating any form of bias, we conclude that our finite multivariate population represents a sample size of 71.

5.9 Scope of Research

The scope of the study is limited to Reverse Logistics in B2C e-commerce in the context of the retail sector. The research focuses on the customer product returns, their service quality expectation and the logistics capability of the logistics provider that can act as a barrier to the service quality. For this study, the UAE retail e-commerce sector is selected. The customer with the experience of online product return service and logistics providers handling reverse logistics are considered for exploratory study. UAE is one of the second largest

e-commerce markets in the Middle East, which can grow in the future. But with, the high percentage of returns and inherent operational complexities of RL lead to inefficiency and customer dissatisfaction.

5.10 Summary

The chapter summarized the research methodologies adopted to respond to the research objectives. Descriptive and exploratory research was used in this study. The quantitative research method has been used to collect data from customers and logistics providers. The chapter also provides details about the sample size methods of collecting data. In the study, convenience and judgemental sampling techniques were used. This chapter briefly describes the rationale for the research and the scope of the study. The following chapter explains the data analysis and results.

CHAPTER 6

DATA ANALYSIS AND RESULTS

The quantitative analysis of the collected data is discussed in this chapter, which aims to respond to the research questions framed to reflect the research goal. The study quantitatively examines the impact of RLSQ (Communication quality, Information quality (IT), Reverse Logistics Process quality (RP), Convenience, Empathy) on customer satisfaction and further explore the link between the RL capability (Communication, IT and RP capability) and service quality provided by the logistics service provider. The chapter provides an insight into the statistical techniques adopted to test hypotheses. Collected data has been analysed by utilizing cross-tabulation, exploratory factor analysis (EFA), Confirmatory factor analysis and structural equational modelling to investigate the impact of RLSQ on customer satisfaction to achieve the research objective 1& 2.

Additionally, the analyse the correlation between logistics capability and service quality, ANOVA is used to evaluate the hypothesis for the RL capability. The results obtained from the data analysis and each objective's findings are discussed in detail.

6.1 Sample Profile

The sample consisted of UAE residents. The respondent was chosen based on their familiarity with internet shopping and product return procedures. The respondent is assumed to be fully acquainted with RL procedures and the web navigation for product returns.

6.1.1 Demographic Profile

Research Objective # 1 To understand the demographic traits of consumers returning goods online and experiencing RL service.

The researcher explored the demographic characteristics to understand the product return behaviour of the customer and personalize services. The respondent's age group, occupation, gender, education, monthly earnings, marital status, and frequency of online purchases contributed to analysing customer expectations and the risk connected with the RL process. Three hundred twenty-two (322) observations were recorded and assessed.

Table 6. 1 Gender-wise sample profile

Gender	Frequency	Percent	Cumulative Percent
Female	139	43.2	43.2
Male	183	56.8	100
Total	322	100	

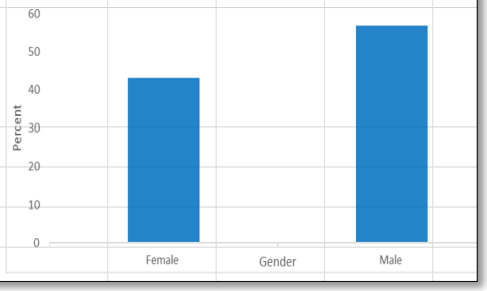


Table 6.1 represents “Gender”, consisting of responses from two genders, namely Male and Female. The statistics stand as 138 respondents, who were female, accounting for 42.90%, and 183 respondents, who were male, accounting for 56.80%.

Table 6. 2 Age-wise sample profile

Age -group	Frequency	Percent	Cumulative Percent
18 – 21 years	122	37.9	37.9
21- 30 years	87	27	64.9
31- 40 years	39	12.1	77
41 - 50 years	39	12.1	89.1
Above 50 years	35	10.9	100
Total	322	100	

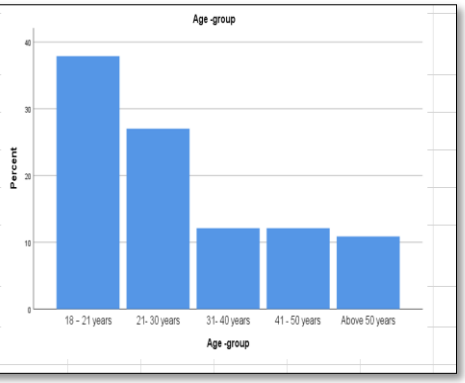


Table 6.2 provides the respondent's age group classifications. The respondents belong to the following age categories – 37.9 per cent fall under the age of 18 and 21, while 27 per cent are aged 21-30. 31 to 40 years and 41 to 50 years represent 12.1% of the population surveyed. Lastly, respondent above 50 years represents 10.9 %. The data also implies that 67.9 % belong to those aged between 18 to 30 years who are active online shoppers.

Table 6. 3 Occupation-wise Sample Profile

Occupation Category	Count	Percent
Business	30	9.3
College Student	157	48.8
Employed	93	28.9
Homemaker	23	7.1
others	19	5.9
Total	322	100

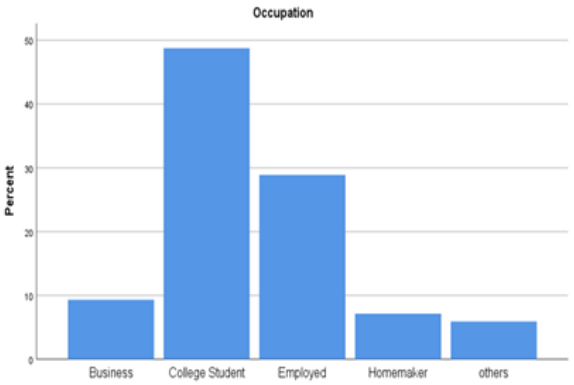


Table 6.3 above represents 'Occupation' for the same study of 322 respondents where most of them were College students, equaling 48.8%, seconded by the employed category making up 28.9%. All other categories, including Homemaker, Business, and others, contributed minimally with 7.1%, 9.3% and 5.9 %, respectively.

Table 6. 4 Frequency of Internet use

Frequency of Internet Use	Frequency	Percent
Active internet user	183	56.8
Active Mobile internet user	93	28.9
Moderate internet user	43	13.4
Occasional internet user	3	0.9
Total	322	100

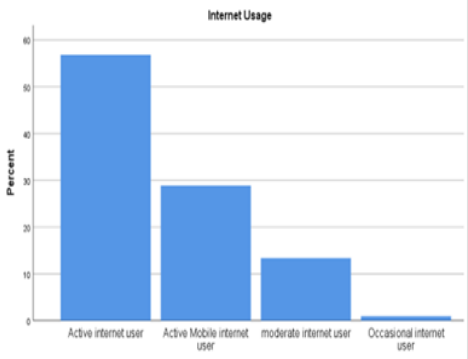


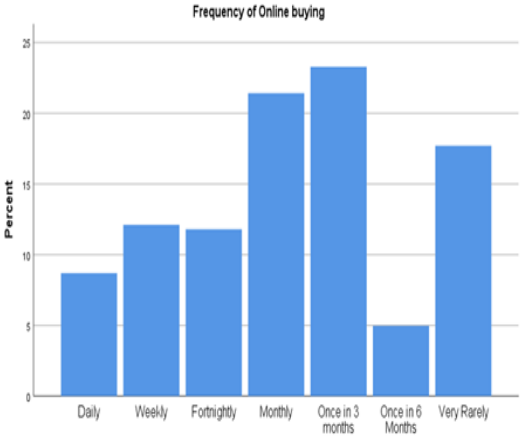
Table 6.4 shows the active internet users based on their activity time. 56.8% (or 183 out of 322), the majority were high internet users, whereas only 0.9% (or three users) were occasional internet users. The categorization of 'Active Mobile internet users' proves that 28.9% of the population uses mobiles to access the internet, whereas many others use other devices.

6.1.2 Frequency of Online shopping

Table 6.5 depicts the frequency with which the population shops or purchases products using online platforms.

Table 6. 5 Frequency of Online Shopping

Frequency of Online buying	Counts	Percent
Daily	28	8.7
Weekly	39	12.1
Fortnightly	38	11.8
Monthly	69	21.4
Once in 3 months	75	23.3
Once in 6 Months	16	5
Very Rarely	57	17.7
Total	322	100



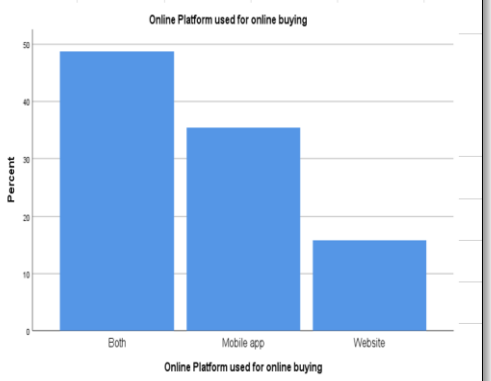
A broad range of data has been observed here, ranging from 'everyday' to very seldom' consumers of internet purchasing. From the entire sample population, 23.3 per cent of the population makes a purchase once every three months, and 21.4 per cent make online purchases monthly.' The 'Daily,' 'Weekly,' 'Fortnightly,' and 'Once in 6 months' categories were less popular, accounting for a tiny fraction of the population.

The online channel or platform used by the population indicates commonly used devices for internet shopping; understanding the same could help formulate the strategies to reach the customer.

The table below reveals that more people use mobile as a platform to shop online compared to the web. But around 48.8 % of the population does switch between web and mobile.

Table 6. 6 Online Channel used for Shopping

Online Channel	Frequency	Percent
Both	157	48.8
Mobile app	114	35.4
Website	51	15.8
Total	322	100



Cross-tabulation and chi-square tests were performed to find the relationship between two categorical variables. Table 6.7 reveals the cross-tabulation results.

Table 6. 7 Cross-Tabulation between Gender and online channel used for Shopping

Per cent within Gender					
		Online Platform used for online buying			Total
		Both	Mobile app	Website	
Gender	Female	46.00%	33.80%	20.10%	100.00%
	Male	50.80%	36.60%	12.60%	100.00%
Total		48.80%	35.40%	15.80%	100.00%

The above table shows how frequently various mediums are used to make online purchases by different genders. The mobile app is preferred over the website as a purchase medium, as indicated by 35.4% and 15.8%, respectively. 20.3% of females prefer both. More than 50% of the males use both platforms for online shopping.

Further, Chi- a square test was performed between the use of online platforms and gender. This could provide a useful tip while the retailer designs the strategy to communicate with the potential customer.

Table 6. 8 Relation between Gender and Channel used for Online Shopping

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	5.349[a]	4	0.253
Likelihood Ratio	5.557	4	0.235
N of Valid Cases	322		

The above results of the Chi-square test depict the association between the two, as provided in the table above. Since the p-value is greater than 0.05 (0.253 > 0.05), there is no significant evidence to suggest an association between the gender and online platform used for purchases.

The age group-wise result of the Chi-squared test suggests that the p-value is 0.195 and greater than 0.05, negating its statistical significance. This implies no association between the age group of the population and their internet usage activity. The test of p-value's significance fails since 0.633 > 0.05, suggesting that the chi-squared test has no relationship between the occupation and their preference for an online platform to purchase.

Table 6. 9 Frequency of Online Shopping V/S age group and occupation

Demographic Characteristics		Frequency of Online buying						
		Daily	Weekly	Fortnightly	Monthly	Once in 3 months	Once in 6 Months	Very Rarely
Gender	Female	6.50%	14.40%	8.60%	17.30%	25.20%	8.60%	19.60%
	Male	10.40%	10.40%	14.20%	24.60%	21.90%	2.20%	16.40%
Total		8.70%	12.10%	11.80%	21.40%	23.30%	5.00%	17.70%
Occupation	Business	13.30%	13.30%		20.00%	26.70%	6.70%	20.00%
	College Student	9.60%	12.70%	17.80%	18.50%	18.50%	3.20%	19.70%
	Employed	7.50%	8.60%	6.50%	33.30%	29.00%	4.30%	10.80%
	Homemaker	4.30%	26.10%	13.00%	4.30%	21.70%	13.00%	17.40%
	others	5.30%	5.30%	5.30%	10.50%	31.60%	10.50%	31.60%
Total		8.70%	12.10%	11.80%	21.40%	23.30%	5.00%	17.70%

Table 6.9 depicts the cross-tabulation link between gender and the frequency of online transactions. Most females make purchases 'Once in 3 months,' accounting for 25.2 % of females. The 'Once in 3 months' buying frequency had the highest frequency (25.2 per cent), and the 'Once in 6 months' category had

the population's lowest frequency (8.6 per cent) for females. The data shows that both males shop online around 24.6 % monthly compared to females around 17.3%, but the weekly online shopping of females is a little higher, i.e. 14.4%, compared to males around 10.4%. The lowest total (5%) online shopping "once in 6 months" shows that in UAE, customers frequently embrace digital shopping compared to the popular notion of retail mall therapy.

The chi-squared test of gender v/s frequency of online purchase shows a p-value ($0.002 < 0.05$), implying a statistically significant relationship between gender and frequency of online purchase.

Table 6. 10 Relation between Frequency of Online shopping & Gender

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	31.720[a]	12	0.002
Likelihood Ratio	19.076	12	0.087
N of Valid Cases	322		

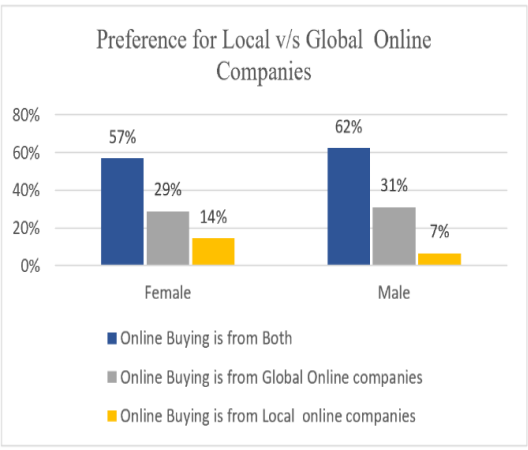
a. 7 cells (33.3%) have an expected count of less than 5. The minimum expected count is .05.

Further, age groups 18-21 order "Fortnightly" with the highest frequency of 22.1%, and only 3.3% of the order once in 6 months. A high skewness is seen in age-groups 31-40 years, where 33.3% purchase every month and age-group 21-30 orders every three months at a high 34.5%, representing the majority.

Also, the chi-squared test shows a statistically significant p-value, which is 0.000 and less than the ideal 0.05, indicating a link between the age range and their frequency of buying online.

Table 6. 11 Preferred online shopping companies (Based on Origin)

	Online Buying is from		
	Both	Global Online companies	Local online companies
Female	57%	29%	14%
Male	62%	31%	7%
Total	59.90%	30.10%	9.90%



The above table represents the purchase made by genders using a global online company (MNCs) or Local online companies for online buying. Most of the population used a mix of global and Local companies to commence purchases; however, males used global companies more often than females (31.1% > 28.3). However, international companies dominated the study with 30.1% of the market, and only 9 % of respondents shop from the local companies.

Table 6. 12 Cross-tabulation for the type of organizations preferred for online shopping by age group and occupation.

Preferred Online Retailer Companies (By Origin)					Total
Demographic Profile		Both	Global companies	Local companies	
Age -group	18 – 21 years	61%	33%	7%	100%
	21- 30 years	64%	28%	8%	100%
	31- 40 years	49%	39%	13%	100%
	41 - 50 years	56%	26%	18%	100%
	Above 50 years	63%	23%	14%	100%
Total		60%	30%	10%	100%
Occupation	Business	67%	27%	7%	100%
	College Student	61%	31%	8%	100%
	Employed	53%	37%	11%	100%
	Homemaker	61%	17%	22%	100%
	others	74%	11%	16%	100%
Total		60%	30%	10%	100%

The majority of 60 % choose both, while 10% solely purchased from local or domestic online businesses, compared to a healthy 30 % market for global online businesses.

The Chi-Squared test that since the p-value is greater than (0.367 > 0.05), implying no significant relationship exists between the age groups of the population and their preference of buying from a global or a local company.

Table 6.13 Frequency of Product categories bought online

Product Category	Never	Sometimes	Frequently	Very Frequently	Total
Clothes	11.2%	50.9%	18.9%	18.9%	100%
Footwear & Accessories	16.1%	49.4%	24.5%	9.9%	100%
Beauty & Personal Products	17.1%	45.4%	27.3%	9.6%	100%
Electronics	12.1%	45.7%	29.8%	12.4%	100%
Grocery	31.7%	26.1%	25.2%	17.1%	100%
General Merchandise	24.2%	51.6%	17.4%	6.8%	100%
Medicines	39.8%	43.2%	10.2%	6.8%	100%

The above table represents a category of products that are bought online. For clothes, 11.2% of the respondents said they never bought products online, whereas 50.9% made purchases sometimes. 37.8% of the population bought clothes very frequently, as the study suggests. Footwear & Accessories bought via online shopping. 16.1% of the respondents said they never bought products online, whereas 49.4% made purchases sometimes. 34.4% of the population bought Footwear & Accessories. Beauty & personal care products are bought via online shopping. 45.7% made purchases sometimes. 36.9% of the population bought beauty & personal care products very frequently. Electronics bought via online shopping. 45.7% made purchases sometimes. 42.2% of the population bought electronics very frequently, as the study suggests. Groceries bought via online shopping show that 26.1% made purchases sometimes. 42.3%

of the population bought groceries very frequently. General Merchandise shows that 26.1% made purchases sometimes, and 42.3% of the population bought general merchandise very frequently. Lastly, results suggest that only 17.0% of the respondents bought medicines very frequently, implying that the market penetration scope was high.

6.2.3 Frequency of Product Return

Table 6.13 shows the returns from the customer in different categories. Understanding the return categories will help the retailer formulate strategies to allocate resources , capabilities and customize the service per customers' needs. Overall certain categories show a very high level of return

Table 6. 14 Frequency of Online Return (Product Category)

Product Category	Never	Rarely	Sometimes	Frequently	Very Frequently	Total
Clothes	19.6%	11.5%	36%	22%	10.9%	100%
Foot ware & Accessories	26.1%	12.4%	40.7%	12.1%	8.7%	100%
Beauty & Personal Products	46.3%	12.1%	32%	7.5%	2.2%	100%
Electronics	28.9%	16.8%	37.8%	13%	3.7%	100%
Grocery	38.2%	6.5%	34.2%	18.3%	2.8%	100%
General Merchandise	47.5%	13%	27.3%	9.3%	2.8%	100%
Medicines	55%	9.3%	30.7%	3.1%	1.9%	100%
Books	41.3%	10.6%	32.6%	13.7%	1.9%	100%

Figure 6.1 below shows product-wise customer returns better to understand the importance of RL in online B2C e-commerce. Again specifically for clothes, it shows that 22% of the customer return the product frequently, and almost 11 % return the product very frequently. Collectively, the percentage of return is very high in this apparel category. Further, 36% return clothing sometimes (i.e.

between 1- 3 months) lower than Footwear & Accessories, which returned almost 41%.

Figure 6. 1 Frequency of Clothes returned by the customer

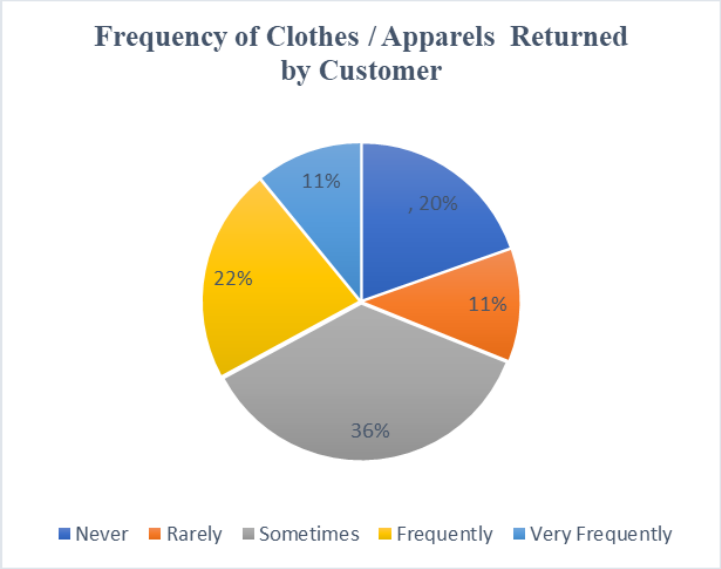
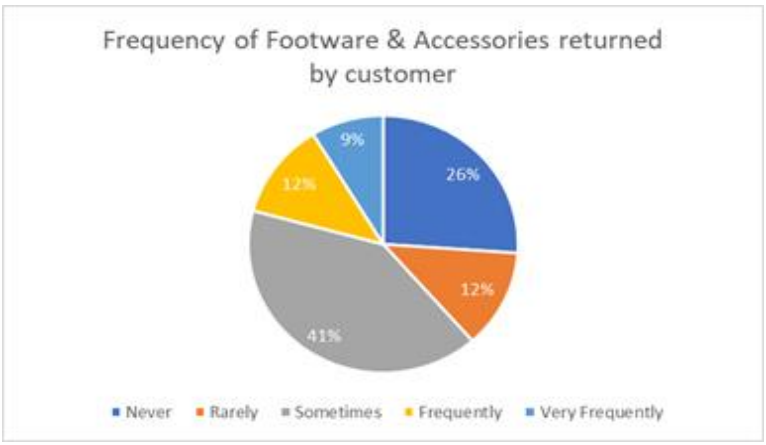


Figure 6.2 reveals that 12.1 % of customers return the product frequently, whereas 8.7 % (i.e., 9 %) are more frequent. Almost 21% of the customers return this category of product in UAE. Also, almost 26 % of them return it sometimes, i.e., once in 3 months.

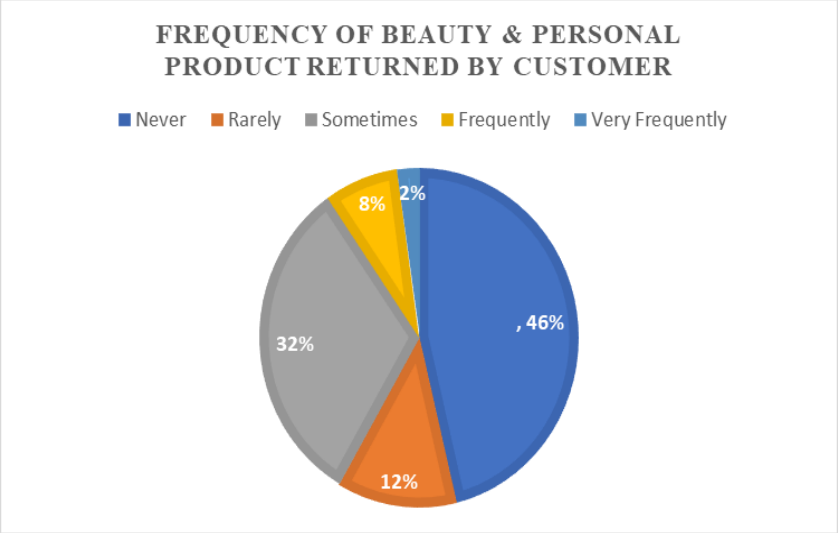
Figure 6. 2 Frequency of Footwear and Accessories returned by the customer



The next category of product considered in return is the beauty and personal category. Though the product is frequently bought by the customer online, the return of the same is lower. The figure below provides a clear picture that 40 %

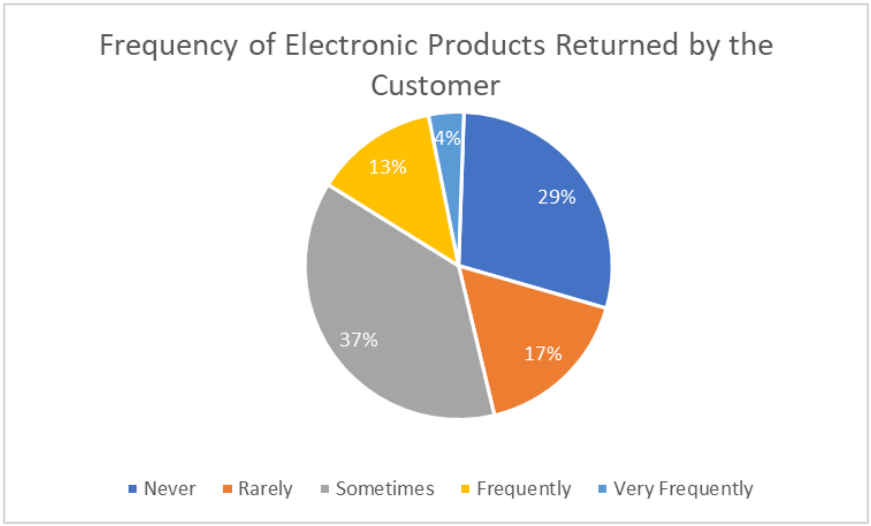
of the respondent never returned the product, and only 2% of the customer returned the product very frequently, which contrasts with 11 % of the customer returning clothes “very frequently”.

Figure 6. 3 Frequency of Beauty and personal products returned by the customer



In the case of electronic goods, the results reveal that the highest returns, i.e. 37.8%, have returned the product sometimes. And around 13% have returned it frequently. And 4 % of them returned very frequently.

Figure 6. 4 Frequency of Electronic products returned by the customer



General merchandise, medicine, and grocery products show that most respondents have never returned the product (38.2%; 55 % and 41.3%). From these results, it can be concluded that clothing, Footwear & accessories, and Electronics are ranked highest returned online goods.

Table 6. 15 Product returned frequency (Gender-Wise)

Product Category	Female					Male				
Category	Never	Rarely	Sometimes	Frequently	Very Frequently	Never	Rarely	Sometimes	Frequently	Very Frequently
Clothes	15.10%	11.50%	42.40%	22.30%	8.60%	23.00%	11.50%	31.10%	21.90%	12.60%
Footware & Accessories	28.80%	11.50%	39.90%	12.90%	7.20%	24%	13.10%	41.50%	11.50%	9.80%
Beauty & Personal Products	44.60%	12.90%	31.70%	8.60%	2.20%	47.50%	11.50%	32.20%	6.60%	2.20%
Electronics	32.40%	15.10%	36.00%	11.50%	5.00%	26.20%	18%	38.80%	14.20%	2.70%
Grocery	40.30%	7.90%	38.10%	10.80%	2.90%	36.60%	5.50%	31.10%	24.00%	2.70%
G.Merchandise	43.90%	13.70%	32.40%	6.60%	1.40%	50.30%	12.60%	23.50%	9.80%	3.80%
Medicines	55.40%	9.40%	30.90%	2.90%	1.40%	54.60%	9.30%	30.60%	3.30%	2.20%
Books	38.80%	10.80%	39.60%	9.40%	1.40%	43.20%	10.40%	27.30%	16.90%	2.20%

For each category of the product returned, cross-tabulation between the gender and product category reveals the customer's demographic profile. The results reveal that females return clothes that both males and females return clothes more frequently than in any other product category. It is observed that 36.0% of clothes were returned sometimes, which accounted for 42.0% of females and 31.1% of Males. However, 8.6 % of females and 12.60 % of males returned the clothes frequently, giving way for improvement in the Clothing line in Online Platform services.

To understand the relationship between the gender and product returned category, chi -square test was performed.

The Chi-squared value of 0.446 > 0.05 is statistically insignificant and concludes that there is no significant relationship between the gender of the customer and them returning the ordered products (Clothes). Table 6.16 provides the details of the Chi-square test.

Table 6. 16 Relationship between Gender and Product returned (Clothes)

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	7.872[a]	8	0.446
Likelihood Ratio	8.201	8	0.414
N of Valid Cases	322		

Further, for the next category of product, "foot ware and Accessories", compared to apparel, females return this product category 9.4% less frequently than clothes (12.90 % compared to 22.30 % in clothes). Similarly, males return 11.50 % of footwear and accessories frequently, 10.4 % less than clothes. The frequency of return observed in both the genders returns footwear highest between 1- 3 months (sometimes).

The chi-square test value of 0.825 > 0.05 is statistically insignificant. Therefore, it is concluded that there is no significant relationship between the gender of the customer and them returning the ordered products (Footwear & Accessories).

Table 6. 17 Relation between Footwear & Accessories return and Gender

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	4.346[a]	8	.825
Likelihood Ratio	4.209	8	.838
N of Valid Cases	322		

The next category of products considered is “Beauty and personal products”, which shows almost the same pattern among both genders. It is observed that 46.3% of Beauty & Personal Products orders were never returned, which accounted for 44.2% of females and 47.5% of Males. However, a low 8.60% of female respondents returned their orders quite frequently, indicating that personal products returned very less. The return policy does not allow the return of personal product and shows less scope for improvement.

Table 6. 18 Relation between Personal beauty Product return & Gender

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	2.000[a]	8	.981
Likelihood Ratio	2.374	8	.967
N of Valid Cases	322		

The Chi-squared value of 0.981 > 0.05 is statistically insignificant; therefore, it concludes that there is no significant relationship between the gender of the customer and them returning the ordered products (Beauty & Personal Products) back.

For the Electronics, 37.6% of orders were returned sometimes, which accounted for 36.2% of females and 38.8% of Males. However, 5 % of females but a very high 14.20 % of males return electronics quite frequently.

Table 6. 19 Relation between Electronics Return and Gender

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	5.419[a]	8	.712
Likelihood Ratio	5.427	8	.711
N of Valid Cases	322		

The Chi-squared value of 0.712 > 0.05 is statistically insignificant. Therefore, it establishes no statistically significant link between a customer's gender and the return of ordered products (Electronics). Similarly, grocery and general merchandise did not show any significant relationship between gender and online product returns.

Cross–Tabulation between Clothes Return & Other Demographic Traits

This section discusses specific product categories and demographic traits. This includes – age-group, occupation, an online platform used for return, types of companies, and frequency of return.

Table 6. 20 Demographic profile of customers returning clothing Online

Products returned to the company [Clothes]						
Characteristics	Categories	Never	Rarely	Sometimes	Frequently	Very Frequently
Age -group	18 – 21 years	14.80%	13.90%	34.40%	27.90%	9.00%
	21- 30 years	29.90%	11.50%	33.30%	12.60%	12.60%
	31- 40 years	17.90%	5.10%	43.60%	15.40%	17.90%
	41 - 50 years	23.10%	12.80%	30.80%	25.60%	7.70%
	Above 50 years	8.60%	8.60%	45.70%	28.60%	8.60%
Occupation	Business	16.70%	20.00%	36.70%	20.00%	6.70%
	College Student	21.00%	14.60%	29.90%	23.60%	10.80%
	Employed	17.20%	6.50%	44.10%	20.40%	11.80%
	Homemaker	21.70%	4.30%	47.80%	26.10%	
	others	21.10%	5.30%	31.60%	15.80%	26.30%

Products returned to the company [Clothes]						
Characteristics	Categories	Never	Rarely	Sometimes	Frequently	Very Frequently
Online Platform	Both	47.60%	51.40%	50.00%	47.90%	45.70%
	Mobile app	28.60%	37.80%	39.70%	29.60%	42.90%
	Website	23.80%	10.80%	10.30%	22.50%	Retruns. 40%
Companies - Returned the products	Both	63.50%	67.60%	61.20%	53.50%	54.30%
	Global Companies Only	23.80%	27.00%	31.00%	31.00%	40.00%
	Local Companies	12.70%	5.40%	7.80%	15.50%	5.70%
Frequency of Online Return	Daily	Weekly	Fortnightly	Monthly	Once in 3 months	Once in 6 Months
Never	11.10%	6.30%	6.30%	25.40%		31.70%
Rarely	2.70%	5.40%	5.40%	24.30%	10.80%	35.10%
Sometimes	9.50%	16.40%	12.10%	26.70%	6.90%	8.60%
Frequently	8.50%	16.90%	19.70%	14.10%	1.40%	18.30%
Very Frequently	8.60%	5.70%	11.40%	25.70%	8.60%	2.90%

Following are the observation of the return behaviour of the customer, specific to clothing –

This table is a representation of customers who returned clothes, based on their Age-group. The data reveals that the age-group 31-40 yrs returns the highest, i.e. 15.40 % frequent and around 17.90 % as very frequently in various categories of the product return. Conversely, unexpectedly 18- 21 yrs of age group only returns 9 % of the product bought frequently.

Table 6. 21 Relation between Age -Group and Clothes return

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	23.080[a]	16	.112
Likelihood Ratio	23.661	16	.097
N of Valid Cases	322		

. 6 cells (24.0%) have an expected count of less than 5. The minimum expected count is 3.80.

The Chi-Squared value of 0.112 > 0.05 and is therefore statistically insignificant. Hence, there is no significant relationship between Age-group and the Frequency of returning Clothes.

Further, occupation also is an important criterion, and a demographic study reveals that self-employed respondents (Business), college students and homemakers return around 20- 26.10 % of clothes frequently. The chi-square test value of 0.221 > 0.05 and is therefore statistically insignificant. Hence, there is no significant relationship between Occupation and Frequency of return.

This table represents how often were Clothes returned utilizing the various online platform. It is observed that a majority, 48.8% of the total population who returned the items, used Both platforms. 35.4% of the people who only used mobile apps made returns, with 42.9%. Comparatively, only 15.8% of the total population who used the website to order made returns. The Chi-Squared value of 0.221 > 0.05 and is therefore statistically insignificant. Hence, it is concluded that there is no significant relationship between and Frequency of returning Clothes and the Online Platform used for buying.

Global and local companies play a critical role in e-commerce. The data reveals that product returned to global companies is around 40 % compared to only 5.7 % of the population returning the product to local companies. The Chi-Squared value of 0.437 > 0.05 and is therefore statistically insignificant. Hence, there is no significant relationship between the type of company and return frequency in the case of clothes. Further, the frequency with which clothes were returned compared to the frequency of online purchases. 23.3% of the total population that made these returns bought clothes Once every three months, whereas 8.7% of those who bought them daily returned them less frequently.

Table 6. 22 Relation between frequency of buying to Return

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	56.683[a]	24	.000
Likelihood Ratio	61.469	24	.000
Linear-by-Linear Association	10.189	1	.001
N of Valid Cases	322		

. 10 cells (28.6%) have an expected count of less than 5. The minimum expected count is 1.74.

The Chi-Squared value of 0.000 < 0.05 and is therefore statistically significant. Hence, there is a significant relationship between the frequency of returning Clothes and the frequency purchased online.

Product Category Returned – Footwear & Accessories

This table represents customers who returned Beauty and Personal Products based on their Age-group, occupation, online platform, type of online companies and frequency of online return. The data reveals that "Footwear and Accessories "are returned in single-digit percentages across the age group. 18-21yrs returns around 9.80 % compared to 9.20 % in 21- 30 years who have returned beauty products very frequently. 33.33 % of the UAE population in the age group of 41-50 years have not returned to this product category. The Chi-Squared value of 0.838 > 0.05 and is therefore statistically insignificant. Hence, it shows no significant relationship between age group and frequency of returning.

Table 6. 23 Demographic profile of the customer returning – Footwear and Accessories

Attributes	Profile & frequency	Never	Rarely	Sometimes	Frequently	Very Frequently
Age -group	18 – 21 years	23.00%	15.60%	41.00%	9.80%	10.70%
	21- 30 years	28.70%	12.60%	37.90%	11.50%	9.20%
	31- 40 years	23.10%	5.10%	41.00%	20.50%	10.30%
	41 - 50 years	33.30%	20.50%	35.90%	10.30%	
	Above 50 years	25.70%		51.40%	14.30%	8.60%
Occupation	Business	33.30%	10.00%	40.00%	10.00%	6.70%
	College Student	26.10%	16.60%	35.70%	10.80%	10.80%
	Employed	22.60%	7.50%	48.40%	12.90%	8.60%
	Homemaker	30.40%	8.70%	43.50%	17.40%	
	others	26.30%	10.50%	42.10%	15.80%	5.30%
Online Platform used for online buying	Both	40.50%	50.00%	51.90%	51.30%	53.60%
	Mobile app	33.30%	42.50%	36.60%	28.20%	35.70%
	Website	26.20%	7.50%	11.50%	20.50%	10.70%
Online Buying is from	Both	57.10%	72.50%	58.80%	53.80%	64.30%
	Global	26.20%	22.50%	35.10%	30.80%	28.60%
	Local	16.70%	5.00%	6.10%	15.40%	7.10%
Frequency of Online buying	Daily	10.70%	7.50%	7.60%	7.70%	10.70%
	Weekly	6.00%	12.50%	16.00%	17.90%	3.60%
	Fortnightly	7.10%	7.50%	15.30%	15.40%	10.70%
	Monthly	16.70%	12.50%	22.10%	28.20%	35.70%
	Once in 3 months	21.40%	27.50%	25.20%	12.80%	28.60%
	Once in 6 months	8.30%	10.00%	3.80%		
	Very Rarely	29.80%	22.50%	9.90%	17.90%	10.70%

This data reveals that only 10 % of business and college students return the product frequently. In contrast, homemakers do not return the product frequently. Also, 36% of them have never returned the product. Chi-Squared values of 0.720 > 0.05 and are therefore statistically insignificant. Thus, there

is no significant relationship between occupation and frequency of returning Footwear & Accessories.

The online platform used to make their purchase shows that, on average, 48.8% of the total population both (webpage and mobile app) return the product. Both platforms. The mobile app is used by 35.70 % very frequently to return the product compared to the webpage, which is used by 10.70 % of the population very frequently. The Chi-Squared value of 0.113 > 0.05 and is therefore statistically insignificant. So there is no significant relationship between and frequency of returning footwear & Accessories and the Online Platform used for buying.

The frequency of products that are returned to the companies facilitating their sale. 30.1% of the total population who purchased Footwear & Accessories via Global Online Companies made returns, while 28.6% made very frequent purchases. On the other hand, 9.9% of the total population made returns, with the majority, 16.7%, never using Local Companies. However, 59.9% of the total population returned items using both online companies to make purchases.

Table 6.24 Relation between use of Global / Local company and Frequency of Returns

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	11.963[a]	8	.153
Likelihood Ratio	11.680	8	.166
N of Valid Cases	322		

The Chi-Squared value of 0.153 > 0.05 and is therefore statistically insignificant. Hence, there is no significant relationship between and frequency of returning Footwear & Accessories and the type of companies used for online shopping.

Product Category Returned – Electronics

This table represents customers who returned Electronics based on their Age-group. We observe that 16.7% of the customers returned Electronics quite frequently, of which above 50 Years of age accounted for the majority, 25.7%. 28.9% of customers of the population never returned their orders, Age-group 31-40 Years is the majority 33.3% of them. The Chi-Squared value of 0.808 > 0.05 and is therefore statistically insignificant. Hence, there is no significant relationship between Age-group and the frequency of returning Electronics.

Table 6. 25 Demographic profile of customers returning to Electronics Online

Products returned back to the company [Electronics]						
Characteristics	Categories	Never	Rarely	Sometimes	Frequently	Very Frequently
Age -group	18 – 21 years	31.10%	17.20%	39.30%	10.70%	1.60%
	21- 30 years	26.40%	13.80%	40.20%	14.90%	4.60%
	31- 40 years	33.30%	23.10%	23.10%	15.40%	5.10%
	41 - 50 years	28.20%	17.90%	41.00%	10.30%	2.60%
	Above 50 years	22.90%	14.30%	37.10%	17.10%	8.60%
Occupation	Business	33.30%	10.00%	30.00%	16.70%	10.00%
	College Student	29.90%	19.70%	35.70%	11.50%	3.20%
	Employed	29.00%	15.10%	38.70%	14.00%	3.20%
	Homemaker	21.70%	17.40%	47.80%	8.70%	4.30%
	others	21.10%	10.50%	47.40%	21.10%	
Online Platform	Both	51.60%	33.30%	52.90%	50.00%	50.00%
	Mobile app	34.40%	46.30%	35.50%	23.80%	33.30%
	Website	14.00%	20.40%	11.60%	26.20%	16.70%
	Both	65.60%	64.80%	56.20%	57.10%	41.70%
Companies - Returned the products	Global Companies Only	32.30%	18.50%	34.70%	23.80%	41.70%
	Local Companies	2.20%	16.70%	9.10%	19.00%	16.70%
Frequency of Online Return	Daily	Weekly	Fortnightly	Monthly	Once in 3 months	Once in 6 Months
Never	5.40%	10.80%	9.70%	18.30%	24.70%	4.30%
Rarely	18.50%	9.30%	14.80%	11.10%	25.90%	5.60%
Sometimes	8.30%	14.90%	12.40%	28.10%	19.80%	5.00%
Frequently	7.10%	9.50%	9.50%	21.40%	28.60%	4.80%
Very Frequently		16.70%	16.70%	25.00%	16.70%	8.30%

This table represents customers who returned Electronics based on their Occupation. In the case of electronics, businessman returns the item highest, i.e. 16.70 %frequently, compared to college students (11.50 %) and homemaker, around 14%. The Chi-Squared value of 0.802 > 0.05 and is therefore statistically insignificant. Hence, it can be concluded that there is no significant relationship between occupation and frequency of returning Electronics.

The above table also represents how often Electronics are returned compared to the online platform used to make their purchase. A majority, 48.8% of the total population who returned the items, observed that they used both platforms. 35.4% of the population who only used mobile apps made returns, with 33.3% making online purchases very frequently. Comparatively, only 15.8% of the total population who used the website to order made returns. The Chi-Squared value of 0.159 > 0.05 and is therefore statistically insignificant. So, there is no significant relationship between and Frequency of returning Electronics and the Online Platform used for buying.

Table 6.25 shows the frequency of products returned to the companies that facilitate the sales. 30.1% of the total population who purchased Electronics via Global Online Companies made returns, while 41.7% made very frequent purchases. On the other hand, 9.9% of the total population made returns, with 19.0% using local companies frequently. However, 59.9% of the total population returned items using both online companies to make purchases. The Chi-Squared value of 0.018 < 0.05 and is therefore statistically significant. It is concluded that there is a significant relationship between and Frequency of Electronics returned and the type of online company used, i.e. local or global companies.

The data also reveals the frequency with which Electronics were returned compared to online purchases. 23.3% of the total population that made these returns bought Electronics Once every three months, whereas 8.7% of those who bought them daily returned them less frequently. The Chi-Squared value of 0.177 > 0.05 and is therefore statistically insignificant. Thus, there is no significant relationship between and Frequency of returning Electronics and the

frequency with which they were purchased online. We also compared the frequency with which Electronics were returned compared to the customer's internet usage. 41.7% of the Active Internet Users returned the products very frequently instead of the 0.9% of the total population who were Occasional internet users, making 8.3% of them returning items frequently. It also revealed that 40.0% of the Active Mobile internet users returned products frequently. The Chi-Squared test indicates that since 0.001 < 0.05, we will reject the null hypothesis as a result is statistically significant. Hence, it can be concluded that there is a significant relationship between the frequency of Electronics returned and the Internet Usage of the buyer.

Table 6. 26 Product Category Returned – Beauty & Personal Products

Attributes	Profile & frequency	Never	Rarely	Sometimes	Frequently	Very Frequently
Age -group	18 – 21 years	45.90%	13.10%	32.80%	6.60%	1.60%
	21- 30 years	48.30%	10.30%	28.70%	9.20%	3.40%
	31- 40 years	56.40%	7.70%	28.20%	7.70%	
	41 - 50 years	41.00%	20.50%	28.20%	7.70%	2.60%
	Above 50 years	37.10%	8.60%	45.70%	5.70%	2.90%
Occupation	Business	60.00%	3.30%	30.00%	3.30%	
	College Student	50.30%	10.80%	27.40%	8.30%	
	Employed	38.70%	16.10%	38.70%	6.50%	
	Homemaker	43.50%	17.40%	26.10%	8.70%	
	others	31.60%	10.50%	47.40%	10.50%	
Online Platform used for online buying	Both	47.00%	41.00%	54.40%	45.80%	57.10%
	Mobile app	32.90%	46.20%	35.90%	33.30%	28.60%
	Website	20.10%	12.80%	9.70%	20.80%	14.30%
Online Return to Company	Both	55.70%	76.90%	61.20%	58.30%	42.90%
	Global	33.60%	12.80%	32.00%	20.80%	57.10%
	Local	10.70%	10.30%	6.80%	20.80%	9.90%
Frequency of Online buying	Daily	6.70%	15.40%	9.70%	8.30%	
	Weekly	12.10%	12.80%	11.70%	12.50%	14.30%
	Fortnightly	12.10%	7.70%	11.70%	16.70%	14.30%
	Monthly	18.80%	15.40%	29.10%	12.50%	28.60%
	Once in 3 months	26.20%	20.50%	16.50%	37.50%	28.60%
	Once in 6 Months	4.70%	5.10%	6.80%		
	Very Rarely	19.5%	23.10%	14.60%	12.50%	14.30%
Online Platform used for returning Product	Through webpage	55.00%	64.10%	58.30%	50.00%	57.10%
	Through Mobile app	27.50%	28.20%	32.00%	25.00%	28.60%
	Both	16.10%	7.70%	9.70%	25.00%	

The table represents customers' age-group-wise returned Beauty and Personal Products. Age-group wise, 46.3% of the customer never returned the product, and only a small percentage, i.e. 7.5% of the customer, returned the product frequently. The age-group 21- 30 years shows the highest returns. The Chi-Squared value of 0.838 > 0.05 and is therefore statistically insignificant. There is no significant relationship between Age-group and frequency of returning Beauty & Personal Products. Occupation-wise, it is observed that a significant 46.7% of the population never returned the product. Only 7.5 % of the respondent returned the beauty items frequently, out of which the majority are students — 39.5%. Therefore, the Chi-Squared value of 0.390 > 0.05 is statistically insignificant and shows no significant relationship between occupation and frequency of returning Beauty & Personal Products.

The other evaluation criteria are the online platform used to make their purchase. The data reveals that a majority, 48.8% of the total population who returned the items, used Both platforms. 35.4% of the population who only used mobile apps made returns, with 28.6% frequent online purchases. Comparatively, only 15.8% of the total population used the website to order complete returns. The Chi-Squared value of 0.449 > 0.05 and is therefore statistically insignificant. So, there is no significant relationship between and Frequency of returning Beauty & Personal Products and the Online Platform used for buying.

The table also represents the frequency of products being returned to the companies facilitating their sale. 30.1% of the total population who purchased Beauty & Personal Products via Global Online Companies, around 57.1% of the customer made frequent returns to the product purchased through Global companies in contrast to 9.9% of the total population made returns to the local Companies frequently. The Chi-Squared value of 0.073 > 0.05 is statistically insignificant, showing no significant relationship between the Frequency of returning Beauty & Personal Products and the companies.

The above table represents the return frequency of Beauty & Personal Products compared to online purchases. 23.3% of the total population that made these

returns bought Beauty & Personal Products Once every three months, whereas 8.7% of those who bought it daily returned it less frequently. Therefore, the Chi-Squared value of 0.683 > 0.05 is statistically insignificant, so there is no relationship between returning frequency in Beauty & Personal Products and online buying frequency.

The comparison between the customer's internet usage and the frequency of return shows that 57.1% of the Active Internet Users returned the products very frequently instead of the 0.9% of the total population who were Occasional internet users, making 14.3% of them returning items very frequently. The Chi-Squared test indicates that since 0.031 < 0.05, as a result, is statistically significant, it shows a substantial relationship between the frequency with which Beauty & Personal Products are returned and the Internet Usage of the buyer.

Other categories like groceries, general merchandise, and books show insignificant returns compared to the above-discussed items. So, for those products, the details are attached in the appendix section.

6.2 Customer Expectation and Reverse Logistics Service Quality

RO #2 To analyse the impact of RL service quality on customer satisfaction.

Exploratory factor analysis is used to analyse the data acquired from the survey for the research questions linked to the study.

6.2.1 Normality Test

A normal probability plot, or a quantile-quantile (Q-Q) plot, is used to assess the data's normality. It shows how the data distribution deviates from the predicted normal distribution. Observations for properly distributed data should be nearly in a straight line. However, if the data is non-normal, the points form a significantly different curve from a straight line. Possible outliers are points near the line's endpoints that appear to be a substantial distance from most observations. Although a slight sweep of the observed point from the normal distribution line is acceptable, to understand if the deviation is high, we have

tried to see if the round-off value of the observed point would align with the straight line or not. We observe that deviations are very low in all the variables, except for a few figures. A detailed plotted graph is attached in the appendix section (E)

6.2.2 Factor Analysis

Factor analyses investigated the independent variable's connection and interrelations and identified the significant factors (variables) for RLSQ. According to (Kim & Mueller, 1978), factor analysis is "a group of statistical techniques whose central objective is to describe a specific set of variables in terms of a smaller number of hypothetical factors." The essential premise of factor analysis is a linear combination of unobservable variables. (Kasper & Ünlü, 2013). Therefore, factor analysis identifies underlying factors and explains the correlation trend within a measured/observed variables group. (Decoster, 1998)

6.2.3 Exploratory Factor Analysis

Popularly termed “EFA”, it is the statistical technique utilized in research to investigate the relationship between observed variables/items. EFA is used to identify the factor influencing variables or examine which variables ’go well together (Decoster, 1998). When many latent variables are present, this approach minimises data and categorises a small number of components that explain most of the variables. (Hair et al., 2010). This strategy benefits research projects with fewer or more items, variables that can be categorized into smaller units, and important notions easily interpreted (Rummel, 1970). This strategy allows researchers to focus on crucial elements rather than considering multiple variables that may be irrelevant. It is, therefore, helpful in categorizing variables into meaningful sets (Young & Schmid, 2006) emphasize that EFA essentially consists of three major stages: a) analysing the adequacy of the data, b) extraction of the factor and c) rotation of the factor. As a result, before starting the factor analysis, some assumptions must be included in the preliminary analysis to test the dataset's suitability for EFA.

EFA is often used early in the study process "when there is a theory about underlying structure, or the researcher seeks to understand underlying structure"(Tabachnick & Fidell, 2012, p.22). As concluded by (B. Tabachnick & Fidell, 2001) - " it acts as a means for aggregating information and creating assumptions about underlying processes". Thus, while using EFA, researchers often determine the number of factors by reviewing the results of a principal components analysis (i.e., Eigenvalues).

Though we had a prior theory about the number of general reverse logistics – LSQ was developed and studied by the researcher earlier. The existing study would highlight RLSQ factors in B2C and how each variable links to these factors. And also, as this is the first study in the UAE region, the factors need. However, the identified constructs are based on literature reviews that broadly align with the research. Still, there is a need for content validity as the significance of the RLSQ relationship with customer satisfaction is a new and emerging area. The critical concept regarding validity is often ignored, "validity is not a characteristic of an instrument, but a characteristic of *usage* of an instrument in a *particular context".* (Kane, 2015). So, anytime an instrument is used in a new context, at least validity should be established for that specific context.

Hence, EFA at the first stage must explore the factors to make it easy to do the CFA with well-identified factors in EFA. We had many variables in our dataset, so by using EFA, items were identified items. The items that do not analytically belong to their intended construct were eliminated. (Knekta, Runyon, & Eddy, 2019). The final EFA is an essential aspect of internal reliability, the results of which are discussed later in the chapter. Also, the complete details of the EFA results are in the appendix section.

6.2.4 Measurement of sampling adequacy

EFA is required to investigate if the components of each construct are appropriate as a single construct. The study employed the KMO (Kaiser-Meyer-Olkin) to confirm factor analysis was appropriate for the sample data and

Bartlett's Test to ensure sampling adequacy. (Fabrigar et al., 1999). The above test was applied to the data to validate the PCA's suitability (Principal Component Analysis) (B. Tabachnick & Fidell, 2001). The static value of the KMO varies from 0 to 1, with 0 indicating that the entire sum of fractional correlations is relative to the sum of correlations. However, the pattern of correlations appears to be scattered (hence, the chances are likely that factor analysis will be unsuitable). The pattern of correlation becomes more compact as the value approaches one. As a result, factor analysis oversees producing unique and dependable factors. Because the links between the variables cannot be captured in the other variables, small unit values for the KMO indicate that variable factor analysis may not be applicable. (Norušis, 1993).

In this study, the EFA analysis was utilized to determine variables, and KMO and Bartlett's Test of Sphericity was employed to verify the applicability of factor analysis for the sample data."

Table 6.27 below shows that RLSQ components had a KMO value near 1 (0.909 to 0.566), and Bartlett's test of sphericity was statistically significant with a p-value of 0.000. All the factors in the KMO analysis show the appropriate data for acceptance. Rating between 0.5 - 0.7 is regarded as mediocre. Further, a value between 0.7 - 0.8 is considered good, 0.8 - 0.9 is considered excellent, and 0.9 or above is considered amazing. (Field, 2005),(Julie, 2011), (Hutcheson, G. and Sofroniou, 1999). However, as per (Kaiser, 1974) and (Birmingham City University, 2017), the KMO value of only one factor was 0.566 with a significant p-value of 0.000. If the value of KMO is more than 0.5, the sample is enough or sufficient(Field, 2005;Ikasari & Lestari, 2019). Rest all the factors, i.e., Communication, IT, RP, and Empathy, show KMO results in 0.789 to 0.90, which are considered good results. Bartlett’s test results, i.e., a p-value of all the factors, were 0.000, which is adequate to further the test.

Table 6. 27 Exploratory Factor analysis: Path I Consumer Expectation

Constructs	Measurement Item	Mean	Std . Div `	KMO	Bartlett's Test of Sphericity	Factor Loading	Cronbach's Alpha Based on Standardized Items
Communication Quality	CS_1	3.44	1.181	.789	439.674	.714	.790
	CS_2	3.38	1.181		p value = .000	.793	
	CS_4	3.10	1.131			.756	
	CS_5	3.16	1.168			.686	
Information Systems Quality	IS_1	2.99	1.218	.874	1058.310	.865	.909
	IS_2	3.21	1.113		p value = .000	.877	
	IS_5	3.47	1.228			.880	
	IS_6	3.29	1.158			.778	
Reverse Process Quality	RP_1	3.30	1.083	.885	1089.832	.864	.858
	RP_3	3.14	1.122		p value = .000	.759	
	RP_4	3.49	1.195			.873	
	RP_5	3.48	1.187			.840	
	RP_6	3.02	1.172			.387*	
Convenience	C_1	3.71	1.138	.566	311.778	.784	.674
	C_2	3.53	1.122		p value = .000	.819	
	C_3	3.11	1.223			.633	
	C_4	2.84	1.241			.595	
Empathy	E_1	3.10	1.278	.791	571.388	.888	.844
	E_2	3.42	1.161		p value = .000	.893	
	E_3	3.23	1.117			.744	
	E_4	3.49	1.190			.774	
Overall Satisfaction	OS_1	3.37	1.028	.907	1978.106	.913	.954
	OS_2	3.34	1.091		p value = .000	.913	
	OS_3	3.44	1.101			.880	
	OS_4	3.39	1.080			.918	
	OS_5	3.48	1.042			.874	

(** Cronbach's value of communication is very low; that is why we also tried to filter it into two separate communication variables, 1 and 2)*

Factor loading in EFA - A factor loading identifies the contribution of the variable to the factor (Gie Yong & Pearce, 2013). A factor with a high loading factor accounts that the variables better account for the dimensions of the factors. According to (Costello & Osborne, 2005), less than three items are generally unstable for factor loading. Hence in his study, four and more items

are considered for the study. The factor loading is above 0.3, considered stable (Field, 2005). According to (B. Tabachnick & Fidell, 2001), 0.32 is a good thumb rule for the minimum factor loading. In the study, only one item is 0.387. The same has been retained because of the literature value of the item.

Lastly, the study's internal reliability and consistency are tested with the help of Cronbach's alpha. The but sometimes we compute it anyway to show that it is > 0.70 (acceptable fit), > 0.80 (good fit), or > 0.90 (great fit).Generally, the maximum value of 0.90 is recommended (Tavakol & Dennick, 2011). The Cronbach's value of communication was very low, The items were rotated with two separate communication variables filtered - variables 1 and 2. (Hinton et al .,2014). After that, the Cronbach alpha value of 0.790 was a good fit as per the set standards.

The Cronbach's α for all the other constructs is above 0.7, which are acceptable consistencies, and the values above 0.8 are high consistency. (Hair et al ., 2007). The composite reliability of all constructs exceeded 0.7). It shows that the measurement item selected is valid for the corresponding construct and confirms the significant convergent validity (Hair et al., 2010). The overall satisfaction shows an alpha value of 0.95, but according (Tavakol & Wetzel, 2020; Bland & Altman,1997) is also acceptable (0.70 to 0.95).To maintain more reliability, no variable except for overall satisfaction exceeded 0.90.so a few overlapping items were reduced in the items in the final SEM model. The construct-wise RLSQ results confirm the study's validity, one-dimensionality, and reliability.

6.2.5 Factor Extraction:

Factor extraction entails deciding on the model and the number of components to extract. After extracting the components, factor rotation occurs to establish a simple structure to increase interpretability.

Two methods for extracting factors result from distinct approaches to the variability partitioning: a) principal components analysis and b) common factor analysis. Table 6.26 shows the eigenvalues of each linear component and the

factor before and after rotation. "The eigenvalue column is the sum of squares on a component, which also displays the variation represented by a factor" (Hair et al., 2007)

Table 6.28 Factor Extraction - Total Variance

Total Variation Chart							
Component	Initial Eigenvalues			Extraction Sum of Squared Loadings			
	Total	Variance %	Cumulative %	Total	Variance %	Cumulative %	
1	2.722	54.447	54.447	2.722	54.447	54.447	Communication Quality
2	0.794	15.887	70.334				
3	0.608	12.156	82.49				
4	0.455	9.103	91.593				
5	0.42	8.407	100				
1	3.674	73.486	73.486	3.674	73.486	73.486	Information Systems Quality
2	0.523	10.455	83.941				
3	0.296	5.927	89.868				
4	0.282	5.64	95.508				
5	0.225	4.492	100				
1	3.951	56.439	56.439	3.951		56.439	Reverse Logistics Process Quality
2	0.939	13.413	69.852				
3	0.722	10.31	80.162				
4	0.519	7.414	87.576				
5	0.344	4.91	92.487				
1	2.039	50.976	50.976	2.039	50.976	50.976	Convenience
2	1.1	27.492	78.468	1.1	27.492	78.468	
3	0.564	14.093	92.561				
4	0.298	7.439	100				
1	2.737	68.426	68.426	2.737	68.426	68.426	Empathy
2	0.625	15.617	84.043				
3	0.389	9.737	93.781				
4	0.249	6.219	100				
1	4.876	81.269	81.269	4.876	81.269	81.269	Overall Customer Satisfaction
2	0.35	5.83	87.099				
3	0.248	4.137	91.236				
4	0.22	3.663	94.9				
5	0.197	3.291	98.191				

6.4.6 Component Matrix (Factor Loading)

The factor load represents a relationship between the item and the factor. A widely recognized standard is that a value of 0.6–0.7 suggests an adequate level of consistency, whereas a value of 0.8 or above reveals a very strong level of

reliability. (Hair et al., 2010). However, the factor loads above 0.30 generally indicate a moderate connection between the item and the factor. Factor loadings are available in most statistical software packages, including SAS, SPSS, and R. principally seek to decrease the initial number of components in the desired instrument to a smaller set. (Tavakol & Wetzel, 2020b)

Table 6.29- Identified factor for Path -I

Items	Factor / Component Matrix	Variable	Factor Name
CS_ [The website for the return request was quick to navigate.]	0.714	CS_1	Communication Quality
CS_ [The website enabled me to complete the return transaction easily. (Within 5-7 min)]	0.793	CS_2	
CS_ [No explanation asked while returning the Product.]	0.736	CS_3	
CS_ [The customer service acted promptly on the complaint. (Response within max. 2-3 hrs)]	0.756	CS_4	
CS_ [The customer service provided a satisfactory explanation. (In case of error wrong delivery)]	0.686	CS_5	
IS_ [The website provided a chatbox for prompt two-way communication.]	0.865	IS_1	Information Systems Quality
IS_ [The information provided by the Company on the exchange of return was timely.]	0.877	IS_2	
IS_ [The Company provided information on pick up time for returned products.]	0.883	IS_3	
IS_ [Sensitive information when returning the Product was secure (credit card details & personal details)]	0.880	IS_4	
IS_ [Real-time track and trace were available on a mobile app for my exchange delivery]	0.778	IS_5	
RP_ [The collection of products to be exchanged were as per the time and date committed on the website]	0.864	RP_1	Reverse Logistics Process Quality
RP_ [The Company compensated for problems related to delivery delays.]	0.759	RP_2	
RP_ [The return service was free of cost.]	0.873	RP_3	
RP_ [The entire process was paperless.]	0.840	RP_4	
RP_ The Company included re-sealable return packaging for an easy return.]	0.687	RP_5	
C_ [The pickup and delivery service were door to door.]	0.784	C_1	Convenience
C_ [The Company was flexible (adjusted the pickup time and place) at my convenience]	0.819	C_2	
C_ [The product could also be returned to a nearby local store for easy return and convenience.]	0.633	C_3	
C_ [The Company made a follow-up call after the returned goods were delivered (to assure the quality)]	0.595	C_4	

E_ [The customer service provided personalized service to me.]	0.888	E_1	Empathy
E_ [The customer service gave priority to convenience and adjusted the pickup place and time accordingly.]	0.893	E_2	
E_ [As a frequent buyer from the Company, got privilege for faster return services and exchange.]	0.744	E_3	
E_ [The customer service was polite and solved my problem in one call.]	0.774	E_4	
OS_ [I am satisfied with the company's communication on the return of goods services.]	0.913	OS_1	Overall Customer Satisfaction
OS_ [I am satisfied with the information systems for the return of goods.	0.913	OS_2	
OS_ [I am very satisfied with the company's Return service process	0.880	OS_3	
OS_ [I am satisfied with the convenience level for the return of goods.]	0.918	OS_4	
OS_ [I am satisfied with the overall service representative's support during the return of goods.]	0.874	OS_5	

All the above factor analysis values are greater than 0.7, indicating good reliability. Only one item, RP_5, shows a value below 0.7. The researcher has retained the item because it is an essential variable from a literature point of view and should remain in the model to capture the latent trait. The constructs state the need for "The Company provided pre-printed returned labels for easy return," which is an essential requirement in the online return to identify the item. Further, (Hair et al., 2010) reported if the factor load is above 0.3 to retain the variable if the dataset is large. Secondly, our dataset has more than 300 data points, which is considered large, compared to the 30-40 data points dataset. Whereas (Velicer, 1988) concluded that any value greater than 0.4 might also be considered stable.

6.3 Confirmatory Factor Analysis

Confirmatory Factor Analysis builds on preceding EFA studies allowing researchers to confirm or disconfirm the underlying factor dimensions. CFA is a model-driven method that evaluates how well data "fits" the suggested model or theory. CFA differs from EFA, wherein the researchers must first develop a factor model before analysing data. (Tavakol & Wetzel, 2020b)

CFA also examines the construct validation, or whether a measure remains constant or invariant across groups, populations, or time. Further, construct validity investigates the link between the constructs.

(Koeske et al.,1994) distinguishes between the two types of validity concerns- conclusion and measure. Further, the measure type is subdivided into three Validity of Measure - Convergent, Discriminant, and theoretical validity. The average variance extracted (AVE) is computed for each convergent and discriminant factor (Curran et al. 1996). It determines the relationship between the elements to validate the hypothetical model's fitness using data from the sample, hence demonstrating the measurement model's validity. (Marsh and colleagues1988)

6.3 Reliability of the Measurement Model

6.3.1 Composite Reliability :

Composite reliability (CR) measures the internal consistency of the constructs' items and the reliability required for the confirmatory factor analysis and SEM Path Model (Hair et al., 2007). It is the sum of the square of standardized loadings "divided by the "sum of the square of summed standardized loadings and the sum of measured error variance". (Fornell & Larcker, 1981). A CR value of higher than 0.6 is considered acceptable for internal consistency within constructions (Hair et al., 2007).

$$CR = \frac{(\sum \lambda_i)^2}{(\sum \lambda_i)^2 + (\sum \epsilon_i)}$$

Whereby λ (lambda) is the standardized factor loading for the item (i and ε), the respective error variance for item i.

CFA affirms the reliability of the constructs by calculating the CR of the constructs. The acceptable criterion of CR is >= 0.60, > 0.70 (acceptable fit), > 0.80. The results show that all the constructs' items are statistically acceptable.

Table 6.30– Composite Reliability

Latent Variable	Standard Loading	Sum of Error (M)	Composite Reliability (CR)
CS_1	0.615	**2.176**	**0.769**
CS_2	0.739		
CS_3	0.655		
CS_4	0.686		
IS_1	0.864	**1.136**	**0.909**
IS_2	0.831		
IS_3	0.85		
IS_4	0.839		
RP_1	0.808	**1.738**	**0.9**
RP_2	0.877		
RP_3	0.68		
RP_4	0.8		
RP_5	0.84		
C_1	0.801	**2.415**	**0.701**
C_2	0.821		
C_3	0.372		
C_4	0.361		
E_1	0.861	**1.628**	**0.851**
E_2	0.86		
E_3	0.71		
E_4	0.622		
OS_1	0.905	**1.071**	**0.948**
OS_2	0.924		
OS_3	0.815		
OS_4	0.894		
OS_5	0.89		

6.3.2 Validity of the Measurement Model: Path -I (Consumer Expectation)

a) Convergent Validity

Convergent Validity was determined using the following criteria: (a) Factor Loadings, (b) Reliability, and (c) Extracted Average Variance (AVE). Concerning Factor Loadings, (Hair et al., 2010) propose that Standardised Regression Weights determined using the SPSS 25 be 0.5 or greater, the ideal would be 0.7 or higher, and statistically meaningful.

Table 6. 31 Validity of Measurement Item & AVE - Customer Perception

Constructs	Measurement Item	Estimates	AVE	Sqrt(AVE)
Communication Quality	CS_1	0.615	0.45599	0.675
	CS_2	0.739		
	CS_4	0.655		
	CS_5	0.686		
IT Quality	IS_1	0.839	0.71545	0.846
	IS_2	0.850		
	IS_3	0.864		
	IS _4	0.830		
Reverse Process Quality	RP_1	0.808	0.64599	0.804
	RP_2	0.877		
	RP_3	0.680		
	RP_4	0.800		
	RP_5	0.840		
Overall Customer Satisfaction	OS_1	0.905	0.78567	0.886
	OS_2	0.924		
	OS_3	0.894		
	OS_4	0.890		
	OS_5	0.815		

Justification for including AVE with a value of 0.45 - AVE should be larger than 0.5, although a value of 0.4 is appropriate too**.** As per (Fornell & Larcker, 1981), if the AVE value is less than 0.5, but CR (composite reliability) is greater than 0.6, the convergent validity of the construct is considered acceptable. Although the AVE value in the case of communication is 0.455, this value is sufficient considering the CR for the same is above 0.7. (Refer to table no 6.31). Finally, we kept communication because it is evident in the literature that it is a useful variable. Also, the researcher did not want to lose an essential piece of information from our analysis which is a crucial aspect of service quality and e-commerce.

b) Discriminant Validity:

It refers to how the measurement instrument can be truly distinctive from other constructs (Cable & DeRue, 2002). The AVE (Average Variance Extracted) estimations for two variables of one construct should be larger than the square of the entire-construct correlation value between the factors to demonstrate discriminant validity. (Fornell & Larcker, 1981; Hair et al., 2010). CFA is generally used to assess each scale's dimensionality and reliability. The components are validated using a CFA test. The test is recommended to analyse the data's internal discrepancy, dependability, and discriminant validity.

Table 6. 32 Discriminant validity

	CS	IS	RP
CS	0.68		
IS	0.46	0.85	
RP	0.57	0.69	0.80

There are two standard criteria to measure the construct discriminant validity - (1) For any construct, the square root of AVE should be greater than the correlations of the construct with any of the other constructs. (Fornell & Larcker, 1981) and (2) If the correlation coefficient for any two constructs is less than 0.90, discriminating validity is satisfied.(Hair et al., 2010) (Fornell & Larcker, 1981). This study (Table 6.29) shows all the correlation coefficients are below 0.90, which confirms the discriminate validity of the research model. The diagonal elements indicate the AVE values of the constructs. The adequate values of the convergent validity when the diagonal values are more than 0.5. Further, discriminant validity is established when diagonal AVE values are greater than off-diagonal values. (Hair et al., 2007; Fornell & Larcker, 1981) Results show that all the values of the Discriminant validity are adequate.

Path coefficients are computed to validate the hypothesized model, and the structural model is examined for model fit.

Correlations: Value of Estimates

The below table shows the diagonal elements that indicate the AVE values of the constructs.

Table 6. 33 Value of Estimates

Correlations			Estimate
RP	<-->	CS	0.565
CS	<-->	IS	0.464
RP	<-->	IS	0.690

We employ convergent and discriminant validity to examine the construct validity. The former refers to how variables in a specific dimension show the same construct. The latter is the degree to which the dimensions identified are independent. Findings of the CFA reaffirmed good model fit. The thesis mainly focuses on CFA results.

6.4 Structural Equational Modelling (SEM) for Path - I

SEM is a statistical method used to examine the link between independent variables (IV), either continuous or discrete. SEM uses multiple regression, factor, and path analysis (Hooper et al., 2008; Jodie et al., 2013). Diagrams are fundamental to SEM, allowing the researcher to view the path and help clarify the research idea about the relationship of the variable. It also validates the research model by loading the observed item and gives information on the validity and reliability of the investigated constructs by generating a model fit value. (Schumacker &Lomax,2004)

6.4.1 Path 1 - Consumer Expectations

We have used Covariance - based SEM, which is used for the reflective study.

- The above technique fits perfectly because this is a reflective study.

- The construction used in the study is backup by theoretical underpinning.

Sample sizes considered in the current study are according to the “rule of 5”, most appropriate for ML-based SEM.

Structural Equation Modelling is a network of variables and latent constructions that serve as a powerful and comprehensive technique to represent, estimate, and test hypothesized models in directional and non-directional relationships (Fabrigar et al., 1999; MacCallum & Austin, 2000). These variables usually have a linear relationship among the variables. The study aims to explain as much of the specified model variance as possible (Kline, 1998) in sync with understanding the covariance or correlation among the variables. The measured variables, in this case, can be directly measured and are considered endogenous, which indicates the model. In contrast, the latent variables can be defined as common factors with multiple variables having common grounds. They are free of any error of measurement.

For SEM, we started with all the five items to measure the influence of latent variables on the factor variables that may impact the overall satisfaction. But the model fit was poor, and not all the factors could explain the convergence. The variables we did not consider in the final model were – Convenience and Empathy. The structural model's model fit indices revealed in Table 6.32 below provide the predicted model's details are evaluated for a sample size of (n= 322).

Following are the model fit indices - as CMIN /df =3.219; CFI = 0.941; IFI =0.942; TLI = 0.929; GFI = 0.902; NFI = 0.918; RMSEA= 0.797. Past studies in CFA show no ideal index for evaluating model goodness of fit. As a result, we explore a variety of methods, including the Minimum Discrepancy per Degree of Freedom (CMIN/DF), Goodness-of-Fit Index (GFI), Tucker Lewis Index (TLI), Comparative Fit Index (CFI), and Root Mean Square Error of Approximation (RMSEA) (RMSEA). However, it has been proposed that the GFI be avoided when determining which indexes to report (Sharma et al., 2005).

The GFI is too sensitive and simple to be used as a standalone index (Hooper et al., 2008).

6.4.2 Model Fit Summary

We have used CMIN, CFI, IFI, TLI, NFI, GFI and RMSEA to correspond to the critical ratios. The measurement model's relative chi-square (CMIN/DF) is 3.355 and is also observed to be within the acceptable range. The Comparative Fit Index (CFI), also commonly recognised as the Bentler Comparative Fit Index, differentiates an existing model's adaptability on lines of an independent model, which is an empty model. It also assumes that the model's indicator variables (and hidden variables) are not correlated, where the CFI range is from 0 to 1. A CFI near 1 indicates a good fit. The CFI of this model is 0.935, which suggests that the provided model can represent approximately 93.5% of the data's covariance. In this study, the IFI was approximately 0.935, greater than 0.90, so it is within an acceptable range.

NFI denotes the fraction of the examiner's model that improves fit over the null model (irrelevant measurement variables). The NFI reported in this study is 0.909, which is less than 0.95, although other experts believe it is still fair. The Lewis Index (TLI), also known as the unstandardised fit index, is comparable to the NFI but considers the model's complexity. Root Mean Square Approximation Error (RMSEA) is also known as RMS, RMSE, and degree of freedom mismatch. RMSEA is a common adjustment metric because it does not require comparison to the null model. The RMSEA score is 0.800, which should be less than or equal to 0.8, indicating that the field model characteristics are satisfied. However, RMSEA occasionally overestimates this value due to the limited sample size. TLI is generally unaffected by sample size. A TLI that is close to one suggests a good match. This study's TLI was 0.922. Other characteristics are satisfying the critical aspects, and thus, it is a naturally reliable model.

Table 6. 34 Measurement Fit Summary

Model Indices	CMIN /DF	CFI	IFI	TLI	GFI	NFI	RMSEA
Measurement Model Statistics	3.355	0.934	0.935	0.922	0.893	0.909	0.080
Acceptable Criterion	≤ 4.000	≥ 0.900	≥ 0.900	≥ 0.900	≥ 0.90	≥ 0.95	≤ 0.08

Ideally, for the SEM model indices to confirm the hypothesis and the model path, any 4 or 5 items must be within the suggested value. In the current study, all indices were within the acceptable ranges. Thus, confirming a good model fit with three variables. The *model fit was found unfit (poor) with all the variables. So, two variables were excluded from the final model. The variables that were not considered in the final model were –* ***Convenience and Empathy****, as not all the factors could explain the convergence. (Refer to appendix section for full model with all the variables)*

6.5 Testing of the Hypothesis: Path – I

6.5.1 A measurement model and structural model fitness

SEM has two key components - a measuring model and a structural model. The measuring model is a confirmatory factorial analysis model which confirms whether the data is fit the suggested model. The measuring model establishes a relationship between underlying variables and multiple observed variables. Measurement model fitness indicators are based on factor loadings, Cronbach alpha, convergence, and discrimination validity. Structural model fitness metrics are CFI, GFI, chi-square, and RMSEA. (Klien.,2005). In the model fit summary below (Table 6.33), all the individual indices are in the appendix.

Table 6. 35 Structural Model Fit & Testing of Hypotheses

Model Indices	CMIN /DF	CFI	IFI	TLI	NFI	GFI	RMSEA
Measurement Model Statistics	3.219	0.941	0.942	0.929	0.918	0.902	0.079
Acceptable Criterion	≤ 4.000	≥ 0.900	≥ 0.900	≥ 0.900	≥ 0.95	≥ 0.90	≤ 0.08

The model fit summary was obtained, where we initially assessed a nested model for the Absolute Model Fit. An output of the RMSEA statistic equals 0.08. The ideal value is 0.08 or less makes our output an excellent indication of Absolute Model Fit when we observe the GFI (Goodness of Fit Index), which ideally is around 0.09, which illustrates that the default model proves to be a good fit.

Checking the Incremental Fit of the Model, we should ideally observe indices above 0.9 and start with our observation of the Comparative Fit Index (CFI). The requirement holds (CFI = 0.941). The Normed Fit Index (NFI) equaling 0.918 confirms the Incremental Model Fit. Checking for the Parsimonious Model of Fit or the minimum discrepancy, the value of our chi-squared value divided by the degree of freedom should be below 5.0. Our observed value is 3.35 and is also indicating a good fit. The other values of EVCI are indicative of how well a model can be used to envisage the future sample covariances (Brown & Kudeck, 1993).

We observe that the $\chi 2$ diff test for the null and free model is observed to be statistically meaningful (p-value of 0.000 < 0.05), which leads us to the conclusion of using a pair-wise setting for comparison for research (Arbuckle and Wothke, 1999). This will help us determine which pairs of parameters drastically vary between the random model's experimental conditions, estimated in the successive tables. The estimated path coefficients column represents the absolute intensity of connections or impact conveyed through that pathway in

this scenario. It is assessed that Communication System (CS) had the strongest path or direct influence of 'The website enabled me to complete the return transaction easily. (Within 5-7 min)' on it with a path coefficient of 1.202 (statistically significant - p-value < 0.001) in the table, followed by the MV - 'The Return Service Was Free of Cost' having a strong pathway connection of 1.15 (statistically significant - p-value < 0.001) on the latent variable Reverse Process. Final two columns of the table lists all the important ratios for the pair-wise distinctions between the two experimental tasks and their levels of significance, where the key for p-value measure is [*** = p-value < 0.001; ** = p-value < 0.01; and * = p-value < 0.05]. For the unstandardized model, implying direct comparisons between variables is not feasible, and for the same reason, we observe the Standardized Model for analysis. When we observe the Standardized Regression Weights, we have a mean of 0 and a unit standard deviation that helps access the coefficients of parameters.

There is a positive direct relationship between IT and customer satisfaction wherein an estimated coefficient of 0.924 is established. Similar direct effects were also observed for other variables, with communication having a significant 0.905 estimate coefficient for 'Overall Satisfaction.

While checking the Direct, Indirect and Total Effects of our Latent Variables on Overall Customer Satisfaction, individual parameters indirectly (following a pathway of more than one to impact OS causally) or directly (direct path establishment and its coefficients being considered) affect OS.

6.5.2 Hypotheses Testing

The table below provides a computed value of all the hypothesis relationships and the details of their path co-efficient (estimates). The significance level (p-value) indicates the support or non-support evidence of the hypothesis.

Table 6. 36 Results of Hypotheses Testing

	Hypotheses	Construct Linked	Estimates	Std. Estimates	p-value	Significance	Hypotheses Result
HI	Communication Quality (CS) → Overall Customer Satisfaction (OS)	CS_1	1				
		CS_2	1.202	0.127	***		
		CS_3	1.062	0.12	***		
		CS_4	1.07	0.117	***		
	OS	**CS**	**0.145**	**0.058**	**0.012**	**Significant**	**Supported**
H2	Information Quality (IS)---->Customer satisfaction (OS)	IS_1	1				
		IS_2	1.062	0.056	***		
		IS_3	1.002	0.056	***		
		IS_4	0.927	0.05	***		
	OS	**IS**	**0.473**	**0.048**	***	**Highly Significant**	**Supported**
H3	Reverse Process (RP)--> Customer satisfaction (OS)	RP_1	1.055	0.061			
		RP_3	0.154	0.059	***		
		RP_4	0.839	0.062	***		
		RP_5	0.948	0.056	***		
	OS	**RP**	**0.395**	**0.056**	***	**Highly Significant**	**Supported**

The table shows the compounded value of all relationships, details of the co-efficient path, and the level of significance, i.e. the (p-value) for the customer expectation, which supports the hypothesis.

The path co-efficient between communication quality –> Overall customer satisfaction, Information systems quality -→ Overall customer satisfaction, and Reverse process → Overall customer satisfaction have substantial values with p-values < 0.001 or <0.01. Hence, hypotheses H1, H2, and H3 are supported in path -1.

For the variable empathy (E), the coefficient is 0.215, the standard error 0.184, and the p-value is 0.254; for convenience (C), the coefficient is - 0.023, standard error 0.212, and the p-value is 0.954, which shows an insignificant relationship

with the customer satisfaction. The path co-efficient between convenience quality –> Overall customer satisfaction and empathy -> Overall customer satisfaction have nominal values.

Hence, the two hypotheses (H, H5) are rejected in Path -I

The summation of Direct and Indirect Effects modelled the overall effect as shown in the final SEM model below (Figure 6.1). The connection strength of the observable path coefficient in the above diagram stands for the response of our dependent variable to a unit change in an explanatory variable. Accordingly, additional variables in the model are considered constant (Bollen, 1989).

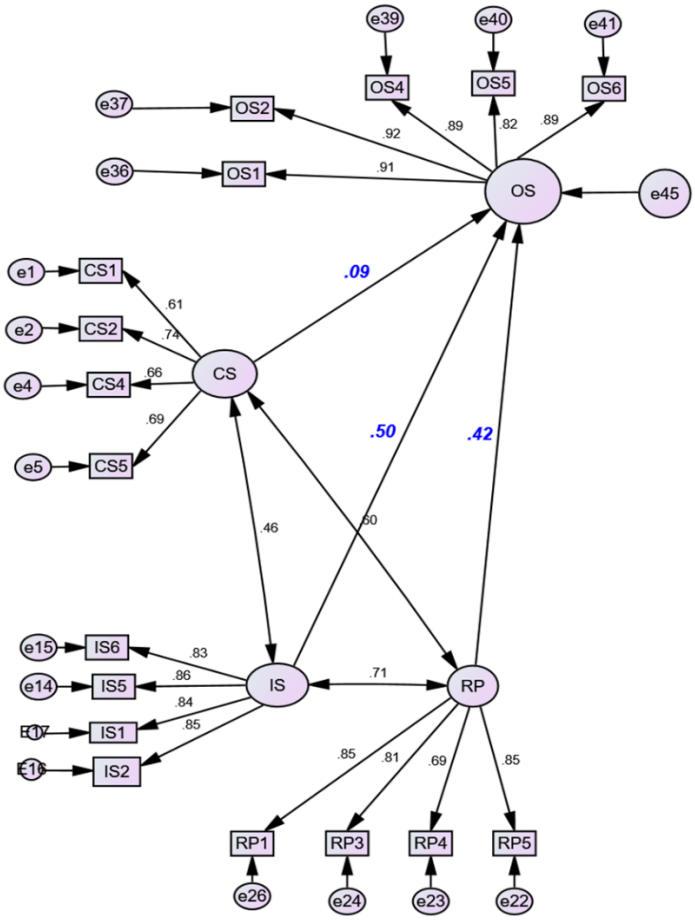


Figure 6. 5 Final Standardized Model

The path coefficients of a structural equation model are interpreted similarly to correlation or regression coefficients. (McIntosh & Gonzalez Lima, 1994). A positive coefficient means that when a unit changes, i.e., an increase brought into one structure, it simultaneously indicates a direct increase in the activity proportional to the projected coefficient's size or measure.

• A negative coefficient implies that when a unit change (increase) is brought about in the activities of one structure, it causes a direct and proportional reduction in the other structure's activity being projected.

- Overall Satisfaction of customers is being measured by the Latent Variable (LV) 'OS.' It is observed to directly affect all the other latent variables, making it an exogenous variable. OS1 to OS6 signify the Measured Variables (MV) having errors associated with MVs e36 to e41. The path coefficients defined with OS1 are 1.0 and imply that OS1 is the fixed-parameter with directional influence on OS, and e45 is significant of a residual error in the prediction of OS via IS, RP, and CS. Similarly, when observed for the Communication Service (CS), CS1 is the fixed-parameter having a directional influence on CS and shows a significant correlation with other Latent Variables - Information Systems (IS) and Resolution Process (RP). It has errors associated with its measured variables CS1 to CS5 as e1 to e5. Considering Information Systems (IS), we observe IS6 to be the fixed-parameter with directional influence. A clear correlation between CS and RP and Reverse Process (RP) has the fixed-parameter for directional influence as RP1.

- Observing the direct effect of CS, IS, and RP on OS, we see that the path coefficient of CS implies an insignificant impact. In contrast, having a path coefficient of 0.52, IS renders a large effect constituting the direct relationship with OS. RP is seen to have a mediocre effect. The strongest correlation is observed to exist between IS and RP with a significant value of 0.64 (Mediocre positive correlation), whereas a weak

correlation is established between IS - CS and CS - RP (0.34 and 0.37, respectively)

- Hence, the figure below shows the outcome of the hypotheses.

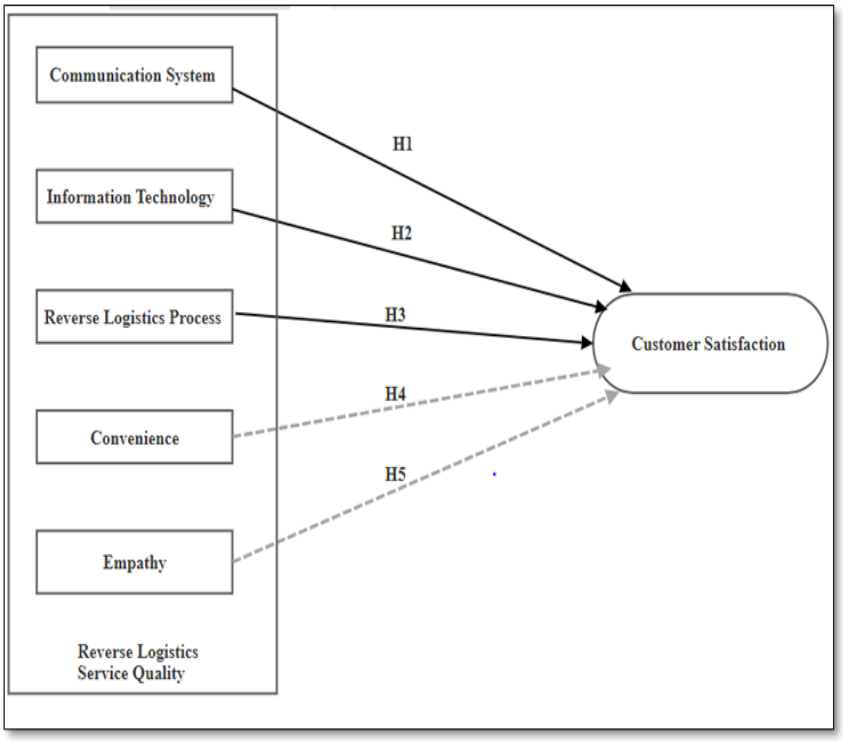


Figure 6. 6 Final Relationship between RLSQ Variables and Customer Satisfaction

6.6 Path -2 RL capabilities and RLSQ

RO#3 Explore the link between the RL Capability and RLSQ and then develop a framework to improve the RL Service Quality.

It is essential to examine RL implementation's logistics capability and barriers to developing the framework to improve the RL service quality. The total number of logistics providers examined was 72 based in the UAE region and undertaking the RL activity for the B2C e-commerce companies

6.6.1 Sample Characteristics

This table shows the responses from e-commerce platforms about their organizational classification.

Table 6. 37 Sample Profile for Managing RL in UAE

Description of Sample	Count	Percent
Logistics providers (3PL)	48	66.7
In-house Logistics management	24	33.3
Total	72	100
	72	100

As is evident from the table, 48 respondents were logistics providers for online retailers. They accounted for 66.7 per cent of the total respondents, and online retailers account for 33.8 per cent with 24 respondents. This shows that e-retailing companies often use Logistics providers to manage Logistics services.

Secondly, the service capability is also dependent on the organisation's size. Logistics capability is most often not an issue with the large-size enterprise. Allocating resources and capabilities for mid-and small-sized enterprises could be challenging.

Table 6. 38 Size of the organization managing RL in UAE

Size of Organization (No. of Employees)	Count	Percent
<50	6	8.3
50-100	11	15.3
100-200	13	18.1
200-500	12	16.7
> 500	21	29.2
Total	63	87.5
Missing Data	9	12.5
Total	72	100

The table shows the approximate number of employees in an organization. Of the total, 21 companies had more than 500 employees, accounting for 33.3 per cent of the overall respondents. Similarly, the second largest number of responses came for the category 100-200 employees (with 13 responses, i.e., 20.6 per cent of the total respondents).

- Category of the product handled by Logistics Provider: The results show that 59.7% of the logistics provide active service to online delivery and returns of General Merchandise, 51.4% in Electronics, and 63.9% in Beauty and Personal Care Products.

- A high 81.9% of these organizations considered reverse logistics activity as important, and 94.5% gave prime importance to the terms of reverse logistics with their customers, which points out a good B2C quality of after-sales services in approximately 60 % and above e-commerce organizations

- When analysing the products returned to the online sellers, '3rd Parties' and Nominated Transporters' made up the majority, 41.7% and 31.9%, respectively. The major reason for the products to be returned was 'Damaged Product' with 55.6% of the customers facing this issue very often, followed by 'Poor Quality' and 'Incorrect size/colour/texture' with 50% of the reasons.

- Results reveal that a substantial relationship exists between the category of the organization and them providing logistic support for 'Footwear & Accessories only. All other products had no relationship with the same. When chi-squared tests results showed a significant relationship between organization type and them facing issues of sending the wrong product to their customers.

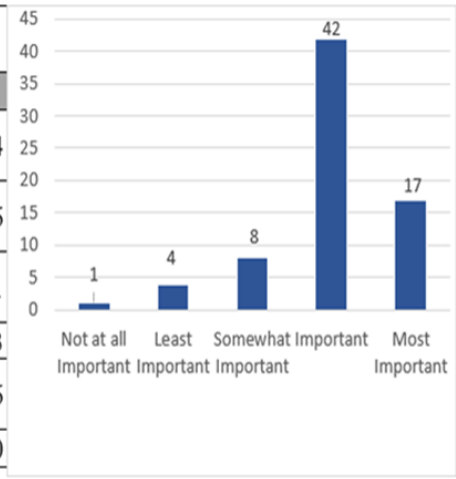
- An interesting observation was a significant link between the number of staff in the organization and how often customers faced poor quality. Statistically, a company with 200-500 employees received the complaint

of Poor-Quality Products 58.3% of the time. All other reasons were deemed invalid with the factor - number of employees at the organization.

- Seventy per cent of these customers faced transparency of product tracking as the major impediment to reverse logistics activity. Therefore, 34.7% of most respondents responded with a dire need for improvement in the reverse logistics process.

Table 6.39 Significance of RL activity within an organization

Importance of reverse logistics activity for the Organization		
Significance	Frequency	Percent
Not at all Important	1	1.4
Least Important	4	5.6
Somewhat Important	8	11.1
Important	42	58.3
Most Important	17	23.6
Total	72	100



The above table reveals that reverse logistics is considered an important activity by 58.3 % and the most important activity by 23.6 % of the 3PL companies. Hence, allocation of resources and building of capabilities is essential.

Further, the evaluation reveals the main reasons for the product return from the customer.

The reasons for returns based on the returns received from the customer show that the returns are due to incorrect size, colour and texture, product specification not matching the catalogue, late delivery, poor quality, and damaged product (often & always). The returns of damaged products are the highest with 25 %, followed by actual products specification not matching the catalogue specification (19.4%). In contrast, returns due to products no longer needed by the customer are only 11% which the customer always returns.

The below table provides logistics providers' details on the reasons for product return as stated in the return request from the customer. This provides a general idea of why the customer returns the goods and could help return forecasting for the retailer.

Table 6.40 Reasons for Product Returns from customer

	Percentage wise Frequency of Returns				
Characteristics	Never	Rarely	Sometimes	Often	Always
Incorrect Size, colour & Texture	19.40%	11.10%	19.50%	31.90%	18.10%
Product specification different from Catalogue	16.70%	9.70%	29.20%	25%	19.40%
Late Delivery	18.10%	4.20%	30.60%	29.20%	18.10%
Poor Quality	12.50%	13.90%	23.60%	34.70%	15.30%
Damaged Product	6.90%	5.60%	31.90%	30.60%	25%
Customer No longer needs it	33.30%	16.70%	23.60%	15.30%	11.10%
Wrong Product delivered	18.10%	12.50%	29.20%	22.20%	18.10%

Most of the time, the LP provides RL service to the customer for incorrect size (31.90 %- *often* and 18.10%- *Always*), in contrast to damaged product (30.60 % -*often* and 25% -*Always*). Poor product quality is also one of the significant reasons for return from the customer (34.60 %- *Often* and 25%- *Always*). The lowest returns are seen in the product no longer needed by the customer.

Additionally, RL's internal barriers identified by the respondent within the company to implement the reverse logistics program. The lack of internal capabilities of the logistics provider can be a severe bottleneck for the company to perform RL effectively

Table 6. 41- Barriers in the Reverse Logistics Operation

Barriers	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
Communication System	12.50%	23.60%	22.20%	26.40%	15.30%
Information and technological systems (Internal)	15.30%	20.80%	19.40%	33.30%	11.10%
Lack of real-time visibility (External)	4.20%	8.30%	16.70%	50.00%	20.80%
Lack of Reverse logistics knowledge	6.90%	26.40%	29.20%	29.20%	8.30%
Lack of adaptation innovative practices in RL	4.20%	15.30%	38.90%	27.80%	13.90%
Lack of coordination in RL Process	4.20%	15.30%	36.10%	31.90%	12.50%

The data reveals that 50% of LP agreed, and 20.8 % strongly agreed (i.e., 70.8%) that there is a lack of visibility among the stakeholder. Ranking second in ranking is the lack of coordination in RL and communication systems and the information systems existing with the LP. Lack of coordination and innovative practices also create a barrier in the current system.

Further, inferential analysis is conducted to analyse the capabilities and their relationship with the logistics service quality.

6.7 Normality Test –

The normality of the data is checked using a normal probability plot, or more specifically, a quantile-quantile (Q-Q) plot.

The appendix (F) for reference contains detailed graphs with the briefs.

6.8 Exploratory Data Analysis

Exploratory factor analysis is used to analyse the data acquired from the survey for the research questions linked to the study to examine the capabilities and barriers in the RL process.

Table 6. 42 Reliability Test for Logistics Capability

Constructs	Measurement Item	Mean	Std. Div.	KMO	Bartlett's Test of Sphericity	Cronbach's Alpha
Communication System Capability	CC1	3.32	1.161	0.625	19.371; pValue 0.036	0.498
	CC2	3.72	1.103			
	CC3	3.15	1.45			
	CC4	3.29	1.305			
	CC5	3.56	1.331			
Information Systems Capability	IC1	3.9	1.077	0.747	105.552 ; pValue 0.000	0.750
	IC2	3.13	1.186			
	IC3	2.6	1.252			
	IC4	3.49	1.245			
	IC5	3.29	1.419			
	IC6	2.74	1.343			
	IC7	2.94	1.32			
Return Process Capability	RP1	3.24	1.327	0.644	89.19 p Value 0.00	0.676
	RP2	3.61	1.217			
	RP3	2.9	1.355			
	RP4	2.99	1.358			
	RP5	2.56	1.443			
	RP6	2.44	1.403			

Communication Capability - The table shows that the KMO and Bartlett's test shows communications capability and has an accuracy of 0.625, implying that the sampling is mediocre. Further, Bartlett's test of sphericity is significant, and its associated probability is less than 0.05 (0.036 < 0.05). Thus, it is small enough to reject the null hypothesis, implying that the correlation matrix is not an identity matrix. These tests indicate that we can analyse the factor to see commonalities and identify the key factors with higher significance.

Additionally, the above table shows Cronbach's Alpha, showing the internal consistency of the analysis. The alpha value here is 0.498, indicating only an acceptable consistency level. (Hair et al.,2007). Therefore, we conclude that the

analysis has a near acceptable internal consistency. Rest both the variables shows adequate internal consistency.

Information Systems Capability -the descriptive statistics of the data are based on a Likert scale (1 to 5) for Information Technology Capability. The mean value of all the variables ranges from 2.74 to 3.90 on the Likert scale. Looking at the mean, we can infer which variable influenced respondents more, where the highest mean of 3.92 meant that IC1 was the most rated variable of the lot and IC6, on the other hand, was the worst-rated with a mean of 2.74. The values of standard deviations are around 1.2, implying its range for 72 observations with no missing or excluded data. The KMO and Bartlett's test results show an accuracy of 0.747, indicating that the sampling is middling. However, bartlett's test of sphericity is significant since its related probability is less than 0.05 (0.000 < 0.05), meaning that the correlation matrix is not an identity matrix. These tests indicate that we can analyse the factor to see commonalities and identify the key factors with higher significance.

For the Return Handling Capability. The result revealed that the mean of all variables ranges from 2.44 to a decent 3.61. Looking at the mean, we can infer which variable influenced respondents more, whereas the highest mean of 3.61 meant that RP2 was the most rated variable of the lot, and RP6, on the other hand, was the worst-rated with a mean of 2.44. The values of standard deviations are around 1.3, implying its range for 72 observations with no missing or excluded data—KMO and Bartlett's test results where the accuracy is 0.644, implying that the sampling is mediocre. Bartlett's test of sphericity is significant since its associated probability is less than 0.05 (0.000 < 0.05) and is sufficiently small to reject the null hypothesis, implying that the correlation matrix is not an identity matrix. These tests indicate that we can analyse the factor to see commonalities and identify the critical factors with higher significance. Further, total variance is explained with the extraction sums of square loading for all the components. Two variances were extracted for this study's IT and reverse logistics processes.

The table below shows the total variance, where the Eigenvalues of the key components influencing the RL operations in the e-commerce retail chains have been included. All the three variables are discussed in the table below –

Table 6. 43 Total Variance Explained

Total Variance							
Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Factor Name
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	
1	1.679	33.572	33.572	1.679	33.572	33.572	Communication System Capability
2	0.979	19.587	53.159				
3	0.876	17.529	70.688				
4	0.851	17.015	87.703				
5	0.615	12.297	100				
1	2.834	40.481	40.481	2.834	40.481	40.481	Information System Capability
2	1.109	15.845	56.326	1.109	15.845	56.326	
3	0.854	12.202	68.528				
4	0.751	10.723	79.251				
5	0.628	8.977	88.228				
6	0.468	6.687	94.915				
7	0.356	5.085	100				
1	2.43	40.493	40.493	2.43	40.493	40.493	Reverse Logistics Process Capability
2	1.092	18.205	58.698	1.092	18.205	58.698	
3	0.906	15.101	73.799				
4	0.771	12.854	86.653				
5	0.521	8.688	95.341				
6	0.28	4.659	100				

The first factor, i.e., Communication Capability, accounts for 33.572% of the total variance with a valid eigenvalue greater than 1. All other components are deemed insignificant. The total column gives the amount of variance in the original variance accounted for by each component. In contrast, the per cent column shows the ratio, expressed as a per cent, of the variance accounted for by each component to the total variance in all variables.

For Information System Capability, the total variance is explained in the model where the Eigenvalues of the key components influencing the organized retail chains have been included. The first factor accounts for 40.481% of the aggregate variance with a valid eigenvalue greater than one, and another component with 15.845% of the total variance. All other components are deemed insignificant—the eigenvalues above 1 as 'strong factors' from the

given scree plot. The Eigenvalues drop off dramatically after component number 3, and the cut-off of an eigenvalue >= one would yield two factors (Component 1 and 2) in this scenario.

For RP capability, the total variance is explained in the model where the Eigenvalues of the key components influencing the organized retail chains have been included. The first factor accounts for 40.49% of the total variance with a valid eigenvalue greater than one, and the second component for 18.20% of the total variance. All other components are deemed insignificant. The overall cumulative sum represents the variation of the original variance accounted for by each component.

6.7.2 Factor loading

Table 6.44 Factor loading Explained

Items	Factor / Component Matrix	Factor Name
CC1	0.517	Communication System Capability
CC2	0.496	
CC3	0.774	
CC4	0.586	
CC5	0.473	
IC1	0.467	Information System Capability
IC2	0.643	
IC3	0.489	
IC4	0.643	
IC5	0.675	
IC6	0.784	
IC7	0.691	
RP1	0.62	Reverse Logistics Process Capability
RP2	0.230**	
RP3	0.675	
RP4	0.627	
RP5	0.736	
RP6	0.633	

The above table indicates how much variation in variables has been found. All the variables are well presented in the common factor space since all individual communality values are below the acceptable 0.5 level. This means that these variables RP2 will be excluded from the factor analysis. On the other hand, RP5 having the maximum variance explained (73.6%) in the lot makes it a significant factor for analysis. Since our model accounts for numerous factors affecting the

dependent variable - Barriers in Reverse Logistics, ANOVA analysis helps detect the important factors.

Table 6. 45 Co-relation Matrix for Lack of Logistics Capability

Correlation Matrix				
		Rank the barriers in [Communication System]	Rank the barriers [Information and technological systems]	Lack of real-time visibility
Correlation	Rank the barriers in the reverse logistics operation [Communication System]	1	0.163	0.309
	Rank the barriers in the reverse logistics operation [Information and technological systems]	0.163	1	0.313
	Lack of real-time visibility in the process followed by logistics provider, customer, and retailer	0.309	0.313	1
	Lack of adaptation innovative practices and technology in RL	0.204	0.065	0.305

It summarizes the variation in data (total sum of squares) and explains factor effects (factor sum of squares).

According to table 6.44, the bulk of the factors has some link, with r = 0.065 for 'Lack of innovative adaptation techniques and technologies in RL'. Another observable barrier in information systems is r = 0.313 for 'Lack of real-time visibility. Moderately weak correlation among items can be confirmed, which is still a good candidate for factor analysis to analyze the factors affecting our explained variable - Barriers in Reverse Logistics (RB).

Table 6. 46 Factor Loading (Lack of RL Capability)

Barriers	Communalities	Factor Loading
Lack of communication channels	0.422	0.649
Lack of IT capabilities	0.311	0.558
Lack of Real Time Visibility	0.625	0.791
Lack of innovative RP practices	0.342	0.585

The above communalities table illustrates how much of the variance in the variables. Observing the component with the highest loading value, we find 'Lack of real-time visibility in the process followed by logistics provider, customer, and retailer' to be the most significant of the lot, with a factor loading value of 0.625.

Table 6. 47 Total Variance explained

Total Variance Explained						
Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	1.701	42.515	42.515	1.701	42.515	42.515
2	0.939	23.486	66.001			
3	0.777	19.417	85.418			
4	0.583	14.582	100			

The table represents the total variance explained in the model where the Eigenvalues of the key components influencing the organized retail chains have been included. The factor represents 42.515% of the total variance with a valid eigenvalue greater than 1 (1.701 in the case).

Table 6. 48 Factor Loading for Co-relational Analysis

Loading Factor	
	Component
	1

Lack of real-time visibility in the process followed by logistics provider, customer, and retailer	0.791
Based on your observation and please rank the barriers in the reverse logistics operation [Communication System]	0.649
Lack of adaptation to innovative practices and technology in RL	0.585
Based on your observation and please rank the barriers in the reverse logistics operation [Information and technological systems]	0.558

The component matrix shows the component loadings, the correlations between the variable and extracted components.
The higher values of the loadings, the more the factor contributes. Since no loading values are below 0.5, all values are relevant, with 'Lack of real-time visibility in the process followed by logistics provider, customer, and retailer' being the factor whose $(0.791)^2 = 0.625$ or 62.5% Variance is explained by Component 1.

The rotated component matrix helps to redistribute the factor loadings so that a variable measure precisely one factor. 'Lack of real-time visibility in the process followed by logistics provider, customer, and retailer' can significantly impact Reverse logistics Barriers. (RB)

Regression

Table 6. 49 ANOVA TEST (Lack of RL Capability)

Model		*Sum of Squares*	*Df*	*Mean Square*	*F*	*Sig.*
1	*Regression*	*7.678*	*1*	*7.678*	*17.047*	*.000b*
	Residual	*31.527*	*70*	*.450*		
	Total	*39.205*	*71*			

Because our model examines numerous factors that impact the dependent (factor sum of squares), ANOVA analysis helps select relevant variables. It demonstrates how much of the variance in the data (total sum of squares) is accounted for by factor effects. The ANOVA test also indicates how much variance is also caused due to random error (residual sum of squares), where we

aim to observe most of the variance explained by the factor effects. The table provides an F-test for the factor effects, making the ANOVA test a good indicator of model fit. The total sum of squares value is 39.205, the total variation attributed to the individual factors. The F-statistic being 17.047 is statistically significant (p-value < 0.05) and implies that the independent variable, i.e., CC, reliably predicts our dependent variable, RB.

6.9 Hypothesis Testing Regression Analysis Result

6.9.1 Communication Capability

H6: Lack of Communication Systems capability (a barrier) is directly associated with Reverse logistics service quality

Table 6. 50 Dependent Variable Reverse Logistics Barrier through ANOVA

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	7.678	1	7.678	17.047	.000[b]
	Residual	31.527	70	.450		
	Total	39.205	71			

The table above provides an F-test for the factor effects, making the ANOVA test a good indicator of model fit. The total sum of squares value is 39.205, the total variation attributed to the individual factors. The F-statistic being 17.047 is statistically significant (p-value < 0.05) and implies that the independent variable, i.e., CC, reliably predicts our dependent variable, RB (Reverse Logistics Barriers)

Table 6.51 Coefficient of Communication Capability through ANOVA

Factor	Unstandardized Coefficients Beta	t	Sig.
CC(Communication Capability)	-.329	-4.129	.000

The coefficients for Standardized Coefficients 'β' signify similarly scaled variables instead of the Unstandardized Coefficients, which measure them in their natural units. The coefficient for CC Component 1 is -0.329, statistically significant as its p-value of 0.000 is less than 0.05 with an acceptably good standard error of 0.080.

As the F-statistic is statistically significant, the hypothesis is supported.

6.9.2 -Information System Capability

H7: Lack of Information Systems capability (a barrier) is directly associated with Reverse logistics service quality.

Table 6. 52 Regression Analysis of Information Capability through ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	5.078	2	2.539	5.134	.008[b]
	Residual	34.127	69	.495		
	Total	39.205	71			

The table provides an F-test for the factor effects, making the ANOVA test a good indicator of model fit. The total sum of squares value is 39.205, the total variation attributed to the individual factors. The F-statistic being 5.134 is statistically significant (p-value < 0.05) and implies that the independent variable, i.e., Information Technology Capability, reliably predicts our dependent variable RB.

Table 6. 53 Coefficient of Information Capability

FACTOR	Unstandardized Coefficients	T	Sig.
IC REGR factor score 1 for analysis 1	-.265	-3.172	.002
IC REGR factor score 2 for analysis 1	-.038	-.457	.649

IC Component 1 (-0.265) coefficient is statistically significant because its p-value of 0.002 is less than 0.05, with an acceptable standard error of 0.083. However, the coefficient for IC Component 2 (-0.038) is statistically insignificant, with its p-value being 0.649 and much greater than 0.05

As the F-statistic is statistically significant, the hypotheses are supported.

6.9.3 – Reverse Logistics Capability

H8: Lack of Reverse logistics process capability (a barrier) is directly associated with Reverse logistics service quality.

Table 6. 54 Regression Analysis of Return Handling Capability through ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	4.472	2	2.236	4.442	.015[b]
	Residual	34.733	69	.503		
	Total	39.205	71			

a. Dependent Variable: RB1

b. Predictors: (Constant), RP REGR factor score 2 for analysis 1, RP REGR factor score 1 for analysis 1

The table provides an F-test for the factor effects, making the ANOVA test a good indicator of model fit. The total sum of squares value is 39.205, the total variation attributed to the individual factors. The F-statistic being 4.442 is statistically significant (p-value < 0.05) and implies that the independent variable Reverse Process Capability reliably predicts our dependent variable RB.

Table 6. 55 Coefficient of Return Handling Capability

FACTOR	Unstandardized Coefficients Beta		T	Sig.
RP REGR factor score 1 for analysis 1	-.202		-2.396	.019
RP REGR factor score 2 for analysis 1	-.149		-1.773	.081

RP Component 1 (-0.202) coefficient is statistically significant because its p-value of 0.019 is less than 0.05, with an acceptably good standard error of 0.084. However, RP Component 2 (-0.149) coefficient is statistically insignificant, with its p-value being 0.81 and greater than 0.05.

As the F-statistic is statistically significant, the hypothesis is supported.

The table provides an F-test for the factor effects, making the ANOVA test a good indicator of model fit. The total sum of squares value is 39.205, the total variation attributed to the individual factors. The F-statistic being 4.442 is statistically significant (p-value < 0.05) and implies that the independent variable Reverse Process Capability reliably predicts our dependent variable RB.

As the F-statistic is statistically significant, the hypothesis is supported.

Overall, we observe that the variables RP, IC, and CC significantly impact the barriers. Increasing these measures, RP, IC, and CC helps reduce the RL barriers. Figure 6.3

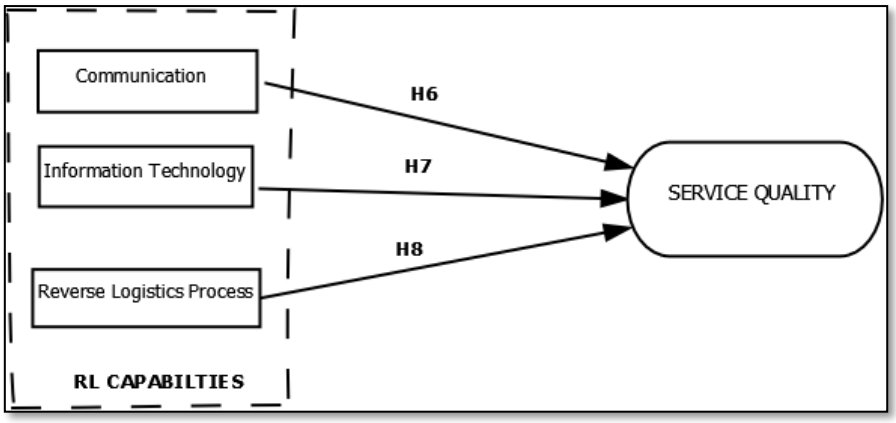


Figure 6. 7 Link between Lack of Capabilities and Service Quality

As shown in the table below, most logistics companies, i.e., 34.7% out of 70, agree that Reverse logistics process improvement should be there. As the barriers to RL decrease, it can help increase customers' overall satisfaction, as we observed through Questionnaire 1.

Further, we draw the following conclusion through the percentage analysis of the employees' opinions, which can improve the service quality in the RL process.

Table 6. 56 Identified RL Operational Area for Improvement

Barriers	Frequency	Percent	Valid Percent	Cumulative Percent
Communication	12	16.7	16.7	16.7
Communication	12	16.7	16.7	33.3
Information system integration with the logistics provider and customer	19	26.4	26.4	59.7
Reverse logistics process improvement	25	34.7	34.7	94.4
Training of internal staff to handle customer service	4	5.6	5.6	100
Total	72	100	100	

The above analysis indirectly establishes that the information system and the reverse logistics process are the most significant areas that are critical and need further improvement.

6.10 At a Glance: Findings

6.10.1 Findings for RO # 1

RO # 1 To *understand the demographic traits of consumers returning goods online and experiencing RL service.*

This study aimed to obtain responses and customer feedback to analyze the scenario of online platforms, e-commerce shopping and consumer preference for a range of products like Clothes, Footwear & Accessories, Beauty and Personal Care Products, General Merchandise, Medicines, Grocery, Books and Other Products. The study included categories such as Gender, Age-group, Occupation, and frequency of buying online. Three hundred twenty-two observations were recorded and assessed on the buying and return behaviour, which provides an insight into the growth trends in B2C shopping and product return assessment.

- Internet usage time and the frequency of online purchases were found to correlate significantly with the 'Gender'. All other factors were deemed to have a statistically insignificant association.
- 'Age-Group' had a strong association with the frequency of buying online, along with Occupation having a similar relationship with the frequency of customers buying online.
- 'Gender' has a significant association in the Footwear & Accessories, Electronics, General Merchandise and Medicines categories
- 'Age-group', on the other hand, was associated with products such as Footwear & Accessories, Beauty and Personal Care, General Merchandise and Medicines. 'Occupation' was associated with Footwear & Accessories, General Merchandise and Medicines. This clearly establishes the association of the frequency of buying products

with categories. The chi-square test for clothes shows no significant association with age or occupation.

- The shopping channels are generally mixed, with customers purchasing things via website and mobile. However, there are no major associations between gender and the frequency of online purchasing.

Purchasing from local e-commerce retailers is less common among college students aged 18 to 21 and professionals aged 21 to 30. The product category commonly purchased online is apparel - Clothing. Electronics and groceries are ranked 2nd and 3rd in online buying in UAE. The pattern of buying ranges from weekly to monthly for grocery and general merchandise, whereas other products – apparel, Electronics, Footwear, and accessories are purchased more monthly.

Product Return - Clothing has the highest customer rate of return, followed by electronics, footwear, and accessories. Apparel and electronics are the two most common products returned by respondents, accounting for nearly three times more than any other type of product returned by the consumer.

- When analyzing the products returned to the online sellers, 'Gender' had no association with any products. 'Age-Group' and 'Occupation' were also statistically disassociated with any of the returned product categories.
- However, a significant relationship is observed between the frequency of customers buying Clothes, Footwear & Accessories, and General Merchandise and the frequency of returns.
- Another significant relationship is between the Internet Usage of the customers and the frequency with which they were returning Footwear & Accessories, Beauty & Personal Care, Electronics, Grocery, General Merchandise, Medicines and Books (Only clothes were excluded).
- Electronics and Beauty & Personal Care products were also found to have a significant relationship with the company (Global or Domestic) they were purchased from and the frequency of customers returning these products.

This demonstrates that individuals buy and return cross-border more than domestic firms.

- Only Medicines had a significant relationship with the online platform (Mobile app, Website or Both) used to return the purchases.

As a result, we find different customer profiles - those who buy online frequently and have a low return rate and those who have a high online purchase and a high online return rate. Product categories can be formed, varying low and high returns depending on the product. Finally, returns between local and global companies may be classified based on product, gender, frequency of returns, and age group.

These findings can support customized strategy formation and develop the service quality framework for RL.

6.10.2 Findings for RO #2

RO#2 – To determine the relationship between the RL service quality on customer satisfaction.

The following are the RL service factors influencing customer satisfaction in the B2C retail e-commerce environment.

1. Communication system quality.

2. Information service quality

3. RL process Quality

Initially, we focused on five factors of reverse logistics service quality. The study identified five variables from the literature that are relevant to service quality. However, the SEM model did not support two identified factors - convenience and empathy. The low response level for these two criteria is due to the highly developed road network and excellent infrastructure in UAE. Secondly, the customer always connects empathy as a personal customer service feature rather than an online feature by the customer in the e-commerce

world. Also, though the customer demanded a chat box facility and personalized service, empathy as a factor was rejected in the hypothesis.

The results of the inferential analysis of the customer expectation enabled us to conclude the following -

1. Communication System Quality - communication quality means the quality of interaction between the Retailer and the customer. Here the communication is between the two stakeholders interacting with each other. Four elements significantly impact customer satisfaction when it relates to communication quality.

   These are-

   - The webpage is quick and straightforward to navigate.
   - The return transaction is easy to complete.
   - The company's response is prompt.
   - The customer service offered a satisfactory explanation.

   Customer satisfaction is positively related to the quality of communication via the webpage. Among all the communication aspects provided, "ease of navigation and promptness of response from the retailer" is regarded as high-impact indicators for RLSQ.
2. Information systems quality- information systems quality means the systems that integrate and provide customer interaction and visibility. The finding shows that it is the most important factor towards customer satisfaction in reverse logistics service quality. The customer is mainly concerned about how the information is reaching them. Analysis of 322 respondents revealed that the expectation of the customer our follows-

   - Chat Box Feature - Most customers want a chat box for prompt two-way information exchange. Most retailers have an option of emails or submission boxes for the details in the notification box on their website, primarily for returns. Secondly, most respondents prefer one-to-one chat facilities for returns and complaints rather than email or phone.

- On-time and accurate information – The on-time and accurate information play an important role in customer satisfaction. The customer often submits detailed complaints to the webpage and receives an auto-response.
- Pick-up information- The retailer's pick-up information is a 2-3 days-long window. The customer expects faster technology intervention for accurate responses from global online companies.
- Real-time visibility - There is real-time visibility available for the delivery of the item to the customer, but there is no real-time visibility for reverse logistics. With most online retailers, the customer keeps calling the retailer's toll-free number to find out the information about the exchange and return of the product. Most often, lack of real-time visibility plays causes dissatisfaction amongst the customers.

The retailer can utilise technology to improve customers' reverse logistics service experience.

3. Reverse logistics process quality- the reverse logistics process quality is the service offered by the logistics provider during the pickup and the delivery of the items from the customer for exchange or return of the goods. following are the findings of the empirical analysis –
    - Timeliness- The results show that the customer expects accuracy in the pickup by the logistics provider, i.e., pick up the goods as per the committed time on the website. Also, the customer expects exchange delivery to be faster and more flexible.
    - Compensation for delayed delivery- This item exhibited a relationship with customer satisfaction, indicating that the consumer is interested in compensation for a delayed delivery but is more concerned with the timeliness of the delivery.

- Free of cost- Most online companies managing reverse logistics for product returns ask for shipping charges when the consumer requests an exchange or return of the products. Customers are discontent when the company asks for shipping charges to exchange their goods.
- Paperless process - The component analysis reveals that this item has very low significance, but we maintained it in our study because it is very significant in the literature review. There is a likelihood that in UAE, with high mobile penetration and Internet knowledge, E-commerce is already at the paperless stage, which might explain why the factor did not exhibit importance in this market.
- Resealable return packaging for easy return- for most items' returns, ecommerce companies do often not provide resealable packaging. This is extremely important in terms of consumer satisfaction. The consumer expects a resealable packing material and labels with the delivery so that they may mail the material and communicate the information with the merchant so that there is no additional communication or confusion about the item for exchange or return.

Evaluating customer expectations and satisfaction for reverse logistics service quality demonstrates that communication systems, information quality systems, and RL management processes significantly impact customer satisfaction. We included two more factors for the RLSQ in this study: convenience and empathy. However, it only had a minimal impact on customer satisfaction. As a result, we may conclude that in the UAE, convenience and empathy do not influence e-commerce consumer satisfaction. One probable reason might be that the city infrastructure is outstanding and that the logistics provider can cover geographical distances fast. Second, empathy may be irrelevant to customers in the E-commerce business.

6.10.3 Findings for RO #3

RO#3 Explore the link between the RL Capability and RLSQ and then develop a framework to improve the RL Service Quality

Logistics Capability –

To establish a framework for improving RLSQ, it is also necessary to comprehend the relationship between logistics provider competence and RLSQ. For this study, seventy-two (72) logistics providers were surveyed to determine the current capability to implement and carry out the reverse program. Most e-commerce companies use nominated logistic providers to perform reverse logistics services. Thus, we surveyed 3PL (logistics service providers) for this study, actively handling reverse logistics in the region. The capability of the logistics provider plays a major role in the service quality offered to the customer.

The organization size by the number of employees considered in this study ranges from less than 50 employees to large companies with over 500 staff members. Almost 85% stated that reverse logistics activity is important for the organization. The findings suggest that most of the product returns from the customer are due to incorrect size, colour, and texture of the clothing (31 %), poor quality of the product (34.7%), damaged products(wrong product delivery and late delivery to the customer

For the inferential analysis, all the capabilities considered in this analysis are the logistic companies' internal capabilities integrated with other supply chain stakeholders.

The reliability and validity of the questionnaire were good. But direct capability questions to the logistics providers gave us only positive answers, which did not provide any insight into the capabilities. Also, our model accounted for numerous factors affecting the dependent variable. Hence, through ANOVA analysis, barriers in reverse logistics help detect the significant factors. For the

correlation analysis, we consider lack of capability (barriers) as an indicator of understanding the existing resources of the logistics provider.

1. Lack of communication channels- The ANOVA test results indicated that the logistic provider's communication capabilities are a significant barrier to the RL service quality of the provider. The communication channel describes internal resources and capabilities of interaction with supply chain stakeholders. According to the findings, most logistic providers communicate internally via email or phone calls. Smaller businesses with less than 500 workers are less likely to have an integrated communication system.
2. Lack of information system capability - According to the f-test data, information technology proficiency statistically influences the quality of reverse logistics services. The information capability includes internal cooperation and interaction with stakeholders to provide outstanding service. The warehousing facility, inventory update data, recycling, and marketing of returned products are all performed via EDI/ RFID. The customer does not have real-time access to the information. Often the customer follows by sending emails or webpage notifications.
3. Reverse Logistic Process capability - The overall reverse logistics process severely impedes the logistic provider's service quality. Knowledge, innovative practices, and stakeholder coordination are integral parts of the logistics process. Improvement in the quality of the logistics process needs devoted individuals well-versed in the RL process. Additionally, all the stakeholders should have equal understanding and commitment to achieving the goal of responsiveness and maximizing customer satisfaction. The existing process is an extension of the forward logistic rather than a specialized service customized for the customer's needs.

To meet the timeline accuracy of the information and minimise cost and customer dissatisfaction, seamless coordination between the stakeholders is necessary. The ANOVA test and percentage analysis of employees' opinions

also showed that reverse logistics processes need improvement by adopting innovative technologies and process integration and collaboration. The framework discussed in the next chapter has been developed based on the empirical analysis of the factors impacting customer satisfaction and the RL capabilities of the provider.

6.11 Conclusion

The chapter provides an insight into the data analysis and the finding of this study. It includes the demographic profile of the respondent, crosstabulation of the characteristics worse is they return behaviour in context to online purchase. Further to analyse the customer expectation, the chapter draws attention to the validity and reliability of the questionnaire, sampling techniques adopted and the justification and testing of the respondent's data using statistical tools. The next chapter discusses the framework to enhance RLSQ.

CHAPTER 7

FRAMEWORK TO IMPROVE RLSQ

The chapter discusses the framework developed to improve RLSQ in B2C E-commerce based on consumer expectations and capacity barriers in logistics services. The framework is determined based on empirical analysis from customers' and logistics providers' gathered data in the United Arab Emirates. Further, the chapter provides the interpretation of the framework, emphasizing a customer-oriented reverse logistics program that will differentiate the e-commerce retailer.

7.1 Customer as a co-creator of RLSQ

In the fiercely competitive e-commerce ecosystem, companies need to offer personalized (customization) services to improve service quality. This service will add value to the customer. The findings are utilized to build consumer categories based on various demographic characteristics, which are then used to customize services.

The demographic traits of respondents reveal the customer's demographic characteristics and frequency of online buying and return behaviour. Further, a service customization matrix is suggested based on the identified parameters that provide insight into return behaviour. Figure 7.1 illustrates the customer segmentation based on product category, age group, and communication channel parameters. The two axes considered the base are - online return and online purchase. On that basis, this study proposes four customer categories /segments. The first category is "*Low online Purchase and Low Returns*" – it includes varied age groups of these customers, mostly buying books but not return is low. This category needs the least attention from the RL perspective.

The second category of customers are those with "*High online purchases, but Low Returns*" – the category includes the age -group 21 to 40 yrs., customers with a high frequency of online buying but the returns for the product category such as personal beauty product, books and groceries. The buying is primarily local, with low-value purchases, so RL service is not a priority. From an RL standpoint, the next two groups are critical for retailers; prioritizing these segments as priority customers can lead to long-term relationships. *"Low Purchase & High Return*", the age group is 41- 50 yrs and above, mostly returning high-value products such as – Electronics using mobile apps and webpages. The aged customer might not be technologically savvy in this category, so the retailer needs to look at simplicity in communication, process, and IT integration. Lastly, *"High online Purchase and High Returns*", with active online shoppers, product category with high returns, and cross-border logistics involvement needs attention and customization to meet the customer satisfaction.

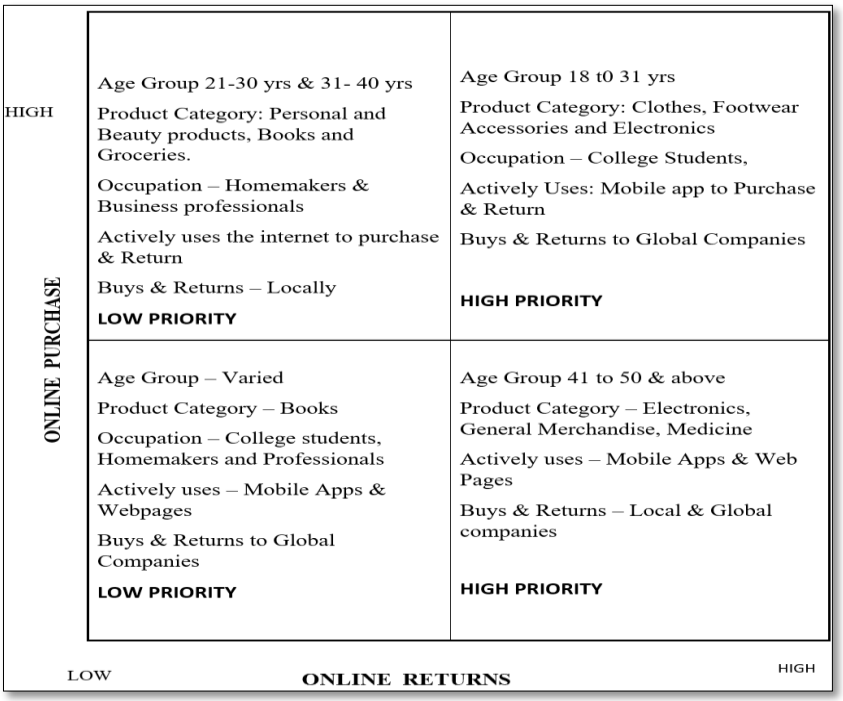


Figure 7. 1 Matrix for customization

7.2 RLSQ Framework

The empirical results in chapter no VI show a strong linkage between the RLSQ and customer satisfaction. The SEM Model path results establish the framework for RLSQ, with a direct relationship (Key drivers) and an indirect relationship (Enablers) RLSQ. Figure 7.2 shows the framework for RLSQ proposed to improve service quality and enhance customer satisfaction. Each component of the framework is explained below-

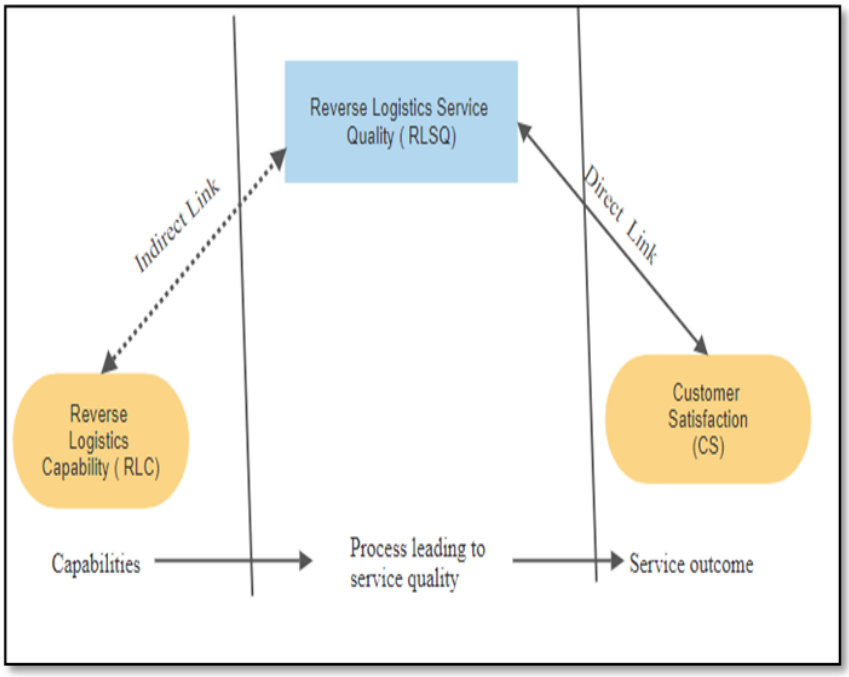


Figure 7. 2 Framework to improve RLSQ

The framework illustrates the relationship between a direct (Key driver) and indirect (Enablers) to provide a holistic solution for improved service quality. It is evident from the empirical analysis the key drivers – Communication Quality, Information technology quality and Reverse Logistics Quality- directly impact customer satisfaction. Further, the service quality enabler is the capability of the logistics provider. The correlation analysis shows an indirect relationship, i.e., lack of capability (barriers) such as – communication, IT and Reverse process on the service quality performance.

7.2.1 RLSQ – Key Drivers

With rising consumer expectations and increasing competition, logistics service quality is the most critical criterion for survival in today's world. The service quality key drivers (factors) that impact customer satisfaction are – communication quality, Information systems (IT) quality and Reverse- logistics processes Quality (RP)—listing the drivers in priority ranking order, based on the SEM model values.

Information Systems Quality –

Returns are challenging to manage in e-commerce. Adopting advanced IT systems is essential for customer satisfaction in the suggested framework. The following items play a crucial role in improving the RLSQ are -

- Chat-Box facility
- Timely updating of the information for returns
- Digitization of the entire process.
- Mobile apps for real-time tracking.

The above items are essential for the robust IT quality that the customer expects from the retailer. The e-commerce retailer should incorporate the same to enhance customer satisfaction.

Reverse Process Quality –

From a customer perspective, an effective RL process is a key to customer satisfaction. A customer is disappointed if the company does not pick up the product as per the commitment. The framework proposes that the e-retailer pay attention to reverse logistics processes to boost customer satisfaction. Few determinants that are vital for the improvement as per the framework are -

- The collection was per the committed time.
- The service was free of cost.

- Re-sealable return package.
- The pick-up location's adaptability/flexibility.

The key drivers for the RLSQ framework are described from the customer perspective. Still, to find a complete solution for a business issue and direct the firms to a customer-oriented solution, it is equally important to look at the RLSQ enabler. These RLSQ enablers are the provider's logistical capabilities. If the company lacks capability, it can be a significant source of poor quality.

Communication Quality –

Customer experience is vital for the growth of B2C e-commerce. Communication quality is essential (must have) for a sustainable e-commerce business. Within the communication, specific items are of significance to enhance service excellence.

- The website navigation for returns has to be quick.
- The returns request is easy to complete.
- Need for a prompt customer service notification for exchange and returns
- Satisfactory explanation and communication for the return request from the customer service.

A website toolbar is a series of links organized as a menu on the webpage. Most websites include a menu at the top of the page or the FAQ section, which is challenging for a new customer to navigate. A local customer, specifically in UAE, is also looking for localization (Language) of the navigation buttons. Ease of returns is one of the most critical aspects the customer considers before loading the shopping cart, so website navigation is essential. Further, most of the existing exchange and return notifications are auto-responses. The longer a consumer waits to respond to a customer complaint, the more dissatisfaction. The customer expects a prompt and proper response from the customer service with appropriate tone and information. Notifications provide customer

awareness of their exchange and expected delivery time, removing anxiety from the online buying experience and elevating the overall customer experience.

7.*3* RLSQ – Enablers

A company's internal capabilities and techniques to perform reverse logistics operations effectively are reverse logistics capabilities. Lack of capabilities can act as a barrier to the service quality offered. So, the company needs to enhance its capabilities as per the customer's expectations.

- **Communication Capability**

The empirical analysis reveals that the logistics provider currently communicates internally (within the company) via email or EDI notification. Externally the communication with the stakeholders is on web EDI or email notification. The current system allows communication only through email or a webpage. The customer expects communication through multiple channels. Based on customer expectations and the logistics provider's capability analysis, the framework suggests a multichannel communication capability for the logistics provider to manage the service quality performance. In the case of returns, the customer is expecting personalized communication also. Live and social media chats (Facebook, Instagram, etc.) need to be integrated with other communication channels for young customers.

- **Information system Capability**

The study shows that dedicated and advanced information technology systems are lacking in the reverse logistics process. The system is based on EDI, and integration and collaboration with the internal and external stakeholders are lacking. The framework proposes the need for real-time visibility across the reverse supply chain. The process consists of five steps - collecting, sorting and stage, processing, evaluating, and support —practically all businesses share, regardless of industry or product. To customize and manage the process efficiently.

- **Reverse Logistics Capability**

In general, returned products may include a wide range of products returned by various carriers and in an unlimited number of shipments, either on whole pallets or in individual containers – a very different method than when the items are shipped out to the customer. There is a need to transition toward automated procedures to lower the RL's high operating costs and lead times. Activities inside the warehouse, in transit, at the customer location and information exchange between the supplier, retailer and logistics provider must be automated and integrated. Distribution centres (DCs) should have a dedicated workspace for handling returns. Establish an SOP for handling inbound shipments and train workers to effectively manage returns, assess items, consolidate, and refurbish.

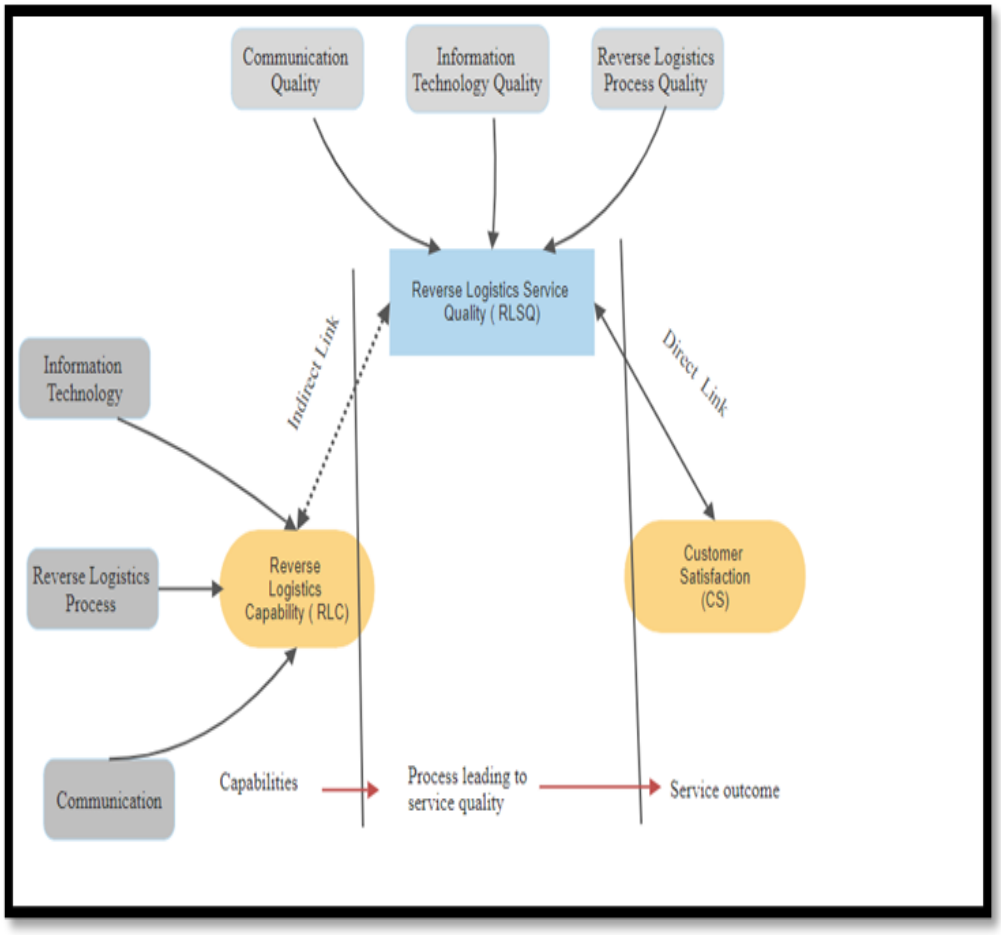


Figure 7. 3 Key drivers and enablers in the RLSQ Framework

7.4 Conclusion

This chapter concludes the framework developed to improve the RLSQ to enhance customer satisfaction in B2C E-Commerce based on empirical evidence of the customer expectations and providers' logistical competence. The next chapter discusses the study's conclusions, recommendations, limitations, and future research scope. Lastly, it underlines the contribution to both academics as well as industry.

CHAPTER – 8

CONCLUSION AND RECOMMENDATION

The chapter reveals the study's conclusion, highlighting the significance of the framework for RLSQ to improve customer satisfaction in the B2C E-commerce sector. Premised on the RLSQ variables and their significant impact on customer satisfaction, this research aims to contribute substantially to academic and industry practitioners. Further, the chapter discusses the limitation and future research direction, followed by the recommendation on the results. This chapter also provides an insight into the literature gaps addressed by this study.

8.1 Conclusion

Reverse Logistics has always been an underrated organizational function. During the Covid times, the customer had a compulsion to embrace digital shopping. With this change in customer buying habits and increased online shopping, the expectation of easy returns and seamless service has gained significance. Customer satisfaction for reverse logistics service in e-commerce has thus gained strategic importance in online retail. Academic and industry practitioners concluded that RL's service offering is vital for improving customer experience and competitive differentiation in the B2C e-commerce business. (Sajjanit & Rompho, 2019);(Jain et al., 2021);(KPMG, 2017)

More importantly, the UAE being the hub of retail and cross-border trade, the customer demand for service excellence is the key driver for business survival. Understanding the consumer and providing service that satisfies their needs is critical to guarantee that a service offering meets their expectations.

Thus, understanding customer demographics and expectations and exploring the provider's logistics capability are the building blocks to a robust foundation for customer satisfaction and retention in e-commerce.

The literature review revealed that various studies are available on Reverse Logistics. However, examining the customer expectation specific to RLSQ and exploring the provider's service capabilities to provide a holistic solution is novel research in the B2C e-commerce sector. This study bridges the gap by adding the customer behaviour and service co-creation aspect to reverse logistics, thus contributing to the marketing and logistics domain. Finally, the framework developed for improving RLSQ identifies the specific enablers and drivers that directly and indirectly impact overall customer satisfaction. Based on the theoretical framework of SD Logic, the thesis builds up a customer-centric approach to logistics and provides a comprehensive solution.

8.2 Discussion for Research Objective # 1

The study's first aim is to understand the customer's demographics, which would eventually provide plausible inference for customer segmentation and create an effective RL strategy for customer satisfaction.

Customers across the globe and now accustomed to return policy and returning products online. During the pre and post-pandemic times, the e-commerce sector witnessed a boom in customer returns due to a liberal return policy. But product returns contribute to customer dissatisfaction and increased costs in the online retail sector. Companies should strategically investigate the product returns to build customer relationships for long-term retention and repurchase. Strategically linking the product return logistics, i.e., Reverse Logistics can help create a superior customer experience.

As the customer initiates the process of RL and is engaged in the entire process as a co-creator of service, the retailer must analyze the customer demographics to provide personalized service. The results of RO#1 provide us with an insight into the customer demographic traits. According to SD logic theory, it is

essential from the perspective of corporate strategy to offer value addition in collaboration with and for consumers.

This study provides comprehensive information on the customer's demographic traits, which helps determine customers' return behaviour. This study's cross-tabulation of quantitative data for 322 respondents revealed meaningful insight into customer profiles. More importantly, e-commerce is gaining traction in the UAE and other emerging economies due to evolving consumer buying behaviour and digital penetration, so the findings are highly relevant for e-retailers.

The demographic traits include - Gender, age, occupation, internet usage frequency, frequency of online shopping, and types of companies for shopping on one side. On the other side, gauge the return experience – product category returned, frequency of return, return channel used and companies to which the customer returns. Customers' behaviour toward online shopping and returns will help e-retailers design service offerings and a strategic vision for the industry to customize the service. Based on the results, the qualitative inference suggests a customer return matrix (discussed in chapter 7), which will help prioritise the service based on value, volume, and product category to the customer.

8.*2.1 Theoretical contribution of RO #1*

Due to the available heterogeneity of individuals in the co-creation of service and value proposition (Vargo&Lusch.,2014.), each customer's socio-demographic traits might culminate in developing customized offers that may enhance the decision-making process and satisfaction levels.

Further, it adds to the existing academic literature and narrows the gaps derived from a review of related literature. –

- **Gap 1**: Despite previous researchers' suggestions, logistics and marketing efforts need to be integrated to enhance the returns of RL systems, particularly in the B2C sector (D. A. Mollenkopf et al., 2010);(Chen et al., 2011) Yet, RL research in the past has paid

limited attention to marketing concepts (Ambilkar et al.,2021), (Dias et al.,2019), (Zhang et al., 2020),(Bernon et al.,2016).

- The research findings contribute to reverse RL and service quality management literature by integrating marketing and logistics functional areas and combining the core idea of the SD logic theory (Vargo & Lusch,2004) and the expectation–disconfirmation paradigm(Oliver,1980) to return a product.
- Service-dominant theory (SD logic) states that the customer is the cocreator of service. Still, the advantage is only leveraged when underlying resources from other functional units contribute to RL is unique in the online B2C sector as the customer initiates the activity but is completed with the resource interaction with the logistics provider. This research explores the customer demographic characteristics (part of consumer behaviour) and links the same for logistics services, thus, building a unique cross-function underpinning SD logic theory.

- **Gap 2** – Past research in the RL management domain mainly was focused on improving the business processes and operations (Brito & Dekker,2002);(Scariotta,2003);(Srivastava et al.,2006); (Genchev,2007);(Akdoğan & Coşkun, 2012);(Govindan & Bouzon, 2018) in B2B context. Further, reverse logistics is gaining prominence with the expansion of B2C online shopping. Recently (Sajjanit & Rompho, 2019) and (Hjort & Lantz, 2016) highlighted the importance of a customer-centric approach to RL. Specifically, in RL, (Timo Rintamaki,2021) studied the planned and unplanned returning habits. But demographic traits, return frequency, type of return and its cross-linkage with age, gender, occupation, and delivery channels are rarely researched.
  - The research fulfils the theoretical gap by focussing on customer orientation in RL. Including customers as service co-creators

will build a value proposition in RL. The study is novel as RL management is still developing, and none of the previous authors has viewed SD logic's application to enhance customer experience.

- Additionally, the study links customer expectations and customer satisfaction for RL services. Understanding customer expectations and building strategies to narrow the gap is the base of the Expectation- Disconfirmation theory, which is reflected in the empirical results.
- Understanding the demographic traits of the customer is the first step toward building a foundation for a long-lasting relationship with the consumer. Highlighting the relational aspect contributes to SD Logic and Expectation – Disconfirmation Paradigm.

8.2.2 Managerial Contribution

The "one-size-fits" approach in the current competitive environment is no longer effective in the highly competitive e-commerce environment. (Hjort & Lantz, 2016) ; (A. Sharma, 2021). Findings and the conclusion of the demographics of the respondents will enable the practitioners to categorise the customer, which would help in the customization/personalization in RL management. Practitioners could then appropriately develop the returns strategies for each segment and category to increase customer satisfaction. A personalized experience enables business to differentiate and drives loyalty from customer.

The study suggests that industry practitioners pay attention to marketing and reverse logistics interfaces and demographic traits while designing the RL programs. The customer return behaviour matrix further categorises the customer segment for value creation and developing a satisfying long-term relationship with the customers.

8.3 Discussion for Research Objective #2

The study's second objective was to examine the linkage between RL service quality and customer satisfaction. SEM analysis validated the relationship between RLSQ variables and customer satisfaction.

Factors like Communication Quality, IT System Quality, RP Quality, Convenience, and Empathy measure the customer expectation for the RLSQ in the B2C context. In a B2C context, anticipating consumer expectations is fundamental to providing superior services. According to the expectation-disconfirmation paradigm, consumers use their expectations as reference points to assess a company's performance. (Oliver, 1980). Also, customer engagement in the value addition and co-creation process (Vargo & Lusch, 2004) to improve returns service provides a holistic foundation for service offering. In logistics services, the customer expectation and perceived value are considered input into the service provider's process(Bolton et al., 2014), (McColl-Kennedy et al., 2012). The results of customer expectations collated after the SEM path model reveal that the quality of Information Technology, RL process, and communication significantly impact customer satisfaction in reverse logistics service quality.

A customer expects accurate, advanced communication on shipment pickup, exchange time and return of new packets, and information related to delays is key to providing a world-class customer experience. Further, customer experience is becoming increasingly dependent on high-quality service processing.

Utilising technology to streamline the returns process can also improve customer retention. The retailer should offer easy-to-use return options through multiple platforms that satisfy varying customer preferences. Customers should be able to make a return using any channel appropriate for them, such as a webpage, phone, or physical store. A return label is one of the essential items that a customer expects to be included with every order for easy return.

8.3.1 Theoretical contribution of RO # 2

- **Gap 3:** Past literature on product returns and RL is designed to focus on aspects such as return policy (Hsu, 2005.);(Anderson et al., 2009);(Dailey & Ülkü, 2018);(Rintamäki et al., 2021) and reasons for the return (Brito & Dekker, 2002); (Foscht et al., 2013); (Powers & Jack, 2015); (Walsh & Brylla, 2017); (Joshi et al., 2018) or forecasting returns (Bienstock & Royne, 2010); (Amit Potdar, 2009). Though many articles on customer dissatisfaction with the RL process have been published (Gallagher & Simpson, 2013); (Frei et al., 2020) and (Kats, 2021) but none of the authors still have explored the service quality perspective of RL, which links customer expectations and satisfaction.

- This study provides an in-depth insight based on the results obtained from the SEM Path Model, which strongly indicates the RLSQ factor's relation with customer satisfaction. The statistical significance of factors on customer satisfaction contributes to the theory of expectancy- disconfirmation paradigm (Oliver 1980), as previously RL factors were not viewed as a significant contributor to customer satisfaction.

- The results reveal interfaces between the customer and the RL service provider at three levels - communication system, information system, and RL Process. The findings support SD Logic's main ideas, particularly its customer-oriented service approach, which examines the relationship between service factors and customer satisfaction.

- The RLSQ framework suggests the key driver and enablers specifically in RLSQ, thus bridging the knowledge gap and showing the interface between the logistics services process and marketing to offer value to the customer as pinpointed in the SD logic theory.

- **Gap 4:** Most of the research in the Middle East (specifically UAE) is at a very nascent stage. In the B2C e-commerce business, there is a scarcity of research on assessing consumer behaviour and reverse logistics. (R. P. Saxena et al., 2018);(Shoaib & Sayani, 2016);(Singh & Singh, 2014) .In UAE, previous literature focused on e-commerce adoption and growth in the industry. (Shoaib & Sayani, 2016); (Siddiqui, 2008); (Ahmed et al., 2020)

    - The comprehensive study on the e-commerce sector in UAE is novel. Additionally, reverse logistics and marketing is a unique cross-function study for the region.

    - Secondly, empirically validated data based on the large sample of customer expectations on RLSQ is an exceptional contribution to the region's academic literature.

8.3.2 Managerial contribution of RO # 2

The research identifies the areas in the logistics which act as a barrier to service quality – such as information quality, reverse logistics process, and communication. Companies should integrate the entire operation and provide real-time visibility with the help of emerging and innovative technology.

As concluded by many authors, the " one size fit " approach does not work for service, especially in B2C E-commerce. (Joshi et al., 2018), understanding the expectation, demographic traits, and product return frequency will help the enterprise develop a customised service excellence solution. This study provides empirical evidence of the importance of service quality in the success of B2C e-commerce to both e-commerce and supply chain managers. The identified factors of the RLSQ which impact customer satisfaction will benefit practitioners to revamp the strategies for improvements.

The findings show that organizations should actively engage consumers in the RL Process for value enhancement. A service improvement strategy should also be developed based on their needs and expectations.

8.4 Discussion for Research Object #3

The third objective of this study was to explore the resource and capabilities of the logistics provider (3PL) because to improve the service quality, the orchestrator is the internal capabilities. Further, based on the empirical results of Path -1 and Path -2, the study aims to develop a framework to improve RLSQ and provide a holistic customer-centric solution in the B2C context.

With most customers shifting to online shopping, the logistics provider must re-evaluate the barriers/capability to enhance customer satisfaction. Logistics capabilities are now the "backbone "of B2C online operation, and as emphasized in this framework – the logistics capability impacts the service to the customer.

In B2C reverse logistics, the logistics provider enhances the service experience. Hence, it was essential to analyse the logistics capability. The comprehensive study focussing on the logistics provider was on logistics service barriers, i.e., capabilities and resources that act as a barrier to RLSQ. Path – 2 empirically examined the link between the logistics capability and the service quality in RL in B2C E-commerce. The results reveal that the key enabling capabilities that act as a significant barrier in the RL - are the lack of multiple communication channels between the various stakeholders in SC, delay in information flow between the entities, and fragmentation due to the lack of integrated IT systems.

Results reveal that most companies have software systems (ERP) that integrate internal capabilities, but the information is loosely connected to external providers and often communicated via email. To reduce error and manual work, the 3PL should adopt technologies for extended supply chain integration

Fragmentation in the IT system leads to a lack of real-time visibility, the weakest link in the operational process. The RL study provides evidence that Internal and external integration issues are significant cost drivers in RM processes, where information system capabilities are a substantial obstacle(Bernon et al., 2016). Innovative practices such as a robust gate-keeping function gather information and apply rule-based processing in the life cycle of a return. Also, an easy and convenient method for the customer has become necessary.

Thus, the results show alignment with the theoretical premises of SD Logic, which emphasizes that service is not a standalone marketing activity but linked with the resource and operational capability of the provider. And the internal capabilities of the provider ultimately add value to the customer experience. (Piercy, 2009); (Fernandes et al., 2018). The study contributes to the ancillary theory of RBV by exploring the link between an internal company's quality and its performance.

Further, it asserts that the type, amount, and nature of an organization's resources and capabilities are significant drivers of its value proposition. (Vlachos & Ip, 2016);(Jack et al., 2010)

As a result, it's critical to mention the barriers and challenges that obstruct reverse logistics adoption. This research empirically investigated the lack of capabilities in the RL operation that impact the quality of service offered to the customer through a questionnaire survey of the logistics provider. Organizational capabilities are created by combining collaborative resources to provide a competitive advantage. This research focuses on the linkage between capabilities and logistics service. For this, ANOVA is used to analyse the correlation between the capabilities and the service quality. The logistics provider's lack of capabilities impacts the RL's logistics service quality because, as per our data analysis, around 73.6% of the companies outsource the logistics services.

Further, 26.4 % agree with facing communication system barriers in reverse logistics. Only 12.5 % per cent feels that communication in reverse logistics is good, and customer is satisfied with it. The return operational handling process is considered by 33.3 % as a barrier. 15.3% feel it is adequate and needs no improvement. Real-time visibility and lack of innovative processes and technology in reverse logistics service are barriers to customer satisfaction. Lack of coordination between the customer and retailer is a barrier and impacts the services offered to the customer. According to the logistic provider, other barriers are knowledge and financial investment, which do not affect the service quality. As per the findings, 60 % of Logistics providers for online retailers consider reverse logistics activity to be "important" and would like to invest capital and knowledge in developing the same to enhance the service quality.

The results indicate vital information about the existing capabilities and the scope for improvement to enhance the service quality. Most service providers have a standard operating process for the return services and mobile apps to communicate but do not have a dedicated chat box or human intervention to handle customer grievances. While evaluating the customer expectation, we found that the customer feels that interaction on a real-time basis will enhance the service quality. Further, most service providers lack the external integration capability, i.e., process and IT integration with the customer and retailer; this leads to a longer lead time for pick-up of the exchange or returned product. Most of the service providers' information system capabilities are limited to EDI and ERP software.

Regarding return handling capability, the service provider does provide advance notification through web and mobile apps but does not have flexible pick-up per the consumer's convenience. Thus, based on customer expectations and logistics provider capability, the researchers provide a framework that describes the factors impacting customer satisfaction and step-by- leads managers to make decisions that break away from the typical internally focused approaches. The framework suggests that better logistics value cocreation performance and its

impact could help firms establish processes to achieve future logistics service improvements.

8.4.1 Theoretical contribution of RO # 3

- **Gap 5:** Previous authors discuss logistics capability either as a tool for cost-saving (Jack et al. 2010),(Vlachos., 2016) logistics network (d. Liu 2014). However, (Ramírez & Morales, 2011);(Hao, 2014) concluded that logistics capabilities impact the organisation's performance. However, limited research is available on RL, highlighting that lack of capabilities impacts the service quality specific to B2C e-commerce. Most RL barriers are in the manufacturing sector and focus on firms' logistics capability associated with the cost and material transaction capabilities. (Braunscheidel & Suresh, 2009); (Waqas et al., 2018)
    - The current research fulfils the theoretical gap of analysing the provider's logistics capabilities in the context of customer return. The study establishes a linkage between the RL capabilities and the service quality in the operations, identifying the current barriers to implementing a robust customer return process. The researcher emphasizes that the providers need to pay attention to and develop the capabilities incorporating the theory of Resource-based View RBV (Barney, 1999) (Gligor & Holcomb, 2012b)to build a strategic competitive differentiation.
    - Through this research, the relation among resources that creates value has been recognized. The empirical results show that capabilities/ resources and services are the two sides of the same coin. The research contributes to the existing RBV theory by exploring 3pl capabilities in managing the services.
- **Gap 6**: Specific to RL Process, past research in B2C e-commerce has highlighted a lack of competencies in RL handling (Hao, 2014), process complexities, Top management negligence, IT and communication (Paris et al.,2015); (Quynh-vo & Hong-Vo, 2015) in B2C e-commerce, which

together impacts RL performance. However, these analyses were in the B2B context. Moreover, (Govindan & Bouzon, 2018) concluded that 3PL has a vital role in managing the RL and highlighted that lack of internal capabilities can lead to poor performance. But like others, this study was a case study of a tire manufacturing company, i.e., B2B.

- This research contributes to the existing RL areas in many ways – firstly, the study explores the RL of the 3PL in B2C.
- Secondly, the research empirically establishes the significance of three essential capabilities - Information Technologies, Reverse Logistics process and Communication and their linkage with the RLSQ, which contributes to the existing RBV theory.
- With the 3PL's capabilities in RL identified, the research uniquely suggests that these are the enablers in service that indirectly impact customer satisfaction.
- Specifically, the results reveal that lack of real-time visibility, lack of innovative technologies and processes integration in RL is the current gap in the existing capabilities of 3PL. This study is novel to e-commerce returns management for linking the lack of internal capabilities with service quality in e-commerce.

- **Gap 7:** Overall, there is minimal research on RL in the Middle East region. In the UAE, there is a void of empirically tested research on the logistic capabilities of 3PL.
  - The research contributes to the regional academic knowledge as very few studies of reverse logistics have been conducted in the Middle East.
  - As a logistics hub, with cross-border e-commerce rising in the region, understanding the logistics capability of the 3PL will contribute to academics and industry.
    - **Gap 8:** Past research in logistics mainly followed two distinct directions either highlighting the overall e-service quality (John Mentzer & Flint, 2001); (Rao et al.,2011); (Bienstock & Royne,

2010)(Li & Lu, 2019) or the logistics capability to enhance the process and optimize the resources within the organization. (Ramírez & Morales, 2011);(Choy et al., 2014); (Davidavičienė & Al Majzoub, 2021).

- This research contributes to the literature a complete service quality framework identifying the linkage with the logistics capability and theoretically linking customer satisfaction in B2C e-commerce. The study develops a dyadic approach between the RLSQ and RLC (Reverse logistics service quality – Reverse logistics capability. Qualitative inference shows a plausible relationship with customer satisfaction. The overall results of the reverse logistics capability study align with triadic research conducted by (Fernandes et al.,2018) in the manufacturing sector.

8.3.3 Managerial contribution of RO # 3

For the practitioner, it is imperative to know the critical enablers related to service performance to develop improvement strategies. This research provides the critical enablers that support the RL efficiency and the factors specific items in each area that will help the industry plug the gap between capability and performance. Managers can use the framework to formulate strategies and plan long-term investments to seamline the process to enhance customer satisfaction. Among the possible managerial implication, it is believed that the model can contribute to e-commerce organization development and aims to guide the manager about essential information for decision making regarding the service factor and capabilities to ensure customer satisfaction in reverse logistics.

This study indicates that service quality is linked to capability, suggesting that service quality excellence will be unattainable until the organization develops logistical capabilities. Hence, to improve logistics service quality and customer satisfaction, the logistics manager must integrate the TMS and WMS data(Wanganoo et al.,2021). Companies must develop and integrate technology

and processes with the logistics service providers engaged in RL to ensure customer satisfaction.

Insights on the relationship between logistic capability and service quality will help practitioners focus on RL enablers. This study will help the practitioner create and develop specific logistic capabilities and understand the importance of integration and collaboration to provide real-time visibility across the Supply chain.

Post- Pandemic, online shopping has become a habit. Hence a quality service offering in RL will help differentiate and attain a competitive edge in the marketplace. Furthermore, this framework will help develop strategic collaborative relationships with the supply chain partners. Thus, the study contributes to the base theory of service-dominant logic by developing a customer-oriented framework in reverse logistics services that help create value. Secondly, the results contribute to the ancillary theories expectation disconfirmation paradigm as is being used in understanding the customer's expectations RL. Though this theory is often used in logistics, RL rarely acknowledges customer expectations. Finally, the resource-based view captures the capability of the logistic provider. The result of the study indicates the link between resources and RLSQ to create value for the customer. These two aspects of the current study contribute to the SD Logic and RBV theory.

With the increase in e-commerce sales, the returns have increased and will always be there. The companies, through the research, get an insight from the consumer perspective. The study is expected to increase the understanding of reverse logistics service quality and logistics service capability.

The current research also represents one of the first efforts to develop a framework to improve the Reverse Logistics service quality of the B2C E-commerce sector in the UAE. The framework will benefit the stakeholders involved in decision-making, planning and executing their operations.

8.5 Limitations and Future Research

Meaningful conclusions have been drawn through the in-depth SEM modelling to understand Reverse Logistics Service Quality & co-related it to the logistics capability. However, like any other research, this study has limitations.

This research has considered product returns concerning catalogue retailers or e-retailers. Our research findings indicate that product categories returned the most are apparel, footwear, and Electronics. Future studies specific to these might provide an in-depth understanding of the customer expectation and perceived risk for low-value and high-value product categories.

Based on the literature collation and the practical basis, this research divided the Reverse Logistics Service Quality (RLSQ) into five determinants (factors) according to the B2C e-commerce retail industry and logistics service operation process. In the future, other angles and combining attributes of reverse logistics can provide different dimensions of reverse logistics service quality.

In this study, the data was collected from respondents based in UAE; future researchers may explore multicultural comparative study between different cultures / Sub-cultures and the perceived risk in reverse logistics service quality. Cross-culture comparative research can provide insight into customer behaviour and marketing support in developing future strategies.

The second part (Path 2) of the study focused on exploring the provider's RL Capability and its linkage with reverse logistics service quality. The study used 3PL as the sample population for the study. In the future, a focus group interview / qualitative data from the e-retailers to get more insight into the logistics capability.

This study only considered the logistics capabilities and the barriers in context to domestic or local operations. Future studies can explore the logistics capabilities required for cross-border e-commerce. The study does not involve returns across countries, wherein the operations are much more complex.

Though the study considers a sizeable percentage of the logistics provider and has provided a meaningful insight, real-time visibility is one of the most significant barriers to service quality. In the future, a larger sample of the logistics provider may help to understand other attributes of the logistics capability that moderately impacts the service quality in the context to reverse logistics in B2C.

One of the major objectives of this study was to focus on the relationship between logistics capability, logistics service quality, and customer satisfaction in the B2C e-commerce context. The results highlight various barriers which could be avenues for future research. It would be beneficial to examine a comparative study of return logistics capability and its link to service quality performance in two different countries. Also, future research can analyse the mediating effect of other variables.

8.5 Recommendation

As this study has focused on customer satisfaction and improvement in the capabilities to enhance the performance at different stages of Reverse Logistics in B2C E-commerce, the recommendations are as follows -

- An unhappy customer needs personalised service. So, firms should study the demographic traits of the customer and provide after-sales service as per the customer's needs and desires.
- Customer returning the goods needs highly responsive and reliable communication. Rather than auto-response in the email, it recommends a chat-box facility with human interaction.
- The 3PL / Retailer should reduce the lead time of product exchange, and internal progress on compliance status should be provided to the customer to keep them engaged in the process.
- Establish multiple communication channels and drop points to make it easy and convenient for the customer.
- GENZ (18 yrs. to 21 yrs.) customers are active mobile app users, frequent online buyers, and product returners. Firms should focus on their service needs and align the IT systems accordingly.

- Cross-border returns are higher than local; hence, global companies should develop a localization strategy to reduce lead time for exchange and refund.
- Training employees should handle the distressed customer within the company's dedicated team, as it’s a complex and highly skilled activity.
- There should be inter-functional dissemination of information within the organization. Further, the extended ERP system should collaborate with the other stakeholders to improve real-time visibility.
- The entire process should be paperless to reduce carbon footprints and customer experience.
- Customers should be provided with packaging and labelling material and the first delivery so that the returns for easy identification.
- There should be a process and technology integration, interdepartmental and intra-organizational, for a seamless service to the customer.
- To forecast returns and enhance the RP capabilities, companies should manage customer information data to help identify time, location, and other preferences before sending the exchange product delivery.
- To enhance interoperability, scalability, and transparency in the reverse logistics process, adopting blockchain technology for cross-border operations can reduce the lead time of the entire operation.
- The enhancement of the RL experience is based on the following principles: a) ease of return, b) traceability and c) agility. Blockchain technology can improve efficiency by fine-tuning operations, which can help companies gain a competitive advantage. (Wanganoo et al.,2021)
- An innovative solution to build around the RL enablers will improve the exchange, repair, delivery efficiency, and effectiveness.
- To enhance customer satisfaction, parcel return lockers to be provided, e.g., a local grocery store with service open 24x7, can be used as a collection and delivery point to enhance customer convenience.
- Smart Tagging uses RFID and sensor technology to link and track products/items in real-time through a cloud server.

- Companies can recapture lost costs through a practical and comprehensive reverse logistics strategy by integrating with emerging technologies to provide savings and increase positive customer experiences and interactions.

8.6 Concluding Remarks:

The chapter reveals the conclusion of the entire study undertaken to provide a holistic solution for managing reverse logistics services and providing customer satisfaction—the chapter highlight theoretical and managerial contribution. The RLSQ framework proposed in the study will help the practitioners improve customer satisfaction and logistics capabilities. The recommendations based on the study results will help the industry companies formulate result-oriented strategies.

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APPENDIX -A

PILOT SURVEY QUESTIONNAIRE

REVIEW BY INDUSTRY & ACADEMIC EXPERTS
SURVEY QUESTIONNAIRE

Part I. Respondent's profiles

1. Gender Description ( ) Male ( ) Female

2. Age …… years

3. Occupation Description :

( ) Students ( ) Employees

( ) Government officers ( ) Business owners

( ) Professionals ( ) Others, please specify……

Part II. Respondent's experience in product returns

1. Please specify the products that you have returned quite often and brands.

( ) Mobiles, tablets or any technology product please specify the brand…….

( ) Apparels , please specify the online website company ……..

() Footwear, please specify the online website company ……..

() Furniture or Household the online website company ……..

() High value accessories the online website company

( ) Others, please specify……

2. The number of times you have experience with the product returns service in online purchase in the last year.

( ) Once ( ) Twice

( ) Thrice ( ) Many times

3. Please specify the type of your requests (you can answer more than one choice)

( ) Returning with product compensation

( ) Repairing service

( ) Exchanging for the new ones

( ) Others, please specify……

5. What is the reason of product return?

_____ [open-ended question]

Part II. Customer-oriented product returns service
Rate the following dimensions of product return services:

[1=strongly disagree; 2=partly disagree; 3=neutral; 4=partly agree; 5=strongly agree; 6=Unsure]

Dimensions	**Rating Options**	**1**	**2**	**3**	**4**	**5**
Responsiveness	1. Employees/website take care of problems promptly.					
	2. Employees /website communicate effectively and easy.					
	3. Employees/website return of goods section was prominent and easy to navigate.					
Explanation	4. Employees/website provides explanation or reason for the problem occurred.					

	5. No explanation asked while returning the product.					
Empowerment	6. The employee contacted first, solves the returns problem.					
	7. Employee/ website was one-stop could complete the overall process for me.					
Reliability	8. Logistics company employed for return pick were dependable.					
	9. Double faults/ problems not found after product return and exchange.[19]					
	10. High – Value goods have high return hassles.					
Timeliness	11. Company processes the return in a short time. [26]					
	12. Company keeps the customer informed about the delivery time and date to the customers as a promise.[18]					
Availability	13. Return process is easy and available electronically. [RP]					
	14. Track and trace option is available with real-time pick up and exchange delivery. [17]					
	15. Employees dealing the product returns are knowledgeable on					

Assurance	various credit transfer methods. [15]					
	16. Company adheres to warranty and other commitments.					
Compensation	17. Company compensates for the inconvenience. [					
	18. Company compensates a customer if the return service is not satisfactory.					

Part III. Customer satisfaction on Product Returns Process

Dimensions	**Rating Options**	**1**	**2**	**3**	**4**	**5**
	19. Customer is completely satisfied with Company's entire product return process.					
	20. The return process is easy.					
	21. There was no paper work involved in the logistics process.					
	22. The collection of the return product was exactly on the time stated in the website.					
	23. Would prefer to return the product to store rather than online process.					
	24. The return process within 24 hrs.					

	25. Company's return policies are completely dependable.[43]					
	26. Return process is supported by mobile app , I am completely satisfied with the return process					
	27. Had to pay shipping charges to return the goods.					
	28. The return process was standard and same for all the products.					
	29. The exchange goods packaging was not proper.					
	30. The return process is consistent every time I have returned the goods. [44]					

*Please describe your overall experience of the returns policy, returns process, and customer service _____(open ended)

Other comments (if any) to improve the product return process

……

……

……

……

APPENDIX -B

PILOT SURVEY QUESTIONNAIRE DEVELOPMENT 1ST ROUND: REVIEW BY INDUSTRY & ACADEMIC EXPERTS (TO MEASURE LOGISTICS CAPABILITY)

1. Name of the organization	(Optional)
2. In which category would you like to categorize your organization	☐ **Manufacturing – online retailer** ☐ **Online retailer** ☐ **Logistics provider for online retailers**
3. Approximate turnover of your organization in USD MN (Millions)	(Optional)
4. Number of employees in your organization.	
5. Products category that your organization markets or provides logistical support.	☐ Clothes ☐ Footwear & Accessories ☐ Beauty & Personal Products ☐ Electronics ☐ Grocery ☐ General Merchandise ☐ Medicines

	☐ All of them
6. How do you rate the returns Policy in the online purchase agreement between the retailer and customer	☐ Not at all Important ☐ Least Important ☐ Somewhat Important ☐ Important ☐ Most Important
7. Please rate the importance of reverse logistics activity in your organization	☐ Not at all Important ☐ Least Important ☐ Somewhat Important ☐ Important ☐ Important
8. Who undertakes reverse logistics operation from customer to store or warehouse?	☐ Own transport ☐ 3PL (3RD Party Logistics) ☐ 4PL (4th Party Logistics) ☐ Nominated transporter
9. Please describe the types of returns your company receives and accepts from customers.	☐ Incorrect Size ☐ Product different from Website image ☐ Product delivered late ☐ Poor Quality ☐ Damaged product ☐ Wrong product shipped

	☐ Warranty returns

Section B – Reverse Logistics Practices and Processes.

Please indicate the presence of a communication system within your organization while initiating reverse logistics.	**Communication system features**	**Yes**	**No**	**Not applicable**
	1. Auto response to the customer is generated by the software.			
	2. A customised mail communication is sent to the customer based on the query.			
	3. Communicate through the mobile app.			
	4. EDI-based communication with the logistics provider before picking up the packet from the customer.			
	5. EDI based communication with the logistics provider after picking the packet from the customer.			
	6.No communication with the logistics provider.			

	7. Apart from the website, follow-up with customer on email/phone through the call centre			
	8. Have an integrated system for real-time communication with the transporter?			
2. Please indicate the presence of an Information system within your organization while initiating reverse logistics.	9. The company provides live track and trace to the customer.			
	10. The system provides a customer facility to chat with the customer service for the specific query.			
	11.The company has an ERP system that provides error-free reports to the customer.			
	12.We have an IoT (Cloud based) integrated system with Logistics provider for easy data collection when customers pick up.			
	13. The company has an EDI based for all logistics activity.			
	14. The company shares information with the logistics provider through email.			

3. When starting the reverse logistics process, please rank the priority of the following items.		Not at all important	Least important	Some what important	Important	Very Important
	15. The collection of products to be exchanged were as per the time and date committed on the website					
	16. The delivery operator notified in advance before the pickup and delivery					
	17.The company compensated for problems related to delivery delays.					
	18.The return service was free of cost.					
	19.The entire process was paperless.					
	20.The company provided pre-printed returned labels for easy return.					
	21. The company provides re-sealable return packaging for an easy return.					
4. Please rate the importance of customer	22. The pickup and delivery service were door to door.					

convenience in the reverse logistics process.	23.The company was flexible (adjusted the pickup time and place) at my convenience					
	24. The product could also be returned to nearby local store for easy return and convenience.					
	25. The company made a follow-up call after the returned goods were delivered (to assure the quality)					

Please rank the challenges your firm faces when undertaking reverse logistics operations.		1 Not at all a barrier	2 May be a Barrier	3 Neutral	4 Barrier	5 Significant Barrier
	Communication System					
	Information and technological systems					
	Reverse Logistics operation carried by 3PL					

	Quantity Issues					
	Resistance to change and adopt innovations					
	Lack of performance metrics					
	Lack of Skilled Manpower					
	High Cost of operations					
	Lack of Returns Handling equipment's					
	Lack of strategic planning related to RL					
	Lack of support from Logistic provider, dealers, distributors and retailers.					
	Any others, please Specify					

APPENDIX – C

Final Questionnaire – Customer Survey

Greetings!

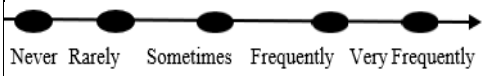
*As a Ph.D. Scholar, I invite you to participate in my study -"**Customer Perception towards Return of Goods Service Quality in E-commerce**." In this survey, I would like to capture customers' expectations and experiences regarding the company and logistics provider's quality of services while returning and exchanging the products. The survey will take about 5-7 minutes to complete. It is completely voluntary to take part in this survey. It's data collection and analysis for academic purposes. As a result, there are no unknown risks associated with this project. Your survey responses will be treated with confidentiality, and the information gathered will be reported in aggregate. You may email me at any time if you have any queries about the survey. Leena.w@gmail.com.*

Thank you so much for your invaluable assistance. Please begin the survey now by clicking below-

Customer Profile

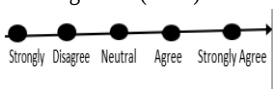
S.no	Demographics	Description
1.	Gender	☐ Male ☐ Female
2	**Age Group**	☐ 18 – 21 years ☐ 21- 30 years ☐ 31- 40 years
3	Occupation	☐ Student ☐ Homemaker ☐ Employed ☐ Business
4	Internet Usage	☐ Active Internet User ☐ Active Mobile Internet User ☐ Moderate Internet User ☐ Occasional Internet User
5	Frequency of Online buying	☐ Daily ☐ Weekly ☐ Fortnightly ☐ Monthly ☐ Once in 3 months ☐ Once in 6 Months ☐ Very Rarely
6	Online Platform used for buying	☐ website ☐ Mobile app ☐ Both

7	You prefer online buying is from companies located	☐ Local retailers ☐ Big Global companies (like -Amazon, Alibaba) ☐ Both				
8	Most frequently bought products	Perceptual Scale: Scale from 1 to 5 (1 Represents –  Never Rarely Sometimes Frequently Very Frequently				
	Clothes	1	2	3	4	5
	Footwear & Accessories					
	Beauty & Personal Products					
	Electronics					
	Grocery					
	General Merchandise					
	Medicines					
	Book					
	Others					
9	Products that I have returned most frequently	Scale from 1 to 5 (1 Represents –  Never Rarely Sometimes Frequently Very Frequently				
	Clothes	1	2	3	4	5
	Footwear & Accessories	1	2	3	4	5
	Beauty & Personal Products	1	2	3	4	5
	Electronics	1	2	3	4	5
	Grocery	1	2	3	4	5

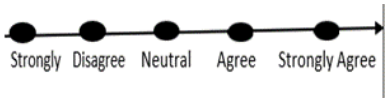
10	Have returned the products purchased online	Scale from 1 to 5 (1 Represents –  Never Rarely Sometimes Frequently Very Frequently
11	The reason for returning the product	☐ Incorrect Size ☐ Product Different from Website ☐ Inaccurate product description ☐ Product arrived late ☐ Poor Quality ☐ Product no longer needed ☐ Damaged Product ☐ Both product and shipping box damaged ☐ Wrong product shipped ☐ Product bought by mistake
12	Returned the product through	☐ Online through website ☐ Through mobile app ☐ In-store

Part II. Customer experience Reverse Logistics Service Quality

I will be thankful if you can share your return of goods feedback and expectation about the online service provider and delivery provider ticking the box of your choice for each statement below.

Dimensions		Ranking Scale (1- 5) 				
	Communication Quality					
1	The website for the return request was quick to navigate.	1	2	3	4	5
2	The website enabled me to complete the return transaction easily. (within 5-7 min)					
3	No explanation asked while returning the product.					
4	The customer service acted promptly on the complaint. (Response within max. 2-3 hrs)					
5	The customer service provided a satisfactory explanation. (in case of error wrong delivery)					
	Information Systems Quality					
6	The website provided a chat box for prompt two-way communication.	1	2	3	4	5
7	The information provided by the company on the exchange of return was timely.					
8	The company provided information on pick-up time for returned products.					
	Return Process and Operations					
11	The collection of products to be exchanged were as per the time and date committed on the website.	**1**	**2**	**3**	**4**	**5**
12	The delivery operator notified in advance before the pick-up and delivery.					
13	The company compensated for problems related to delivery delays.					
14	The return service was free of cost.					
15	The entire process was paperless.					
16	The company included re-sealable return packaging for an easy return.					
	Customer Convenience					
18	The pick-up and delivery service were door to door.	**1**	**2**	**3**	**4**	**5**
19	The company was flexible (adjusted the pick-up time and place) at my convenience					
20	Product could also be returned to a nearby local store for easy return and convenience.					
21	The company made a follow-up call after the returned goods were delivered (to assure the quality)					
	Customer Service (Empathy)	**1**	**2**	**3**	**4**	**5**
22	The customer service provided personalized service to me.					
23	The customer service gave priority to convenience and adjusted the pick-up place and time accordingly.					
24	As a frequent buyer from the company got the privilege of faster n return and exchange.					
25	The customer service was polite and solved my problem in one call.					

Part III. Customer satisfaction on overall product returns service

	Overall Customer Satisfaction	Perception Scale (1-5) 				
26	I am very satisfied with company's communication on the return of goods services.	**1**	**2**	**3**	**4**	**5**
27	I am very satisfied with the company's information systems and quality for the return of goods.					
28	I am very satisfied with the company's Return service process.					
29	I am very satisfied with the measures taken to provide customer convenience for the return of goods.					
30	I am delighted with the service representative's approach during the return of goods.					
31	The experience of the complete return of goods process was very satisfying.					

APPENDIX – D

QUESTIONNAIRE TO MEASURE LOGISTICS CAPABILITY

Greetings!

The concept of reverse logistics has played a vital role in the retail e-commerce business. As e-commerce reverse logistics is still evolving, the researcher is surveying to understand the reverse logistics or return goods management's resource and service capability. The feedback would help me to understand the current operation and practices in reverse logistics. We humbly request that you take a few minutes to complete this questionnaire. We promise to provide you with a complimentary report on consumer expectations for reverse logistics service quality and the logistics capability required to meet those expectations.

The research is solely for educational reasons. All responses will be kept strictly confidential, we assure you. Unless the individual or organization gives written permission, their names will not be utilized. The analysis and report will be done on a collective rather than on an individual or sample level.

Thank you in advance for your cooperation.

Yours Sincerely

Leena Wanganoo

Mob: 00971501139849

Brief Profile: - Currently pursuing research with the University of Petroleum & Energy, Dehradun, and working as an Asst. Professor with Amity University, Dubai. Seventeen years of experience in the Logistics and Supply Chain sector both in India & UAE. For further information, please look up my Profile at *https://www.linkedin.com/in/leena-wanganoo-a7a0985/*

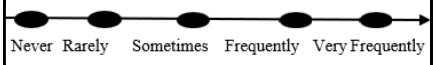
Section A – Organizational Demographic

Name of the organization	Options
In which category would you like to categorize your organization	☐ **Manufacturing – online retailer** ☐ **Online retailer** ☐ **Logistics provider for online retailers**
Please indicate the approximate turnover of your organization in USD MN (Millions)	(Optional)
Please indicate the approximate number of employees in your organization.	
Kindly indicate your job title (Please check the closer title which applies)	Business Unit head Operations Manager Warehouse Manager Customer service Manager Logistics Manager Customer service Executive Any other (Pls Specify) ……
Please indicate the product category that your organization markets Online.	Clothes Footwear & Accessories Beauty & Personal Products Electronics Grocery General Merchandise Medicines All of them
Please indicate the product category of e-commerce that your organization provides logistics support as a Logistics Provider.	Clothes Footwear & Accessories Beauty & Personal Products Electronics Grocery General Merchandise Medicines All of them Others
Please rate the importance of reverse logistics activity in your organization.	Not at all Important Least Important Somewhat Important Important Most Important

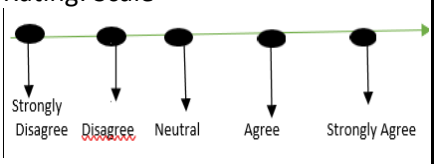
Declarations: The answers provided here will not be disclosed anywhere or misused under any circumstances

Section B – Reverse Logistics Practices and Processes.

Please tick mark against each rating response –

	Our organization receives returned goods from the customer for the following reasons.	**Rating: Scale of 1to 5**  				
	Incorrect Size,Color,texture	1	2	3	4	5
	Product Different from the online catalogue	1	2	3	4	5
	Product delivered late	1	2	3	4	5
	Poor Quality	1	2	3	4	5
	Damaged product	1	2	3	4	5
	Customer no longer needs it	1	2	3	4	5
	Wrong product shipped	1	2	3	4	5

Indicate the capabilities for Reverse Logistics

S.no	Please indicate the existing system within your organization to manage the return of goods process (Reverse logistics)	Rating: Scale  				
1	We have a standardized system to generate an auto-response communication with the customer.	1	2	3	4	5
2	We have a dedicated customer service executive to handle every customer query related to the return of goods					
3	We communicate with the customer through the mobile app.					
4	We notify the updates to our customer only through our website					
5	The system provides a customer facility to chat with customer service for a specific query.					
6	We notify the return of goods details to our Logistics provider through the EDI system					

7	We have an internal software-based system for real-time communication with the customer					
8	The company provides live track and trace to the customer.					
9	The company have an ERP system to reconcile all the data of the customer					
10	Our information system is integrated with a Logistics provider for easy data collection customer pick up.					
11	We get real-time visibility of the transport activity undertaken by our provider.					
12	The pickup of products to be exchanged is precise as per the time and date committed on the website					
13	The delivery operator notified in advance before the pickup and delivery					
14	The company compensated for problems related to delivery delays.					
15	The entire process was paperless.					
16	The company is flexible (adjusted the pickup time and place) as per the customer's convenience.					
17	The company provides re-sealable return packaging for an easy return.					

Kindly rate your opinion about the current challenges (Bottlenecks) in providing superior quality service to your customer.		1- Strongly Disagree; 2-Disagree ; 3 Neither Agree nor Disagree; 4 Agree; 5 Strongly Agree				
18	Lack of dedicated reverse logistics communication system with multiple partners in the operation	1	2	3	4	5
19	Lack of common IT operating system between the logistics provider, customer and retailer					
20	Lack of real-time visibility in the process followed by logistics provider, customer, and retailer					
21	Lack of Reverse logistics knowledge to solve the operational complexities of the logistics provider/transporter.					
22	Lack of Financial support is a challenge in reverse logistics operation [High operating cost]					
23	Lack of adaptation innovative practices and technology in RL					
24	Lack of coordination with other participants for the collection of the returned product.					

According to your opinion which operational area need more focus to improve the reverse logistics service quality – (Tick mark the appropriate choice)

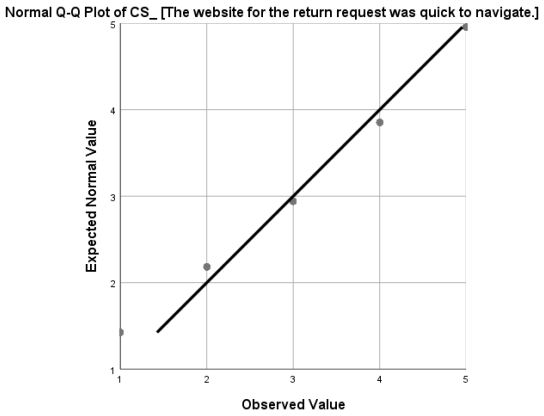
- ☐ Communication System
- ☐ Information system integration with the logistics provider and customer
- ☐ Reverse logistics process improvement
- ☐ Enhancing customer service area
- ☐ Training of internal staff to handle customer service

Thank you very much for participating in this research.

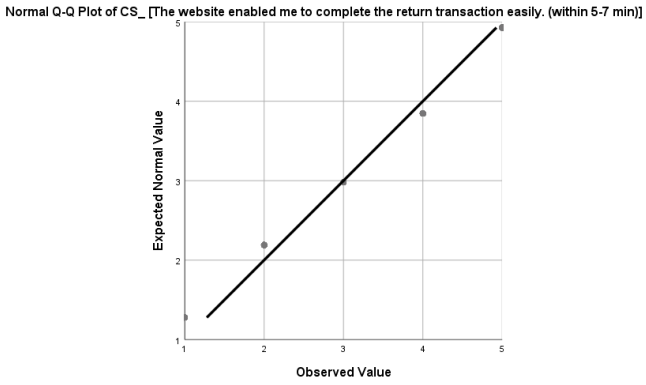
APPENDIX –E

Normality Test for Data Set -1 (Path -1)

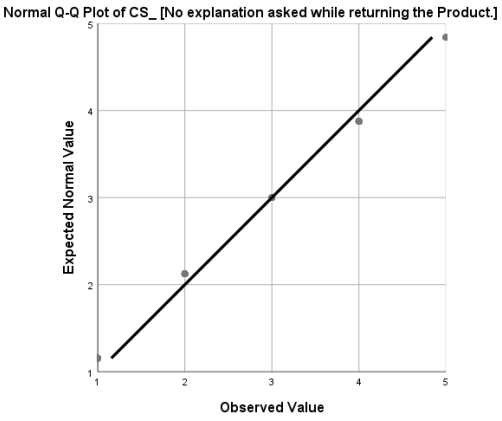
CS_ [The website for the return request was quick to navigate.]



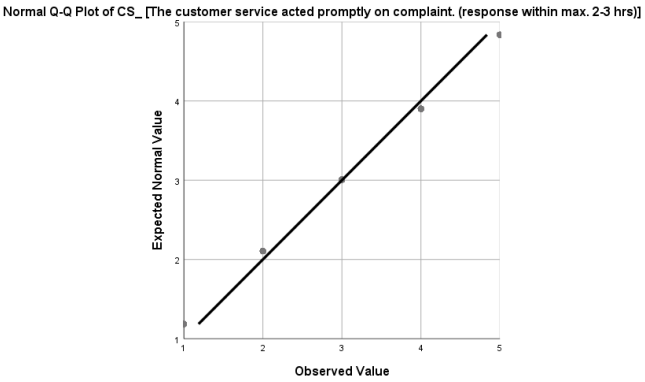
CS_ [The website enabled me to complete the return transaction easily. (within 5-7 min)]



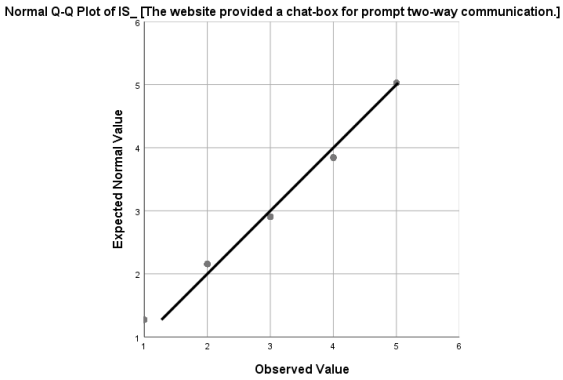
CS_ [No explanation asked while returning the Product.]



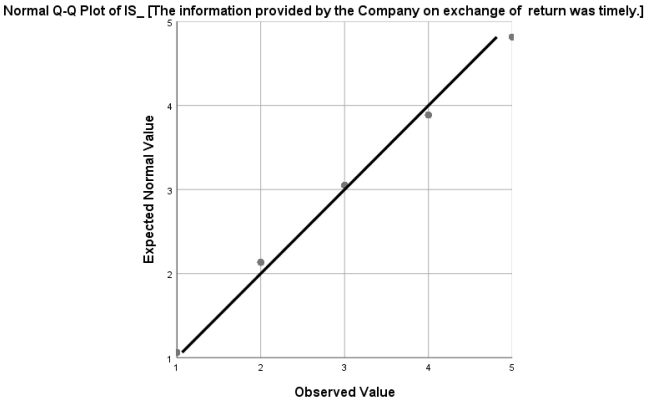
CS_ [The customer service acted promptly on complaint. (response within max. 2-3 hrs)]



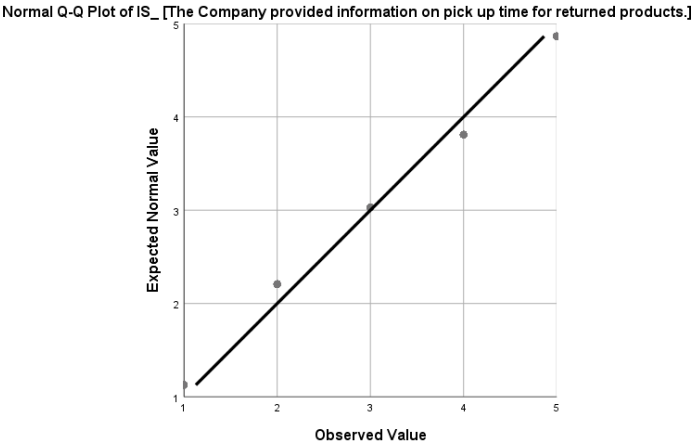
IS_ [The website provided a chat-box for prompt two-way communication.]



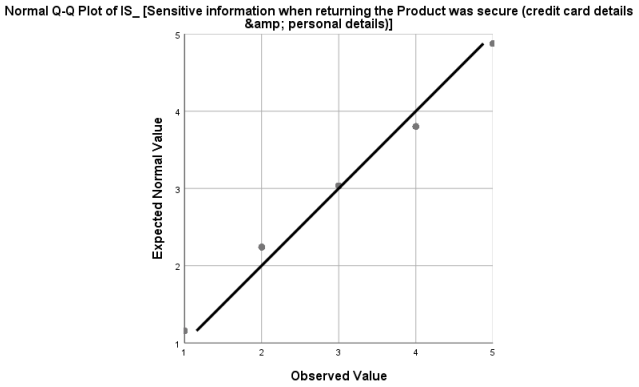
IS_ [The information provided by the Company on exchange of return was timely.]



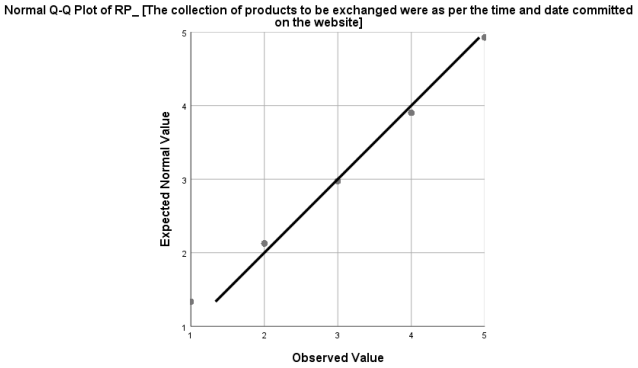
IS_ [The Company provided information on pick up time for returned products.]



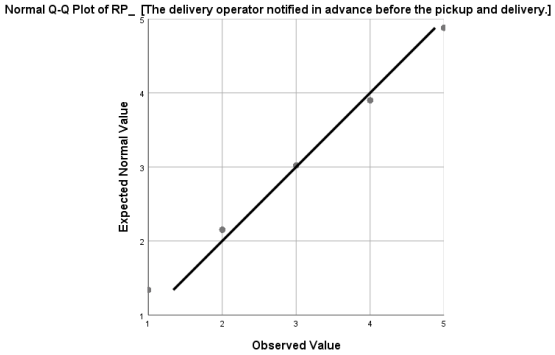
IS_ [Sensitive information when returning the Product was secure (credit card details & personal details)]



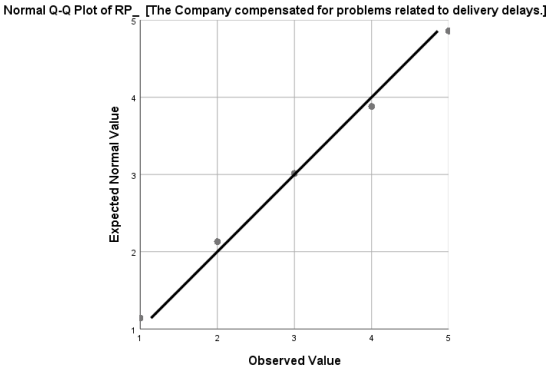
RP_ [The collection of products to be exchanged were as per the time and date committed on the website]



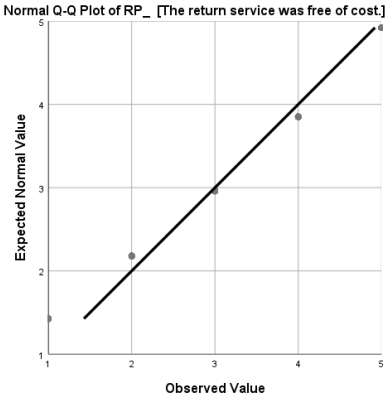
RP_ [The delivery operator notified in advance before the pickup and delivery.]



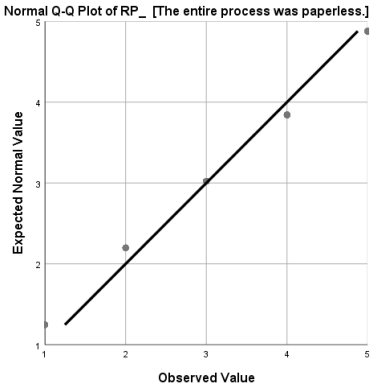
RP_ [The Company compensated for problems related to delivery delays.]



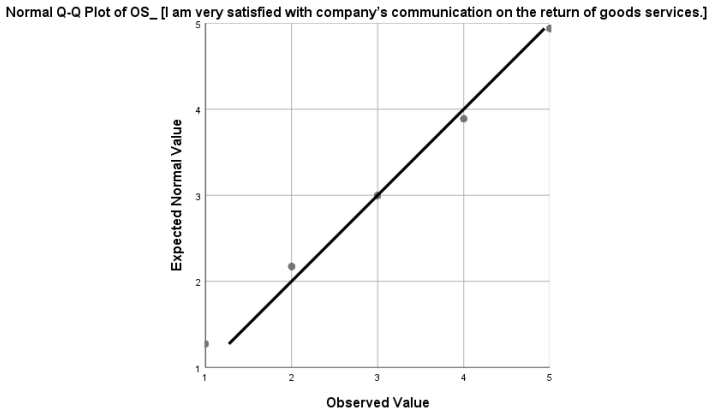
RP_ [The return service was free of cost.]



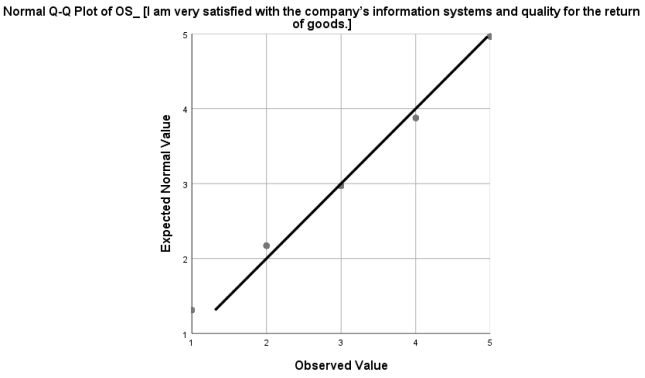
RP_ [The entire process was paperless.]



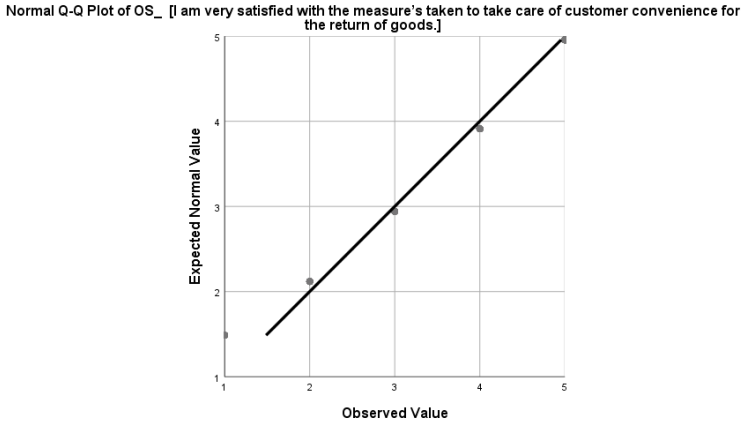
OS_ [I am very satisfied with company's communication on the return of goods services.]



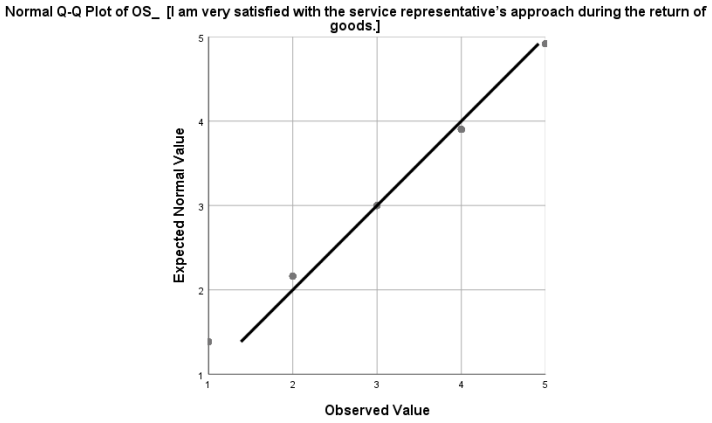
OS_ [I am very satisfied with the company's information systems and quality for the return of goods.]



OS_ [I am very satisfied with the measure's taken to take care of customer convenience for the return of goods.]



OS_ [I am very satisfied with the service representative's approach during the return of goods.]



OS_ [The experience of the complete return of goods process was very satisfying.]

We can observe in the figures of customer satisfaction that points are almost aligning to the straight line, however in the case of "The website for the return request was quick to navigate" and "The website enabled me to complete the return transaction easily. (Within 5-7 min)]", we can observe a few outliers.

In the second set of figures of Information System, we can observe that points are almost positioned in a straight line, except for the categories "The website provided a chat-box for prompt two-way communication" and "Sensitive information when returning the Product was secure (credit card details & personal details".

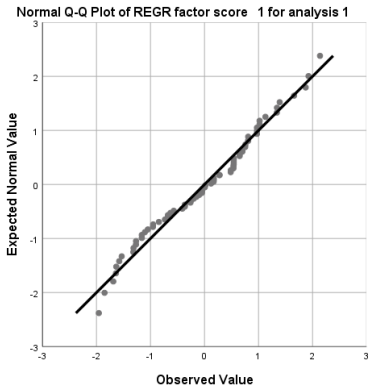
In the third set of figures of Reverse Process, points are almost aligning to the straight line; however, in cases of "The delivery operator notified in advance before the pickup and delivery", "The return service was free of cost.", and "The entire process was paperless", we can observe some outliers.

In the fourth set of figures of Overall Satisfaction, we can observe that points are normally distributed, except an outlier at the first point is observed.

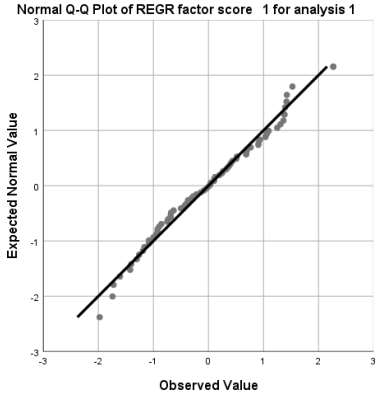
APPENDIX - F

Normality Test for Data 2 (Path -2)

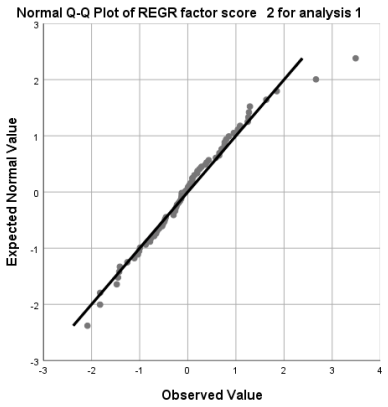
CC Factor



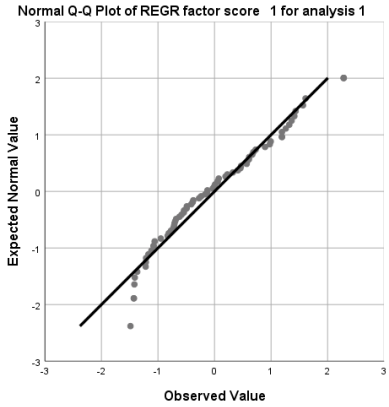
IC Factor 1



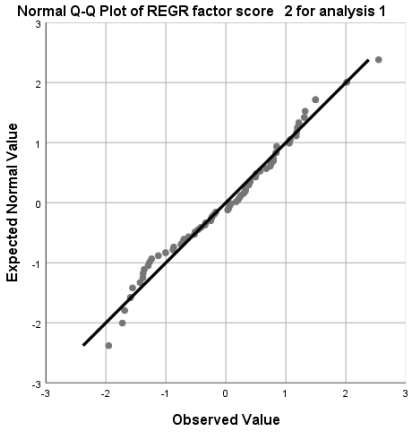
IC Factor 2



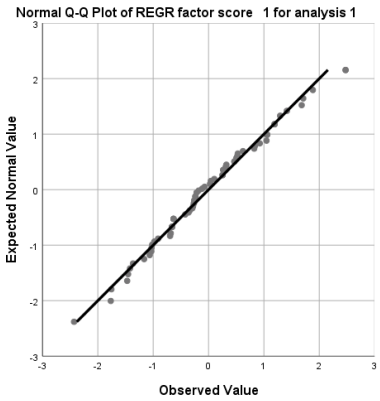
RP Factor 1



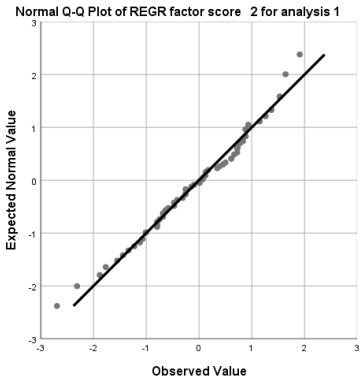
RP Factor 2



Flexibility Capability Factor 1



Flexibility Capability Factor 2



In the Communication Capabilities factor, we can observe that points almost align with the normal straight line. Again, in Information Capability factor 1, we can observe that points are in sync with the normal straight line. However, in Information Capability factor 2, we can observe outliers on the higher end of the distribution. In Return Process Capability factors 1 and 2, some outliers are observed on the lower and upper end of the distribution. Flexibility Capability Factor 1 has almost all points aligning to the straight line; thus, it is normally distributed. However, we can observe outliers in observed points of Flexibility Capability Factor 2.

In a survey dataset, every point is vital to understanding the behaviour of consumers and retailers to answer the research questions. There could be a few points where data is not normally distributed. However, due to a few points in the sample data and the relevance of the research question, I did not remove the

entries. As per Frost[1], outliers should be removed if there is data entry error, or a measurement error. While conducting the normality test, each entry in the sample data was explicitly checked , and the opinions of the individuals are valid. As suggested by Frost, an outlier increases the variability of the data, which will decrease the statistical power. An outlier can provide valuable insight into the subject-area and the collection process. As per the Central Limit Theorem, sampling will become normally distributed if I can increase my sample size. However, it is difficult to increase the sample size due to paucity of time and limited responses I could get. Additionally, most of the data points we have found align with the normal distribution and some outliers that we found are natural in the data distribution, which brings better insights to our analysis.

[1] https://statisticsbyjim.com/basics/remove-outliers/

APPENDIX -G

(CFA RESULTS)

CMIN

Model	NPAR	CMIN	DF	P	CMIN/DF
Default model	60	432.790	129	.000	3.355

Baseline Comparisons

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Default model	.909	.892	.935	.922	.934

Parsimony-Adjusted Measures

Model	PRATIO	PNFI	PCFI
Default model	.843	.767	.788

NCP

Model	NCP	LO 90	HI 90
Default model	303.790	244.416	370.764

c

Model	NCP	LO 90	HI 90
Default model	303.790	244.416	370.764

Model	FMIN	F0	LO 90	HI 90
Default model	1.348	.946	.761	1.155

RMSEA

Model	RMSEA	LO 90	HI 90	PCLOSE
Default model	.086	.077	.095	.000

AIC

Model	AIC	BCC	BIC	CAIC
Default model	552.790	560.339		

ECVI

Model	ECVI	LO 90	HI 90	MECVI
Default model	1.722	1.537	1.931	1.746

HOELTER

Model	HOELTER .05	HOELTER .01
Default model	117	126

APPENDIX F – FINAL SEM MODEL RESULTS

Variable Summary (Group number 1)

Your model contains the following variables (Group number 1)

Observed, endogenous variables
CS_Thewebsitefortheretumrequestwasquicktonavigate
CS_Thewebsiteenabledmetocompletetheretumtransactioneasily.withi
CS_Noexplanationaskedwhileretumingthe Product
CS_Thecustomerserviceactedpromptlyoncomplaint.responsewithinmax
IS_TheCompanyprovidedinformationonpickuptimeforretumedproducts
IS_Sensitiveinformationwhenretumingthe Productwassecurecreditcar
RP_Thereturnservicewasfreeofcost
RP_TheCompanycompensatedforproblemsrelatedtodeliverydelays
RP_Thedeliveryoperatornotifiedinadvancebeforethepickupanddeliver
RP_Thecollectionofproductstobeexchangedwereasperthetimeanddateco
OS_Iamverysatisfiedwithcompany'scommunicationonthereturnofgood
OS_Iamverysatisfiedwiththecompany'sinformationsystemsandqualit
OS_Iamverysatisfiedwiththemeasure'stakentotakecareofcustomerco
OS_Iamverysatisfiedwiththeservicerepresentative'sapproachdurin
OS_Theexperienceofthecompletereturnofgoodsprocesswasverysatisfyi
IS_TheinformationprovidedbytheCompanyonexchangeofreturnwastimely
IS_Thewebsiteprovidedachatboxforpromptttwowaycommunication
Unobserved, endogenous variables
OS
Unobserved, exogenous variables
CS
e1
e2
e4
e5
IS
e14
e15
RP
e22
e23
e24
e26
e39
e40
e41

e45
E17
e36
e37
E16

Variable counts (Group number 1)

Number of variables in your model:	39
Number of observed variables:	17
Number of unobserved variables:	22
Number of exogenous variables:	21
Number of endogenous variables:	18

Notes for Model (Default model)

Computation of degrees of freedom (Default model)

Number of distinct sample moments:	170
Number of distinct parameters to be estimated:	57
Degrees of freedom (170 - 57):	113

Result (Default model)

Minimum was achieved
Chi-square = 363.717
Degrees of freedom = 113
Probability level = .000

Estimates (Group number 1 - Default model)

Scalar Estimates (Group number 1 - Default model)

Maximum Likelihood Estimates

Regression Weights: (Group number 1 - Default model)

			Estimate	S.E.	C.R.	P	Label
OS	<--	IS	.455	.048	9.417	***	par_11
OS	<--	CS	.113	.059	1.897	.058	par_15
OS	<--	RP	.428	.060	7.139	***	par_16
CS_Thewebsitefor thereturnrequestwasquicktonavigate	<--	CS	1.000				
CS_Thewebsiteenabledmetocompletethereturntransactioneasily.withi	<--	CS	1.203	.127	9.485	***	par_1
CS_Noexplanationaskedwhilereturningthe Product	<--	CS	1.063	.120	8.847	***	par_2
CS_Thecustomerserviceactedpromptlyoncomplaint.responsewithinmax	<--	CS	1.072	.118	9.118	***	par_3
IS_TheCompanyprovidedinformationonpickuptimeforreturnedproducts	<--	IS	1.062	.056	18.844	***	par_4
IS_SensitiveinformationwhenreturningtheProduct wassecurecreditcar	<--	IS	1.000				
RP_Thereturnservicewasfreeofcost	<--	RP	1.105	.060	18.421	***	par_5
RP_TheCompanycompensatedforproblemsrelatedtodeliverydelays	<--	RP	.841	.062	13.639	***	par_6
RP_Thedeliveryoperatornotifiedinadvancebeforethepickupanddeliver	<--	RP	.946	.055	17.076	***	
OS_Iamverysatisfiedwithcompany'scommunicationonthereturnofgood	<--	OS	1.000				
OS_Iamverysatisfiedwiththecompany'sinformationsystemsandqualit	<--	OS	1.085	.039	27.625	***	par_8
OS_Iamverysatisfiedwiththeservicerepresentative'sapproachdurin	<--	OS	.913	.045	20.474	***	par_9
OS_Theexperienceofthecompletereturnofgoodsprocesswasverysatisfyi	<--	OS	1.050	.042	25.155	***	par_10
IS_TheinformationprovidedbytheCompanyonexchangeofreturnwastimely	<--	IS	.928	.050	18.395	***	par_17
OS_Iamverysatisfiedwiththemeasure'stakentotakecareofcustomerco	<--	OS	1.034	.041	25.015	***	par_18
IS_Thewebsiteprovidedachatboxforprompttwowaycommunication	<--	IS	1.003	.056	18.052	***	par_19
RP_Thecollectionofproductstobeexchangedwereasperthetimeanddateco	<--	RP	1.000				

Standardized Regression Weights: (Group number 1 - Default model)

			Estimate
OS	<---	IS	.498
OS	<---	CS	.088
OS	<---	RP	.422
CS_Thewebsiteforthereturnrequestwasquicktonavigate	<---	CS	.614
CS_Thewebsiteenabledmetocompletethereturntransactioneasily.withi	<---	CS	.739
CS_NoexplanationaskedwhilereturningtheProduct	<---	CS	.655
CS_Thecustomerserviceactedpromptlyoncomplaint.responsewithinmax	<---	CS	.687
IS_TheCompanyprovidedinformationonpickuptimeforreturnedproducts	<---	IS	.864
IS_SensitiveinformationwhenreturningtheProductwassecurecreditcar	<---	IS	.830
RP_Thereturnservicewasfreeofcost	<---	RP	.848
RP_TheCompanycompensatedforproblemsrelatedtodeliverydelays	<---	RP	.687
RP_Thedeliveryoperatornotifiedinadvancebeforethepickupanddeliver	<---	RP	.806
OS_Iamverysatisfiedwithcompany’scommunicationonthereturnofgood	<---	OS	.905
OS_Iamverysatisfiedwiththecompany’sinformationsystemsandqualit	<---	OS	.925
OS_Iamverysatisfiedwiththeservicerepresentative’sapproachdurin	<---	OS	.815
OS_Theexperienceofthecompletereturnofgoodsprocesswasverysatisfyi	<---	OS	.893
IS_TheinformationprovidedbytheCompanyonexchangeofreturnwastimely	<---	IS	.850
OS_Iamverysatisfiedwiththemeasure’stakentotakecareofcustomerco	<---	OS	.891
IS_Thewebsiteprovidedachatboxforprompttwowaycommunication	<---	IS	.840
RP_Thecollectionofproductstobeexchangedwereasperthetimeanddateco	<---	RP	.847

Intercepts: (Group number 1 - Default model)

CS_Thewebsiteforthereturnrequestwasquicktonavigate
CS_Thewebsiteenabledmetocompletethereturntransactioneasily.withi
CS_Noexplanationaskedwhilereturningthe Product
CS_Thecustomerserviceactedpromptlyoncomplaint.responsewithinmax
IS_TheCompanyprovidedinformationonpickuptimeforreturnedproducts
IS_SensitiveinformationwhenreturningtheProductwassecurecreditcar
RP_Thereturnservicewasfreeofcost
RP_TheCompanycompensatedforproblemsrelatedtodeliverydelays
RP_Thedeliveryoperatornotifiedinadvancebeforethepickupanddeliver
RP_Thecollectionofproductstobeexchangedwereasperthetimeanddateco
OS_Iamverysatisfiedwithcompany'scommunicationonthereturnofgood
OS_Iamverysatisfiedwiththecompany'sinformationsystemsandqualit
OS_Iamverysatisfiedwiththemeasure'stakentotakecareofcustomerco
OS_Iamverysatisfiedwiththeservicerepresentative'sapproachdurin
OS_Theexperienceofthecompletereturnofgoodsprocesswasverysatisfyi
IS_Thewebsiteprovidedachatboxforprompttwowaycommunication
IS_TheinformationprovidedbytheCompanyonexchangeofreturnwastimely

	Estimate	S.E.	C.R.	P	Label
	3.441	.066	52.303	***	par_20
	3.379	.066	51.336	***	par_21
	3.006	.066	45.868	***	par_22
	3.099	.063	49.162	***	par_23
	3.289	.070	47.092	***	par_24
	3.469	.068	50.684	***	par_25
	3.488	.067	52.367	***	par_26
	3.137	.063	50.172	***	par_27
	3.506	.060	58.407	***	par_28
	3.304	.060	54.774	***	par_29
	3.373	.057	58.868	***	par_30
	3.342	.061	54.937	***	par_31
	3.388	.060	56.291	***	par_32
	3.481	.058	59.965	***	par_33
	3.323	.061	54.489	***	par_34
	2.988	.068	44.027	***	par_35
	3.211	.062	51.773	***	par_36

Covariances: (Group number 1 - Default model)

			Estimate	S.E.	C.R.	P	Label
RP	<-->	CS	.396	.060	6.643	***	par_12
CS	<-->	IS	.342	.060	5.712	***	par_13

	Estimate	S.E.	C.R.	P	Label
RP <--> IS	.657	.075	8.733	***	par_14

Correlations: (Group number 1 - Default model)

	Estimate
RP <--> CS	.597
CS <--> IS	.465
RP <--> IS	.705

Variances: (Group number 1 - Default model)

	Estimate	S.E.	C.R.	P	Label
CS	.524	.096	5.456	***	par_37
IS	1.036	.116	8.942	***	par_38
RP	.839	.092	9.147	***	par_39
e45	.159	.021	7.621	***	par_40
e1	.865	.081	10.704	***	par_41
e2	.632	.072	8.734	***	par_42
e4	.787	.077	10.216	***	par_43
e5	.674	.069	9.739	***	par_44
e14	.398	.042	9.523	***	par_45
e15	.468	.045	10.309	***	par_46
e22	.400	.043	9.285	***	par_47
e23	.662	.058	11.512	***	par_48
e24	.406	.040	10.241	***	par_49
e26	.330	.035	9.305	***	par_50
e39	.240	.023	10.555	***	par_51
e40	.363	.031	11.587	***	par_52
e41	.242	.023	10.508	***	par_53
E17	.436	.043	10.119	***	par_54
e36	.191	.019	10.171	***	par_55
e37	.173	.018	9.416	***	par_56
E16	.343	.035	9.883	***	par_57

Factor Score Total Effects (Group number 1 - Default model)

	IS	CS	RP	OS
OS	.455	.113	.428	.000
IS_Thewebsiteprovidedachatboxforprompttwowaycommunication	1.003	.000	.000	.000
IS_TheinformationprovidedbytheCompanyonexchangeofreturnwastimely	.928	.000	.000	.000
OS_Theexperienceofthecompletereturnofgoodsprocesswasverysatisfyi	.477	.118	.450	1.050
OS_Iamverysatisfiedwiththeservicerepresentative'sapproachdurin	.415	.103	.391	.913
OS_Iamverysatisfiedwiththemeasure'stakentotakecareofcustomerco	.470	.117	.443	1.034
OS_Iamverysatisfiedwiththecompany'sinformationsystemsandqualit	.493	.122	.465	1.085
OS_Iamverysatisfiedwithcompany'scommunicationontheretur nofgood	.455	.113	.428	1.000
RP_Thecollectionofproductstobeexchangedwereasperthetimeanddateco	.000	.000	1.000	.000
RP_Thedeliveryoperatornotifiedinadvancebeforethepickupanddeliver	.000	.000	.946	.000
RP_TheCompanycompensatedforproblemsrelatedtodeliverydelays	.000	.000	.841	.000
RP_Thereturnservicewasfreeofcost	.000	.000	1.105	.000
IS_SensitiveinformationwhenreturningtheProductwassecurecreditcar	1.000	.000	.000	.000
IS_TheCompanyprovidedinformationonpickuptimeforreturned products	1.062	.000	.000	.000
CS_Thecustomerserviceactedpromptlyoncomplaint.responsewithinmax	.000	1.072	.000	.000
CS_NoexplanationaskedwhilereturningtheProduct	.000	1.063	.000	.000
CS_Thewebsiteenabledmetocompletethereturntransactioneasily.withi	.000	1.203	.000	.000
CS_Thewebsitefortherequestwasquicktonavigate	.000	1.000	.000	.000

Standardized Total Effects (Group number 1 - Default model)

	IS	CS	RP	OS
OS	.498	.088	.422	.000
IS_Thewebsiteprovidedachatboxforprompttwowaycommunication	.840	.000	.000	.000
IS_TheinformationprovidedbytheCompanyonexchangeofreturnwastimely	.850	.000	.000	.000
OS_Theexperienceofthecompletereturnofgoodsprocesswasverysatisfyi	.445	.078	.377	.893

	IS	CS	RP	OS
OS_Iamverysatisfiedwiththeservicerepresentative's approachdurin	.406	.072	.344	.815
OS_Iamverysatisfiedwiththemeasure'stakentotakecareofcustomerco	.444	.078	.376	.891
OS_Iamverysatisfiedwiththecompany'sinformation systemsandqualit	.461	.081	.390	.925
OS_Iamverysatisfiedwithcompany'scommunicationonthereturnofgood	.451	.079	.382	.905
RP_Thecollectionofproductstobeexchangedwereasperthetimeanddateco	.000	.000	.847	.000
RP_Thedeliveryoperatornotifiedinadvancebeforethepickupanddeliver	.000	.000	.806	.000
RP_TheCompanycompensatedforproblemsrelatedtodeliverydelays	.000	.000	.687	.000
RP_Thereturnservicewasfreeofcost	.000	.000	.848	.000
IS_SensitiveinformationwhenreturningtheProductwassecurecreditcar	.830	.000	.000	.000
IS_TheCompanyprovidedinformationonpickuptimeforreturnedproducts	.864	.000	.000	.000
CS_Thecustomerserviceactedpromptlyoncomplaint.responsewithinmax	.000	.687	.000	.000
CS_NoexplanationaskedwhilereturningtheProduct	.000	.655	.000	.000
CS_Thewebsiteenabledmetocompletethereturntransactioneasily.withi	.000	.739	.000	.000
CS_Thewebsiteforthereturnrequestwasquicktonavigate	.000	.614	.000	.000

Direct Effects (Group number 1 - Default model)

	IS	CS	RP	OS
OS	.455	.113	.428	.000
IS_Thewebsiteprovidedachatboxforpromptttwowaycommunication	1.003	.000	.000	.000
IS_TheinformationprovidedbytheCompanyonexchangeofreturnwastimely	.928	.000	.000	.000
OS_Theexperienceofthecompletereturnofgoodsprocesswasverysatisfyi	.000	.000	.000	1.050
OS_Iamverysatisfiedwiththeservicerepresentative'sapproachdurin	.000	.000	.000	.913

	IS	CS	RP	OS
OS_Iamverysatisfiedwiththemeasure'stakentotakecareofcustomerco	.000	.000	.000	1.034
OS_Iamverysatisfiedwiththecompany'sinformationsystemsandqualit	.000	.000	.000	1.085
OS_Iamverysatisfiedwithcompany'scommunicationonthereturnofgood	.000	.000	.000	1.000
RP_Thecollectionofproductstobeexchangedwereasperthetimeanddateco	.000	.000	1.000	.000
RP_Thedeliveryoperatornotifiedinadvancebeforethepickupanddeliver	.000	.000	.946	.000
RP_TheCompanycompensatedforproblemsrelatedtodeliverydelays	.000	.000	.841	.000
RP_Thereturnservicewasfreeofcost	.000	.000	1.105	.000
IS_SensitiveinformationwhenreturningtheProductwassecurecreditcar	1.000	.000	.000	.000
IS_TheCompanyprovidedinformationonpickuptimeforreturnedproducts	1.062	.000	.000	.000
CS_Thecustomerserviceactedpromptlyoncomplaint.responsewithinmax	.000	1.072	.000	.000
CS_NoexplanationaskedwhilereturningtheProduct	.000	1.063	.000	.000
CS_Thewebsiteenabledmetocompletethereturntransactioneasily.withi	.000	1.203	.000	.000
CS_Thewebsitefortherereturnrequestwasquicktonavigate	.000	1.000	.000	.000

Standardized Direct Effects (Group number 1 - Default model)

	IS	CS	RP	OS
OS	.498	.088	.422	.000
IS_Thewebsiteprovidedachatboxforpromptttwowaycommunication	.840	.000	.000	.000
IS_TheinformationprovidedbytheCompanyonexchangeofreturnwastimely	.850	.000	.000	.000
OS_Theexperienceofthecompletereturnofgoodsprocesswasverysatisfyi	.000	.000	.000	.893
OS_Iamverysatisfiedwiththeservicerepresentative's approachdurin	.000	.000	.000	.815
OS_Iamverysatisfiedwiththemeasure'stakentotakecareofcustomerco	.000	.000	.000	.891

	IS	CS	RP	OS
OS_Iamverysatisfiedwiththecompany'sinformation systemsandqualit	.000	.000	.000	.925
OS_Iamverysatisfiedwithcompany'scommunicationonthereturnofgood	.000	.000	.000	.905
RP_Thecollectionofproductstobeexchangedwereasperthetimeanddateco	.000	.000	.847	.000
RP_Thedeliveryoperatornotifiedinadvancebeforethepickupanddeliver	.000	.000	.806	.000
RP_TheCompanycompensatedforproblemsrelatedtodeliverydelays	.000	.000	.687	.000
RP_Thereturnservicewasfreeofcost	.000	.000	.848	.000
IS_SensitiveinformationwhenreturningtheProductwassecurecreditcar	.830	.000	.000	.000
IS_TheCompanyprovidedinformationonpickuptimeforreturnedproducts	.864	.000	.000	.000
CS_Thecustomerserviceactedpromptlyoncomplaint.responsewithinmax	.000	.687	.000	.000
CS_NoexplanationaskedwhilereturningtheProduct	.000	.655	.000	.000
CS_Thewebsiteenabledmetocompletethereturntransactioneasily.withi	.000	.739	.000	.000
CS_Thewebsitefortherequestwasquicktonavigate	.000	.614	.000	.000

Indirect Effects (Group number 1 - Default model)

	IS	CS	RP	OS
OS	.000	.000	.000	.000
IS_Thewebsiteprovidedachatboxforpromptttwowaycommunication	.000	.000	.000	.000
IS_TheinformationprovidedbytheCompanyonexchangeofreturnwastimely	.000	.000	.000	.000
OS_Theexperienceofthecompletereturnofgoodsprocesswasverysatisfyi	.477	.118	.450	.000
OS_Iamverysatisfiedwiththeservicerepresentative'sapproachdurin	.415	.103	.391	.000
OS_Iamverysatisfiedwiththemeasure'stakentotakecareofcustomerco	.470	.117	.443	.000

	IS	CS	RP	OS
OS_Iamverysatisfiedwiththecompany'sinformation systemsandqualit	.493	.122	.465	.000
OS_Iamverysatisfiedwithcompany'scommunicationonthereturnofgood	.455	.113	.428	.000
RP_Thecollectionofproductstobeexchangedwereasperthetimeanddateco	.000	.000	.000	.000
RP_Thedeliveryoperatornotifiedinadvancebeforethepickupanddeliver	.000	.000	.000	.000
RP_TheCompanycompensatedforproblemsrelatedtodeliverydelays	.000	.000	.000	.000
RP_Thereturnservicewasfreeofcost	.000	.000	.000	.000
IS_SensitiveinformationwhenreturningtheProductwassecurecreditcar	.000	.000	.000	.000
IS_TheCompanyprovidedinformationonpickuptimeforreturnedproducts	.000	.000	.000	.000
CS_Thecustomerserviceactedpromptlyoncomplaint.responsewithinmax	.000	.000	.000	.000
CS_NoexplanationaskedwhilereturningtheProduct	.000	.000	.000	.000
CS_Thewebsiteenabledmetocompletethereturntransactioneasily.withi	.000	.000	.000	.000
CS_Thewebsitefortherequestwasquicktonavigate	.000	.000	.000	.000

Standardized Indirect Effects (Group number 1 - Default model)

	IS	CS	RP	OS
OS	.000	.000	.000	.000
IS_Thewebsiteprovidedachatboxforprompttwowaycommunication	.000	.000	.000	.000
IS_TheinformationprovidedbytheCompanyonexchangeofreturnwastimely	.000	.000	.000	.000
OS_Theexperienceofthecompletereturnofgoodsprocesswasverysatisfyi	.445	.078	.377	.000
OS_Iamverysatisfiedwiththeservicerepresentative'sapproachdurin	.406	.072	.344	.000
OS_Iamverysatisfiedwiththemeasure'stakentotakecareofcustomerco	.444	.078	.376	.000

	IS	CS	RP	OS
OS_Iamverysatisfiedwiththecompany'sinformation systemsandqualit	.461	.081	.390	.000
OS_Iamverysatisfiedwithcompany'scommunicationthereturnofgood	.451	.079	.382	.000
RP_Thecollectionofproductstobeexchangedwereasperthetimeanddateco	.000	.000	.000	.000
RP_Thedeliveryoperatornotifiedinadvancebeforethepickupanddeliver	.000	.000	.000	.000
RP_TheCompanycompensatedforproblemsrelatedtodeliverydelays	.000	.000	.000	.000
RP_Thereturnservicewasfreeofcost	.000	.000	.000	.000
IS_SensitiveinformationwhenreturningtheProductwassecurecreditcar	.000	.000	.000	.000
IS_TheCompanyprovidedinformationonpickuptimeforreturnedproducts	.000	.000	.000	.000
CS_Thecustomerserviceactedpromptlyoncomplaint.responsewithinmax	.000	.000	.000	.000
CS_NoexplanationaskedwhilereturningtheProduct	.000	.000	.000	.000
CS_Thewebsiteenabledmetocompletethereturntransactioneasily.withi	.000	.000	.000	.000
CS_Thewebsitefortherequestwasquicktonavigate	.000	.000	.000	.000

Model Fit Summary

CMIN

Model	NPAR	CMIN	DF	P	CMIN/DF
Default model	57	363.717	113	.000	3.219
Saturated model	170	.000	0		
Independence model	34	4414.045	136	.000	32.456

Baseline Comparisons

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Default model	.918	.901	.942	.929	.941
Saturated model	1.000		1.000		1.000
Independence model	.000	.000	.000	.000	.000

Parsimony-Adjusted Measures

Model	PRATIO	PNFI	PCFI
Default model	.831	.762	.782
Saturated model	.000	.000	.000
Independence model	1.000	.000	.000

NCP

Model	NCP	LO 90	HI 90
Default model	250.717	196.818	312.228
Saturated model	.000	.000	.000
Independence model	4278.045	4064.720	4498.633

FMIN

Model	FMIN	F0	LO 90	HI 90
Default model	1.133	.781	.613	.973
Saturated model	.000	.000	.000	.000
Independence model	13.751	13.327	12.663	14.014

RMSEA

Model	RMSEA	LO 90	HI 90	PCLOSE
Default model	.080	.074	.093	.000
Independence model	.313	.305	.321	.000

AIC

Model	AIC	BCC	BIC	CAIC
Default model	477.717	484.489		
Saturated model	340.000	360.198		
Independence model	4482.045	4486.085		

ECVI

Model	ECVI	LO 90	HI 90	MECVI
Default model	1.488	1.320	1.680	1.509
Saturated model	1.059	1.059	1.059	1.122
Independence model	13.963	13.298	14.650	13.975

HOELTER

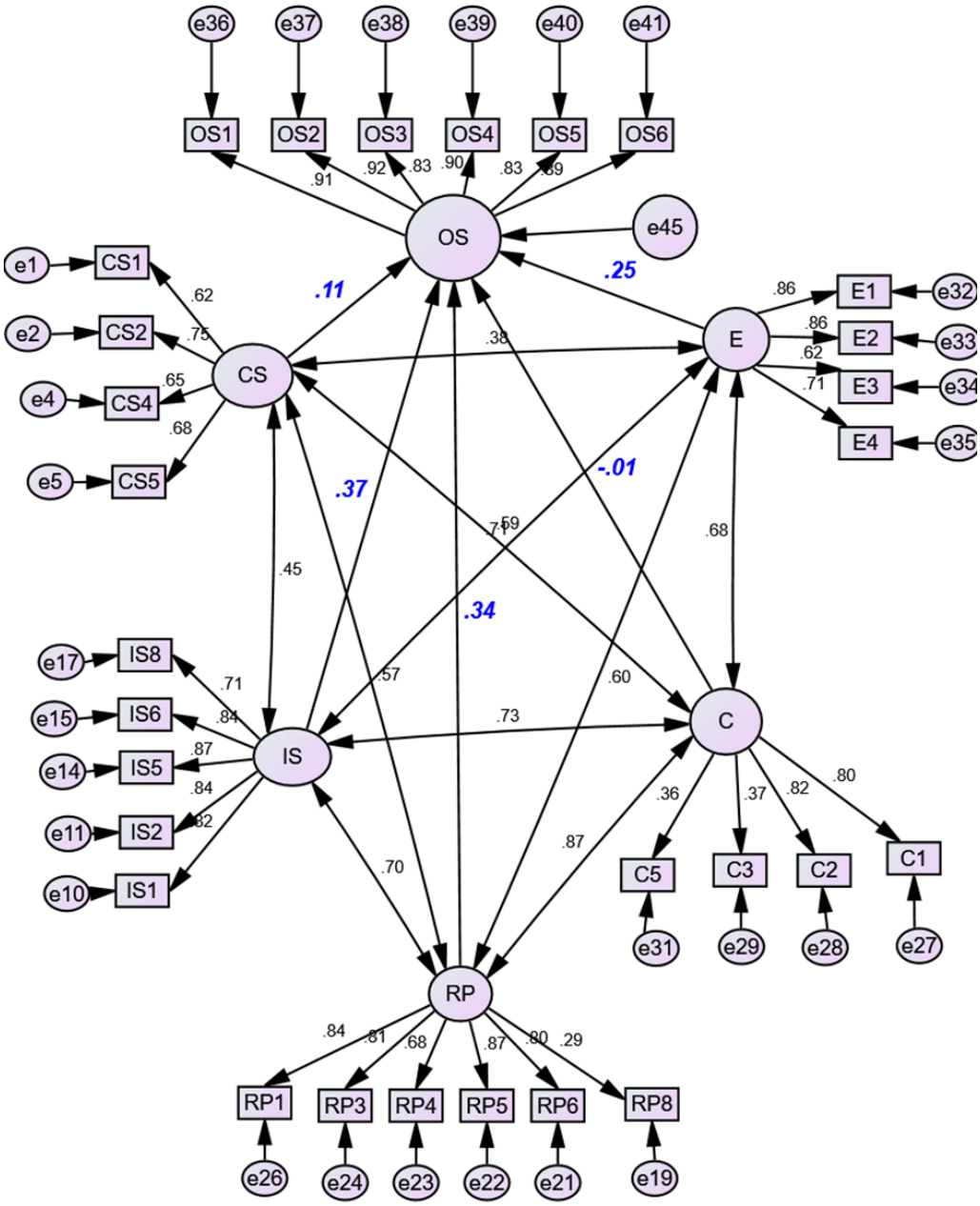
Model	HOELTER .05	HOELTER .01
Default model	123	134
Independence model	12	13

Final Model

		Estimate	S.E.	P
OS	IS	0.473	0.048	***
OS	CS	0.145	0.058	0.012
OS	RP	0.395	0.056	***
CS_Thewebsiteforthereturnrequestwasquicktonavigate	CS	1		
CS_Thewebsiteenabledmetocompletethereturntransactioneasily.withi	CS	1.202	0.127	***
CS_NoexplanationaskedwhilereturningtheProduct	CS	1.062	0.12	***
CS_Thecustomerserviceactedpromptlyoncomplaint.responsewithinmax	CS	1.07	0.117	***
IS_TheCompanyprovidedinformationonpickuptimeforreturnedproducts	IS	1.062	0.056	***
IS_SensitiveinformationwhenreturningtheProductwassecurecreditcar	IS	1		
IS_Thewebsiteprovidedachatboxforprompttwowaycommunication	IS	1.002	0.056	***
IS_TheinformationprovidedbytheCompanyonexchangeofreturnwastimely	IS	0.927	0.05	***
RP_Thecollectionofproductstobeexchangedwereasperthetimeanddateco	RP	1		
RP_Theentireprocesswaspaperless	RP	1.055	0.061	***
RP_Thereturnservicewasfreeofcost	RP	1.154	0.059	***
RP_TheCompanycompensatedforproblemsrelatedtodeliverydelays	RP	0.839	0.062	***
RP_Thedeliveryoperatornotifiedinadvancebeforethepickupanddeliver	RP	0.948	0.056	***

APPENDIX - H

FULL SEM MODEL PATH WITH ALL VARIABLES



APPENDIX -I
PUBLICATIONS

1. L. Wanganoo, "Streamlining Reverse Logistics through IoT driven Warehouse Management System," 2020 8th International Conference on Reliability, Infocom Technologies and Optimization (Trends and Future Directions) (ICRITO), 2020, pp. 854-858, doi: 10.1109/ICRITO48877.2020.9197929.

2. L. Wanganoo, B. Prasad Panda, R. Tripathi and V. Kumar Shukla, "Harnessing Smart Integration: Blockchain-Enabled B2C Reverse Supply Chain," 2021 International Conference on Computational Intelligence and Knowledge Economy (ICCIKE), 2021, pp. 261-266, doi: 10.1109/ICCIKE51210.2021.9410677.

3. S. R. Chatterjee, V. K. Shukla, L. Wanganoo and S. Dubey, "Transforming Supply chain Management through Industry 4.0," 2021 9th International Conference on Reliability, Infocom Technologies and Optimization (Trends and Future Directions) (ICRITO), 2021, pp. 1-6, doi: 10.1109/ICRITO51393.2021.9596392.

4. Wanganoo, L., Tripathi, R., & Yanamandra, R. (2022). Revamping Reverse Logistics to Enhance Customer Satisfaction. In Handbook of Research on Supply Chain Resiliency, Efficiency, and Visibility in the Post-Pandemic Era (pp. 175-194). IGI Global.

5. Leveraging IIot in Reverse Logistics: A WSN Approach by Vinod Kumar Shukla, Leena Wanganoo, Mohammed Yousuf, and Rajesh Tripathi Source Title : Internet of Things : Technological Advances and New Applications. Hard ISBN: 9781774911280 ; https://www.appleacademicpress.com/internet-of-things-technological-advances-and-new-applications/9781774911280

Scholar's Profile

LEENA WANGANOO

28 years of total experience in Industry and Academics

More than 18 years of corporate experience in Supply Chain Management and International Marketing roles. Last nine years, I have been associated with academics, teaching management students at the Postgraduates level. With hands-on experiences in Supply chain operations, I have been able to add value in academics by sharing corporate experience to prepare the generation next in SCM. Have worked in Global Multinationals companies at Sr. Management level, gaining experience leading Supply Chain Department and grooming the team.

Professional Experience

Currently, I am working with Murdoch University, Dubai Campus, as Head – of Business Discipline, responsible for both Postgraduate and Undergraduate courses. Earlier, I worked with Amity University, Dubai Campus, as a Program Head for Undergraduate courses and a subject matter expert in "Logistics & Supply Chain". I have also worked as a Programme Coordinator and Subject area expert (Asst. Professor) with Manipal Academy of Higher Education, Dubai Campus.

I have been teaching Supply Chain, Logistics & Warehousing Management, Special Cargo Movements, and Strategic Operations to undergraduate and as well as postgraduate students.

Before starting my journey as an academician, I had more than 18 years of industry experience, having worked in departments like International Marketing and Supply Chain areas with the fortune 500 companies like – John Deere & DHL besides Atul Limited & Garware Wall Ropes. Industry working has

enhanced my expertise in the end–to–end supply chain management, and I bring the same hands-on experience into my classroom.

Research Publication

- L. Wanganoo, "Streamlining Reverse Logistics through IoT driven Warehouse Management System," 2020 8th International Conference on Reliability, Infocom Technologies and Optimization (Trends and Future Directions) (ICRITO), Noida, India, 2020, pp. 854-858, DOI: 10.1109/ICRITO48877.2020.9197929.
- L. Wanganoo and V. K. Shukla, "Real-Time Data Monitoring in Cold Supply Chain Through NB- IoT," 2020 11th International Conference on Computing, Communication and Networking Technologies (ICCCNT), Kharagpur, India, 2020, pp. 1-6, DOI: 10.1109/ICCCNT49239.2020.9225360.
- L. Wanganoo and A. Patil, "Preparing for the smart cities: IoT enabled last-mile delivery," 2020 Advances in Science and Engineering Technology International Conferences (ASET), Dubai, United Arab Emirates, 2020, pp. 1-6, DOI: 10.1109/ASET48392.2020.9118197.
- Wanganoo L., Shukla V.K., Panda B.P. (2021) NB-IoT Powered Last-Mile Delivery Framework for Cold Supply Chain. In: Singh T.P., Tomar R., Choudhury T., Perumal T., Mahdi H.F. (eds) Data-Driven Approach Towards Disruptive Technologies. Studies in Autonomic, Data-driven and Industrial Computing. Springer, Singapore. https://doi.org/10.1007/978-981-15-9873-9_22
- S. R. Chatterjee, V. K. Shukla, L. Wanganoo and S. Dubey, "Transforming Supply chain Management through Industry 4.0," 2021 9th International Conference on Reliability, Infocom Technologies and Optimization (Trends and Future Directions) (ICRITO), 2021, pp. 1-6, DOI: 10.1109/ICRITO51393.2021.9596392.
- L. Wanganoo, B. Prasad Panda, R. Tripathi and V. Kumar Shukla, "Harnessing Smart Integration: Blockchain-Enabled B2C Reverse

Supply Chain," 2021 International Conference on Computational Intelligence and Knowledge Economy (ICCIKE), 2021, pp. 261-266, DOI: 10.1109/ICCIKE51210.2021.9410677.

- **Chapter Publication :**
  - Leveraging IIot in Reverse Logistics: A WSN Approach by Vinod Kumar Shukla, Leena Wanganoo, Mohammed Yousuf, and Rajesh Tripathi Source Title: Internet of Things: Technological Advances and New Applications. Hard ISBN: 9781774911280; https://www.appleacademicpress.com/internet-of-things-technological-advances-and-new-applications/9781774911280
  - Shukla, V.K., Wanganoo, L., Tiwari, N. (2022). Real-Time Alert System for Delivery Operators Through Artificial Intelligence in Last-Mile Delivery. In: Garg, L., Chakraborty, C., Mahmoudi, S., Sohmen, V.S. (eds) Healthcare Informatics for Fighting COVID-19 and Future Epidemics. EAI/Springer Innovations in Communication and Computing. Springer, Cham. https://doi.org/10.1007/978-3-030-72752-9_20
  - Revamping Reverse Logistics to Enhance Customer Satisfaction. Leena Wanganoo (University of Petroleum and Energy Studies, India), Rajesh Tripathi (University of Petroleum and Energy Studies, India) and Ramakrishna Yanamandra (Skyline University College, UAE) ; Source Title: Handbook of research on Supply Chain Resiliency, Efficiency, and Visibility in the Post-Pandemic Era Copyright: © 2022 |Pages: 20 DOI: 10.4018/978-1-7998-9506-0.ch010
- **Case – Study Publication :**
  - *Landmark Group: Using Blockchain to Unlock Value in Logistics*

    Reference no. 620-0012-1

    Subject category: Production and Operations Management

    https://www.thecasecentre.org/main/products/view?id=169574
  - Cargotecture: A Sustainability Initiative in the UAE

Reference no. 720-0018-1

Subject category: Ethics and Social Responsibility

https://www.thecasecentre.org/main/products/view?id=169104

Conference Participation & Paper Presentation

1. Manipal Entrepreneurship Research Conference (MERC), 2017 "Women Entrepreneurship in Logistics in UAE.

2. *5th Agro Supply Chain Conference 2018- ASCC – paper* - Logistics Service Quality for Cold Chains: A Study from UAE Fruit and Vegetable Market By Wangnoo & Panda (2018)

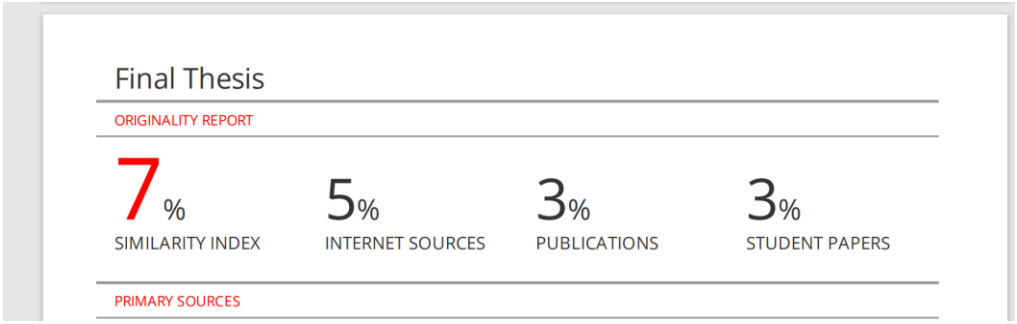
3.MERC - 2019. School of Business, Manipal Academy of Higher Education, Dubai

4. ASET 2020 - 3rd Advances in Science and Engineering Technology multi-conferences (ASET'20)

5. 11th International Conference on computing, communication and networking technologies (ICCCNT), IIT Kharagpur

6. IEEE 8TH I*nternational conference on Reliability, Infocom Technologies and Optimization (* ICRITO'2020)

7. International conference on machine intelligence & Data Science application MIDAS 2020)



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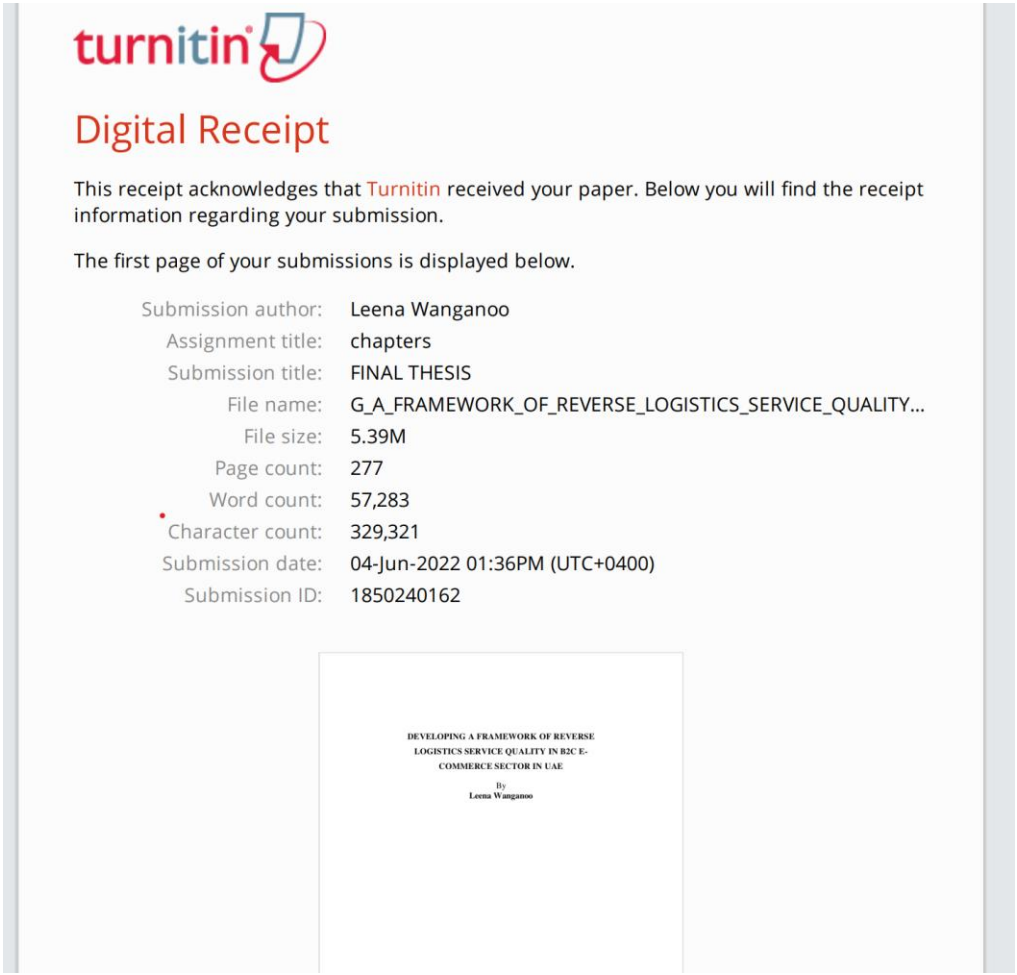

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DEVELOPING A FRAMEWORK OF REVERSE LOGISTICS SERVICE QUALITY IN B2C E-COMMERCE SECTOR IN UAE

By

Leena Wanganoo

I have excluded certificates, scholar publications, profiles, and references for the report generation.