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**ROLE OF REVERSE MARKETING IN
SUPPLY CHAIN MANAGEMENT OF CIR-
CULAR INDUSTRIES**

Multiple case studies

Master's thesis
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ABSTRACT

Saumitra Shekhar Pathak: Role of reverse marketing in supply chain management of circular industries

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In the current market and environmental situation, it is essential to promote circular economy in all the aspects of our day-to-day products. This thesis focused on building a comprehensive knowledge on supply chain management, circular economy, and by exploring the concept of reverse marketing and its role in building the supply channels. With the increasing burden on virgin raw materials, it is important for the organizations to shift their focus toward circular raw materials and to achieve this goal this thesis explores the challenges and process to overcome these challenges.

The motivation for this thesis is from author's own professional background and challenges faced in sourcing of raw materials for different industries. In this thesis, industry experts have been interviewed to get a deeper understanding of the concepts and market research is used to attain the information. The study uses different methods of existing material, interviews, and market research as the main data gathering methods.

The main findings of this study have been the challenges and process of overcoming those challenges in actual case industries of e-commerce, construction, packaging, and energy. This has led draw difference between the supply professional's role in linear and circular industries. Interestingly, none of the interviewees were aware of the concept of reverse marketing although, they were using it in everyday sourcing for their respective industries.

Keywords: Supply chain management, complex supply chain, circular economy, reverse marketing, linear economy, supplier development process, marketing process, reverse marketing process.

The originality of this thesis has been checked using the Turnitin OriginalityCheck service.

PREFACE

As I approach the conclusion of this thesis, titled “Role of Reverse Marketing in Supply Chain Management of Circular industries”, I’m thrilled with a profound sense of accomplishment and gratitude. The path that has brought me to the conclusion of this thesis has been marked by both significant challenges and deeply satisfying rewards.

First and foremost, I extend my heartfelt gratitude to my supervisor, Dr Jouni Lyly-Yrjänäinen, whose expertise and unwavering commitment to my academic and research growth have been instrumental throughout this process. Their insightful feedback, constructive criticism, and dedication to academic excellence have been invaluable. Additionally, I would also like to thank all the industry professionals who provided their valuable feedback on the topic.

Espoo, September 2023

Saumitra Shekhar Pathak

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LIST OF SYMBOLS AND ABBREVIATIONS

SCM	Supply chain management
B2B	Business to business
B2C	Business to customer
C2B	Customer to business
3PL	Third-party logistics
GBFS	Granulated blast furnace slag
FMCG	Fast-moving consumer goods
CAPEX	Capital expenditures

1. INTRODUCTION

1.1 Background

The study aims at advancing the knowledge of supply chain practices in circular economy industries by exploring the concept of reverse marketing from a sourcing point of view. According to Esposito et al. (2017), the current resource consumption is 50% faster than their replacement takes place. With new laws and regulations being implemented by different governments, organizations are making a shift towards making their linear economy model to a circular economy model. In circular economy, the materials are either recycled or reused from the waste generated by industries to process them further to be utilised in other or same industries (Potting et al., 2017).

Sustainability has become a focal point for among global organizations with changes in their production practices by use of recycled raw materials or by using energy efficient machineries. Circular economy also allows organizations to cut down on their costs by sourcing sustainably and by managing resources efficiently. To support sustainability, supply chain management plays an important role in value creation by implementing efficient supply chain practices and reverse supply chain practices (Genovese et al., 2017). Supply chain is the backbone of any organization as it is responsible for all the incoming goods to the company which can be further processed to make the final product to be sold to its consumers.

However, the supply chain in circular industries differs significantly from that in linear industries because it involves the reuse or recycling of waste materials. These steps help in promoting circular economy, but they also come with challenges such as quality control and logistics. Maintaining a certain level of quality of raw material is challenging when the product is already used or is recycled, as every product has its lifecycle deterioration. Logistics is also a challenge as these raw materials can be available at further distances than the production sites of new raw materials, increasing the costs and associated CO₂ emission.

1.2 Objective and question

The main aim of this thesis is to develop a comprehensive understanding of circular industries and to compare supply chain challenges in linear and circular economies. The objective is selected based on my professional background and challenges faced in my career so far. This thesis is also aimed at understanding reverse marketing from the perspective of supply chain and to see what role it plays for supplier development. To investigate further, the main research questions to be answered in this research are:

- **RQ1:** What is circular economy and supply chain challenges for these companies?

The objective of this research question is to develop a comprehensive understanding of circular economic companies by exploring the basics of circular economy and how it helps towards building a sustainable future. Such companies are very different than linear companies and face a completely different set of challenges, these challenges are seen across all the divisions. This thesis is targeted at challenges faced by the supply chain division of an organization. Furthermore, this question paves the way to generate understanding of supply and sales channels in circular industries.

- **RQ2:** What are the supply and sales channels for circular industries?

This research question helps to understand what supply sources for such companies in a diverse group of industries such as e-commerce, construction, and energy. It also explores challenges faced during supplier development and supplier relationship management. The existence of these channels raises the question of reverse marketing's role within such industries.

- **RQ3:** What role reverse marketing plays in supplier development for circular economies?

To understand the role of reverse marketing in supply chain, this question is focused on understanding the basics of supply chain and supplier development process. Reverse marketing does not a lot of literature available, hence this research will provide better understanding of the concept.

1.3 Structure of thesis

This study is divided into following seven chapters:

Chapter 1 outlines the research motivation, background, objective, and the research questions to be explored in the study.

Chapter 2 provides details on research methods and processes to be used in data collection and analysis to answer to the research questions.

Chapter 3 focuses on developing an understanding of supply chain management.

Chapter 4 provides a comprehensive view on circular economy and different frameworks currently used in the industry.

Chapter 5 focuses on exploring the concept of reverse marketing and how it is derived from the marketing concept.

Chapter 6 builds the framework of this study and showcases how supply chain management, circular economy, and reverse marketing are interconnected.

Chapter 7 presents the case industries and results after the interviews and market research was conducted with industry experts.

Chapter 8 concludes this thesis beginning with answering the research questions and future implication of this study.

2. RESEARCH METHODOLOGY

2.1 Research methodology

The goal of data collection process was to focus on case studies of different circular economic organizations globally. The search for organizations was based on market research and professional history which ensured a comprehensive data by using different data collection methods. The primary purpose of conducting these case studies is to gain a deeper understanding and delve into intricate or concealed phenomena more effectively (Gummesson, 1993). Table 1 describes the different data collection methods.

Table 1. *Data gathering techniques (Gummesson, 1993)*

Method	Description
Existing material	Sometimes known as a secondary source, this method involves utilizing various forms of existing literature, including books, articles, journals, official websites, social media, databases, and annual reports.
Questionnaire survey	The questionnaire survey serves as a valuable means of collecting qualitative data. This approach emphasizes the diverse survey types employed by researchers.
Qualitative interview	The qualitative interview is a highly effective approach for data collection and understanding diverse perspectives. Although it may require considerable time, it remains a dependable source of data.
Observation	Observational data collection is a gathering technique where the subject under study is meticulously observed to extract relevant information.

Action science	Action science is a demanding data gathering method often employed in case studies. With this approach, the researcher assumes the role of a change agent who actively influences the case study.
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In this thesis, data is collected by using different methods of existing material (academic literature and organisational case studies), interviews, and market research. A single method approach is avoided to gather a detailed data on how supply chain works in a linear organization versus a circular economic organization. The semi-structured interviews were conducted with industry experts from both types of organizations and existing materials were used in the form of market research and literature. Table 2 table shows the interviewee details and data collection method used.

Table 2. Interview details and data collection methods

Interviewee	Industry type	Industry	Data collection method
Category Buyer	Linear	Compressors	Semi-structured interview
Purchasing Manager	Linear	Heavy machinery	Semi-structured interview
Global Supplier Development Manager	Linear	Pharmaceuticals	Semi-structured interview
Business Development manager	Circular	E-commerce	Semi-structured interview
Business development manager	Circular	Packaging industry	Semi-structured interview
Supply chain manager	Circular	Construction	Semi-structured interview

Chief Procurement Officer	Circular	Energy	Semi-structured interview
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2.2 Research process

The research process started in February 2023. The development of the theoretical framework primarily relied on a combination of literature and academic sources related to supply chain management, circular economy, and reverse marketing. This framework was crafted between February and April 2023, and the process heavily involved the extensive utilization of existing materials and methodologies. Afterwards, the work started in formation of interview questions, and contacting the interviewees. Later, the data was collected and analysed to form it in an academic master's thesis. Table 3 outlines the thesis plan.

Table 3. Thesis design plan

Task description	Feb-23	Mar-23	Apr-23	May-23	Jun-23	Jul-23	Aug-23
Theoretical background							
Preparing the interview questions							
Contacting the participants							
Conducting interviews							
Data collection and analysis							
Writing and finalization							

Throughout the course of this thesis, various concepts, including supply chain management and the circular economy, were examined to determine how reverse marketing contributes to the evolution of supply networks in circular industries. Subsequently, interviews were carried out with industry experts in the summer of 2023, and the data collected was analysed to conclude the thesis.

3. SUPPLY CHAIN MANAGEMENT

3.1 Definition of supply chain and supply chain management

The origin of the supply chain concept dates back to 1975 when (Banbury, 1975) discussed the delivery process of supplying electricity to the final consumer. This concept gained significance in the business context when frameworks were developed to integrate the purchasing, manufacturing, sales, and distribution processes, exposing connections between them. Table 4 summarises definitions of supply chain in different literary sources.

Table 4. *Definitions of supply chain in literature*

Author(s)	Definition
Lambert et al., 1998	Supply chain is defined as the alignment of firms that bring products or service to the market.
Copařā & Meindl, 2007	A supply chain consists of all parties involved, directly or indirectly, in fulfilling a customer request. Within each organization, such as a manufacturer, the supply chain includes all functions involved in receiving and filling a customer request. These functions include, but are not limited to, new product development, marketing, operations, distribution, finance, and customer service.
Chen & Paulraj, 2004	A typical supply chain is a network of materials, information, and services processing links with the characteristics of supply, transformation and demand
Mentzer et al., 2001	A supply chain is defined as three or more entities directly involved in the upstream and downstream flow of products, services, finances, and information from a source to a customer.

Ayers, 2001	Life cycle processes comprising physical, information, financial, and knowledge flows whose purpose is to satisfy end-user requirements with products and services from multiple linked suppliers.
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Every demand in any industry requires some supply which can either be fulfilled by purchasing final products or purchasing raw materials for further processing to manufacture final product according to their products. An upstream supply includes all the activities related to the supply side of business i.e., all the suppliers of final goods or raw material suppliers. Whereas downstream supply includes all the activities related to the demand side of business i.e., all the customers and distribution activities. Figure 1 represents a basic supply chain model.

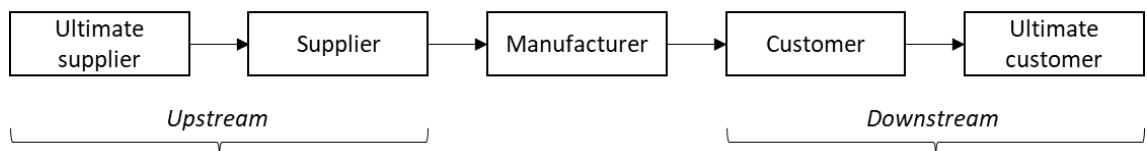


Figure 1. Supply chain model

Above figure illustrates a basic supply chain model showcasing the process from ultimate supplier who supplies raw material to the final product to the ultimate customers. The virgin raw materials are extracted from the nature which are then sent to sub-suppliers who turn those raw materials into products to be used in final production. This flow of material is called upstream where the material flows from extraction to the initial product. Once the upstream supply and production is completed, it is sent to the manufacturer to produce final product as per customer's requirements of manufacturer product line. Further, this final product is sent to a customer who acts as a distributor who is responsible for marketing and delivering the products to ultimate customers. This flow of final product is called downstream supply chain.

Supply chain management can be explained as management of goods, services, or information in both upstream and downstream supply chain. The concept of SCM initially appeared in the literature in the mid-1980s which includes managing cross-functional operations of an organization, systems integration research, and more efficient flow of

information within the organization (Cooper et al., 1997). However, many authors have defined supply chain management in a different way which can be seen in Table 5.

Table 5. *Definitions of supply chain management in literature*

Author(s)	Definition
Monczka, 1998	SCM requires traditionally separate materials functions to report to an executive responsible for coordinating the entire materials process, and also requires joint relationships with suppliers across multiple tiers. SCM is a concept, "whose primary objective is to integrate and manage the sourcing, flow, and control of materials using a total systems perspective across multiple functions and multiple tiers of suppliers."
La Londe & Masters, 1994	Supply chain strategy includes: "... two or more firms in a supply chain entering into a long-term agreement; ... the development of trust and commitment to the relationship; ... the integration of logistics activities involving the sharing of demand and sales data; ... the potential for a shift in the locus of control of the logistics process."
Stevens, 1989	"The objective of managing the supply chain is to synchronize the requirements of the customer with the flow of materials from suppliers in order to effect a balance between what are often seen as conflicting goals of high customer service, low inventory management, and low unit cost."
Houlihan, 1988	Differences between supply chain management and classical materials and manufacturing control: "1) The supply chain is viewed as a single process. Responsibility for the various segments in the chain is not fragmented and relegated to functional areas such as manufacturing, purchasing, distribution, and sales. 2) Supply chain management calls for, and in the end depends on, strategic decision making. "Supply" is a shared objective of practically every function in the chain and is of particular strategic significance because of its impact on overall costs and market share. 3) Supply chain management calls for a dif-

	ferent perspective on inventories which are used as a balancing mechanism of last, not first, resort. 4) A new approach to systems is required integration rather than interfacing.”
Oliver & Weber, 1982	“Supply chain management (SCM) is the process of planning, implementing, and controlling the operations of the supply chain with the purpose to satisfy customer requirements as efficiently as possible. Supply chain management spans all movement and storage of raw materials, work-in-process inventory, and finished goods from point-of-origin to point-of-consumption.”
Wisner et al., 2004	“Supply chain management is the integration of trading partners’ key business processes from initial raw material extraction to the final or end customer, including all intermediate processing, transportation and storage activities and final sale to the end product customer.”

The table above offers various literary perspectives on the provided definitions. Supply chain management holds a central role in every sector, tasked with ensuring the incoming supplies necessary for final product production. It also bears the responsibility for managing an organization's overall expenses, a critical aspect in sustaining profitability.

3.2 Complex supply chains

The supply chains can be complex due to the current global nature of the organizations where employees, suppliers, and ultimate customers can be located anywhere in the world. The complexity of the supply chain can vary based on the number of participants and the diversity of business processes involved, yet a central entity is always present (Felea & Albăstroiu, 2013). This central entity might oversee the complete supply chain, or even if it doesn't, the supply chain as a business phenomenon remains in existence (Mentzer et al., 2001). Figure 2 represents a complex supply chain in a global organization.

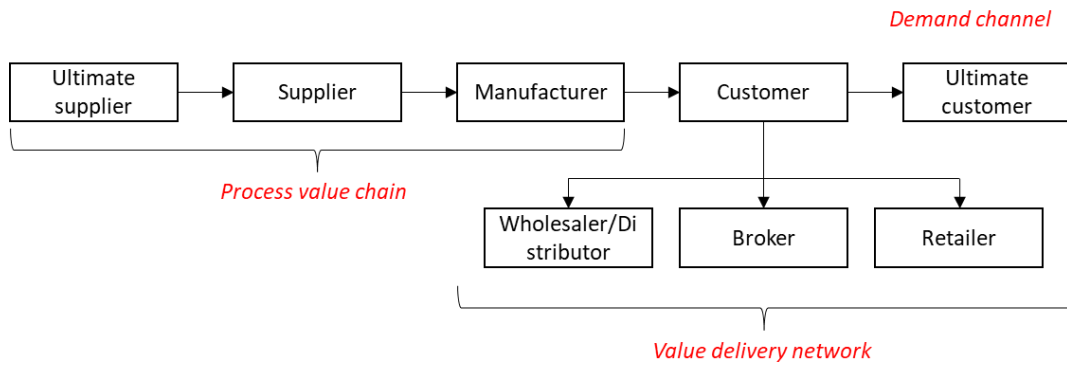


Figure 2. Supply chain components (adapted from Mentzer et al., 2001)

As can be seen from the above figure, supply chains can have more than just suppliers and customers, there can be different types of subcategories of these components. Ultimate suppliers are generally raw material producer which converts virgin raw materials to usable basic products. The customer can be wholesalers or distributors, brokers, or retailers who are responsible for transferring the manufactured product to the ultimate customer. Figure 3 shows a complex supply chain of a global organization.

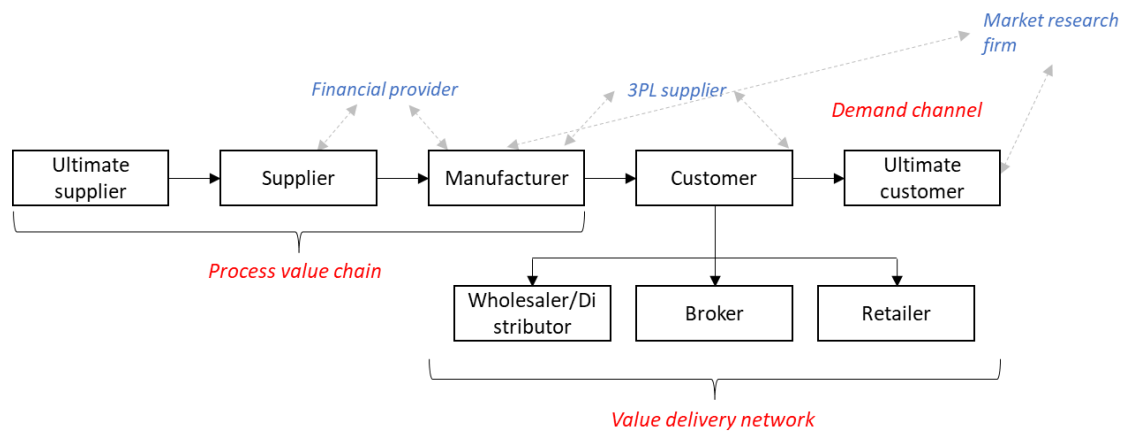


Figure 3. Complex supply chain in global organizations (adapted from Mentzer et al., 2001)

Above figure shows a complex supply chain where the components are group into different segments and additional components of supply chain. Firstly, the process value chain, which is composed of suppliers and manufacturers or assemblers, the main purpose of this component is to receive demand from the marketing intelligence team and then to translate them into products and services as required (Ross, 2011). Secondly, the value delivery network whose main goal is to structure the delivering channels that

facilitates the effective distribution of products or services as per the demand requirements (Ross, 2011). The thirdly, the demand channel which consists of the customer laying out the requirements for the remaining components.

As is evident from Figure 3, supply chains can have more than just suppliers and customers; instead they can also have third party financial providers for financing to assess and monitor financial risk, a 3PL provider for logistics support and a marketing research company conducting marketing analysis for supply chain activities both upstream and downstream. (Mentzer et al., 2001). In the current scenario where organizations are global, it adds up numerous different entities across the world making supply chains even more complicated. A typical complex supply chain where the additional third-party providers are linked to more than one entity in the chain. The above ultimate supply chain is usually observed in today's technology-enabled supply networks where one entity in the chain can be located across the world.

In many traditional companies, supply chain is divided into demand, production and delivery components which allow them to alter the configurations to create an efficient supply chain. The demand component dictates the requirements, and the production component is responsible for designing, procuring, and assembling the materials into a final product. In linear economies, majority of the raw materials used are virgin raw materials extracted from the earth and subsequently increasing the stress on already limited natural resources. Furthermore, the delivery components are also designed in such a way that logistics and distribution are not designed in the most efficient way. For example, every customer delivery is organized on a separate truck instead of combining them together and shipping once a week.

3.3 Complex supply chain management

In every organization, managing supply chains plays a vital role in maintaining the business continuity. The main role of supply management is to recognize and acquire all the external resources needed to facilitate the operations of the company (McKeller, 2014). Managing such complex situation require both strategic and tactical responsibilities. Strategic responsibilities involve long term and financial consequences for an organization whereas tactical responsibilities include day-to-day activities of an organization (McKeller, 2014). Table 6 summarizes the strategic and tactical responsibilities.

Table 6. Strategic and tactical responsibilities (McKeller, 2014)

Strategic responsibilities	Tactical responsibilities
Strategic planning	Processing requisitions
Category management	Releasing orders
Supplier sourcing	Expediting parts and materials
Make vs buy and outsourcing decisions	Processing invoices
Contract negotiations and management	Maintaining order records
Cost analysis	Processing purchase orders

La londe (1997) defines supply chain management (SCM) can be understood as the practice of overseeing relationships, information exchange, and material movement across organizational limits to deliver products and services that offer increased customer worth. This is achieved by ensuring the seamless flow of materials and the corresponding information throughout the entire supply chain. According to Mentzer et al., (2001), the objective of SCM is to achieve customer contentment and value. To realize this, the SCM philosophy encompasses all supply chain activities, not merely as a logistical task. To comprehend this philosophy in practical terms, SCM is founded on the subsequent attributes:

- Taking a holistic view of the supply chain involves overseeing the movement of inventory from the supplier to the final customer.
- Establishing collaborative partnerships with both internal and external stakeholders to achieve common objectives.
- Concentrating on customers involves generating distinctive resources to create value for customers and ultimately attain their satisfaction.

Many researchers have defined supply chain and supply chain management with different intricate details about the process and requirements. The evaluation of these defini-

tions helped to identify four major criteria: management activities, logistics activities, objectives, and components (Felea & Albăstroi, 2013). Table 7 outlines the key concepts and definitions of each criterion.

Table 7. Four major concepts of supply chain management (Felea & Albăstroi, 2013)

Criteria	Key concepts	Definition
Management activities	Planning, organizing, implementing, motivating, controlling	Supply chain management (SCM) involves efficiently planning, organizing, implementing, motivating, and controlling all the activities engaged in the movement of goods and services from the initial supplier to the end customer.
Logistics activities	Transportation, processing, storage	SCM encompasses the movement, processing, and storage of raw materials, work-in-progress items, and finished products from the initial extraction phase to the ultimate customer.
Objectives	Value, customer requirements, trust, competitive advantage, relationships	SCM comprises several value-enhancing procedures aimed at meeting customer needs, fostering enduring relationships, cultivating trust among supply chain collaborators, and attaining a lasting competitive edge.
Components	Suppliers, manufacturers, warehouses, stores	SCM covers suppliers, producers, storage facilities, retail outlets, and other intermediaries participating in the transfer of products and services from the source to the end consumer.

The initial conceptualization of supply chain management verified that it can be an essential competitive tool reduce inventory and costs, and to meet customer demand (Rebelo et al., 2022). The global business environment has become more competitive, and organizations require their working capital and lead time to be reduced considerably, and at the same time improving service level for customers (Chong & Bai, 2014; Paluri

& Mishal, 2020). Table 8 lists other common challenges of supply chain management in linear economies as described different authors.

Table 8. *Supply chain challenges in linear economies*

Challenge	Author(s)
Lack of trust between supply chain members	Bankvall et al., 2010; Liu R. & Chua, 2016; Thunberg et al., 2017
Temporary nature of supply chain	Ala-Risku et al., 2010; Bankvall et al., 2010; Liu R. & Chua, 2016
Different information systems and lack of interoperability	Liu R. & Chua, 2016; Yu et al., 2018
Lack of coordination between contractor and suppliers	Thunberg et al., 2017
Too many suppliers and fragmented supply chain	Behera et al., 2015; Liu R. & Chua, 2016
Spreadsheets, emails, and manual data collection	Ala-Risku et al., 2010
Insufficient procurement planning and manual material movement processes	Ala-Risku et al., 2010
Item identification and on-site material storing	Ala-Risku et al., 2010
Poor real time supply chain visibility	Behera et al., 2015; Liu R. & Chua, 2016
Material traceability and tracking	Helo & Shamsuzzoha, 2020

Within a linear economy, items possess a finite life cycle and are frequently engineered for one-time use or short-lived durability. This leads to substantial waste generation, leading to overflowing landfills, pollution, and inefficiencies in resource usage. The management of such waste is costly and burdens waste disposal systems. Additionally, linear

economies engender environmental deterioration through the processes of resource extraction, manufacturing, and disposal, which frequently produce pollution and greenhouse gas emissions. This not only negatively impacts the environment but also exacerbates climate change.

4. TOWARDS CIRCULAR ECONOMY

4.1 Circular Economy

Humanity has put a burden on the environment since the beginning of industrialisation, and with the current rate it is estimated that 1.5 earths are required to sustain our social, economic, and demographic existence (WWF, 2012). The humans and environment are currently threatened heavily by the linear production industry which is extracting, consuming, and dumping the natural resources (Johansson, 2021). Extraction and processing of natural resources is responsible for over 90% of global biodiversity loss and water scarcity, 50% of climate emissions, and one-third of the health impacts of particulate matter (The European Commission, 2020; UNEP, 2019).

The linear production industry is currently the backbone of all day-to-day use products and is putting stress on the limited natural resources hence contributing to the economic situations such as higher inflation and complex supply chain. In linear economy model, sustainable economic growth is not viable in a planet where resources and waste absorption capacity are limited (Bonciu, 2014). In a linear economy, production output is very high, and the raw material input is very low, however, the waste from this production is not reutilised and instead, it is dumped into landfills (Sakthivelmurugan et al., 2022). Figure 4 shows a linear economy model.

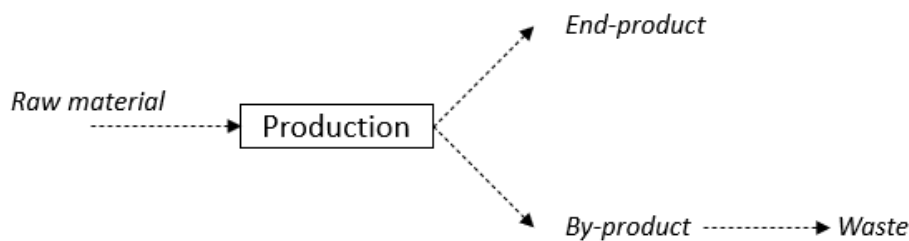


Figure 4. Linear economy model (based on Sakthivelmurugan et al., 2022)

As can be seen in the figure above, raw material is needed prior to production which is extracted from natural resources and after production it generates an end-product. Considering the low input of raw materials, the economic gains from this system is more and

the raw material can be easily procured from the traditional sources. However, production also generates a by-product which is considered as waste in linear economy model. This waste is further dumped in landfills creating numerous environmental challenges and economic challenges as it does not bring any value.

To address these environmental and economic concerns, a concept of circular economy was introduced which has now picked up pace and is considered as one of the most efficient ways of sustainable production which is evident from the European Circular Economy Package (European Commission, 2015). Circular economy is an economic model which is based on the principle of zero waste to optimise the resource extraction and utilisation. Figure 5 shows a circular economy model and how it differs from linear model.

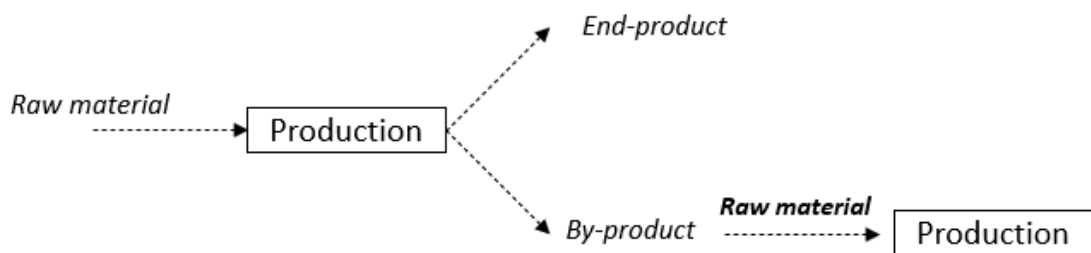


Figure 5. Circular economy model (based on Sakthivelmurugan et al., 2022)

Above figure shows that the by-product from a linear economy model is further used as a raw material for some other production. In this model, raw material or waste from linear economy model is very high for higher production output. This waste requires further processing to achieve required quality standards in the end-product. This additional processing requires technology development and currently, there are many companies which are investing heavily in such processes to optimise cost and get the maximum economic returns.

The Ellen MacArthur Foundation (2013) refers to Eurostat (2011) data indicating that the European economy consumed 65 billion tons of raw materials in 2010 which generated 2.7 billion tons of waste, out of which only 40 percent was reused. The manufactured products are largely consumed in the developed countries (i.e. western countries), however, the resources are exploited globally (Sariatli, 2017). The abundant availability of

resources and energy made it cheaper, but the labour has always been expensive (Sariati, 2017). Considering these circumstances, recycling, and reusing of waste was neglected for a very long time.

4.2 Principles of Circular Economy

The basic principle of circular economy is to minimise waste and pollution, product lifecycle management and to regenerate natural systems by reducing burden on natural resources. Over the years, circular economy is studied and researched extensively leading to multiple frameworks to explain the principles of circular economy. The most notable of them are 3R framework, 4R framework and 9R framework (Ghisellini et al., 2016; Kirchherr et al., 2017; Yuan et al., 2006). The concept of the circular economy operates by following a reduction approach that aims to minimize the use of primary energy, raw materials, and waste. This is achieved by enhancing efficiency in both production (referred to as eco-efficiency) and consumption processes. This includes the adoption of improved technologies, the creation of more compact and lightweight products, streamlined packaging, the development of more efficient household appliances, and promoting a simpler way of life, among other strategies. (Su et al., 2013; Zhijun & Nailing, 2007).

3R principle is based on reducing, recycling, and reusing activities of waste materials or by-products. The Chinese circular economy promotion law is based on the principle of 3R activities in the process of production, circulation, and consumption (Ghisellini et al., 2016). China being a supply hub for majority of industries worldwide, this step taken by the Chinese government has improved the treatment and reuse of solid waste. Figure 6 shows 3R principles of Circular economy.

Recycle	Reuse	Reduce
Disintegrating waste and using as input for new production	Utilising waste again in the same or different industry	Minimizing generation of waste in the first place by repairing or reconditioning of whole or part of waste

— Least preferred ————— Most preferred —→

Figure 6. 3R principle of Circular Economy (Ütebay et al., 2020)

As is evident from the above figure, reduce is the most preferred way of implementing circular economy in 3R principle as it minimises the waste creation and improves the lifecycle of the product. In reuse principle, all and any waste is reused in either the same industry or a different industry as an input. This principle is widely used as it releases the stress on natural resources by reducing the utilization of virgin raw materials. The third principle is based on recycling of waste by disintegrating it and reusing as input for further production.

The other principle of circular economy is called 4R which is similar to 3R principles with addition of fourth R of 'Recover' which represents recovering of materials in a production/distribution and consumption processes (Kirchherr et al., 2017). This allows organisation to scrutinise their processes and work on a micro level (products, companies, consumers), meso level (eco-industrial parks) and macro level (city, region, nation and beyond) with the aim to accomplish sustainable development (Kirchherr et al., 2017). EU's Waste Framework Directive is based on the principles of 4R which has helped European nations to promote circular economy on a larger scale (European Commission, 2008).

The third principle of circular economy is of 9R which is a more comprehensive framework. This framework generates more economic value (increasing products or material's economic value), social value creation (engaging in minimising social value destruction and promoting healthy working conditions) and promoting environmental values by engaging in sustainable practices (Buren et al., 2016). Table 9 represents and explains the different strategies of 9R.

Table 9. The 9R framework (Potting et al., 2017)

Smarter product use and manufacture	R0 Refuse	<i>Redundant product by abandoning its function or using a radically different product</i>
	R1 Rethink	<i>More intensive product use</i>
	R2 Reduce	<i>More efficient product manufacture or use with less natural resources and materials</i>
Extend lifespan of product and its parts	R3 Reuse	<i>Reuse of discarded product fulfilling the original function by another consumer</i>
	R4 Repair	<i>Repair and maintenance of product for the original function</i>
	R5 Refurbish	<i>Restore and update of an old product</i>
	R6 Remanufacture	<i>Parts used in a new product having the same function</i>
	R7 Repurpose	<i>Product or parts used in a new product having a different function</i>
Useful application of materials	R8 Recycle	<i>Materials processed to obtain the same or lower quality</i>
	R9 Recover	<i>Incineration of material and energy recovery</i>

The framework explained in the above table has strategies which are used by different industries according to their business models. Recover is the least preferred method of this framework as there is still a possibility of generating more waste whereas, in the case of Refuse, all the operations are optimised leading to zero waste. This framework contributes to the main research question of this thesis by providing a criterion to evaluate the best possible strategy for sourcing of raw materials (waste).

4.3 Business models of Circular Economy

Governments and companies are investing heavily in developing sustainable options to drive their future growth and circular economy is the central focus for them. The prevailing model in use today follows a linear consumption pattern known as "consume-use-discard," involving the extraction of natural resources and raw materials, their transformation into finished products, and ultimately their disposal as waste once they are consumed (Su et al., 2013). Figure 7 shows the complete process from sourcing to waste creation.

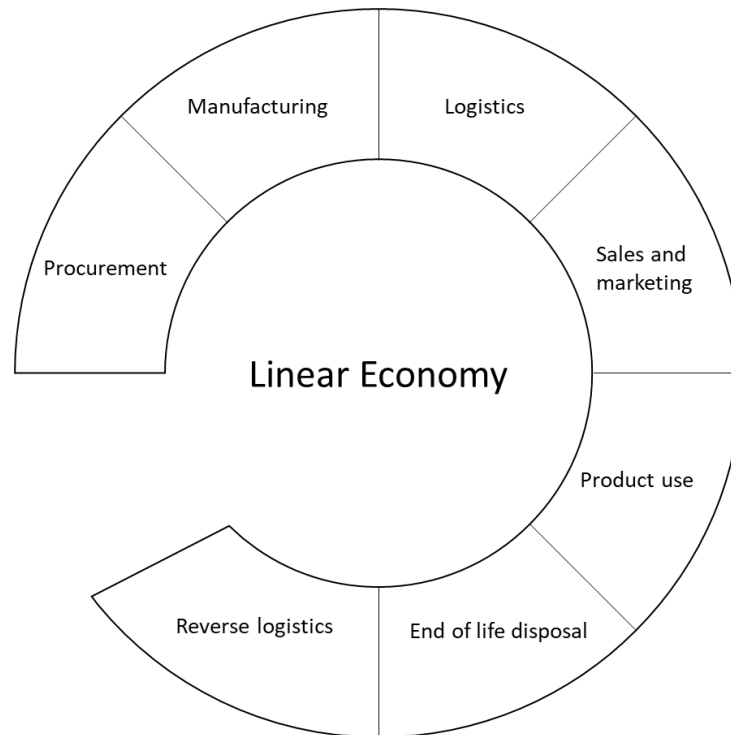


Figure 7. Product cycle based on linear consumption model (adapted from Accenture, 2014).

Above figure depicts a general view of the product cycle based on a linear consumption model where once the product is designed it is transferred to the supply chain department of the company which is responsible for procurement of everything related to production. After this step, the production begins and logistics are figured out, in the meantime sales and marketing looks for the customers. Once a product is sold and used, it comes to end of its lifecycle which is further disposed of by the customer. This whole process is unsustainable and is not a preferred way of business.

As with linear industries, circular economies are also based on different business models which vary from the source of supply to marketing practices. A shift from linear economy to circular economy has led to some new business models, value chains, and product/service delivery models which is embedded in through new design methods, production, use and disposal processes (Buren et al., 2016). These business models are mainly based on Circular Supplies, Resource Recovery, Product Life Extension, Sharing Platforms, and Product as a Service (Accenture, 2014). Figure 8 shows the circular business model.

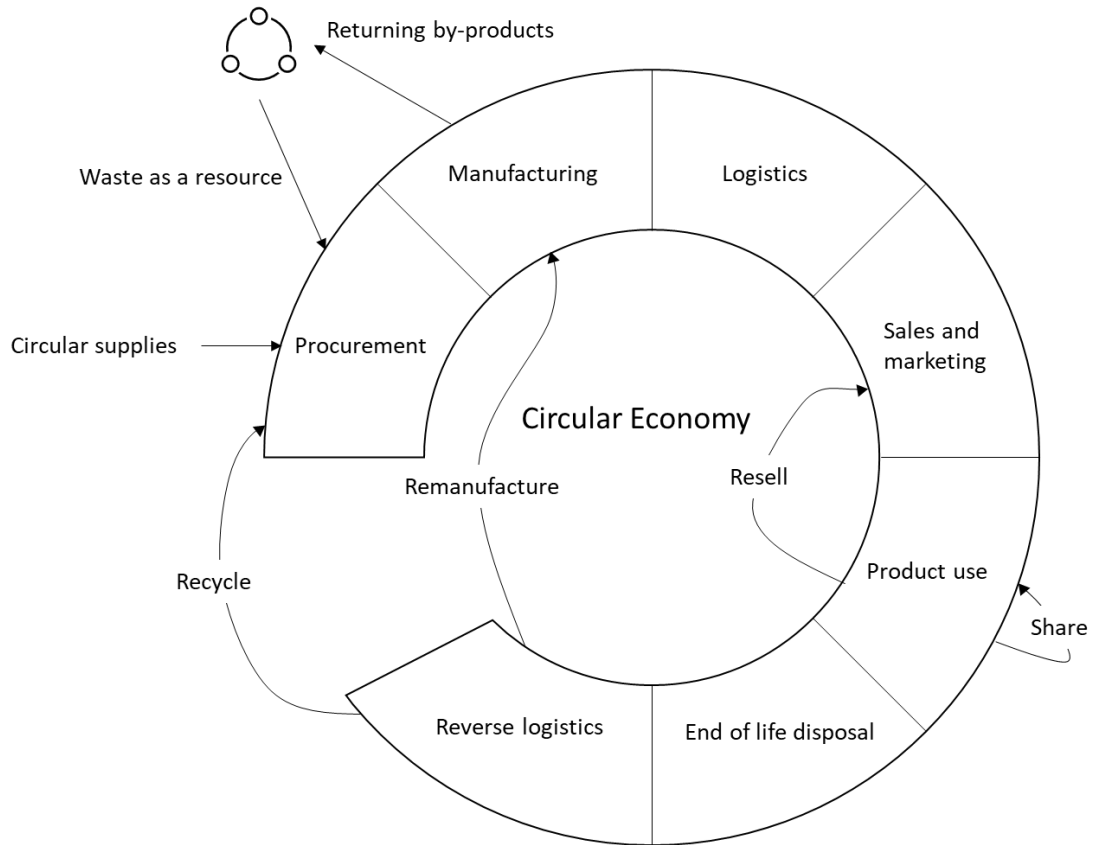


Figure 8. Circular business models (Accenture, 2014)

Above figure outlines the different circular business models and the segment of product cycle. The first business model of circular supplies is based on the principle of using renewable, recyclable, or biodegradable resource input for production and consumption (Accenture, 2014). This method has been popular amongst companies whose end product is based on heavy consumption of raw materials which is scarcely available or comes with higher environmental emissions.

The second business model of resource recovery states that any end-of-life product should be used as an input to promote return supply chain and transform waste into value through innovation in recycling and upcycling services (Accenture, 2014). This model improves the sustainability of substances and reduce adverse impact on the environment by overuse of virgin raw materials (Hao et al., 2022). To have a successful implementation of this business model, companies require innovative approaches to make all the production processes leaner and reuse all the generated waste.

The third business model of product life extension allows companies to extend their product's lifecycle to increase their values, as otherwise they would be contributing towards

waste creation leading to unsustainable practices (Accenture, 2014). To best achieve this, developing effective strategies, eco-design principles in product designing and careful material selection (Milios, 2021). In other business models, there are some associated costs for the companies once the product is at end of its lifecycle, however, this business model allows companies to achieve cost savings by extending product lifecycle.

The fourth business model of sharing platforms allows organisations to share their platform amongst other users, either individuals or organisations (Accenture, 2014). Products having low consumptions are best suited for this business models as it reduces the waste of energy and raw materials. Many industries are now working on collaborating with each other where there is no direct threat to their intellectual property.

The fifth business model of product as a service is an alternative to the traditional model of “buy and own” which allows multiple customers to use the product at a lease or pay-for-use arrangement (Accenture, 2014). Offering product as a service can allow organisations to upgrade their products after a period of time as they can be returned back to the organisation leading higher customer satisfaction. Implementation of this model requires higher conceptual changes to overall design (Krummeck et al., 2022).

Nonetheless, the circular economy also presents certain hurdles, particularly concerning technical obstacles tied to execution. Items must be engineered to allow for disassembly, reuse, and recycling. Furthermore, not all materials possess limitless reusability. The contamination of materials can impede their effective recycling. Take vehicles as an example; they consist of an array of materials including metals, plastics, and glass. (Krummeck et al., 2022)

Circular economy can also be referred to as industries of the future due to the reduction in the use of virgin raw material which in turns also reduces CO₂ emissions generated by extraction processes. The circular raw materials used in such industries have their own set of challenges which makes the implementation of circular economy further difficult. Table 10 enlists the challenges of circular economy available in different literary sources.

Table 10. Challenges of circular economy listed by different authors.

Author(s)	Challenge
Guerra & Leite (2021)	Lack of data about the materials and their conditions.
	Stigma of using “second-hand” products.
	Matching supply and demand in terms of materials quantities and locations, which often makes the process not viable.
	Difficulty in certifying the salvaged materials with the relevant governing bodies for Testing and Materials standards
	Expenses associated with the treatment of these materials in order to enable their reuse.
Adams et al. (2017)	Complexity of business models
	Fragmented supply chains
	Low value of materials/products at end-of-life cycle
	Unclear financial case
	Lack of market mechanism for recovery
	Lack of consideration for end-of-life issues
	Lack of incentive to design end-of-life products
	Lack of circular economy knowledge
	Limited awareness across supply chain

Although the circular economy offers a hopeful remedy for resource scarcity and environmental issues, overcoming these obstacles necessitates collaborative endeavours from governments, enterprises, and individuals to nurture a sustainable and circular to-

morrow. This includes tackling concerns associated with extended producer accountability, waste handling, and product labelling. Achieving alignment for these regulations at a worldwide level can be intricate.

5. CONCEPT OF REVERSE MARKETING

5.1 Concept of Marketing

According to Kotler (2002), marketing can be perceived as a set of aspirations and targets, along with guidelines and regulations that guide a company's marketing endeavours in response to an ever-changing environment and varying competitive scenarios. Market-focused strategic planning involves the procedure of establishing and upholding a sustainable connection among an organization's goals, employee development, and available resources. The primary objective of strategic marketing planning is to recognize and establish a competitive edge. It follows a coherent sequence and encompasses a sequence of actions that lead to defining objectives and devising marketing approaches and methods to attain goals. This process also involves assessing the financial outcomes that arise from implementing the suggested strategies. Table 11 outlines different definitions of marketing strategies in literature.

Table 11. *Definitions of marketing strategies in literature*

Author(s)	Definition
ANDERSON, (1982)	The real lesson in strategic marketing philosophy is that more effective organizations recognize the underlying and enduring nature of the customer needs they are trying to meet.
Doyle (2000)	Strategic marketing is a management process aimed at maximizing shareholder value by creating a competitive advantage in the provision, communication, and delivery of value to the consumer in the hope of developing long-term relationships. A strategy built on trust will provide a competitive advantage. Marketing strategy includes internal integration and external focus on its customers in a competitive environment.
Hambrick & Fredrickson (2001)	A marketing strategy consists of five elements: planning the organization of its activities, methods of achieving goals, how successful it will be, determining the speed and sequence of the company's actions, the method of making a profit.

Achrol & Kotler (1999)	The core of the marketing strategy revolves around catering to specific customer groups. The organization handpicks its market, segments it, opts for the most feasible approach, and concentrates its efforts on serving the identified segments. Employing available resources like product, pricing, promotion, and distribution, the company develops a tailored marketing blend. Crafting a marketing strategy demands an evaluation of both external conditions and internal operations.
Baker, (2008)	A strategic marketing plan is a model for positioning a company relative to competitors, it contains a definition of market needs, goals to be achieved, strategies for achieving goals and resources necessary to obtain the desired results.

Developing supplier – buyer relationships are complex in nature and are iterative where either supplier or the buyer must bring certain changes in their own process to establish a successful relationship. According to Petison & Johri (2008), the initial phase of the supplier - buyer relationship is characterized as a market-based exchange, and over time, it transitions into a collaborative partnership. In developing new customers, it is important to have a clear communication and communication medias to address the issues better. These communication types can be awareness, persuasion, and commitment phase. There are several phases to develop new customers and they are listed below as outlined by Andersen (2001):

- Pre-relationship phase: For the sales divisions of an organization to develop new leads to achieve revenue targets or to launch a new product in the market, they are required to generate more leads which can be further developed into clients. This phase involves a process of evaluating the potentials of customers and marketing organization's value proposition to the decision makers in the buying organization.
- Negotiation phase: Once the buying organization evaluates the selling organization's potential then both the parties analyse the requirements and negotiate on different parameters such as price, lead time, delivery terms, and quality.
- Relationship development phase: This phase is achieved after some orders are fulfilled by the selling organization which allows buying organization to assess selling organization's performance and decide on future of the partnership. This phase requires constant communication and commitment from both the parties.

The three stages are defining phases involved in relationship building, however, there are intermediary tasks involved in building a successful partnership. Andersen (2001) proposes a comprehensive model for building relationships that encompasses three distinct stages as mentioned showed in Figure 9.

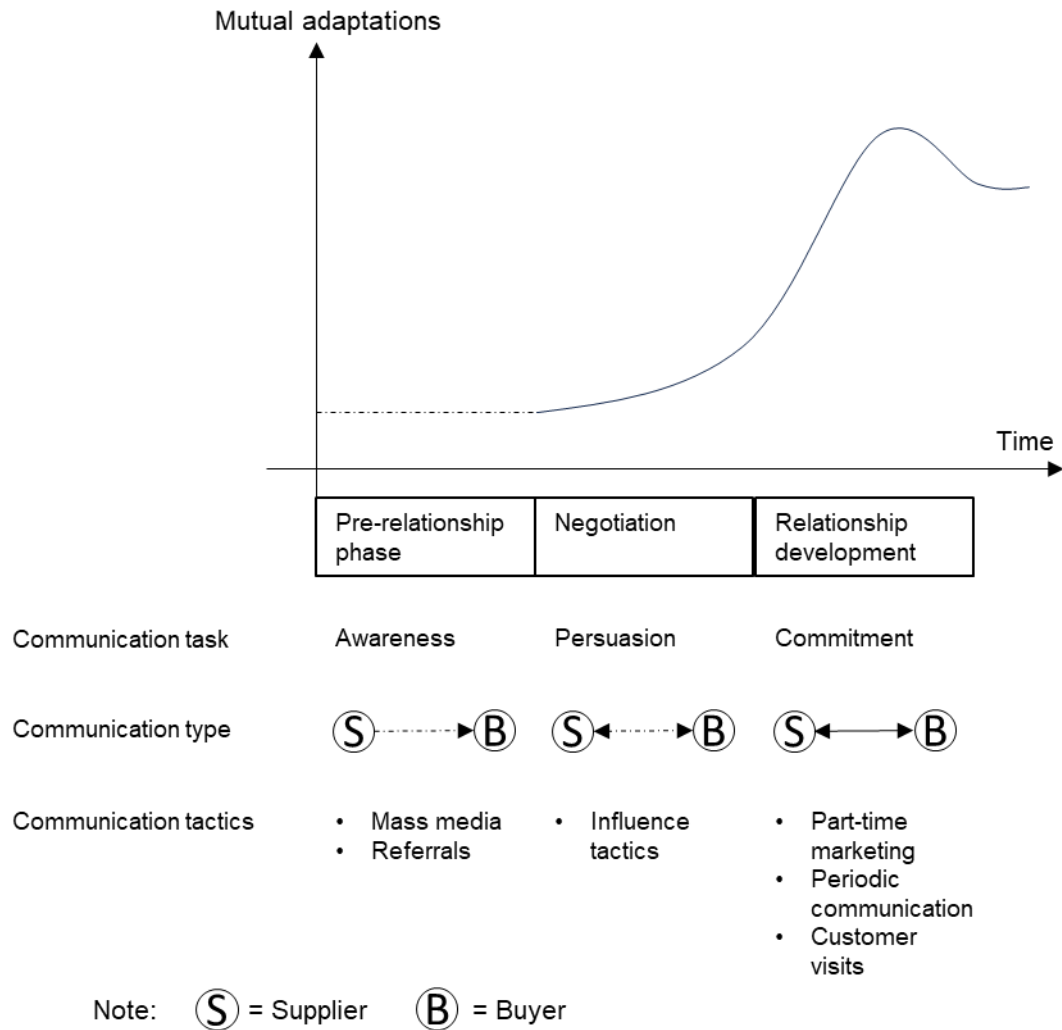


Figure 9. Design of communication means and strategies (Andersen, 2001)

Above figure showcases how a supplier – buyer relationship is developed and its affiliation with time and mutual adaptations by both parties. Firstly, pre-relationship phase is time consuming where the mutual acceptance is minimal as both the parties are still in evaluating phase. This phase involves supplier contacting the buyer by using mass media and referrals from current customer base. Secondly, in negotiation phase, mutual acceptance increases over time by completing some deliveries. This phase requires communication between both buyer and supplier by influencing their decision-making.

Thirdly, in relationship development both the parties keep open communication channels by using different communication tactics.

The marketing process can be described as a collection of actions undertaken by a company to realize the marketing objective, which involves generating value for customers and establishing robust connections to gain reciprocal value in return (Kotler et al., 2013; Sanchez, 1999). The marketing process contains three components, and they are interconnected to each other. Figure 10 outlines the marketing process and its broader components.

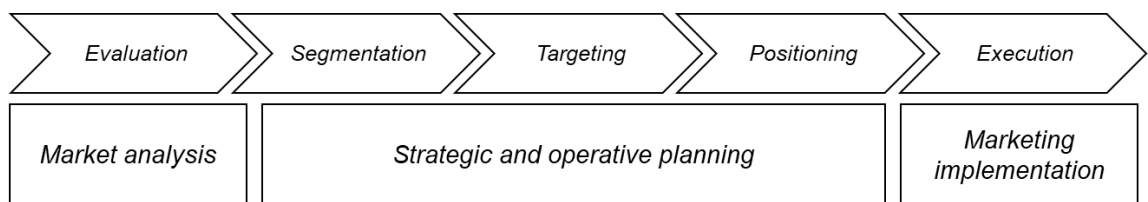


Figure 10. Marketing process (Bickhoff et al., 2014)

The above figure shows a marketing process which includes all the steps of supplier – buyer relationship. Firstly, the evaluation stage requires evaluating the customer by conducting market analysis to gain insights into the market and identify opportunities. Secondly, segmentation includes segmenting customers based on the market analysis done in the previous stage. Thirdly, targeting a select market segment with different marketing tools. Fourthly, positioning involves developing an understanding of the market to take a position in the industry by evaluating profitability potentials. Lastly, execution includes implementing the marketing plan to achieve the strategic goals of the organization.

5.2 Reverse Marketing

Reverse marketing allows a manufacturer to enhance the coordination of quality decisions within its supply chain by taking direct control over quality choices. However, this also means that the manufacturer must bear the cost of investing in quality improvement. (Lin et al., 2014). Reverse marketing involves a manufacturer expanding its operations towards the raw material source, thereby enhancing its control over supply-side quality. This stands as a primary incentive driving the adoption of reverse marketing.

The dynamics of buyer-supplier relationships have undergone significant transformation. In the conventional setup, the seller typically promotes their product or service with the aim of making a sale. This traditional approach has now evolved into a scenario where the buyer actively seeks out a supplier who can precisely meet their specific requirements, a concept often referred to as "reverse marketing" (Blenkhorn & Banting, 1991). Reverse marketing is not a new concept but there is not much literature available on this topic as it has recently started to gain attention in SMEs and startups, even then not many companies are aware of the actual literary term of this marketing style. Figure 11 shows the supplier-customer relationship between linear and circular industries.

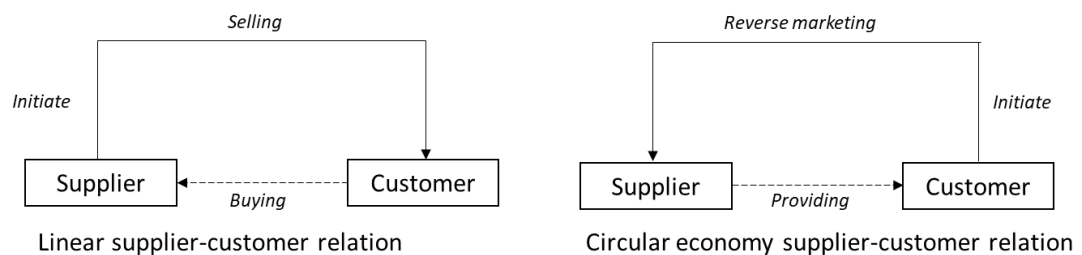


Figure 11. Supplier-customer relation between linear and circular industries (Blenkhorn and Banting, 1991).

Above figure helps to understand and implement reverse marketing it is essential to understand the dynamics of buyer-seller relationships from an industrial perspective. For buyer-seller relationship to take place, it requires interaction between two active parties and traditionally, it is the seller who does marketing of their product for the targeted market audience. However, any of the active parties can play an initiator role and establish the relationship. Developing this relationship is very vital for the companies to meet their supply and demand, therefore, building a relationship into a long-term relationship is the end goal of many companies to maintain the requirements.

These relationships are complex in nature and affect the buying decision by analysing supplier performance in different settings, many organisations have an army of supply analyst feeding data to the buyers. If the relationships are built on a shaky ground, then even the smallest of errors can affect the buying decisions greatly. Therefore, Ford (1980) outlined a five-stage process for developing the buyer-seller relationships, these stages do not guarantee a successful relationship building as they solely dependent on the actions of both the individual parties. Figure 12 illustrates the stages in relationship development.

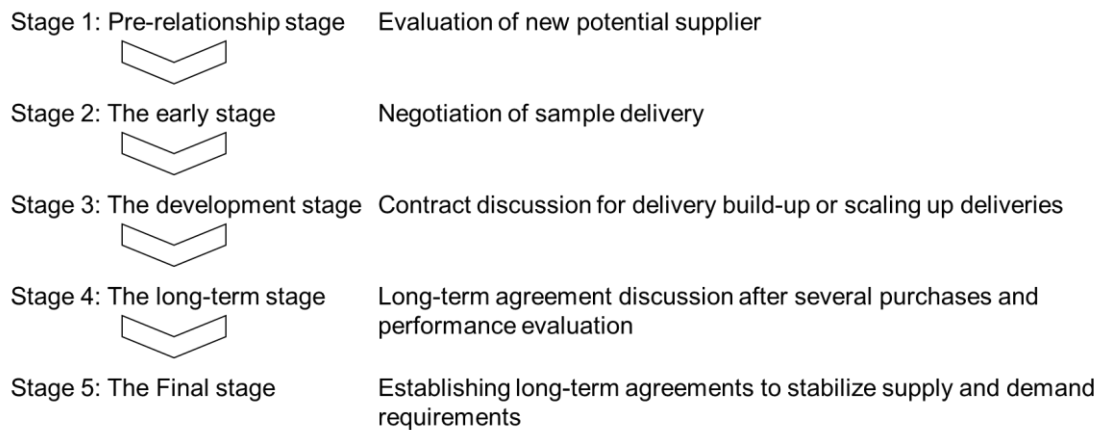


Figure 12. Buyer-seller relationship development (adapted from Ford, 1980)

The figure above illustrates that these stages serve as the foundation for a successful buyer-seller relationship. In the pre-relationship stage, the buyer looks for a new supplier due to varied reasons such as problems with existing supplier or a new product line. In this stage, the supplier is evaluated by the buyer and vice-versa to assess the future of the relationship with absolutely zero commitment. In this stage, both the parties exchange relevant information after the NDA process is completed.

In the early stage, both the parties negotiate a sample delivery or a small batch order where the quality and performance of the supplier is evaluated thoroughly with low commitments. Once these evaluations are completed, buyer moves towards the development stage where similar orders are continued to further evaluate performance and quality over a period. In this stage the commitment from both the parties is also evaluated by the counterparts to assess the possibility of a long-term relationship.

In the long-term stage, the agreements are discussed and mutual importance of both the parties is established as this stage requires higher commitment from both. This is demonstrated by several deliveries and a detailed analysis of performance in all the aspect. The final stage is achieved only in a stable market where the products can be standardised, and industry codes of practice can be met. This stage is not very common due to the dynamics of buyer-seller relationship.

Traditionally, buyer only initiates the supplier evaluation process due to issues with existing relationships with their suppliers or the suppliers initiates the contact by using different marketing approaches. Furthermore, in the majority of the aforementioned stages, the supplier undergoes evaluation based on the buyer's criteria., however, in case of reverse marketing approach the buyer is scrutinised by the seller. The buyer scrutiny is done is to understand the level of commitment from the buyer as the majority of risk lies on the supplier. Blenkhorn & Banting (1991) did research with organizations in North American and Japan to identify role of reverse marketing in purchasing function and identified some of the key elements of it:

- To achieve both short and long-term supply objectives of an organization, purchaser takes the initiatives of contacting and proposing the requirements to seller. However, reverse marketing often leads to an aggressive and imaginative approach to achieve its supply objectives.(Blenkhorn & Banting, 1991)
- Reverse marketing is an approach where both existing and new suppliers are having to be managed to achieve ambitious supply objectives of the organization. This generally involves influencing a reluctant supplier to supply, influencing internal stakeholders to sell what was formerly purchased or vice-versa, influencing users on new product, service, or system. (Blenkhorn & Banting, 1991)
- Reverse marketing is a technique which enable future and it also requires precision planning and research to achieve the objectives of quality, quantity, price, delivery, and service. With higher stakeholder management and cooperation from different functions reverse marketing can become a success permitting supply function to contribute effectively to the overall objectives and strategy of an organization. Achieving 5 to 30 percent of savings is not uncommon amongst other rewards. (Blenkhorn & Banting, 1991)
- Reverse marketing speaks to a diverse viewpoint on the part of supply and how it ought to be overseen so as to contribute viably to organizational objectives and strategies.(Dwyer, 1989)

Reverse marketing is a strategic purchasing approach which requires additional skills and expertise than the traditional approach. Every significant organizational change, for successful implementation of reverse marketing it requires some changes in (Biemans & Brand, 1995):

- Personnel with right education and attitude

- Sufficient commitment and support from organization
- Practical guidelines to accommodate strategy implementation.

Figure 13 outlines the reverse marketing process as outlined by Blenkhorn & Banting, (1991).

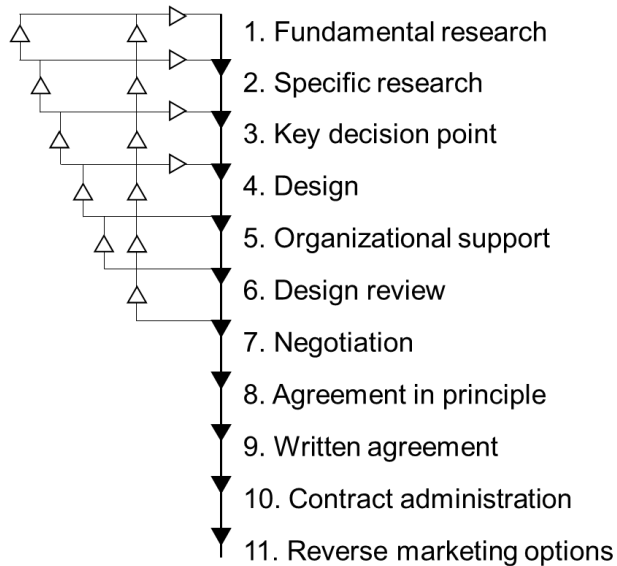


Figure 13. *The reverse marketing process (Blenkhorn & Banting, 1991).*

The figure above demonstrates the various phases of reverse marketing and their cyclic progression from one stage to another. The initial seven stages of this process are iterative in nature and can be revisited numerous times until a desired outcome is received. Negotiation is the most vital step in this process and in general, negotiation takes back and forth of information and revised prices. It involves a great deal of aggressive behaviour to ensure that the supply function achieves its goals which can also include bottom-line profitability (Blenkhorn & Banting, 1991).

With this new type of purchasing, buyers initiate more problems to be solved by using creative solutions allowing the seller to work on building a long-lasting buyer-seller relationship. It also allows sellers to work on developing their own internal processes and technologies to accommodate the challenges presented by the buyers allowing them to acquire new technologies and exploring new product lines. Thus, diversifying product portfolio and maximising the revenue generation opportunities.

5.3 Marketing tools in B2B and B2C relationships

B2B relationships are between two business and B2C relationships where business sell directly to the end consumers. B2B involves diverse groups within a single customer's organization, and it's crucial to tailor the product messaging for each of these audiences. In the B2C context, the consumer often serves as both the purchaser and the user of the product. As a result, the product messaging is directed straight to the consumer, and B2C segments typically consist of the consumer alone, with occasional instances where the buyer isn't the end-user. B2B marketing generally involves 4P's marketing mix whereas B2C is based on 4C's of marketing mix. Figure 14 outlines the different marketing mixes.



Figure 14. 4Ps and 4Cs of marketing mix (adapted from Wu & Li, 2018).

As can be seen from above figure, there are two types of marketing mix which are 4Ps and 4Cs. 4Ps include product, promotion, price, and place. Firstly, a product refers to any physical or non-physical item that is exchanged in the marketplace. The fundamental essence of a product lies in delivering value to a customer. Secondly, prices are frequently formulated by considering per-unit calculated costs along with sales margins after accounting for taxes (Kotler, 2002). Thirdly, promotion involves actions like sales or advertising that result in enhancing brand recognition and sales volume. To be more precise, promotion also functions as a form of marketing communication. Fourthly, place involves deciding the location and manner in which a product will be marketed. This

aspect of marketing primarily centres on distribution channels, the accessibility of those channels, sales reach, supply logistics, and transportation arrangements.

In the 4C model, communication is synonymous with promotion. Customer cost serves as the counterpart to pricing, while customer solution represents the product, and convenience aligns with place. Overall, this concept places the spotlight squarely on satisfying customer needs. The model's objective is to simplify the purchasing process by emphasizing the product's value to customers and offering a fair and reasonable price. Shifting from promotion to communication helps foster a positive customer perspective on purchasing products, moving beyond mere promotion. Diverse forms of advertising across media, social networks, or websites can be employed to engage with customers.

In case of reverse marketing, both the models are useful depending on the organization business model, however, instead of doing marketing activities towards customers, here the same efforts are taken towards suppliers. This allows the buying organizations to control cost and quality more efficiently.

6. REVERSE MARKETING IN CIRCULAR SUPPLY CHAIN MANAGEMENT

6.1 Circular supply chain management

(Farooque et al., 2019) defines “circular supply chain management as the integration of circular thinking into the management of the supply chain and its surrounding industrial and natural ecosystems. It systematically restores technical materials and regenerates biological materials toward a zero-waste vision through system-wide innovation in business models and supply chain functions from product/service design to end-of-life and waste management, involving all stakeholders in a product/service lifecycle including parts/product manufacturers, service providers, consumers, and users.” Embracing and executing circular economy necessitates organizations to rethink and restructure their supply chains, encompassing aspects such as sourcing, operations, logistics, as well as handling returns and disposal (Zhang et al., 2023). Figure 15 outlines a circular supply chain management framework.

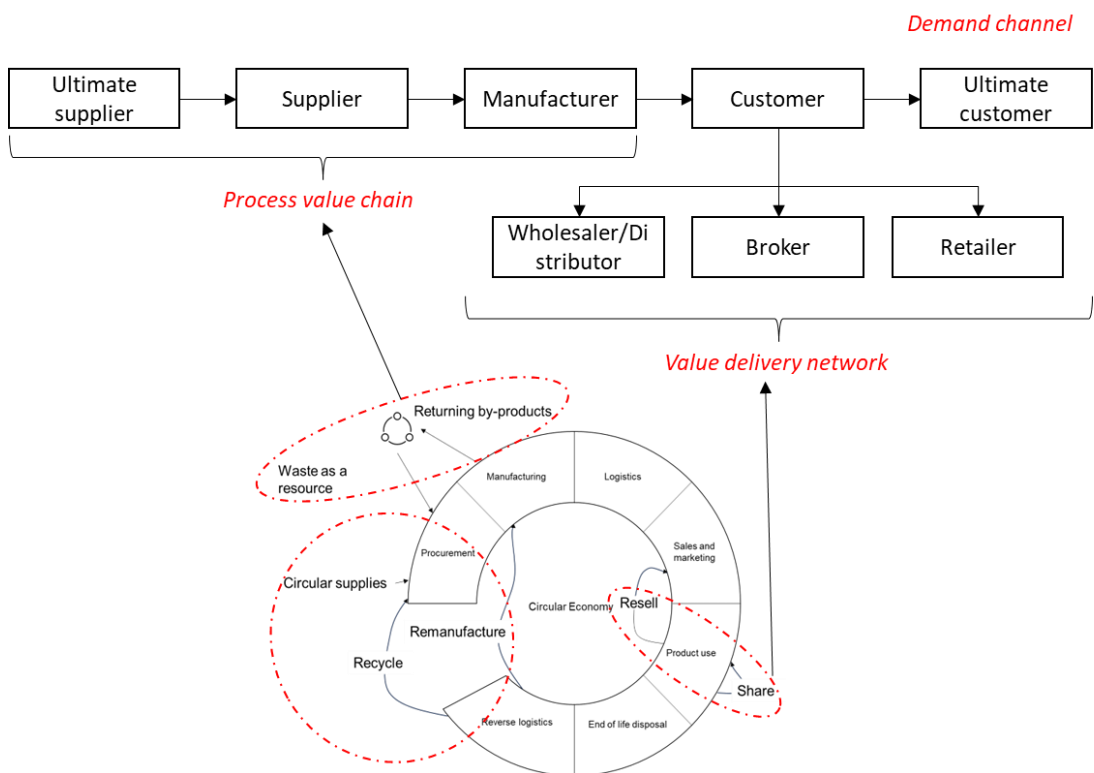


Figure 15. Circular supply chain management

As shown in above figure, the business models of circular economy correlate to the components of supply chain management. Firstly, the process value chain component of supply chain management adopts return, recycle, and remanufacture business models of circular economy. Since the process value chain is embedded in the upstream supply chain and the suppliers are responsible for delivering the raw materials or products. Similarly, in case of circular business models, the parties who are source of circular raw materials acts in the same manner as a supplier would act in a linear business model. For example, a machining industry has an end-of-life equipment which is reducing their productivity can sell the equipment back to the original manufacturer to recycle and sell it as refurbished equipment or strip it for parts. In this case, the end customer from the linear economic business models becomes a supplier in the circular economic model.

Secondly, the value delivery network component of supply chain management adopts resell, and reuse or share business models of circular economy. From a linear economy perspective, value creation network works in the downstream supply chain and the manufacturers uses different customer types to deliver to the ultimate customer. Similarly, in circular business models, the customers who market and deliver the manufactured products to the ultimate customer serve as a conduit for the resale or reuse of the products acquired from the ultimate customer. For example, in a B2C relationship, the end user purchases a wrong product and returns it back to the distributor. Since this returned product cannot be sold as a new product, the distributor resells it as an open box product to some other customer.

Shifting towards a circular economy demands significant changes in the way business models operate, supply chains are structured, and approaches to designing products/services, manufacturing, consumption, waste handling, as well as reuse and recycling are carried out (Hobson, 2016; Mendoza et al., 2017). Supply chains in circular economy are more complex than in linear economy due to other supporting factors such as quality, cost, environmental implications, and resource utilisation for the raw materials. Therefore, supply chain efforts in such an industry requires reverse marketing activities to build the supply.

6.2 Challenges in circular supply chain management

Implementing circular supply chain management is challenging due to the change in traditional practices from linear economy. Despite these difficulties, the possible environ-

mental and financial advantages of circular supply chain management, including diminished resource usage and waste, heightened sustainability, and enhanced brand image, justify its pursuit. Yadav et al. (2020) did an extensive review of literature and has outlined different supply chain challenges commonly seen in circular industry, these challenges are listed in Table 12.

Table 12. Circular supply chain challenges (adopted from Yadav et al. (2020))

Challenge	Description
Significant upfront expenses associated with environmental packaging.	The elevated expense associated with product packaging limits its uptake within organizations.
Inadequate commitment from management for the implementation of sustainability practices.	Lack of active engagement by top management in embracing sustainability results in failures when implementing Sustainable Supply Chain Management (SSCM).
The inadequate integration of sustainability into the current process framework.	In numerous instances, management struggles to incorporate sustainability into the established supply chain process structure.
Divergence between product sustainability policies and the provisions of free trade agreements.	A conflict of interest arises between product sustainability policies and free trade provisions, which has an impact on the adoption of sustainability measures.
Lack of a viable framework for the adoption of SSCM.	The absence of a suitable SSCM framework steers organizations away from achieving sustainability in their supply chains.
Insufficient awareness of sustainable standards for raw materials.	Being well-informed about the current sustainable standards for raw materials, especially in relation to suppliers, is of utmost importance.

A firm belief in the expectation of limited economic gains.	The decision-making authorities hold the belief that the adoption of SSCM is associated with limited economic returns.
Elevated expenses associated with implementing sustainability measures.	The implementation of SSCM demands a substantial initial investment, which in turn serves as a deterrent for management to proceed with the adoption process.
Inadequate training of employees in sustainability practices.	Employees require training in sustainability adoption strategies to improve the performance of the supply chain.
Failure to take into account human-related factors.	A lot of organizations disregard human factors, which ultimately impacts their organizational performance and disrupts the alignment of supply chain activities.
Lack of consistent alignment between sustainability initiatives, organizational objectives, and customer expectations.	Achieving a harmonious blend of sustainability, organizational objectives, and meeting customer expectations is crucial for maintaining competitiveness on a global scale.
High disposal costs	The organization's adoption of sustainability in the supply chain is limited by the high costs associated with disposal.
Inadequate communication with suppliers.	Maintaining robust and immediate communication with suppliers, including tracking organizational activities, is crucial to eliminate production delays.
Copying sustainability adoption strategies from other organizations.	In pursuit of rapid success in SSCM adoption, many organizations try to imitate strategies from other companies, but this often results in adoption failures.
Complex design aimed at reducing energy consumption.	Many organizations shift to alternative design approaches in order to produce sustainable products

	and reduce energy consumption, but this often introduces complexity.
Improper implementation of sustainability measures.	The ineffective utilization of sustainability practices poses challenges when it comes to adopting SSCM.
Insufficient employee engagement and empowerment.	Clearly involving employees in managerial activities and providing empowerment enhances their efficiency and facilitates the adoption of SSCM.
Incorrect estimation of the adoption cost for SSCM.	Accurate estimation of the adoption costs SSCM is crucial for its successful implementation.
Insufficiency of resources, including financial, technical, and human, is a hindrance.	The absence of financial, technical, and human resources makes it challenging for organizations to embrace sustainability.
Inadequate strategies for selecting suppliers.	Choosing the right supplier is essential for producing the desired sustainable products.
A performance measurement system that is not effective.	The absence of a suitable performance measurement system leads to inefficient tracking and mapping of supply chain activities and performance.
An unsuitable or ineffective system for reverse logistics.	The absence of an efficient reverse logistics system complicates the recycling of products, diverting the path towards achieving sustainability.
The absence of sustainability standards and regulations.	Having awareness and adherence to sustainability standards and regulations is crucial because it ensures that the products produced meet established benchmarks.

The table provided above delineates the difficulties encountered by circular industries, and it's clear that a substantial portion of these challenges pertains to both product cost and quality, as well as the accompanying services. Moreover, achieving success in this business model necessitates an extensive amount of supply and operations planning.

6.3 Role of reverse marketing

Supply chain management plays a critical role in the success of circular industries, however, finding suppliers in such an industry is very complex due to the end product and its design. Design is done in accordance with the environmental conditions and quality of raw materials that can be sourced through circular economic models. In most cases, suppliers are unaware of the value of these used products and can be scrapped with minimal value. Figure 16 showcases a framework to outline role of reverse marketing in supply chain management of circular industries.

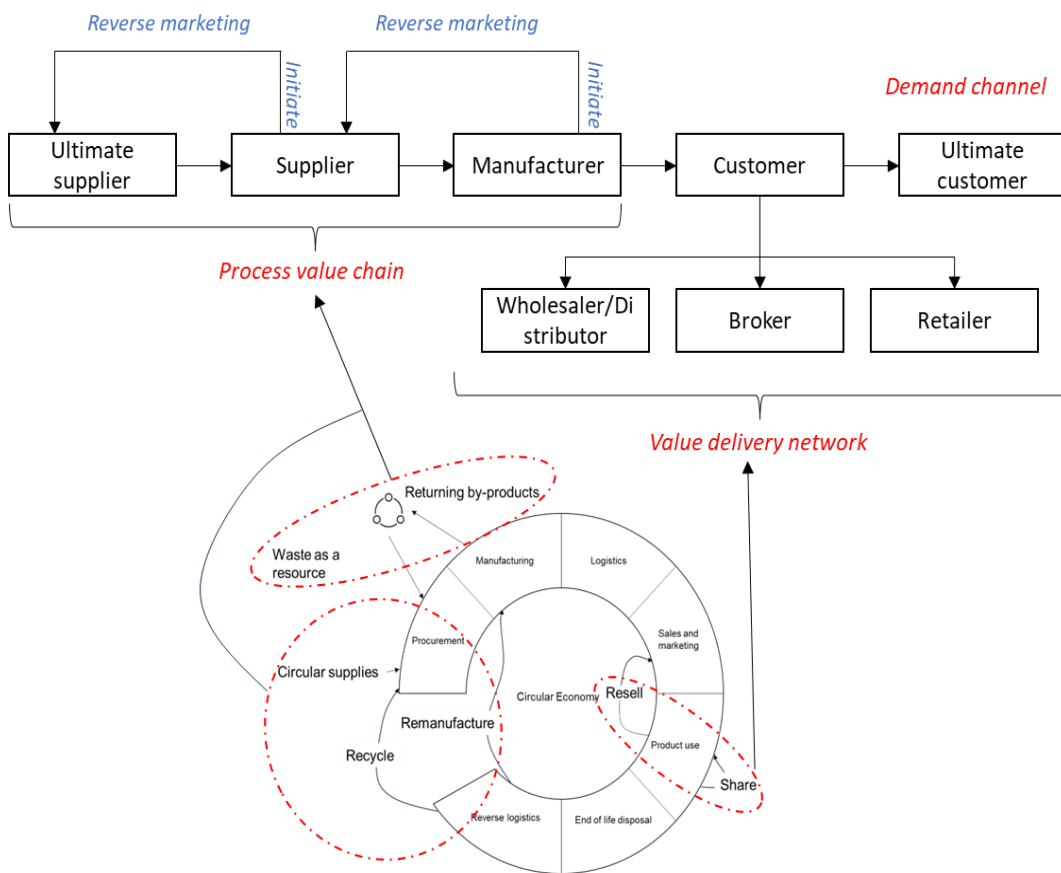


Figure 16. Role of reverse marketing in supply chain management of circular industries

Above figure portrays a connection between circular supply chain management and reverse marketing where it plays a major role in the process value chain of circular supply chain. The industries looking for circular raw materials have to initiate contact with the

potential suppliers who may have access to such raw materials. To initiate contact, supply chain divisions of such organizations use marketing tools to communicate value proposition to these potential suppliers to purchase the raw materials.

7. DISCUSSION AND RESULTS

7.1 Description of case industries

With the emergence of internet, online shopping has increased exponentially in the last decade and companies like Amazon are providing a platform for majorities of the commodities to be sold online with maximum ease for the consumers. (Alberto et al., 2014) states that with the presence of internet e-commerce has emerged and has allowed consumers to trade goods, services, or information online with low time and distance barriers. However, electronics is a segment which has grown over the past few years exponentially and the market acceptance has also increased where consumers are preferring refurbished electronics over new electronics. Refurbished electronics provide higher benefits to consumers such price benefit, environmentally friendly operations, and product lifecycle management. There are other companies which are solely focused on selling refurbished electronics in a B2C and a B2B setting across Europe. Table 13 lists circular electronics companies in Europe.

Table 13. Circular electronics companies in Europe

Company	Products
Swappie Oy	iPhones
Back Market	All electronics
Refurbed	All electronics
Amazon	All electronics
Apple	Apple products
Mazuma	Smartphones
Foxway	Smartphones
Furbie	All electronics

Verkkokauppa	All electronics
Gigantti	All electronics

Above table shows the major players in refurbished electronics in Europe, many of these companies sell all types of refurbished electronics such as headphones, smartwatches, smartphones, laptops, tablets and many more. For B2B supply model, companies must create value proposition for their suppliers to understand the value that these customers can provide to them in the long-term setting. The relationship building here is a vital component of making sure that the supply objectives are met while keeping a check on quality. These companies are the ones who initiates the relationship by different processes which are generally used by sales and marketing divisions such as lead generation, cold calling, and creating proposals for the counter parties to evaluate.

For supply channels, these company can either have a B2B setting that is they buy from a supplier and quality control is done in house or contracted to some other trusted supplier or with C2B setting where trade-ins marketed to consumers looking to sell. These B2B settings are managed by a team of sourcing personnels by supplier development and supplier management where day-to-day purchases are made.

Circular economy can be seen in multiple sectors which have a higher potential to implement certain changes to promote circularity. As circular economy promotes cost saving opportunities, it is a positive change towards bringing the overall production and product cost down for some of these industries. Some of these industries work on the principle of “someone’s trash is someone else’s treasure” where waste or byproducts from other industries is reutilised in manufacturing or production of a wide range of products. Some of these industries are:

- Construction industry
- Packaging products
- Water
- Energy and energy production

With the growing urbanization, cities are getting demolished and new buildings are built frequently, these demolitions generate waste which is dumped into the landfills. Waste

materials can vary from concrete, bricks, wood, plastic, metals, and soil. These waste materials are a great source of raw materials if processed properly and it requires changes in the current processes which is not always cost efficient. Such diverse raw materials require separation from each other to be used as a raw material for new concrete or construction products. For example, the demolished buildings are great source of raw material to replace aggregates in the production of concrete which reduces the overall CO₂ emissions.

The construction industry uses cement as the primary product and about 176.58 MMT of cement was consumed in Europe in 2021 which is expected to grow at a rate of 1.9% from the coming 5 years (Expert Market Research, 2022). Cement production is one of the major sources of environmental pollution accounting for 5% of overall emissions (Tanabe et al., 2022). Many organizations in Europe are working towards replacing cement from the concrete by using industrial byproducts such as slag from the steel industry, ash from the energy production or tailings from mines. Table 14 shows a list of major players in Europe working towards substitution of cement.

Table 14. Major European players in green cement

Company	Location	Cement substitution
CRH Plc	Ireland	GBFS
LafargeHolcim	Switzerland	GBFS
Heidelberg Cement	Germany	GBFS, Fly ash
Finnsementti	Finland	GBFS
Consolis group	Finland	GBFS

Above table shows material that substitutes cement in production of concrete, this substitution can be either one hundred percent or partial substitution based on the cement standards. GGBFS used here is the slag from blast furnaces used to produce steel from iron ore, in this process slag is collected to remove impurities from the final steel. This slag is then further processed such that it resembles the qualities of cement. Fly ash is

the byproduct from burning of coal for energy production, this ash is collected in the bed trays of an energy plant.

By using GGBFS and fly ash in the production on concrete, the circular concept of reuse is implemented here by reusing the byproducts of steel and energy industry. If these byproducts are not used, they are put in landfills owned by these producers where a limited quantity is allowed to be dumped annually by the governments. Supply chain of these materials is complex due to the heavy logistics requirements, pricing concerns and quality control.

Packaging industry is an industry with a higher potential for implementation of circular economy due to its higher requirement of wood and paper products. For packaging, plastics are also commonly used which amounted at 57,9 million tonnes in Europe for the year of 2019. In 2018, 17,8 million tonnes of post-consumer plastic packaging waste were collected and about 42% was recycled (PlasticsEurope, 2020). Table 15 shows some of the companies which are producing recycled packaging products.

Table 15. Companies producing recycled packaging products.

Company	Location	Product	Industries served
Amcor	Australia	Recycled packaging material	FMCG, healthcare, speciality packing, technical applications
Tetra Pak	Sweden – Switzerland	Recycled packaging material	FMCG
Bemis	USA	Flexible packaging material	FMCG, healthcare, speciality packing, technical applications
Mondi	UK	Recycled paper packaging	Flexible packaging, corrugated packaging, containerboards
Stora Enso	Finland	Plastic free packaging products	E-commerce, FMCG, healthcare

Circularity in energy sector is vital as it aims at getting the most out of available materials and design them in such a way that they can be reused in the same or other industries.

Energy transition is a structural change in the energy system, related to collection, conversion, transport, consumption, and management of energy resources (W.-M. Chen & Kim, 2019). Energy transition shares principles with the framework of reduce from circular economy as it relies on sustainable use of natural resources by moderating the use.

In energy sector, circularity can be seen in different sub-sectors such as use of byproducts from the energy sector, reusing waste from other industries for energy production, and producing renewable petroleum products by using waste of food sector. In Europe, electricity is generated by different sources such nuclear, natural gas, coal, hydro, wind, solar, biofuels, and petroleum (Conte, 2023). All these sources create some waste which can be further utilised in other industries, for example, ash from the coal electricity plants can be used in the construction industry.

Production of energy is a circular process where either the raw material or recycled raw material is used which produces byproducts for other industries. For example, the wood waste from forest and furniture industry is used as a raw material to be used as biomass energy plant which further produces bioash. Bioash can further be used in the construction industry for road construction, concrete production and can be used in agricultural products such as fertilizers.

7.2 Supply and demand channels of circular industries

Circular industries usher in a supply chain that revolutionizes the management of resources and a demand network moulded by environmentally aware consumers. In synergy, they lay the foundation for a more sustainable and accountable economic framework, characterized by waste reduction, resource preservation, and the flourishing of innovation. Depending on the business model of the organization, the supply and demand channels vary. Some organizations target the end consumers directly, whereas others have a business model which focuses on businesses. Table 16 outlines the supply and demand channels of circular organizations collected by interviews and market research.

Table 16. Supply and demand channels of circular organisations

Industry	Organization	Supply channel	Demand channel
E-commerce	Swappie Oy	B2B and C2B	B2C
	Back Market	B2B and C2B	B2C
	Refurbed	B2B and C2B	B2C and B2B
	Amazon	B2B	B2C
	Apple	C2B	B2C and B2B
	Mazuma	C2B	B2B
	Foxway	B2B and C2B	B2B
	Furbie	B2B and C2B	B2C
	Verkkokauppa	B2B	B2C
	Gigantti	B2B	B2C
Construction	CRH Plc	B2B	B2B
	LafargeHolcim	B2B	B2B
	Heidelberg Cement	B2B	B2B
	Finnsementti	B2B	B2B
	Consolis group	B2B	B2B
Packaging industry	Amcor	B2B and C2B	B2B
	Tetra Pak	B2B and C2B	B2B
	Bemis	B2B and C2B	B2B
	Mondi	B2B and C2B	B2B
	Stora Enso	B2B and C2B	B2B

Energy	Neste	B2B	B2B
	Gevo	B2B	B2B
	Siemens Energy	B2B	B2B
	Shell	B2B	B2B
	Chevron	B2B	B2B
	BP	B2B	B2B
	TotalEnergies	B2B	B2B
	Eni	B2B	B2B

In case of C2B supply, these companies market their trade-in options to consumers either on the website or on with pop-in booths in select cities. Managing quality in such a setting is a challenging task as the trade-in consumer can also become a buying consumer as per the requirements. Figure 17 depicts some of the trade-in campaigns.

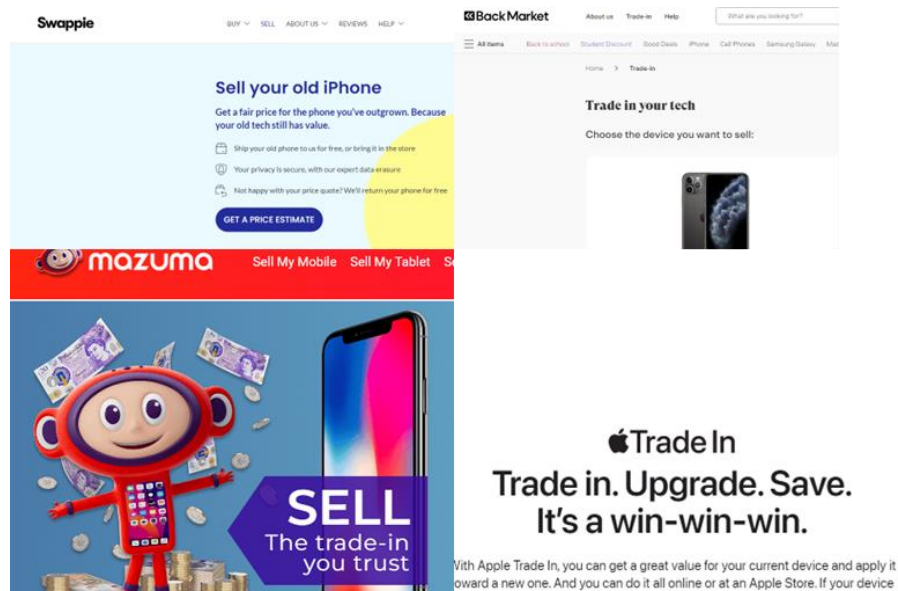


Figure 17. C2B trade-in campaigns (screenshots from company websites)

To address the “throw-away” culture designers and companies have started to increase the longevity of the product and it is a fundamental strategy for sustainability (Cooper,

2010). Companies selling refurbished electronics generally execute a series of evaluation, maintenance, and repair of the devices before they are sold to the new consumers (Rizos et al., 2019). This increases the consumer confidence to purchase old and refurbished electronics which often comes with a warranty period.

7.3 Supply chain challenges in circular industries

In recent times, the global business environment has undergone a notable transformation in the movement of products and services from suppliers to consumers. This shift, propelled by globalization, technological progress, and evolving consumer preferences, has led to the emergence of the concept of supply chain. Along with these factors, circular economies have also fuelled the supply chain challenges by introducing new ways of working. While supply chains have become indispensable for the effective and punctual delivery of goods, they are accompanied by various challenges. To get more insights into the challenges of circular industries, interviews were conducted with industry experts from different industries as described in the previous section.

The interview with Business Development Manager from e-commerce industry gave detailed insights into the supply chain management of circular electronic industry. The interviewee explained how the supply channel is built and it being a naïve industry, finding credible suppliers with quality products is extremely challenging. The interviewee also explained that due to the perception of used electronics with the consumers is not good, they expect high quality of electronics and implementing stringent quality control protocols with them is not an easy task.

“...supply activities in this industry challenges supply chain professionals to come up with out-of-the-box thinking on finding new suppliers and building long lasting supplier relationships. There are suppliers with very low capital and sometimes it's just a one-man company, therefore, the due diligence becomes of utmost importance. There are some big suppliers who have long standing agreements with the original producers, and convincing those suppliers to divert their sales to our company is very challenging. “

Similarly, an interview was conducted with the Supply Chain Manager from a construction company which focuses on reducing the CO₂ emissions from the cement industry. To achieve this mission, they are developing new solutions with by-products from steel and mining industries. The challenges in this industry are mainly to identify sources which can be recycled or reused directly in the concrete production. The owners of such by-products are generally unaware of the value that can be generated and hence, finding these suppliers and building relationships is challenging. At the same time, by-products are unregulated and are stored without any proper arrangements.

“...identifying sources and developing them in this industry is the biggest challenge that I have seen so far in my career. Every year billions of tons by-products are generated globally and very few owners of these by-products know a valuable use for it. These by-products are not regulated, therefore, the quality of it changes in every batch of production which makes our processing further challenging. Additionally, there are other bigger challenges such as unavailability of a pricing model and logistics of such higher quantities across the globe.”

Business Development manager from a packaging company was interviewed to understand the challenges faced in supply chain management for production of sustainable packaging products. To make the products recyclable and reusable, they have implemented changes in their designing and material selection process to support circular activities. The main challenge for them is logistics of these recyclable products from the households which are collected by the local municipalities and is further processed to meet the hygiene standards.

“...our items can be easily found in neighbourhood grocery stores and serve a variety of everyday needs. After these products are consumed or their packaging is opened, the packaging materials are disposed of in recycling bins that are regularly picked up by local authorities, either on a daily or weekly schedule. We have established partnerships with specific second-tier suppliers, who, in turn, have arrangements with the municipalities to recycle these materials and transport them back to us.”

An interview was also conducted with an ex-executive of an energy company developing sustainable diesel and sustainable aviation fuel. Aviation being an industry where CO₂ emissions are quite high, need of sustainable fuel options are required to be developed. There are many challenges in this industry as it required used cooking oils and used palm oil is preferred. One of the major challenges is to find new suppliers and if new suppliers are found, there is higher competition between companies developing such solutions.

“...this is a challenging industry due to the sheer size of the businesses and a scarcity of suppliers who are mainly traders and producers of used oil. On top of this challenge, access to best quality and easy supply options are limited. Furthermore, these raw materials for sustainable fuels are requires shipping to refineries and such logistics requires bulk shippers and specialised trucks to transport the loads. In most the cases, the economics of scale are unrealistic, and it requires higher CAPEX for the business to make sense.”

7.4 Addressing the supply challenges and the role of reverse marketing

Dealing with supply chain challenges is a complex undertaking that necessitates a mix of strategic planning, flexibility, and cooperation. It initiates with a thorough evaluation of the entire supply chain, encompassing the sourcing of materials to the delivery of products to consumers. Recognizing weak points, broadening supplier options, and allocating resources to technology for instant monitoring allow organizations to fortify their supply chains. Additionally, transparent communication and solid partnerships with suppliers and collaborators play a pivotal role in promptly resolving issues as they emerge. Table 17 shows responses received from all the interviewees on their process of addressing the challenges.

Table 17. Addressing supply chain challenges

Industry	Interviewee Response
E-commerce	<i>“...to tackle supply challenges in this industry, we must become more creative in developing new suppliers and building supplier relationships. We have an intro deck for our reach-outs where we</i>

	<i>communicate our value proposition to the suppliers to convince them to sell to us. We also have separate division for C2B sourcing, where we run online campaigns to increase awareness to the consumers.”</i>
Construction	<i>“...we place significant reliance on marketing analysis and research as the initial step in our process. This involves identifying potential partners and collecting comprehensive information through online resources and industry networks. Subsequently, armed with this data, we engage with potential partners, presenting our services and the future prospects of our product lines. To streamline our approach, we have developed standardized proposals and presentation materials tailored to different partner segments, which we deploy as needed.”</i>
Packaging	<i>“...forging strategic alliances with suppliers has been instrumental in integrating circularity into our operations. These supplier relationships have evolved gradually, commencing with modest orders and demonstrating unwavering dedication from the outset. This approach has been instrumental in transforming these suppliers into strategic partners. We have developed our collection channels to bring ease of doing business with our suppliers. Identifying these suppliers was a challenging task, prompting our sourcing team to implement an ongoing development process to ensure a consistent and reliable supply chain.”</i>
Energy	<i>“...we have instigated strategic relationships with many of our suppliers who are mainly traders collecting used cooking oils from different restaurant chains. To get better quality of this used product, we are paying higher price premium and, to get first rights on the materials. Additionally, we have developed an extensive logistics model by partnering with 3PLs and investing in shipping networks in certain business streams.”</i>

The interviews about supply streams, supply challenges, and addressing those challenges has given necessary data to identify how the role of a supply chain professional from linear industry differs from circular industry. There are different strategies made by

professionals from both industries and they differ from each other as in linear industries supplier reaches out and in circular industries, the buyer reaches out to supplier. Table 18 showcases difference in roles of supply chain professionals in linear and circular industries.

Table 18. *Difference in role of supply chain professionals of linear and circular industries*

Circular industry professional	Linear industry professional
Proactive approach	Responsive approach
Multi-dimensional thinking	Uni-dimensional thinking
Cooperative approach	Authoritative approach
Focusing on long term relationships than cost benefits.	Focusing on cost benefit more than long term relationship.
Assertive negotiation	Passive negotiation

Supply chains tend to be intricate in linear industries, and they become even more intricate in circular industries due to the complex nature of their business models. As the interviews make clear, tackling these challenges demands innovative thinking from circular industry experts, which differs from the approach taken by professionals in linear industries.

8. CONCLUSION

Promoting circular economy in every aspect of businesses have become a necessity in current the present-day context where virgin raw materials are supporting global economies. These virgin raw materials are limited, and their extraction process is unsustainable, and is also expensive due to the additional price premium associated with it. Many governments have imposed heavy charges on such operations and are monitored to reduce environmental impact, this monitoring is done mainly by issuing fixed term permits which require higher CAPEX. Frequently, companies engage in addressing problems primarily motivated by potential business benefits, and it is natural for any organization to have a shortage of viable solutions for every issue. Albeit these efforts have increased awareness amongst end consumers about circular industries and more people are preferring products produced with sustainable practices.

The objective of this thesis was to study circular industries and how they operate from a supply chain perspective to understand the business models, supply and demand sources, supply challenges, and these challenges are addressed. To accommodate this objective, literature was referred to explain the concepts of supply chain management, circular economy and introducing reverse marketing in the context of circular economy. Reverse marketing is not a widely studied concept and there is unavailability of comprehensive literary sources, therefore, this concept is introduced with the traditional marketing and how it links to the concept of reverse marketing. Many challenges were identified from the literary point of view and was validated with the help of market research and interview conducted with select industry experts.

These interviews and market research showed importance of reverse marketing in supply chain of circular industries. It is evident from the interviews that many of these experts rely on marketing practices, although, these practices are helping them towards building supply as compared to the traditional customer development. Additionally, the study also outlines how the supply chain roles in circular industries vary from the linear industries. The limitation of this study is that the results cannot be quantified as there are multiple business models in every industry and each organization have their own way of working. Furthermore, this study paves the way for additional need of literature building for the concept of reverse marketing.

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