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Proposal

Value Creation from Implementation of Closed-Loop Supply Chain in FMCG industry

The case of Vietnam

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1. The Necessity of the Study

In recent decades, concomitant with the advancement of economic prosperity, the expansion of population, and the enhancement of societal well-being within nations, there has been a notable surge in the magnitude of both discarded commodities and waste materials necessitating proper management and disposal. In addition to this, it is noteworthy that product life cycles are exhibiting a discernible trend towards contraction, thereby inducing customers to relinquish their existing products at an accelerated pace in favor of procuring and utilizing novel offerings. In the realm of environmental stewardship, it is worth noting that national governments play a pivotal role in promulgating a multitude of regulations that mandate businesses to engage in production and business activities with a strong emphasis on environmental responsibility. The advent and expeditious progression of electronic commerce has engendered an augmented frequency of reclaimed merchandise, as patrons are bereft of immediate physical proximity to commodities akin to those in conventional commercial transactions. Due to the aforementioned rationales, the concept of Closed-Loop Supply Chain (CLSC), which pertains to the efficient retrieval and recycling of utilized goods and waste, has garnered escalating interest within the realm of commercial operations, as well as in the scholarly domain, across numerous nations worldwide.

The systematic investigation of CLSC theory emerged in developed nations, including the United States and Europe, during the 1990s of the previous centuries. In conjunction with fundamental subject matter encompassing various perspectives, characteristics, influencing factors, as well as models pertaining to the management and implementation of CLSC across diverse industries and domains, these scholarly investigations have demonstrated a progressively significant role of a sustainable chain within the realm of the economy, supply chains, and business enterprises. CLSC is a conceptual framework that pertains to the pivotal role of logistics in the realms of recycling, waste treatment, and the management of hazardous materials within the context of a nation or residential locality. This framework serves as a catalyst for fostering sustainable economic growth and the harmonious development of residential areas, all while ensuring the preservation and conservation of the environment. Moreover, it is imperative to acknowledge that CLSC constitutes an integral component of the broader framework of supply chain management, as elucidated by Mollenkopf and Closs (2005). This phenomenon pervades the operational landscape of all entities encompassed within the intricate web of product supply chains, spanning from suppliers of raw materials to manufacturers, as well as wholesale and retail distribution intermediaries. The operational efficiency of these individuals in managing CLSC flows will have a significant influence on various aspects such as cost management, revenue generation, and customer satisfaction (Jack, Powers,

& Skinner, 2010). In addition to its role within businesses, CLSC serves as a significant mechanism for cost reduction, revenue enhancement, customer service level improvement, and mitigation of environmental repercussions resulting from production activities. Consequently, it enables businesses to attain a competitive edge and fulfill their corporate social responsibility objectives.

Although the theory of CLSC has a solid foundation in developed countries, in Vietnam it is still mainly limited to research related to the management of household waste or industrial waste (especially solid waste) on aspects of law, planning and treatment technology. The number of direct studies on CLSC is not much and only focuses on used electronic products, household appliances, and batteries. Therefore, in terms of academic science, the research and development of CLSC logistics theories in Vietnam is extremely important, especially in the context that the concept of sustainable development has become the way to go. The Party's guidelines and policies of the State and Vietnam have signed many international commitments on sustainable development.

Indeed, it is worth noting that within the context of Vietnam, a well-established solid waste management and recovery system has been implemented under the auspices of the state for a considerable duration. In addition to the aforementioned, there exist discrete endeavors in the realm of private recovery activities aimed at augmenting revenue streams and exploring and harnessing the potential of discarded materials for the purpose of remanufacturing. With the transition towards a market-oriented economy, Vietnam has witnessed the emergence of environmental management enterprises, in conjunction with the implementation of policies aimed at socializing urban environmental work. The function of state management pertaining to the environment and waste has been delegated to these enterprises, thereby giving rise to the establishment of a market for the recovery of solid waste. Nevertheless, it is worth noting that the annual estimation of solid waste volume generated across the nation stands at approximately 28 million tons, exhibiting a growth rate of 10% per annum (Nguyen *et al.*, 2023). It is imperative to acknowledge that the collection rate in urban areas ranges from 83% to 85%, whereas in rural areas, it hovers between 40% and 50% (Hoang *et al.*, 2023). In rural locales, the recycling and reuse rate is observed to hover around a modest range of 10 to 12 percent. The present circumstance can be attributed, in part, to the prevailing practice within Vietnamese enterprises, wherein CLSC is predominantly centered on the retrieval of products from customers for the purposes of exchange, repair, warranty, or the reclamation of packaging materials for recycling endeavors. The current understanding of businesses regarding the significance of an environment-friendly logistics in fostering competitive advantages and promoting sustainable development is limited. The inability of Vietnamese businesses to effectively organize, deploy, and control the supply chain activities in a systematic manner can be attributed to a

confluence of factors, including deficiencies in management skills, limitations in infrastructure, and weaknesses in technology systems. The aforementioned observation underscores the imperative of fostering the establishment of CLSC practices within the Vietnamese context, as it holds profound significance for enterprises, industries, and the nation at large.

Furthermore, it is noteworthy to mention that Langley et al. (2008) have conducted extensive research on the subject matter, shedding light on the considerable variability observed in recovery rates within the realm of CLSC flow across various industries and fields. This variability spans a wide range, with recovery rates reported to range from as low as 3% to as high as 50%. In the context of Vietnam's fast-moving consumer goods (FMCG) industry, the establishment and advancement of CLSC practices emerges as a pivotal and pressing measure. The Fast-Moving Consumer Goods (FMCG) sector stands out as the industry with the most substantial plastic consumption within the broader economy. It is worth noting that plastic, as a material, possesses remarkable potential for recovery, recycling, and subsequent reuse. The study conducted by Graczyk and Witkowski (2011) has yielded significant findings regarding the average recovery rate of plastic products in European nations. The research indicates that the overall recovery rate stands at approximately 54%. Notably, certain countries have exhibited exceptionally high rates of recovery and treatment for plastic products. For instance, Switzerland boasts an impressive recovery rate of 99.7%, followed closely by Germany at 96.7% (Lambert, Riopel and Abdul-Kader, 2011). Denmark, Sweden, Belgium, and the Netherlands also demonstrate commendable rates of recovery, with figures of 96.6%, 95.9%, 93.1%, and 89.2%, respectively (Michaud and Llerena, 2011; Lee and Lam, 2012). Moreover, plastic materials are presently being employed as substitutes for numerous conventional materials, including wood, metal, and silicates, across various economic sectors such as electricity, electronics, automotive, telecommunications, transportation, construction, and civil engineering. Hence, the practice of recuperating, reprocessing, and repurposing plastic commodities not only facilitates cost reduction and sustainable growth within the FMCG sector, but also bears significance for various other industries that rely on plastic goods. Moreover, in the event that plastic products are not appropriately discarded subsequent to their utilization, their decomposition process becomes arduous, thereby engendering profound repercussions on the environment (Toffel, 2003; Subramoniam, Huisingh and Chinnam, 2010; Eltayeb, Zailani and Ramayah, 2011). Hence, the implementation of CLSC within the plastic industry will serve as a viable solution for effectively addressing the challenges associated with product recall and disposal in the realm of plastic products.

The successful implementation of this model necessitates the active engagement of all stakeholders within the plastic product supply chain in Vietnam in order to effectively manage the waste recovery stream. The

significance of CLSC activities within the contemporary product supply chain in Vietnam cannot be overstated. The aforementioned analysis collectively indicates that the utilization of CLSC theory is presently not widely implemented in Vietnam. Simultaneously, the imperative to cultivate an environment-friendly logistics for recycled products, which possess distinct attributes and substantial advantages derived from recovery, recycling, and reuse endeavors, is highly indispensable in the imminent timeframe. Hence, the pursuit of scholarly inquiry pertaining to the subject matter of "***Value Creation from the implementation of closed-loop supply chain in FMCG industry***" would effectively address both theoretical and practical imperatives within the contemporary Vietnamese landscape.

2. A literature review of existing studies

2.1. An overview of research on CLSC logistics

Closed-loop Supply Chain (CLSC) emerged as a novel idea in the logistics and supply chain management domain throughout the 1990s. The initial research on CLSC was conducted by Stock in 1992 and Kopicki et al. in 1993, and their findings were initially published by the Board of Directors of Logistics. Stock (1992) highlighted that the domain of CLSC is intricately connected to the operations of enterprises and society at large. Kopicki et al.'s (1993) study, conducted one year later, examined the regulations and procedures of CLSC, highlighting potential avenues for recycling and reutilization. During the late 1990s, several other research on CLSC emerged. Nevertheless, the bulk of research is subsequently published in publications that focus on practical applications rather than in scholarly academic journals (Xu *et al.*, 2009; Lambert, Riopel and Abdul-Kader, 2011; Michaud and Llerena, 2011; Rahman and Subramanian, 2012). The focus of these CLSC studies mostly revolves around strategic aspects, employing qualitative methodologies like case studies, idea interpretation, and research synthesis. Several studies on CLSC include both qualitative and quantitative research methodologies. Nevertheless, case studies are often employed due to the nascent nature of CLSC research throughout the 1990s. Janse et al (2008) observed that a minor fraction of less than 5% of studies conducted between 1995 and 2005 included survey methodologies. Verstrepen et al. (2007) reported an increase in the use of quantitative approaches, namely surveys, to investigate difficulties of CLSC implementation during the late 2000s.

The development path of CLSC may be categorized into two fundamental groupings as follows:

- Research on theoretical foundation of Closed-loop supply chain

- Research, application and implementation of Closed-loop supply chain.

2.2. Theoretical foundation of CLSC

The present discourse delves into the realm of CLSC research within the context of the product supply chain. Henceforth, this scholarly discourse shall undertake a comprehensive examination of the theories

pertaining to CLSC, categorizing them into two distinct groups for the purpose of elucidation: (1) A compendium of overarching investigations into CLSC, and (2) An assemblage of inquiries specifically focused on the supply chain within the intricate framework of supply chains.

2.2.1. General theoretical studies of CLSC

The scholarly investigation pertaining to CLSC encompasses a diverse array of viewpoints and conceptualizations, delving into the distinction between CLSC and its counterpart, traditional logistics. Additionally, it explores the various factors that foster the development of CLSC, elucidating the manifold advantages and functions it offers. Furthermore, it scrutinizes the costs associated with closed and sustainable logistics, while also identifying the impediments encountered during the implementation of such practices.

The scholarly discourse surrounding the notion of recovery management has been extensively explored by notable academics, including Beckley and Logan (1948), Terry (1967), and Guiltinan and Nwokoye (1975). However, it is worth noting that these discussions did not establish a direct correlation with the domain of CLSC. The term "reverse distribution" was employed by Murphy and Poist (1989). The utilization of comparable terminology is also observed in the works of Barry et al. (1993) and Carter and Ellram (1998). According to the scholarly work of Pohlen and Farris (1992), the concept of CLSC is elucidated through a deliberate emphasis on the directional flow of goods within the distribution channel. The concept, although not explicitly addressed by Thierry et al. (1995), was introduced by the authors under the framework of "Product Recovery Management (PRM)". Kroon and Vrijens (1995) provide a comprehensive definition of "Closed-loop Supply Chain" that places particular emphasis on the waste management component. According to their work, CLSC encompasses a range of logistics management activities and associated competencies that are specifically geared towards mitigating, handling, and disposing of both hazardous and non-hazardous product and packaging damage (Skinner, Bryant and Glenn Richey, 2008). The conceptual framework presented by Murphy and Poist (1989) elucidates the phenomenon of CLSC, delineating its operational dynamics as the intricate process of facilitating the movement of goods from end-consumers back to the original manufacturers. In contrast to their predecessors, Giuntini and Andel (1995) abstained from explicitly delineating the trajectory of material flow. Instead, their focus lay on the realm of CLSC, encompassing the manifold activities associated with the management of materials received from customers (Amini, Retzlaff-Roberts and Bienstock, 2005).

The American Logistics Board adopts a perspective on CLSC that positions it as a logistics endeavor encompassing recycling, waste incineration, and the management of hazardous materials. In their seminal work, Carter and Ellram (1998) introduced a significant augmentation to the prevailing notion of reverse logistics by incorporating environmental factors into its framework. According to Rogers and Tibben-Lembke (1999), CLSC encompasses the strategic management and handling of products that have been

recalled. In a more precise manner, the aforementioned process pertains to the act of transferring commodities from their ultimate location with the intention of attaining value restoration or appropriate annihilation. According to Dowlatshahi's (2000) definition, this chain of logistics can be understood as a systematic procedure employed by manufacturers to receive products and components from the point of consumption, with the intention of either disposing of them, recycling them, or, if feasible, remanufacturing them. The perspectives elucidated herein pertain to the domain of CLSC as expounded upon by preceding scholars (Mollenkopf *et al.*, 2007; Hazen *et al.*, 2012).

In order to elucidate the conceptual framework and inherent characteristics of CLSC, numerous scholarly sources have undertaken a comparative analysis of reverse logistics vis-à-vis forward logistics. As posited by Guide et al. (1996), the term CLSC poses a distinct challenge stemming from the inherent uncertainty surrounding the formulation and execution of plans and programs pertaining to the reception of recalled products. It is postulated that this particular facet renders the process notably more arduous when compared to its forward logistics counterpart. According to Fleischmann et al. (2001), the concept of CLSC involves the collection of products from multiple points of consumption, with the intention of delivering them to a single processing point. In contrast, forward logistics entails the transportation of products from the point of production to numerous points of consumption. In their seminal work on the subject matter, Brito and Dekker (2002) conducted an investigation into the realm of CLSC, specifically focusing on the quality of products and packaging. Their findings shed light on a significant concern within this domain, namely the lack of assurance pertaining to the preservation of packaging integrity and product quality during instances of product recalls from customers or Centralized Return Centers (CRCs)(Genchev, 2009).

In stark contrast, it is imperative to note that novel commodities within the realm of FMCG are consistently dispatched to patrons in strict accordance with their individual specifications, accompanied by standardized packaging and unwavering adherence to quality standards (Gehin, Zwolinski and Brissaud, 2008). In addition to the aforementioned, the authors posit that the elucidation of the destination and trajectory of recalled products is frequently nebulous, as this determination is contingent upon the subsequent deliberation of how to effectively manage said product. In the realm of downstream logistics, it is imperative to establish a well-defined trajectory for the product, one that is intricately aligned with the specific demands and geographical whereabouts of the esteemed clientele (Atasu, Guide and Van Wassenhove, 2010). In their scholarly discourse, Vahabzadeh and Yusuff (2015) expound upon the matter of cost considerations within the realm of CLSC. They assert that implementation of this logistics technique encompasses a myriad of cost components, including but not limited to transportation, storage,

and packaging. However, it is crucial to note that the measurement of CLSC logistics costs diverges from that of traditional logistics costs.

Enterprises have several incentives to establish a CLSC system. CLSC management is a crucial element for firms to attain strategic, economic, and environmental benefits. Roy (2003) highlighted that organizations have been more interested in this branch of logistics due to legal, marketing, and economic factors. Akdogan and Coskun (2012) identified three primary factors that drive CLSC logistics operations in the Turkish home appliance sector, namely regarding standards for economics, environment, social aspects, and commercial partnerships. Zhu and Sarkis (2008) conducted a study on the factors influencing the adoption of green supply chain management, which is also closedly connected to CLSC. Their findings indicate that firms are influenced by government legislation, competitive pressure, and market demands. According to Verstrepen et al (2007), the primary purpose of creating a recall management system is to attain economic goals and marketing objectives. Kumar and Putnam (2008) argued that environmental regulation, consumer demand for sustainable goods, corporate reputation, and waste reduction are the primary factors pushing the adoption of green practices in the electronic products industry. According to Lau and Wang (2009), in China's electronics sector, legislation, company image, marketing goals, and economic goals are considered the primary factors that drive CLSC logistics. The study conducted by Hernandez, Marins, and Rocha (2010) highlights the significance of CLSC in the car industry, as it serves as a driving force for enterprises in the sector to prioritize marketing goals, economic goals, and corporate responsibility.

The advantages of CLSC include two primary facets: firstly, it aids organizations in diminishing material and energy usage, consequently leading to a reduction in operational expenses; secondly, businesses may augment their income by capitalizing on recycled and reused items and resources (Stock, Speh and Shear, 2002). Thus, Daugherty et al. (2004) propose that CLSC is not only a cost-increasing system, but rather a valuable asset that may be utilized to gain a competitive edge. Marien (1998) regards this branch of logistics as a viable method to enhance resource efficiency, mitigate environmental harm, and optimize both business processes and environmental outcomes. Consequently, enterprises can get a competitive edge (Li and Olorunniwo, 2008a, 2008b).

In their study, Rogers and Tibben-Lambke (2001) examined various expenses associated with CLSC logistics, including sorting, inspection, cleaning, shipping, storage, repair, sale, and burning. Hu et al (2002) examined a range of expenses, including costs associated with retrieval, storage, manipulation, and transportation. Kovacs and Rikhardson (2006) categorize CLSC into several activities, including collection, inspection and sorting, processing, destruction, and redistribution. They employ activity-based cost analysis to ascertain the expenses associated with managing a CLSC logistics. Jiang-gou and colleagues (2007) conducted a study that identified several components of logistics costs, which

encompass recovery costs, storage costs, selling costs, waste disposal costs, and other concealed expenses associated with CLSC logistics.

CLSC includes operational logistics functions, such as storage, shipping, warehousing, packaging, and customer service (Tsoulfas and Pappis, 2006). Researchers, such as Fleischmann et al. (2002) and Inderfurth (2005), have acknowledged the intricacy of managing inventory of both old and replacement items in the logistic stream of CLSC, as well as new products, finished products, or semi-finished products in the forward logistics stream. Thus, the authors suggested different approaches that lie between inventory control and purchasing in order to achieve the most efficient inventory performance. Inderfurth et al. (2005) and Fleischmann et al. (2002) both examine different strategies for managing product supply and demand in logistics flows. White (1994) emphasizes the significance of CLSC in the context of storing raw materials. The roles of raw material storage, including transit, storage, preservation, and control, will undergo changes as the closed logistics system evolves.

Andel (1995) discusses the optimal design of transport routes for cost-efficient delivery of recovered items in CLSC. Cost reductions can be achieved by consolidating and centralizing recovery activities through the utilization of third-party service providers. Kroon and Vrijens (1995), Thierry et al (1995), White (1994), and Young (1996) emphasize the need for enterprises to effectively align CLSC activities with transportation modes, volume, network, and other resource considerations in order to maximize profitability. Companies have to employ multimodal transportation for the conveyance of recalled items inside the CLSC logistics stream (Ferrer and Clay Whybark, 2000). Murphy (1986) highlights that the majority of corporations frequently employ trucks for the CLSC logistics of recalled items. Hence, when selecting a recall pathway, companies must take into account the quantity and geographical distribution of customers, the timing of deliveries and receipts (Srivastava, 2008), the pivotal stage in the remanufacturing process (Lau, Xin and Yau, 2008), the relationship between the volume and weight of the product being recalled (Hojas Baenas *et al.*, 2011), and the interconnection between the recalled product and other frequently transported items in the downstream logistics flow (Hicks *et al.*, 2004).

Khalid (2014) proposes that firms should assess the demands of both recalled and departing items, as well as storage protocols and transportation expenses, in order to effectively analyze inventory costs. The corporation has the option to keep recalled items either in its own warehouse or in a rented facility. Nevertheless, according to Murphy (1986), private warehouses are frequently employed in CLSC because of their ease and dependability. When considering storing items in the logistics cycle, companies must take into account many factors like the availability of warehouse space, pricing, capital investment in equipment, manpower, and processes (De Souza and D'Agosto, 2013). Furthermore, the corporation must also take into account the managerial aspects related to physical products in the warehouse, including storage, transit, counting, coordination, and preservation (Ciliberti, Pontrandolfo and Scozzi, 2008).

CLSC supply management focuses on the reuse of parts and components from recovered items in order to decrease the expenses associated with raw materials. The organization has the ability to reorganize the bill of materials in order to effectively control the movement of products or components used in recycling processes (Zhu *et al.*, 2008). Additionally, we can also monitor the consumption of products and raw materials that are not suitable for reuse. Packaging serves as a strategic marketing instrument that facilitates the establishment and enhancement of product perceptions, dissemination of information, and promotion of products (Ye *et al.*, 2013). Packaging is a constituent of the overall cost of a product. Packaging plays a crucial role in safeguarding items from external environmental factors. A CLSC logistics system must offer packaging that enables the execution of the aforementioned tasks while also assuring the minimization of raw resources, expenses, and transportation demands (Mont, Dalhammar and Jacobsson, 2006).

According to Dawe (1995), managing recall is seen as the most effective way to distinguish customer service, particularly in industries characterized by fierce rivalry and narrow profit margins. This can provide the organization a competitive edge. The authors Mollenkopf et al. (2009) have examined the advantages of CLSC in terms of customer interactions, specifically in terms of sustaining and pleasing consumers by implementing more flexible return policies. Additional research on this branch of logistics, specifically focusing on distribution, storage, and transportation operations. These studies highlight the significance of managing the distribution, warehousing, transportation, and information flow in CLSC systems for recalled items. While these tasks may not generate substantial value for the organization, they do have a notable effect on costs and time. Hence, it is important to not disregard these actions in any logistics system.

2.2.2. CLSC in the context of supply chains

Within the realm of global supply chain research, the concept of Closed-Loop Supply Chain (CLSC) has garnered significant attention, manifesting itself across various tiers to delineate the intricate process of product recovery, whereby goods are redirected from their initial destination back to their original point of departure. The inclusion of CLSC as a fundamental business process within the realm of supply chain management is duly noted. The Supply Chain Council (SCC) formulated the Supply Chain Operation Reference Model (SCOR Model) in 1994 with the objective of offering a fundamental framework to assist its constituents in replicating the design of business processes within the realm of supply chain management. The model under consideration delineates CLSC logistics as the fifth sequential process within the broader framework of the supply chain. This sequential arrangement encompasses the following processes: planning, purchasing, production, delivery, and recall. In a seminal work published in 1999, Lambert, Cooper, and Pagh of the esteemed Global Supply Chain Forum (GSCF) meticulously delineated the fundamental underpinnings of supply chain management. Their comprehensive analysis

identified a total of eight cardinal processes that constitute the very essence of this discipline. These processes, which encompass the entire spectrum of supply chain operations, are as follows: product development and commercialization, demand management, supplier relationship management, production flow management, order fulfillment, customer relationship management, customer service management, and recall procedures. The present discourse elucidates the existence of eight pivotal business processes that traverse the entire expanse of the supply chain, while simultaneously intersecting various functional domains within the organization. These domains encompass Marketing, Research and Development, Finance, Production, Purchasing, and Logistics. Subsequently, the scholarly endeavors of Morzit Fleischmann (2000) and M. Fleischmann and colleagues (2004) entailed the construction, identification, and explication of the fundamental attributes pertaining to five distinct CLSC logistics flows within the intricate framework of the supply chain. The aforementioned authors have successfully delineated the individuals who have assumed the role of the previous and forthcoming product owners, as well as the team members who bear the responsibility of making the recall decision within the intricate web of the supply chain.

In their seminal work, Guide and Wassenhove (2002) introduced the notion of the "Closed-Loop Supply Chain," which pertains to a sequence of essential operations aimed at retrieving utilized goods from consumers for the purpose of either disposal or reutilization. Guide and Wassenhove (2002) assert that a closed and environment-friendly supply chain encompasses five primary components, namely, product acquisition, reverse logistics, inspection and processing, recovery, and distribution and sales. Prahinski and Kocabasoglu (2005) provided a definition for "Closed-loop Supply Chain Management" as the proficient and streamlined administration of the requisite activities involved in the retrieval of products from customers, with the objective of either disposing them or recovering their value. In a seminal study conducted by Krikke, Blanc, and Velde (2004), the authors undertake a comprehensive analysis of recalled products, categorizing them into distinct classifications and subsequently associating each category with its corresponding supply chain strategy. In their respective studies, Min, Ko, and Ko (2006) as well as Wang and Hsu (2010) directed their attention towards the investigation of an optimization model pertaining to the supply chain. Specifically, their objective was to minimize the expenses associated with recall activities.

The inception of the CLSC concept precipitated a transformation in the conventional supply chain paradigm, which had hitherto encompassed solely downstream activities, upstream, and reverse stream, leading to the emergence of closed-loop supply chains (CLSC). In 2004, Blackburn . presented the notion of closed-loop supply chain management, a framework that encompasses the strategic planning, structural arrangement, and operational execution of a system aimed at optimizing value generation across the complete product life cycle, while simultaneously facilitating the dynamic rejuvenation of various value

dimensions. In their seminal work, Oh and Li (2014) highlight the significance of closed-loop supply chains in orchestrating the harmonious integration of upstream and downstream operations, with the overarching objective of optimizing both economic and ecological outcomes. Henceforth, in conjunction with conventional downstream logistics procedures encompassing sourcing, manufacturing, and distribution, closed-loop supply chains encompass a myriad of supplementary activities, including but not limited to gathering, sorting, selecting, dismantling, refurbishing, repairing, reusing, remanufacturing, and recycling (Kumar and Putnam, 2008). These activities serve the purpose of recuperating and rejuvenating the value of the product at requisite locations, thereby facilitating a comprehensive regeneration process throughout the entirety of the supply cycle. The closed-loop supply chain, through the seamless integration and coordination of both forward and reverse logistics flows, serves as a mechanism to achieve not only the objectives of efficiency and performance in supply chains, but also the imperative of sustainable development goals. The utilization of the closed-loop supply chain diagram, as presented in the scholarly investigation conducted by Jisoo Oh and Yonglian Li (2014), was employed by the author to scrutinize the significance of CLSC within the context of product supply chains.

Guide and Wassenhove (2002) used the term "Closed-loop Supply Chain" to describe the process of collecting old items from consumers for either disposal or reuse. They identified five primary components: product procurement, reverse logistics, inspection and processing, recovery, and distribution and sales. Prahinski and Kocabasoglu (2005) provided a definition for "Reverse Supply Chain Management" as the proficient and productive administration of operations required to retrieve items from consumers for either disposal or value recuperation. Krikke, Blanc, and Velde (2004) categorize recalled items and associate each category with a corresponding supply chain approach. In their studies, James (2012) specifically investigated the optimization of the reverse supply chain model in order to decrease the expenses associated with recall actions.

With the emergence of the reverse supply chain idea, the conventional supply networks evolved into closed-loop supply chains (CLSC). Accordingly, closed-loop supply chain management refers to the systematic design, organization, and implementation of a system aimed at maximizing value generation across the whole life cycle of products, including the dynamic restoration of various values. Jisoo Oh and Yonglian Li (2014) argue that closed-loop supply chains aim to synchronize the operations of both upstream and downstream processes in order to optimize economic and ecological benefits. Hence, closed-loop supply chains encompass not only conventional downstream logistics procedures like sourcing, manufacturing, and distribution, but also involve tasks such as gathering, sorting, selecting, dismantling, refurbishing, repairing, reusing, remanufacturing, and recycling (Xu *et al.*, 2009; Lambert, Riopel and Abdul-Kader, 2011). These activities enable the retrieval and rejuvenation of the product's value at essential locations and throughout the supply cycle. The closed-loop supply chain, by linking and

integrating both forward and CLSC flows, simultaneously achieves sustainable development goals along with efficiency and performance goals in supply chains. The author utilized the closed-loop supply chain diagram from the study conducted by Jisoo Oh and Yonglian Li (2014) to examine the significance of CLSC in product supply chains.

2.3. Types of Values created by CLSC

2.4. Value creation of CLSC

Currently, we may categorize these four kinds of as numerous values in CLSCs. The four categories of value encompass intangible and concrete advantages for many stakeholders, including manufacturers, consumers, suppliers, and the broader environment and society. Therefore, with CLSCs, the business value extends beyond just economic gains. It is uncertain if organizations will eventually prioritize an even wider range of value propositions in the future. In the next part, a brief overview of the sorts of values will be provided, and potential areas for further research will be highlighted.

2.4.1. Environmental value

CLSCs are frequently seen as sustainable due to their potential to mitigate corporate environmental impact. In our comprehensive analysis of existing literature, we have discovered two primary classifications of environmental value creation in the literature on Corporate Social Responsibility (CSR) and Responsible Supply Chain (RSC): (1) Value is generated via the establishment of an environmentally conscious company reputation (Jacobs and Subramanian, 2012), and (2) value is generated through the implementation of environmentally friendly business practices and the production of sustainable products (*Klassen: Comment on "The Evolution of Closed–Loop... - Google Scholar*, no date).

Regarding the positive reputation of environmentally-friendly businesses, most writers agree that product recovery is primarily driven by current environmental rules (Kapetanopoulou and Tagaras, 2011; Wong *et al.*, 2012). Additionally, compliance with these requirements is seen as a way to uphold the validity of the firm. Only a small number of authors address the advantages of actively adhering to forthcoming laws in order to enhance the business reputation or predict opportunities for value generation (Ashby, Leat and Hudson-Smith, 2012; Fayezi, O'Loughlin and Zutshi, 2012). The literature also presents examples of corporations that effectively responded to increasing stakeholder pressure for a more environmentally friendly image by actively decreasing their environmental footprint and resource consumption. Moreover, the Wikner and Tang's (2008) study demonstrated that engaging in CLSC activities can make a substantial contribution to a company's environmental performance, as well as that of the entire supply chain. This can be achieved by implementing eco-friendly processes and practices, such as minimizing energy consumption, packaging materials, water usage, and non-renewable resource utilization. Remarkably, there is a scarcity of research that specifically examine the societal benefits of CLSC

(Grönroos and Voima, 2013), such as the effects on public health caused by business items that include dangerous substances (Van Hoek, 2001), as well as the challenges surrounding waste management and product retrieval in poor nations (Rashid *et al.*, 2013). These subjects merit more investigation in future studies.

2.4.2. Economic value

Reviewed articles have extensively recognized the profitability of CLSCs. The economic benefit is evident in three distinct categories: (1) the reduction of costs (Geyer and Jackson, 2004; Elshaer, Azazz and Fayyad, 2023); (2) the development of additional income (Elshaer, Azazz and Fayyad, 2023); and (3) the mitigation of risks (Krikke, Hofenk and Wang, 2013). Recovering returned items can result in cost savings in several areas such as materials, manufacturing, operations, and logistics. Additionally, it can enhance process efficiency, for instance, by reducing lead times. Furthermore, the company generates extra income by selling used parts and goods, expanding its aftermarket and service operations, and increasing sales through advantageous return policies. Additionally, remanufactured items might be utilized to penetrate untapped market niches. Insufficient focus has been given to the potential for mitigating risks through the implementation of CLSC processes (Ketzenberg, 2009; Krikke, 2011). Recovering old resources offers a chance for sourcing, allowing a producer to protect themselves from unpredictable changes in commodity costs. The retrieved items can function as a substitute for expensive last-minute purchase choices (Atasu, Guide and Van Wassenhove, 2008). Furthermore, via the retrieval of components and goods, producers can establish authority over subsequent markets and secondary marketplaces (Dowlatshahi, 2010; Gustafsson, Jonsson and Holmström, 2021). Subsequent studies should focus on the intangible and indirect economic advantages of CLSC management.

2.4.3. Customer value

Customer value in CLSCs is achieved through three mechanisms: superior customer service (Gustafsson, Jonsson and Holmström, 2021), enhanced product features (Ketzenberg, 2009), and a positive business reputation (Krikke, Hofenk and Wang, 2013). These factors lead to high customer satisfaction and loyalty. CLSC methods facilitate manufacturers in providing enhanced post-sales services, hence improving customer satisfaction (Kuppulakshmi, Sugapriya and Deivanayagam Pillai, 2022). For instance, both maintenance policies and product return policies might be prolonged due to the availability of recovered components as a substitute for new ones. In addition, alternative methods of delivering service become financially viable, such as the option to lease things instead of selling them outright (Rubio, Chamorro and Miranda, 2008). Green design characteristics of a product, achieved via the reuse of materials and decreased pricing, may also contribute to customer happiness and loyalty (De Cremer, 2006). CLSC actions serve a dual purpose: encouraging corporate responsibility and safeguarding the corporate and brand image through the management of product recovery and end-of-life product disposal. Future CLSC

research may concentrate on exploring the potential for enhancing business image and safeguarding brand reputation. Furthermore, considering the current shift towards customer-centric supply chains and the emphasis on service-oriented thinking, there is a need for further research on novel service ideas that might facilitate value creation in the framework of closed-loop supply chains (CLSCs) (Harms *et al.*, 2018).

2.4.4. Information value

Our review of the literature indicates that information value receives the least amount of attention compared to environmental, economic, and consumer value (Geyer and Jackson, 2004). CLSC provides essential information on consumer behavior, the product life cycle, and product and process performance. Information technology can facilitate the enhancement of information value through enhanced information gathering (Krikke, Hofenk and Wang, 2013). By sharing and analyzing collected information across departments, it is possible to utilize it as feedback to enhance operations and product creation. By following this approach, the creation of valuable knowledge is facilitated. Enhanced processes and product design have the potential to subsequently amplify the generation of value for customers, the environment, and the economy (*Klassen: Comment on "The Evolution of Closed–Loop... - Google Scholar*, no date). Therefore, information value may be seen as a catalyst for the other three forms of value. Future study has the potential to establish a connection between organizational learning theories and the operations of CLSCs, considering the undervalued potential of information in these settings.

2.5. Empirical studies on the Values creation of CLSC

Thierry et al (1995) described the product recall initiatives undertaken by many businesses such as 3M, Aurora, BMW, etc. Russell (1993) highlights the significance of the just-in-time (JIT) production model due to its compatibility with recycling operations in high-tech firms. Storage Tek has achieved substantial cost savings with the implementation of recycling. Hefling (1995) asserted that the implementation of technology such as barcoding and voice recognition systems can enhance the efficiency of retrieving and processing sold components in car parts recycling operations. Giuntini and Andel (1995) examined companies operating in the steel, personal computer, and commercial aircraft manufacturing sectors. The findings indicate that the use of CLSC has facilitated the extension of product life cycles, reduction in raw material expenses, decrease in pricing, and enhancement of equipment dependability for these enterprises.

There have been two studies conducted on the use and implementation of CLSC in the FMCG business. These studies were conducted by Pohlen and Farris in 1992, and Graczyk and Witkowski in 2011. In their study titled "CLSC in plastic recycling - a less polluted FMCG industry," Pohlen and Farris (1992) examined the challenges related to recycling plastic products. Their research primarily investigated the following topics: (1) The reverse logistics channel for recycled materials; (2) Factors influencing the flow

of CLSC logistics; (3) Potential future developments in CLSC and recycling practices. The findings of this study, including the circle logistics routes, the roles and responsibilities of channel members, can be extrapolated to various types of recyclable commodities. These two writers employed qualitative research methodologies by conducting interviews and engaging in in-depth conversations with several members of the CLSC logistics channel to explore its structure and operation. The individuals interviewed encompassed the Director of Research and Training in the Division of Waste Prevention and Recycling at the Ohio Department of Natural Resources, an assistant consumer and environmental organization for solid waste management at a prominent enterprise involved in recovery operations, the director of a company that manufactures products from recycled materials, a marketing representative from a company specializing in the recovery and manufacturing of recycled products, and a broker and billing representative from the largest recycling company in the State of Ohio. The interviews offered the two writers valuable understanding of the tasks and functions performed by various members of the logistics channel.

In their study titled "A Closed-loop Supply Chain Processes In Plastic-driven FMCG Supply Chains," Graczyk and Witkowski (2011) primarily aimed to enhance the efficiency and sustainability of the logistics process in manufacturing companies. Manufacturing of packaging materials for fast-moving consumer goods (FMCG) companies. This study is a component of a research initiative aimed at creating practical approaches to achieve a balance between economic and environmental considerations in the CLSC process. The goal is to minimize energy consumption and raw material expenses for plastic producers.

There is a significant lack of theoretical research on Closed-loop Supply Chain (CLSC) in Vietnam. Here are three scarce publications on reverse logistics, a niche area within the broader field of CLSC, which has been studied in the specific context of Vietnam. These resources might be valuable for PhD students seeking to further their knowledge in this field. Nevertheless, the shared characteristic among all three research is their publication in other countries.

In the study "Study on building and evaluating model of collecting used batteries in Vietnam," MORNE (2008) highlighted that the rising number of cars, motorbikes, and the demand for batteries in civil and industrial sectors have led to a rapid increase in the demand for batteries in Vietnam. In Vietnam, battery collecting and recycling efforts are mostly conducted by private entities with obsolete technologies, resulting in significant environmental contamination and enduring impacts on human well-being. Hence, the research suggests a fitting and efficient methodology for the recovery of old batteries in Vietnam.

Ngoc Quang (2008) conducted a research titled "Assessment of the recycling system for home appliances in Vietnam" to analyze the characteristics, participating elements, and internal operations of the electronic

waste recycling system in Vietnam. Simultaneously, the author offers suggestions for constructing a more appropriate electronic waste recycling system in Vietnam in the future.

Pfohl and Nguyen Thi Van Ha (2011) conducted a research titled "Reverse logistics in Vietnam: The case of electronics industry". The study utilized secondary databases and interviews with four major firms in the electronics sector. Additionally, the study examined the consumption of electronic items in 181 households. The authors have conducted a study and evaluation of the present state of reverse logistics in the electronics sector in Vietnam. Based on this rationale, the author suggests a reverse logistics framework that is appropriate for electronic products in Vietnam, both at the industry level and inside individual enterprises.

2.6. Research gap

Based on the analysis presented in the summary of the aforementioned research works, we may derive the following conclusions:

The concept of Closed-loop Supply Chain (CLSC) has been extensively studied and is well-established in industrialized nations. Prior research has developed a theoretical framework on CLSC, encompassing topics such as: various viewpoints and definitions of CLSC; the distinction between CLSC logistics and conventional logistics; advantages and functions of CLSC; management activities for storing, transporting, and warehousing recalled products in the logistics process; costs associated with CLSC; factors that drive or hinder the implementation of CLSC. Furthermore, prior research has acknowledged reverse stream as an integral system of the supply chain, working in conjunction with forward logistics to establish a closed-loop supply chain. Nevertheless, the comprehensive exploration of CLSC as a distinct study subject within the field of supply chain management has not been extensively investigated in existing literature both domestically and internationally. When examining reverse logistics as a distinct component within product supply chains, it becomes evident that CLSC plays a crucial role in efficiently, expertly, thoroughly, and methodically overseeing the movement of physical things in the supply chain. Conversely, this strategy also demonstrates the remarkable benefit of the supply chain in coordinating the movement of goods and services both upstream and downstream, thereby optimizing resources in the implementation of CLSC. Simultaneously, by fostering collaboration among supply chain stakeholders, the process of planning and executing CLSC would be streamlined and enhanced. Hence, the thesis endeavors to organize the theoretical aspects of CLSC in prior studies. Simultaneously, it positions it as the central subject of investigation in the cooperative association among the participants of the product supply chain. This point serves as a crucial aspect of inheritance and is a novel addition to the existing body of study on CLSC.

Currently, CLSC is a relatively novel idea in Vietnam. The predominant focus of research was solely linked to logistics, and mostly focus on the recovery of solid waste. However, the majority of these studies

primarily concentrate on enhancing the legislative framework for managing solid waste, devising collection networks, and advancing solid waste treatment technologies at both national and regional levels, including various provinces, cities, and residential areas. There is a limited number of studies specifically investigating reverse logistics in Vietnam, with a narrow emphasis on two specific product categories: home electrical equipment and used batteries. However, there is a lack of study in Vietnam about the use of CLSC in the product supply chain for many industry, particularly in the FMCG.

Therefore, it can be stated that currently, there is no existing study worldwide, including Vietnam that specifically focuses on CLSC as an independent research topic inside the supply chain of Vietnamese FMCG industry. This represents a significant void in research, both in terms of theory and practical application. Conducting research on this subject will contribute to the already comprehensive theoretical framework on CLSC logistics in developed nations. However, it has not extensively addressed the CLSC aspects within product supply chains. Additionally, it will help disseminate a relatively new theory to a developing country like Vietnam. The research provides a novel perspective on the evolution of CLSC and its parts within the FMCG supply chain in Vietnam. Consequently, investigating this subject matter guarantees the fulfillment of the originality criterion for a PhD dissertation.

3. Research objectives and research questions

The primary objective of this thesis is to elucidate the theoretical and practical scientific foundation for suggesting strategies to enhance the implementation of CLSC in Vietnam's FMCG product supply chain, with a focus on the period until 2025 and a long-term vision until 2030. In order to accomplish the study objective, the thesis must undertake three tasks by addressing the respective research inquiries:

The primary objective of the thesis is to build a theoretical foundation for the development of CLSC within the FMCG product supply chain. This theoretical approach is founded on the synthesis and thorough examination of research publications from industrialized nations. It also incorporates selected and additional aspects that are appropriate for a developing country like Vietnam. Subsequently, the thesis should construct a comprehensive theoretical framework regarding the advancement of CLSC logistics model in the supply chain of FMCG products. In order to achieve this objective, the thesis must address the following research inquiries:

- What is CLSC development in the product supply chain?
- What content does developing CLSC in the product supply chain include?
- How to measure the value created by CLSC development in the product supply chain?

The second objective involves conducting a comprehensive analysis of the development of CLSC in the Vietnamese FMCG product supply chain. This analysis will include assessing the environmental factors, as well as evaluating the present organizational structure and implementation methods of CLSC for all

participants in the supply chain of FMCG products in Vietnam. Some research questions that might help attain this objective are:

- How are members of the Vietnamese FMCG product supply chain organizing and implementing logistics flows and activities in a CLSC?
- How do environmental factors impact the development of CLSC model in the Vietnamese FMCG product supply chain?

The third objective involves doing research to identify practical directions and solutions for all participants in the supply chain of Vietnamese FMCC goods in relation to logistical operations of CLSC. The thesis suggestions serve as a foundation for assisting enterprises in the Vietnamese FMCG product supply chain to achieve a competitive edge by meeting consumer demands, minimizing expenses, and fostering sustainable growth. The inquiry posed for this part is:

- Which CLSC logistics model is appropriate for the FMCG product supply chain in Vietnam?
- What measures must the Vietnamese FMCG product supply chain, as well as its member enterprises, undertake to establish this CLSC logistics model?

4. Scope and object of the research

The thesis focuses on studying the CLSC operations within the supply chain of FMCGs in Vietnam. Hence, the key entities responsible for implementing CLSC development solutions in the Vietnamese FMCG supply chain are the many stakeholders involved in the chain, such as raw material suppliers, manufacturing businesses, wholesale trading enterprises, retail establishments, and other service providers. These entities are responsible for initiating, managing, and overseeing the CLSC operations within the FMCG supply chain in Vietnam. The thesis does not address the examination of consumers of FMCG products, since this topic is too intricate and impractical to be included in the logistics flows within the FMCG supply chain in Vietnam, both presently and in the projected year of 2030. Nevertheless, this thesis focuses on Organizations and state management agencies because of their crucial involvement in establishing, overseeing, and advancing conducive circumstances for the logistics sector as a whole, with a specific emphasis on closed-loop logistics in the FMCG business.

- Investigative material: The thesis will investigate the primary components of CLSC logistics, including: (1) The components, procedures, and movement of logistics within the product supply chain; (2) The individuals involved in the logistics process within the closed-loop supply chain, along with their respective duties and advantages; (3) The factors that influence the growth of CLSC in the FMCG product supply chain, encompassing environmental, market, and supply chain factors; (4) Approaches for overseeing the logistics flow within the supply chain.

- Components and products that are being returned or recycled in the CLSC process: Recallable or dischargeable objects in the FMCG supply chain might exist in solid, liquid, or gaseous states. However, the thesis only concentrates on investigating CLSC operations for tangible items that emerge during the manufacturing and utilization of FMCG products (bottles, packages, etc. mostly made of plastic). The thesis only examines the processes of recovering, recycling, reusing, or destroying objects composed of plastic elements. This thesis does not investigate the study on the recovery, reuse, or destruction of chemicals and additives employed in the manufacturing of FMCG items. Furthermore, the thesis exclusively concentrates on investigating CLSC logistics within the supply chain of FMCG products in the local market. This thesis does not focus on researching CLSC for Vietnamese items that are sold to overseas markets.

- Field of study: The empirical data utilized in the thesis was collected through surveys conducted in five specific regions: Hanoi, Hai Phong, Bac Giang, Hung Yen, and Quang Ninh. These localities represent the concentrated areas where over 60% of enterprises working in the Fast-Moving Consumer Goods (FMCG) supply chain in Vietnam are located. Hence, the study findings from these five specific locations can serve as a reliable representation of the overall Fast-Moving Consumer Goods (FMCG) business in Vietnam.

- Research timeframe: The thesis aims to investigate the present state of CLSC in FMCG product supply chain enterprises from 2018 to 2023, spanning a duration of 5 years. Proposed solutions for enhancing logistics in the supply chain of Vietnamese plastic goods are outlined till 2025, with a long-term goal extending to 2030. These proposals are based on the authorized growth plan for Vietnam's consumer sector by the Government.

5. Research process and Methodology

5.1. Research process

The author's thesis research process is carried out according to a process including steps as illustrated in the image below:

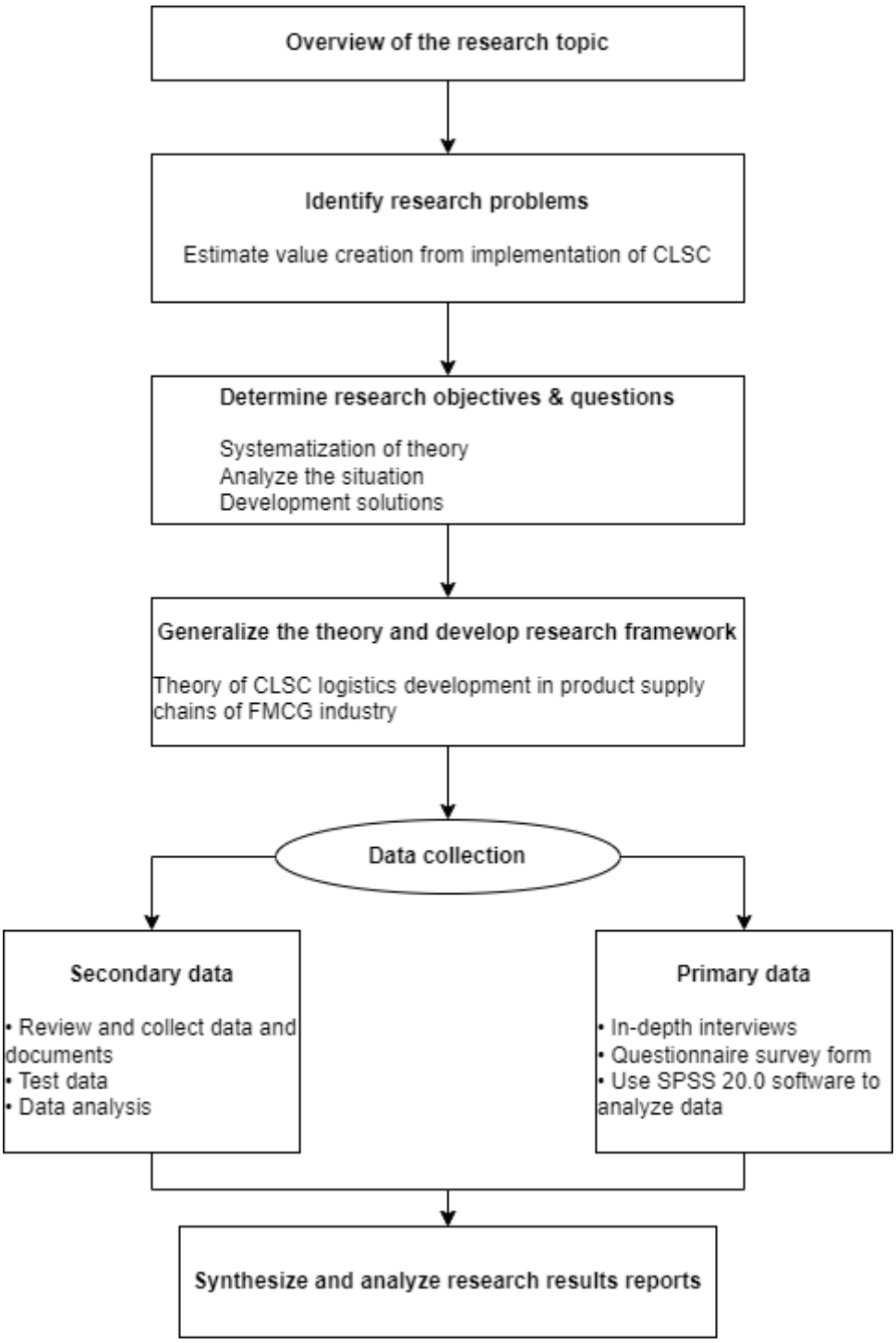

Figure 5-1: Research process illustration

The procedure starts by doing a comprehensive examination of prior research in order to pinpoint any existing gaps in the study. Based on this premise, the author labels the study subject of the thesis as the ***Value Creation from the implementation of closed-loop supply chain in FMCG industry.*** This problem is considered novel in both theoretical and practical aspects, particularly in a developing nation like Vietnam. In order to address this issue, the author has explicitly delineated the research objectives, assignments, and precise inquiries that the thesis must address in order to accomplish these objectives and assignments.

Subsequently, the forthcoming stages of the research procedure will sequentially execute each study task outlined in the thesis. The primary objective is to organize the theoretical aspects of CLSC discussed in existing research, with the aim of establishing a theoretical framework for enhancing CLSC in the FMCG product supply chain. Subsequently, the author will gather primary and secondary data that accurately depict the present state of CLSC in the supply chain of FMCG goods in Vietnam. Ultimately, utilizing the amalgamation of gathered data, the author scrutinizes and assesses the present circumstances and puts forward answers and proposals to enhance the implementation of CLSC in the supply chain of Vietnamese FMCG goods. This thesis faithfully and comprehensively presents the author's study findings with utmost accuracy and integrity.

5.2. Research framework

The author has synthesized the following 6 variables based on a comprehensive analysis of prior research on factors influencing CLSC in the product supply chain and insights gathered from interviews and direct conversations with managers in the FMCG product supply chain in Vietnam. Specifically, there are five distinct sets of parameters that serve as independent variables, influencing the value creation of CLSC, which is the dependent variable.

(1) **Laws and policies**: assessed based on 5 observed variables, comprising 4 variables inherited from prior research (Regulations of Environmental Law, Regulations on Extended Responsibility, Government financial support policy for reclamation, Requirements for environmental certifications) and a novel variable (Environmental law enforcement effectiveness).

(2) **Technological level** a novel component that is based on one observed variable from prior studies (Level of information technology application) and two newly introduced variables (Recycling Technology and Collection Technology).

(3) **Market requirements** are assessed based on four observed characteristics. The variables considered in this study consist of two customer-related factors, namely Customer awareness and Customer desire for environmentally friendly goods, as well as two competitor-related factors, namely the return policy of rivals and the prevention of technology theft.

(4) **Colloboration level** in the supply chain is assessed based on six observable characteristics derived from previous research. These variables indicate the extent of collaboration among various parts of the supply chain while arranging and carrying out recall actions.

(5) **Enterprise policies and resources** are assessed based on four observable characteristics derived from prior research: support from top management, enterprise policies, coordination across functional units, and capabilities and resources for CLSC.

(6) **Value creation** from CLSC may be assessed based on four observable criteria derived from prior research: meeting customer expectations, reducing manufacturing and company expenses, increasing profitability, and creating a positive environmental image for enterprises.

Therefore, in contrast to other investigations, this project introduces three more observed variables to the existing research model. Table 5.1 provides a comprehensive overview of the many elements that influence the value created from implementation of CLSC. These components have been identified in earlier research, and additional variables have been included by the author in this study. Each of these observed variables will undergo testing to determine their reliability and correlation. Based on this premise, the thesis evaluates the suitability of the proposed research model.

Table 5-1: Factors affecting value creation of CLSC

Factors	Observed variables	Expected impacts
Laws and Policies	Regulations of Environmental Law	Assist in the many stages of CLSC, including collecting, categorizing, processing, and redistributing.
	Financial support policy	
	Require environmental certification	
	Corporate social responsibility	
	Effective enforcement of environmental laws	
Technological level	IT supports CLSC	Support every functions of a CLSC system
	Collection technology	
	Recycling technology	
Market requirements	Customers' awareness about environmental protection	Exerting influence on the decision-making process for the implementation of CLSC
	Customer demand for environmentally friendly products	
	Policies of competitive enterprises	
	Limit technology theft	
Collaboration level	Collaborate with suppliers	Increased collaboration in sharing information and resources among members of the supply chain has a favorable impact on the outcomes of CLSC.
	Collaborate with manufacturers	
	Collaborate with wholesalers	
	Collaborate with retailers	
	Collaborate with collectors and recyclers	
	Colloborate with clients/customers	
Enterprise's policy	Company's policies of CLSC	CLSC may be positively impacted by a strategic focus, a keen knowledge of its value, and the allocation of sufficient resources.
	Supports from high-level managers	
	Cooperations between departments regarding CLSC system	
	Resouces allocating for CLSC	
Value creation from CLSC	Customers satisfy with our products	The above factors impact this variable
	Reduce production and business costs	
	Increase profit potential	
	Create a green image for businesses	

The research model depicting the elements influencing the development of CLSC in the FMCG supply chain is presented in Figure 5.2 of this study. The research hypotheses are formulated as follows using this research model:

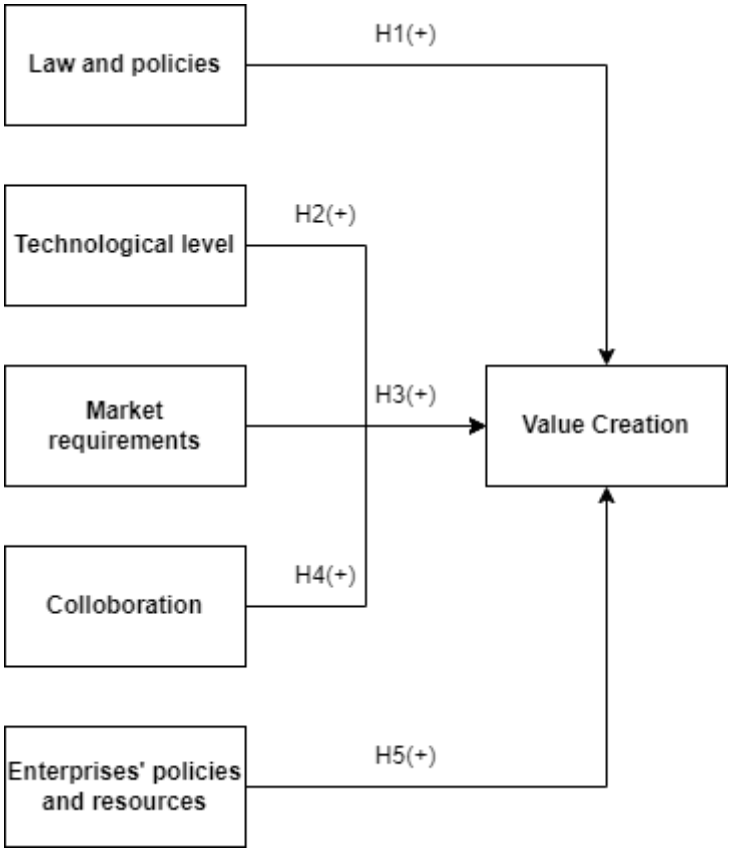

Figure 5-2: Research framework

- Hypothesis H1: Laws and policies exert a beneficial impact on the outcomes of CLSC in the supply chain of FMCG products in Vietnam.

- Hypothesis H2: Technology application level positively affects the values created by CLSC in the production of FMCG goods in Vietnam.

- Hypothesis H3: Market requirements determinants exert a favorable impact on the values created by CLSC in the production of FMCG goods in Vietnam.

- Hypothesis H4: The degree of collaboration among members exerts a beneficial impact on values created by CLSC in the production of FMCG goods in Vietnam.

- Hypothesis H5: Company's policies and resources exert a favorable impact on values created by CLSC in the production of FMCG goods in Vietnam.

5.3. Research methodology

In order to achieve thoroughness, impartiality, and precision, the thesis employs a blend of secondary and primary data research methodologies.

Secondary data for thesis research include information on the developmental status of Vietnam's FMCG industry and the enterprises operating within it. The Plan for FMCG sector Development of the Ministry of Industry and Trade, the Report of the Vietnam Consumer Goods Association, the Specialized Magazine of the Vietnam Consumer Goods Association, and other associations provide secondary data on Vietnam's FMCG sector. Scientific conferences, both domestic and international, that focus on the FMCG business, the official website of the Consumer Goods Association, and companies involved in the manufacture and selling of plastic products in the FMCG sector. The procedure of gathering and examining secondary data is carried out in accordance with the sequential stages depicted in the accompanying image:

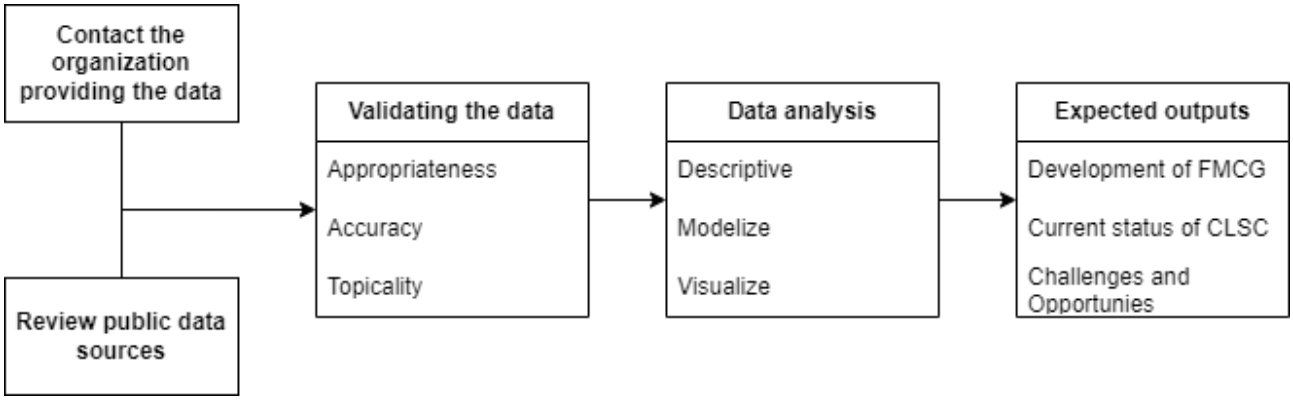

Figure 5-3: Secondary data collection process

The essential data to be gathered and examined pertains to the present state of CLSC in the Vietnamese FMCG supply chain. This includes information on the organization of a logistic system, the flow and activities, and the factors that influence the advancement of CLSC. The collection of primary data involved the utilization of two distinct methods: the in-depth interview approach and the survey method. The image below illustrates the process of gathering and examining primary data using these two methodologies.

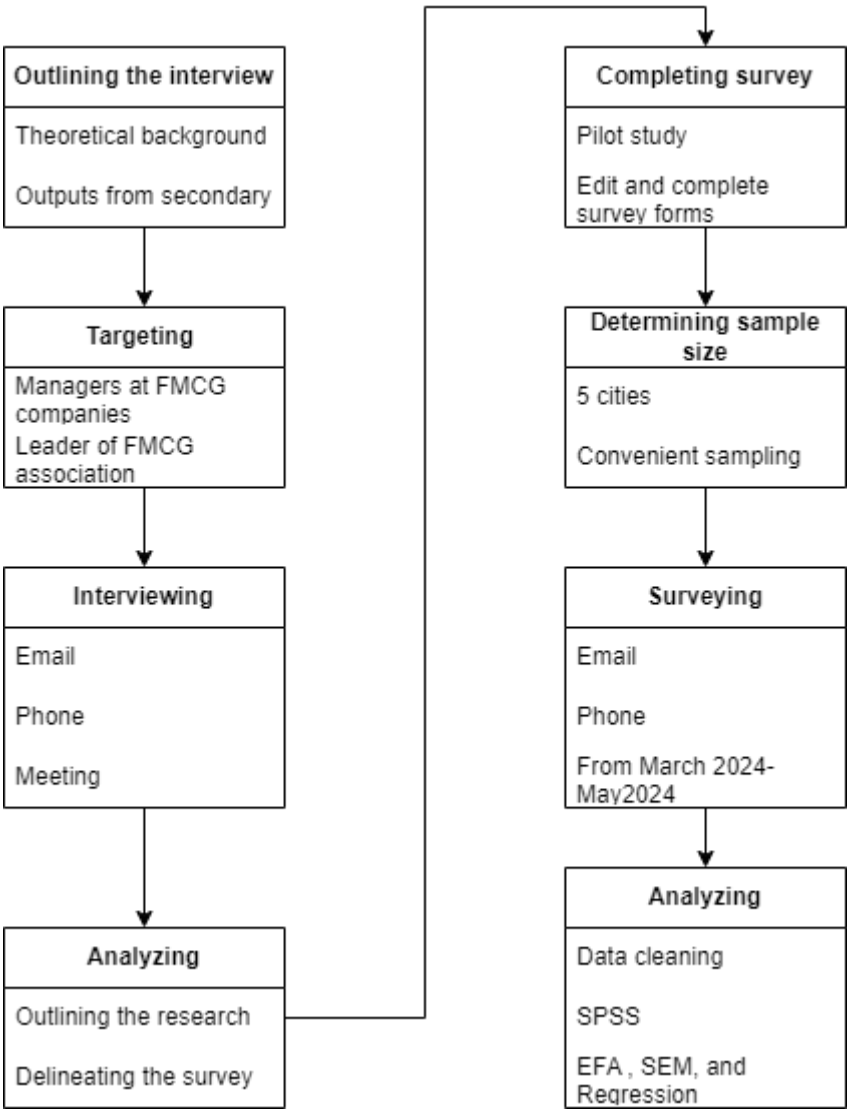

Figure 5-4: Preliminary data analysis

a. In-depth interview

The author employs this approach as an initial step in gathering primary data to investigate the present state of CLSC in typical enterprises. The method involves engaging in discussions with experts regarding the measurement indicators system, assessing the current state of CLSC and determining the survey's content.

b. Questionaire survey

The purpose of this method is to conduct a quantitative study on the current situation and factors affecting CLSC development in the Vietnamese FMCG product supply chain. After completing the first draft in the previous stage, both survey forms were sent for pilot interviews at 10 businesses and recycling facilities. The problems and shortcomings of the first draft were pointed out by businesses and the author edited and completed this draft to conduct an official investigation.

The research population is FMCG manufacturing and trading enterprises in Vietnam; regardless of the type of business, production and business field (household plastics, packaging, engineering, construction materials or plastic raw materials), size or market of the business. There are more than 2,200 businesses gathered in the overall research target (N). The sample calculation formula (Copper, Donald R., Schindler and Pamela S., 2000) used is:

$$n = \frac{Nz^2\sigma^2}{N\varepsilon^2 + z^2\sigma^2}$$

The sampling frame is drawn from the list of manufacturing and trading enterprises in the Vietnam FMCG Yearbook 2020- 2021. It focuses on manufacturing and trading enterprises in 5 different locations: Hanoi, Hung Yen, Bac Giang, Hai Phong, and Quang Ninh- are localities with a high concentration of FMCG enterprises. Convenience sampling method was used to select businesses to conduct the survey to ensure the highest likelihood of obtaining feedback and in accordance with the time and budget constraints of the survey.

6. Expected contribution of the study

The thesis is a comprehensive endeavor that integrates both theoretical and applied research, yielding significant novel contributions.

The thesis employed a combination of secondary and primary data gathering methods, encompassing both qualitative and quantitative research approaches. The thesis makes a novel contribution by incorporating a quantitative research model that examines the factors influencing value created by CLSC in the Vietnamese FMCG product supply chain. In addition to incorporating 23 observed variables from previous studies, the thesis introduces 3 new observed variables to enhance the reliability of the quantitative model.

The thesis enhances and finalizes the theoretical framework of CLSC by exploring a research direction that has been seldom pursued before, which involves analyzing the theoretical model of closed-loop supply chain in the FMCG product supply chain. In addition, the thesis adds to the introduction and dissemination of the theory of CLSC, which is still relatively novel in Vietnam.

The thesis has conducted a thorough and accurate analysis and evaluation of the current state of CLSC activities in the FMCC supply chain in Vietnam. This includes examining the organizational model of logistic sytem within the chain and at individual enterprises, as well as studying the flow of goods within the chain and the specific activities carried out by member enterprises. This study provides a detailed overview of the present state of CLSC in the FMCG supply chain in Vietnam, which has not been previously investigated in any research.

The thesis suggests three sets of practical solutions for members of the Vietnamese FMCG supply chain and one set of solutions for entities outside the supply chain. These solutions aim to facilitate the implementation of CLSC in the supply chain of Vietnamese FMCG industry from 2025 to 2030.

7. Reference

Amini, M.M., Retzlaff-Roberts, D. and Bienstock, C.C. (2005) 'Designing a reverse logistics operation for short cycle time repair services', *International Journal of Production Economics*, 96(3), pp. 367–380. Available at: https://doi.org/10.1016/J.IJPE.2004.05.010.

Ashby, A., Leat, M. and Hudson-Smith, M. (2012) 'Making connections: A review of supply chain management and sustainability literature', *Supply Chain Management*, 17(5), pp. 497–516. Available at: https://doi.org/10.1108/13598541211258573/FULL/XML.

Atasu, A., Guide, V.D.R. and Van Wassenhove, L.N. (2008) 'Product Reuse Economics in Closed-Loop Supply Chain Research', *Production and Operations Management*, 17(5), pp. 483–496. Available at: https://doi.org/10.3401/POMS.1080.0051.

Atasu, A., Guide, V.D.R. and Van Wassenhove, L.N. (2010) 'So what if remanufacturing cannibalizes my new product sales?', *California Management Review*, 52(2), pp. 56–76. Available at: https://doi.org/10.1525/CMR.2010.52.2.56/ASSET/CMR.2010.52.2.56.FP.PNG_V03.

Ciliberti, F., Pontrandolfo, P. and Scozzi, B. (2008) 'Logistics social responsibility: Standard adoption and practices in Italian companies', *International Journal of Production Economics*, 113(1), pp. 88–106. Available at: https://doi.org/10.1016/J.IJPE.2007.02.049.

De Cremer, D. (2006) 'Affective and motivational consequences of leader self-sacrifice: The moderating effect of autocratic leadership', *The Leadership Quarterly*, 17(1), pp. 79–93. Available at: https://doi.org/10.1016/J.LEAQUA.2005.10.005.

Dowlatshahi, S. (2010) 'A cost-benefit analysis for the design and implementation of reverse logistics systems: case studies approach', *International Journal of Production Research*, 48(5), pp. 1361–1380. Available at: https://doi.org/10.1080/00207540802552642.

Elshaer, I.A., Azazz, A.M.S. and Fayyad, S. (2023) 'Green Management and Sustainable Performance of Small- and Medium-Sized Hospitality Businesses: Moderating the Role of an Employee's Pro-Environmental Behaviour', *International Journal of Environmental Research and Public Health*, 20(3). Available at: https://doi.org/10.3390/IJERPH20032244.

Eltayeb, T.K., Zailani, S. and Ramayah, T. (2011) 'Green supply chain initiatives among certified companies in Malaysia and environmental sustainability: Investigating the outcomes', *Resources, Conservation and Recycling*, 55(5), pp. 495–506. Available at: https://doi.org/10.1016/J.RESCONREC.2010.09.003.

Fayezi, S., O'Loughlin, A. and Zutshi, A. (2012) 'Agency theory and supply chain management: A structured literature review', *Supply Chain Management*, 17(5), pp. 556–570. Available at: https://doi.org/10.1108/13598541211258618/FULL/XML.

Ferrer, G. and Clay Whybark, D. (2000) 'From garbage to goods: Successful remanufacturing systems and skills', *Business Horizons*, 43(6), pp. 55–64. Available at: https://doi.org/10.1016/S0007-6813(00)80023-3.

Gehin, A., Zwolinski, P. and Brissaud, D. (2008) 'A tool to implement sustainable end-of-life strategies in the product development phase', *Journal of Cleaner Production*, 16(5), pp. 566–576. Available at: https://doi.org/10.1016/J.JCLEPRO.2007.02.012.

Genchev, S.E. (2009) 'Reverse logistics program design: A company study', *Business Horizons*, 52(2), pp. 139–148. Available at: https://doi.org/10.1016/J.BUSHOR.2008.09.005.

Geyer, R. and Jackson, T. (2004) 'Supply loops and their constraints: The Industrial ecology of recycling and reuse', *California Management Review*, 46(2), pp. 55–73. Available at: https://doi.org/10.2307/41166210/ASSET/41166210.FP.PNG_V03.

Grönroos, C. and Voima, P. (2013) 'Critical service logic: Making sense of value creation and co-creation', *Journal of the Academy of Marketing Science*, 41(2), pp. 133–150. Available at: https://doi.org/10.1007/S11747-012-0308-3/METRICS.

Gustafsson, E., Jonsson, P. and Holmström, J. (2021) 'Reducing retail supply chain costs of product returns using digital product fitting', *International Journal of Physical Distribution and Logistics Management*, 51(8), pp. 877–896. Available at: https://doi.org/10.1108/IJPDLM-10-2020-0334/FULL/HTML.

Harms, P.D. *et al.* (2018) 'Autocratic leaders and authoritarian followers revisited: A review and agenda for the future', *The Leadership Quarterly*, 29(1), pp. 105–122. Available at: https://doi.org/10.1016/J.LEAQUA.2017.12.007.

Hazen, B.T. *et al.* (2012) 'Consumer reactions to the adoption of green reverse logistics', *The International Review of Retail, Distribution and Consumer Research*, 22(4), pp. 417–434. Available at: https://doi.org/10.1080/09593969.2012.690777.

Hicks, C. *et al.* (2004) 'A functional model of supply chains and waste', *International Journal of Production Economics*, 89(2), pp. 165–174. Available at: https://doi.org/10.1016/S0925-5273(03)00045-8.

Hoang, A.T. *et al.* (2023) 'Green hydrogen economy: Prospects and policies in Vietnam', *International Journal of Hydrogen Energy* [Preprint]. Available at: https://doi.org/10.1016/J.IJHYDENE.2023.05.306.

Van Hoek, R.I. (2001) 'The rediscovery of postponement a literature review and directions for research', *Journal of Operations Management*, 19(2), pp. 161–184. Available at: https://doi.org/10.1016/S0272-6963(00)00057-7.

Hojas Baenas, J.M. *et al.* (2011) 'A study of reverse logistics flow management in vehicle battery industries in the midwest of the state of São Paulo (Brazil)', *Journal of Cleaner Production*, 19(2–3), pp. 168–172. Available at: https://doi.org/10.1016/J.JCLEPRO.2010.08.018.

Jacobs, B.W. and Subramanian, R. (2012) 'Sharing Responsibility for Product Recovery Across the Supply Chain', *Production and Operations Management*, 21(1), pp. 85–100. Available at: https://doi.org/10.1111/J.1937-5956.2011.01246.X.

Kapetanopoulou, P. and Tagaras, G. (2011) 'Drivers and obstacles of product recovery activities in the Greek industry', *International Journal of Operations and Production Management*, 31(2), pp. 148–166. Available at: https://doi.org/10.1108/01443571111104746/FULL/XML.

Ketzenberg, M. (2009) 'The value of information in a capacitated closed loop supply chain', *European Journal of Operational Research*, 198(2), pp. 491–503. Available at: https://doi.org/10.1016/J.EJOR.2008.09.028.

Klassen: Comment on "The Evolution of Closed–Loop... - Google Scholar (no date). Available at: https://scholar.google.com/scholar_lookup?title=Comment%20on%20the%20evolution%20of%20closed%20loop%20supply%20chain%20research%20by%20V.%20Daniel%20R.%20Guide%2C%20Jr.%20and%20Luk%20N.%20Van%20Wassenhove&author=R.D.%20Klassen&publication_year=2009 (Accessed: 6 December 2023).

Krikke, H. (2011) 'Impact of closed-loop network configurations on carbon footprints: A case study in copiers', *Resources, Conservation and Recycling*, 55(12), pp. 1196–1205. Available at: https://doi.org/10.1016/J.RESCONREC.2011.07.001.

Krikke, H., Hofenk, D. and Wang, Y. (2013) 'Revealing an invisible giant: A comprehensive survey into return practices within original (closed-loop) supply chains', *Resources, Conservation and Recycling*, 73, pp. 239–250. Available at: https://doi.org/10.1016/J.RESCONREC.2013.02.009.

Kumar, S. and Putnam, V. (2008) 'Cradle to cradle: Reverse logistics strategies and opportunities across three industry sectors', *International Journal of Production Economics*, 115(2), pp. 305–315. Available at: https://doi.org/10.1016/J.IJPE.2007.11.015.

Kuppulakshmi, V., Sugapriya, C. and Deivanayagam Pillai, N. (2022) 'An inventory model for fish marketing under uncertain lockdown situation and normal backordering situation', *Journal of Advances in Management Research*, 19(2), pp. 220–239. Available at: https://doi.org/10.1108/JAMR-09-2020-0249/FULL/HTML.

Lambert, S., Riopel, D. and Abdul-Kader, W. (2011) 'A reverse logistics decisions conceptual framework', *Computers & Industrial Engineering*, 61(3), pp. 561–581. Available at: https://doi.org/10.1016/J.CIE.2011.04.012.

Lau, K.-S., Xin, Z.-P. and Yau, S.-T. (2008) 'Third International Congress of Chinese Mathematicians, Part 2'. Edited by K.-S. Lau, Z.-P. Xin, and S.-T. Yau, 42.2. Available at: https://doi.org/10.1090/AMSIP/042.2.

Lee, C.K.M. and Lam, J.S.L. (2012) 'Managing reverse logistics to enhance sustainability of industrial marketing', *Industrial Marketing Management*, 41(4), pp. 589–598. Available at: https://doi.org/10.1016/J.INDMARMAN.2012.04.006.

Li, X. and Olorunniwo, F. (2008a) 'An exploration of reverse logistics practices in three companies', *Supply Chain Management*, 13(5), pp. 381–386. Available at: https://doi.org/10.1108/13598540810894979/FULL/XML.

Li, X. and Olorunniwo, F. (2008b) 'An exploration of reverse logistics practices in three companies', *Supply Chain Management*, 13(5), pp. 381–386. Available at: https://doi.org/10.1108/13598540810894979/FULL/XML.

Michaud, C. and Llerena, D. (2011) 'Green consumer behaviour: an experimental analysis of willingness to pay for remanufactured products', *Business Strategy and the Environment*, 20(6), pp. 408–420. Available at: https://doi.org/10.1002/BSE.703.

Mollenkopf, D.A. *et al.* (2007) 'Managing Internet Product Returns: A Focus on Effective Service Operations', *Decision Sciences*, 38(2), pp. 215–250. Available at: https://doi.org/10.1111/J.1540-5915.2007.00157.X.

Mont, O., Dalhammar, C. and Jacobsson, N. (2006) 'A new business model for baby prams based on leasing and product remanufacturing', *Journal of Cleaner Production*, 14(17), pp. 1509–1518. Available at: https://doi.org/10.1016/J.JCLEPRO.2006.01.024.

Nguyen, N.H. *et al.* (2023) 'Role of consumer ethnocentrism on purchase intention toward foreign products: Evidence from data of Vietnamese consumers with Chinese products', *Heliyon*, 9(2), p. e13069. Available at: https://doi.org/10.1016/J.HELIYON.2023.E13069.

Rahman, S. and Subramanian, N. (2012) 'Factors for implementing end-of-life computer recycling operations in reverse supply chains', *International Journal of Production Economics*, 140(1), pp. 239–248. Available at: https://doi.org/10.1016/J.IJPE.2011.07.019.

Rashid, A. *et al.* (2013) 'Resource Conservative Manufacturing: an essential change in business and technology paradigm for sustainable manufacturing', *Journal of Cleaner Production*, 57, pp. 166–177. Available at: https://doi.org/10.1016/J.JCLEPRO.2013.06.012.

Rubio, S., Chamorro, A. and Miranda, F.J. (2008) 'Characteristics of the research on reverse logistics (1995–2005)', *International Journal of Production Research*, 46(4), pp. 1099–1120. Available at: https://doi.org/10.1080/00207540600943977.

Skinner, L.R., Bryant, P.T. and Glenn Richey, R. (2008) 'Examining the impact of reverse logistics disposition strategies', *International Journal of Physical Distribution & Logistics Management*, 38(7), pp. 518–539. Available at: https://doi.org/10.1108/09600030810900932/FULL/XML.

De Souza, C.D.R. and D'Agosto, M.D.A. (2013) 'Value chain analysis applied to the scrap tire reverse logistics chain: An applied study of co-processing in the cement industry', *Resources, Conservation and Recycling*, 78, pp. 15–25. Available at: https://doi.org/10.1016/J.RESCONREC.2013.06.007.

Srivastava, S.K. (2008) 'Value recovery network design for product returns', *International Journal of Physical Distribution and Logistics Management*, 38(4), pp. 311–331. Available at: https://doi.org/10.1108/09600030810875409/FULL/XML.

Subramoniam, R., Huisingh, D. and Chinnam, R.B. (2010) 'Aftermarket remanufacturing strategic planning decision-making framework: theory & practice', *Journal of Cleaner Production*, 18(16–17), pp. 1575–1586. Available at: https://doi.org/10.1016/J.JCLEPRO.2010.07.022.

Toffel, M.W. (2003) 'The growing strategic importance of end-of-life product management', *California Management Review*, 45(3), pp. 102–129. Available at: https://doi.org/10.2307/41166178/ASSET/41166178.FP.PNG_V03.

Tsoulfas, G.T. and Pappis, C.P. (2006) 'Environmental principles applicable to supply chains design and operation', *Journal of Cleaner Production*, 14(18), pp. 1593–1602. Available at: https://doi.org/10.1016/J.JCLEPRO.2005.05.021.

Wikner, J. and Tang, O. (2008) 'A structural framework for closed-loop supply chains', *The International Journal of Logistics Management*, 19(3), pp. 344–366. Available at: https://doi.org/10.1108/09574090810919198/FULL/XML.

Wong, C. *et al.* (2012) 'Towards a theory of supply chain alignment enablers: A systematic literature review', *Supply Chain Management*, 17(4), pp. 419–437. Available at: https://doi.org/10.1108/13598541211246567/FULL/XML.

Xu, D.F. *et al.* (2009) 'Modelling for product information tracking and feedback via wireless technology in closed-loop supply chains', *International Journal of Computer Integrated Manufacturing*, 22(7), pp. 648–670. Available at: https://doi.org/10.1080/09511920701675755.

Ye, F. *et al.* (2013) 'The impact of institutional pressures, top managers' posture and reverse logistics on performance—Evidence from China', *International Journal of Production Economics*, 143(1), pp. 132–143. Available at: https://doi.org/10.1016/J.IJPE.2012.12.021.

Zhu, Q. *et al.* (2008) 'Firm-level correlates of emergent green supply chain management practices in the Chinese context', *Omega*, 36(4), pp. 577–591. Available at: https://doi.org/10.1016/J.OMEGA.2006.11.009.

8. Appendix

APPENDIX 1: SURVEY FORM OF ENTERPRISES IN VIETNAM FMCG PRODUCT SUPPLY CHAIN

Ladies and gentlemen!

Closed-loop supply chain (CLSC) is simply understood as the process of recalling products, selling products, raw materials and packaging for refurbishing, repairing, recycling, reusing or treating waste appropriately to meet customer requirements, reducing production and business costs and negative impacts on the environment. CLSC is increasingly receiving deep attention from businesses and researchers because of the great benefits it brings to the sustainable development of businesses, product supply chains as well as economies.

This survey program is part of a doctoral thesis with the purpose of collecting data on the current situation of CLSC at businesses participating in the supply chain of Vietnamese FMCG. Your answers are important so that researchers can collect accurate data for this research. The PhD student commits to keeping the company's private information confidential and will only use this information in aggregate form in the thesis report. Sincerely thank you for your help and cooperation!

Part 1: General Information

Company name: ..... Phone: .....Website: .....

Address: ..... Cities: ....

Name: ..... Position: ....

Please tick the answers that match the characteristics of your business

1. **Years of establishment?**
2. Total **employees** that are currently working in the company?
3. Which **role** does the company play in the supply chain of FMCG?

☐ Suppliers ☐ Manufacturers

☐ Wholesalers ☐ Retailers

4. Please indicate **the main markets** of the business**?**

☐ Domestic ☐ Export ☐ Boths

5. In which of the **following ranges** would you say your business's revenue last year was in?

☐ <10 billion ☐ 51-100 billion ☐ 501-1000 billion

☐ 10-50 billion ☐ 101-500 billion ☐ > 1000 billion

6. In general, are you satisfied with your business's production and business activities last year?

Totally unsatisfied				*Totally satisfied*
1	2	3	4	5

Part 2: The current state of Closed-loop supply chain in the company

Please tick the answers that match the characteristics of your business

7. From your point of view, is CLSC important to the success of your business?

Totally disagree	*Disagree*	*Neutral*	*Agree*	*Totally agree*
1	2	3	4	5

8. The contribution of CLSC to the business performance?

	1 is Lowest/ 5 is Highest				
a. Meet customer requirements	1	2	3	4	5
b. Reduce production and business costs	1	2	3	4	5
c. Increase profits for businesses.	1	2	3	4	5
d. Creating a "green" business image	1	2	3	4	5

9. Enterprises deploy CLSC flow for which of the following subjects? (can choose multiple options at the same time)

☐ Final product ☐ Unsold product ☐ Packages

☐ Defective product ☐ Waste products and by-products during the production process ☐ Others

10. What is the average recovery rate on the corresponding number of products produced by each line at the enterprise in 2023?

Final product	☐ <10%	☐ 10-25%	☐ 26-40%	☐ 41-59%	☐ > 60%
Defective product	☐ <10%	☐ 10-25%	☐ 26-40%	☐ 41-59%	☐ > 60%
Unsold product	☐ <10%	☐ 10-25%	☐ 26-40%	☐ 41-59%	☐ > 60%
Wastes and by-products	☐ <10%	☐ 10-25%	☐ 26-40%	☐ 41-59%	☐ > 60%
Packages	☐ <10%	☐ 10-25%	☐ 26-40%	☐ 41-59%	☐ > 60%
Others	☐ <10%	☐ 10-25%	☐ 26-40%	☐ 41-59%	☐ > 60%

11. How long does your company implement the CLSC?

☐ <1 years ☐ more than 3 years ☐ We will implement in the near future

☐ 1-2 years ☐ Not intend to apply ☐ Others (detail)

12. To what extant that you agree with the following statements:

	1 is Lowest/ 5 is Highest				
a. Enterprises are aware of the role of reverse logistics activities	1	2	3	4	5
b. Enterprises clearly define goals for reverse logistics activities	1	2	3	4	5
c. Enterprises develop recall instructions for customers	1	2	3	4	5
d. Enterprises focus on developing reverse logistics networks	1	2	3	4	5
e. Enterprises build clear financial principles for reverse logistics	1	2	3	4	5
f. Enterprises apply e-commerce in managing reverse logistics activities	1	2	3	4	5
g. Enterprises separate warehouses for products to recover	1	2	3	4	5
h. Well-coordination between delivering products to customers and transport recovered products	1	2	3	4	5
i. Enterprises have good technologies for handling recalled products	1	2	3	4	5
j. Cross-functional departments to manage reverse logistics	1	2	3	4	5

13. Enterprises construct and manage CLSC activities in which of the following methods?

☐ Self-developed ☐ Consulting

☐ Outsourcing ☐ Outsour partly

14. Which of the following logistics activities does the business outsource?

☐ Collect returned product ☐ Selling scrap ☐ Fixing and maintenance

☐ Check and classify recalled products ☐ Transport recalled products ☐ Recycle

15. To what extant that you agree with the following statements:

	1 is Lowest/ 5 is Highest				
a. If the product has complex characteristics, businesses will outsource CLSC activities	1	2	3	4	5
b. When recalling is small-scale and infrequent, businesses will outsource CLSC activities	1	2	3	4	5
c. When businesses want to focus on core competitiveness, they will outsource CLSC activities	1	2	3	4	5
d. When resources (finance, facilities, human resources...) are limited, businesses will outsource CLSC activities.	1	2	3	4	5

e. When reverse logistics activities contain many risks, businesses will outsource CLSC activities 1 2 3 4 5

f. When businesses have close relationships with collection, recycling, and logistics businesses, they will outsource CLSC activities. 1 2 3 4 5

16. Which of the following members does the enterprise cooperate with to deploy CLSC flow?

☐ Suppliers ☐ Manufactuers ☐ Retailers ☐ Do not cooperate with any members

☐ Logistic service providers ☐ Wholesalers ☐ Scrap collecters

17. Who was the first partner in your CLSC circle?

☐ Suppliers ☐ Manufactuers ☐ Retailers ☐ Do not cooperate with any members

☐ Logistic service providers ☐ Wholesalers ☐ Scrap collecters

18. The most prevalence method your company uses to handle collected packages is:

☐ Sell directly to other companies ☐ Refurbishment ☐ Bury ☐ Others (in detail)

☐ Recycle ☐ Incineration ☐ Reuse

19. Please give a general assessment of your business's logistics activities?

Totally unsatisfied ***Totally satisfied***

1 2 3 4 5

Part 3: Value Creation from implementing CLSC

20. To what extant that you agree with the following statements regarding the impacts of laws and policies on the values created from the implementation of CLSC:

	1 is totally disagree/ 5 is totally agree				
a. Regulations of the Environmental Law promote businesses to develop CLSC activities.	1	2	3	4	5
b. The effectiveness of environmental law enforcement encourages businesses to develop CLSC activities	1	2	3	4	5
c. Regulations on corporate social responsibility promote businesses to develop CLSC activities	1	2	3	4	5

d. The Government's financial support policy encourages businesses to develop CLSC activities	1	2	3	4	5
e. Requirements for environmental certifications (ISO14000, Eco label, green label) promote businesses to develop CLSC	1	2	3	4	5

21. To what extant that you agree with the following statements regarding the impacts of technological level on the values created from the implementation of CLSC:

	1 is totally disagree/ 5 is totally agree				
a. Applying information technology (Barcode, EDI, RFID...) helps improve the values of CLSC at enterprises	1	2	3	4	5
b. A properly designed network of collection facilities helps improve the values of CLSC activities at enterprises	1	2	3	4	5
c. Modern recycling technology helps improve the values of CLSC activities at businesses	1	2	3	4	5

22. To what extant that you agree with the following statements regarding the impacts of market requiements on the values created from the implementation of CLSC:

	1 is totally disagree/ 5 is totally agree				
a. High customer awareness of environmental protection will motivate businesses to implement CLSC	1	2	3	4	5
b. High customer demand for environmentally friendly products will push businesses to implement CLSC	1	2	3	4	5
c. Competitors strengthening reverse logistics policies will push businesses to implement CLSC	1	2	3	4	5
d. The requirement to limit technology theft will promote businesses to implement CLSC	1	2	3	4	5

23. To what extant that you agree with the following statements regarding the impacts of collaboration on the values created from the implementation of CLSC:

	1 is totally disagree/ 5 is totally agree				
a. Collaborating with suppliers helps improve values creation of CLSC at businesses	1	2	3	4	5
b. Collaborating with manufacturers helps improve values creation of CLSC at businesses	1	2	3	4	5

c. Collaborating with distributors helps improve values creation of CLSC at businesses	1	2	3	4	5
d. Collaborating with retailers helps improve values creation of CLSC at businesses	1	2	3	4	5
e. Collaborating with collectors and recyclers helps improve values creation of CLSC at businesses	1	2	3	4	5
f. Collaborating with customers helps improve values creation of CLSC at businesses	1	2	3	4	5

24. To what extant that you agree with the following statements regarding the impacts of company's policy and resource allocation on the values created from the implementation of CLSC:

	1 is totally disagree/ 5 is totally agree				
a. Enterprises that have clear policies for reverse logistics activities will have higher results in reverse logistics activities	1	2	3	4	5
b. The greater the support of senior managers, the higher the reverse logistics performance	1	2	3	4	5
c. The closer the coordination between functional departments, the higher the results of reverse logistics operations	1	2	3	4	5
d. The more businesses prioritize investing resources in reverse logistics, the higher the reverse logistics results will be	1	2	3	4	5