Exploring challenges of the implementation of reverse logistics practices in the UK, Current Discourse: A Preliminary Study

*Anthony Ezenwa[1], Akunna Oledinma[2], Tazin Sultana Khan[3]

[1]Bournemouth University, United Kingdom, **aezenwa@bournemouth.ac.uk** [2]University of Hull, United Kingdom, A.Oledinma@hull.ac.uk [3]Liverpool John Moores University, United Kingdom, tazinkhan2022@gmail.com

Abstract

Purpose: This paper aims to examine current research into existing reverse logistics practices in the UK, identify the magnitude of challenges and develop strategies to support the adoption of reverse logistics (RL) in the UK. However, a few European countries and one North American study were captured in this review as integral parts of the reviewed empirical studies or purposefully selected to boost our understating of the subjects considered in this exploratory study.

Research approach: Eight electronic databases were searched from 2013-2023. Criteria used for study selection were RL's current practice and factors influencing their implementation and strategies, primary studies; published in the English Language in peer review journals from 2013- 2023. Overall, eleven articles were identified for inclusion in the thematic review.

Findings/originality: Despite recent progress in addressing RL adoption challenges in the UK/EU, most interventions through research and policy documents continue to adopt generic agenda and seldom consider industry-specific action preparedness based on local-level assessment. Analysis of relevant cross-thematic literature indicates that organisational leadership, awareness, and incorporation of RL principles into organisational visions appear to play key roles in shaping RL practices and, by extension, sustainability values attained in the UK. Based on the notion that RL is inherently desirable in the modern logistics market, we suggest a new sustainable 'policy integration thinking' that embraces the integration of RL principles into organisational strategic visions, balancing short-term and long-term priorities.

Research and practical impacts: As local and international organisations develop strategies to achieve sustainable business practices, conflicting RL policies and implementation strategies are undermining the cross-thematic integrative roles of RL. This raises fundamental questions over how coherent portfolios of RL interventions across vital industries can be advanced and managed. Taking the UK/EU as empirical examples, we analyse relevant literature and policy documents relating to RL practices, challenges/opportunities, and strategies for improvements with significant implications on research and professional practice.

Keywords: reverse logistics, reverse supply chain, close loop, returns management, sustainability, recycling, industrial ecology.

Introduction

Reverse Logistics (RL) is developed following the need to move goods from customers back to suppliers and manufacturers (Bernon et al., 2018, Frei et al., 2020; Zhang et al., 2023). These goods can be reused, refurbished/repaired, remanufactured, cannibalised, recycled, and disposed of (Bernon et al., 2018; Trivyza et al., 2022). Unlike forward logistics (FL), which is relatively stable, reverse logistics (RL) management is more complicated in terms of inconsistent forecasts; non-uniform product quality and packaging; price dependence on many factors; lack of standard accounting systems, less transparent and high cost of transactions, among other contextual factors (Rogers and Tibben-Lemke, 1999).

Despite the RL management challenges, there is a growing need globally to manage increasing waste management needs effectively/efficiently. It is suggested that the advancement of e-commerce has further aggravated RL challenges, as business organisations have resorted to using a lenient return policy as one of the critical competitive priorities (Frei et al., 2020; Zhang et al., 2023). According to Berno and Cullen (2007), return figure indicated a staggering £ 5.75 bn in the UK retail sector, representing 5-20% (Daugherty, Autry and Ellinger, 2001), up to around 50% in some sectors (Rogers et al., 2002) in return rates. The rise of the internet and home shopping, along with the less restrictive return policies and shortened product life cycle, are captured as primary factors contributing to the rise in the product return rate phenomenon (Bernon and Cullen 2007).

These justify why the attitudes of business /public organisations and end-users towards adopting sustainable business practices have been under scrutiny in recent years (Frei et al., 2020; Zhang et al., 2023). Yet, circular economy (CE), closed-loop supply chain (CLSC), reverse exchange (RE), market exchange (ME) among other sustainability principles have not been mainstreamed by local RL operators in the UK/EU (Bernon et al., 2018, Frei et al., 2020; Zhang et al., 2023), possibly due to lack of awareness, leadership, evidence-based support tools that can inform cross-functional integration of RL. In this light, this article is developed on the premise that a lack of understanding of cross-sectoral action plans in national logistics markets such as the UK may impede sustainable RL practices, spur unhealthy business environment with the associated negative social and environmental impacts (Xie et al., 2016). Therefore, we identify and evaluate cross-sectoral RL practice and adoption challenges and identify ways forward that better integrate sustainability management goals on RL practices. In this light, we ask:

- What do we currently know about RL practice in the UK?
- What strategic considerations are needed to improve sustainable RL practices in the UK/Europe?

For this study, RL is defined as the role of logistics in product returns, source reduction, recycling, material substitution, reuse of materials, waste disposal and refurbishing, repair, and remanufacturing." (Stock 1998, p.20). Subsequent sections of this paper encompass research methodology, results/discussions, and conclusion/recommendations.

Methodology

Design

A thematic appraisal is undertaken in this literature review using a six-step process suggested by Leininger (1985) alongside open and magnitude coding strategies proposed by Stratus (1987).

Search method

Sampling

Electronic databases, including Scopus, Web of Science, Thomson Reuters, ABI/Inform, Emerald, Science Direct, MEDLINE, and IEEE Xplore, were searched using the following keywords: reverse logistics, circular economy, sustainability, product recovery, retail, product return, reverse logistics, reverse supply chain, return policy, return management, closed-loop supply chain and management, sustainability, industrial ecology, UK logistics market and their combinations to retrieve the reviewed papers. The search period covered from 2013 to 2023.

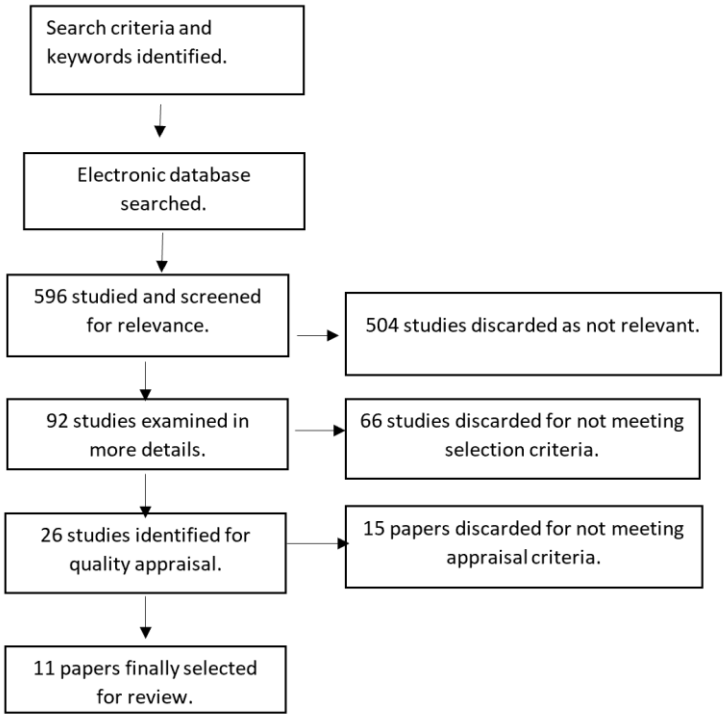

Figure 3: Literature Review Flowchart (Adapted: Pickles et al., 2009).

Inclusion and exclusion criteria

Inclusion criteria adopted for selecting the papers were guided by the scope of the study, empirical studies, studies undertaken in the UK and wider EU, published in the English Language, and published in peer-reviewed journals between 2013 and 2023. Papers excluded were based on study scope outside the reverse or related subjects, published earlier than 2013, and primary studies published in other languages. Relevant studies published in other major geographical regions, literature review publications, and/or publications before 2013 are only used for comparisons.

Search results

Initial searches identified 596 articles, which were screened for appropriateness. The title and abstract of each paper were read to determine suitability; 504 were discarded as not being directly linked to the scope of the study, leaving 92 for a more detailed examination. These were examined to determine whether they met the inclusion criteria, and 26 were identified for appraisal and possible inclusion.

Study location

The included studies incorporated research into factors influencing and challenging RL implementations in the UK (n= 4), UK and other EU countries (n= 4), EU (n= 2), and UK and other geographical locations (n= 1).

Study design
Of the included studies, whilst four employed qualitative research approaches, one applied the quantitative method, and the rest (six) adopted mixed research methods.

Quality appraisal
Each study was selected and summarised according to year of publication, location, peer review process, and research process to ascertain whether the thoroughness of the study justified its inclusion. The appraisal process was undertaken cooperatively between the lead author and co-authors. Each author reviewed papers independently, and the results were compared. In circumstances where differences in the interpretation of results were observed, we achieved resolution through discussion.

Eight critical questions proposed by Schneider (2004) were used to assess the strengths and weaknesses of qualitative studies. Alternatively, the strengths and weaknesses of the quantitative papers' counterparts were evaluated using ten of Schneider's (2004) most relevant critical questions. While some studies that did not include sufficient detail about their research processes were excluded, others with clear and justifiable reasons supporting their study limitations were incorporated into the study.

Overall, papers that did not achieve two of three of Schneider's (2004) questions were not included. In line with quality appraisal, fifteen studies were removed (Chang et al., 2023; Md Shamimul et al., 2021; Sergey, 2021; Shuihua, 2016; Nageswara et al., 2019; Kenan and Christopher, 2022; Robert et al., 2023; Mehdi et al. 2021; Kamalakanta et al. 2023; Xi et al. 2016; Pedro and Pedro, 2015; Luai et al., 2023; Mukesh et al., 2023; Ipek et al. 2021; Abraham et al., 2023).

Analysis of research processes
Of the eleven papers studies, 16 different data collection instruments were used. The reliability and validity were reported. In three of the reviewed studies, the instrument used could be seen as a weakness. Concisely, most of the studies criticised their research instruments based on limited data, sample size, limited range of sampled companies, and geographical locations (Bernon et al., 2018; Xie et al., 2016; Trivyza et al., 2022; Larsen et al., 2918; Lapko et al., 2019). Others reveal that their research instruments lack generalisation in terms of mapping every aspect of strategic decisions around product recovery and interrelationships (Stindt et al., 2017; Lapko et al., 2019); limited context – reverse water logistics (Parry et al., 2016); limited scope (Frei et al., 2020; Zhang et al., 2023) This wide variety of instrument and differences in methods created difficulties in comparing results from each study and made direct comparison problematic.

Data abstraction and synthesis
Manual coding and thematic analyses of the finding, marking keywords, phrases, and sections; identifying the meaning they communicate in relation to RL practices, challenges, and mitigations through identifying range of proposed initiatives and/or those already implemented in practice. Each paper was read several times, analysed and major themes extracted, and the frequency of prominent codes determined. These processes were informed by Robert and Taylor (2002), Leininger (1985), and Strauss (1987). This method involved a systematic analysis of the findings, groupings connected ideas, reducing connected ideas together and reducing the grouping as far as possible without losing their meaning. However, it is important to mention that the analysis carried out did not capture implementation effectiveness in terms of the identified mitigation strategies. Also, an assessment of the outcomes of policy actions on each identified RL implementation barriers were not carried out. Inherently, these are potential areas for further research.

Results

What do we currently know about RL practice in the UK?

Following analysis of the reviewed studies, four major industry contexts of RL initiatives were identified, including manufacturing, retail, healthcare, and household utility. Each of the reviewed studies shows that RL operators across industries and sectors focus on achieving a variety of recovery options: reuse, repair, refurbish, remanufacture, cannibalise, recycle, and dispose, as demonstrated in detail below:

Theme 1 – Manufacturing Industry

Manufacturing was among the most commonly occurring theme and was identified in 36.36% (n=4) of the studies. The associated sub-themes include automotive/aeronautic (n=1, 25%) (Trivyza et al., 2022), Original Equipment Manufacturing (OEM) (n=2, 50%) (Larsen et al., 2018; Stindt et al., 2017), and manufacturing-green energy technologies photovoltaic panels and wind turbine (n=1, 25%) (Lapko et al., 2019). Whilst Trivyza et al. (2022) utilises reverse supply chain optimisation model to explore how composite materials are commonly used in engineering application to replace the conventional materials in UK's Automotive/Aeronautic, Larsen et al. (2018) employ seven case studies of OEM in Denmark to highlight how the reverse supply chain contributes to a firm's competitiveness via its applications at strategic, tactical, and operational levels; Lapko et al. (2019) utilise single case study instrument to examine how closed-loop supply chain has been used to improve cascading of green energy technologies (e.g., photovoltaic panels and wind turbine) in Europe; Stindt et al. (2017) adopt Mixed method study to investigate the attractiveness of product recovery among OEM firms in the UK and Germany.

For the OEM operators in Denmark, reverse supply chain contributes to a firm's competitiveness via its applications at strategic, tactical, and operational levels (Larsen et al. 2018). This explicitly highlights the current urgency of integrating RSC in the strategic positioning of OEMs- even though all the sampled firms adopt different strategies (competitive priorities) to attain their desired competitive advantages. Larsen et al. (2018) study demonstrates the interplay among value creation mechanisms, enabling environment, and degree of the alignment between value creation mechanisms and competitive strategies. Similarly, Stindt et al. (2017) reveal that despite some progress (in addressing the RL integration in competitive positioning of firms), sustainable RL practices are not well integrated into the UK and German local business operations, at least product take-back and recovery initiatives (Maslennikova and Foley, 2000).

Further, Lapko et al. (2019) reveal that while there is no anticipation of any future improvement in the frequency of green energy technologies photovoltaic (PV) recycling in Europe due to its long product lifecycle, Lapko et al. (2019) indicate that there is a lack of infrastructure and insufficient capacities (collection system) to support product return management. The RL concerns referred to in this article refer to in this article is the underutilisation of capacity in the broader sense, as PV recycling activities comprise about 10% of the overall operational activities. Such operational challenges could have huge implications for the price instability of critical raw materials (CRMs), low market demand for recycled materials, and low business opportunity for recycling material.

Theme 2 – Retail Industry

Like manufacturing industry, four studies (36.36%) emerged from the retail industry, focusing on CE (Bernon et al. 2018), product return management (Saarijärvi et al., 2017). and sustainable reverse supply chain management (Zhang et al., 2023; Frei et al., 2020). The focus on CE was broadened following the increasing interest in maximising the circulation and minimising the content that could end up in landfill or incineration (Bernon et al., 2018). This initiative formed the basis for integrating RL practices into CE, facilitating management of product returns, end-of-life (EoL) procession and product recovery-repairs, reuse, refurbishment, remanufacturing, and recycling. However, to date, this is yet to be implemented in the UK's logistics market (Bernon et al et al. 2018). The desire for the implementation of these key principles gave rise to other initiatives, including bottom-line management, especially

when return management is a critical element (Stock 1998 and Mason 2002). This development has a variety of overarching implications in the modern market systems due to the globalisation of e-commerce, online purchase and associated return management challenges which have become increasingly critical in the modern retail industry (Zhang et al., 2023; Frei et al., 2020; Bernon et al., 2018; Saarijärvi et al., 2017).

Currently, product returns in the retail industry are prominently wasteful with considerable negative environmental impacts (Zhang et al., 2023; Frei et al., 2020). For example, packaging and processing, and the returned item is often discarded. Product return management challenges are exacerbated by the recent flourishing of e-commerce. While embracing ease of accessibility of goods and services and low cost of operations associated with online sales, there is a significant gap regarding the management of product returns in a more environmentally sustainable manner (Zhang et al., 2023; Frei et al., 2020). This development supports the notion that multichannel retailers (including the fashion industry) in the UK, EU, and North America lack a comprehensive approach to addressing the environmental impact of product return (Zhang et al., 2023; Frei et al., 2020). Following this development, Saarijärvi et al. (2017). identified ten categories of online returning behaviour and links with when the decision to return ordered items emerge, including product defects, delivery of wrong products, unanticipated negative features, unanticipated product size, and misconception of product fit. Others are misconception of product quality, lack of funds, out of fashion, multiple orders without intention to keep all (maximisation driven), and pretest of products before actual purchase.

Theme three – Healthcare

Whist Xie et al. (2016) explores reverse exchange systems used for medical devices in the UK National Health Service (NHS), Papalexi et al. (2022) examine factors influencing pharmaceutical supply chains and management innovation in the UK and Greece. They collectively represent 18.2% of the sample studies using mixed research methods. Reverse exchange (RE) of medical devices can be defined as occurring when products are returned to the source for exchange or final recovery due to product replacement (based on patients' needs changing), product maintenance (the functionality of the product parts needs to be checked or repaired) or obsolescence (product reaches its natural end of life).

A range of approaches for implementing RE of medical devices was identified, including adopting a closed-loop supply chain, e-procurement, and e-supply chain management techniques among three NHS Trusts in Greater London and Essex, England. Concisely, NHS Trust in Greater London focuses on the RE of infusion pumps used in the Oncology Department, using e-procurement and e-supply chain management tools to collaboratively identify the users who borrowed the devices and contact them via email or telephone. Collections and reprocessing are arranged by the Medical Equipment Libraries (MEL). Overall, there are four types of RE of infusion pumps between the Oncology Department and MEL, including manufacture recall, a faulty device, regular maintenance, and end-of-life returns.

Similarly, the innovative pharmaceutical supply chain (PSC) initiative reflects the awareness to improve service provisioning in Hospitals and Community Centres, especially regarding the delivery processes of pharmaceutical products (PapalexI et al., 2022). Indeed, how the pharmaceutical companies in the UK and Greece adapt to the high-volume demand of pharmaceutical supplies is a pressing supply chain management issue as they are currently using moderate innovations (Papalexi et al., 2022). Although PSCs are supposed to account for both forwards and reverse logistics management, they are currently forward supply chain oriented and concerned mainly about delivery in terms of quality (product and service quality), visibility (knowledge and information sharing), speed (response to customers and suppliers need), and cost minimisation (Papalexi et al., 2022). As such, there are limited wider efforts to adopt lean/reverse logistics approaches among the 130 sampled firms in the study locations. Inherently, the adoption of lean RL approaches could have helped the local Pharmacies to provide greater value to customers (competitive advantage) through incorporation of

sustainable RL management practices, commitment of relevant manpower and infrastructural capacities (Papalexi et al., 2022).

While RL adaptation practices were found to be less visible in PSC, enthusiasm and engagement were significantly higher in the adoption of RE and lean logistics (e.g., just-in-time deliveries) approaches, highlighting the acceptability of innovative practices in the healthcare sector (Timmons et al., 2014). To drive conversations on RL implementations, there is a need to adopt CE values, closed-loop supply chain principles, and e-inventory approaches to promote the standardisation of RL processes through the support of relevant, intelligent solutions (Shafigue et al., 2019). This seems appropriate given the need for developing compatible and integrated IT systems to facilitate capturing, storage, and manipulation of large volumes of data related to medical device exchanges and the distribution/use of pharmaceutical products (Raghupathi and Raghpathi, 2014).

Theme 4 – Household Utility

This theme refers to the household utility of products and implications for the operationalisation of reverse supply chains using IoT (Parry et al., 2016). The study adopts multiple case study research methods in the UK. Much speculation about how the improvement of reverse supply chain requires accurate and timely information about the pattern of consumers encompasses a variety of mechanisms. With IoT has been used to track consumers' use of products at home settings, the extent of applications of RL practices are far fetching in the domestic product recycles. However, the ways to generate and access use-visibility data in home settings are in their infancy (Parry et al. 2016).

A synthesis of the six case examples used by Parry et al. (2016) shows that IoT devices can be used to track consumers use processes of goods, services and resources in their homes. The reverse supply chain implications of this outcome include that consumer's perception of resource use can significantly differ from the actual use. For example, the sharing of Megan's towel without her knowledge and the difference between the time spent in the shower versus her assessment all indicate the reverse supply chain situation in the home setting. Second, use activities that are linked can follow a discrete pattern, meaning that some use activities are moderators for other use operations. For example, "when Megan goes running (moderator), she uses twice as much shower gel and water." (Parry et al., 2016). Third, utilisation functions in the homes are disproportionally shared by the residents. As such, when the generated data represent the individual in the shared spaces, attribution of data to an individual becomes more complex compared to when accumulating data from personal devices, such as smartphone applications (Parry et al., 2016).

RQ2: What strategic considerations are needed to improve sustainable RL practices in the UK/Europe?

A range of factors may explain the lack of cross-thematic integration of RL across the identified industries in the UK comprising lack of adequate leadership and visioning, inappropriate infrastructural and human capacity, and limited regulation compliance, among others. The RL being a cross-thematic function is governed by the innovative capabilities of concerned firms. It relies on the combination of institutional (legislative), organisational, and market expertise to develop a regional and collaborative RL framework. Governance (legislation) and funding arrangement from relevant external institutions can enhance opportunities for wider local-level consultations on how to embed sustainability values and principles in RL practices. For example, the literature reports limited integration of sustainability values with RL practices in the UK's retail sector. This indicates that action preparedness based on local scoping, training, and awareness of how to transform sustainable business principles into business opportunities (Trivyza et al., 2022; Lakpo et al., 2019; Bernon et al., 2018; Larsen et al., 2018; Stindt et al., 2017).

Constraints, including lack of effective leadership and vision, infrastructure (ICT), manpower, market-related (the effect of the secondary market, lack of interest in remanufactured products), inconsistent legislation and sustainable business practice, lack of sufficient alignment between reverse supply chain and firms' competitive advantage, dearth of EoL material catchment area, spanning multiple countries, and absence of multi-product recycling solutions – can encourage cross-thematic incoherence in the application of RL values (Bernon et al., 2018; Trivyza et al., 2022; Larsen et al., 2018; Lakpo et al., 2019; Stindt et al., 2017). Similarly, lack of collaboration among relevant stakeholders can limit the scope for comprehensive RL practice in the UK's health sector and consumers' returning behaviours (Papalexi et al., 2022; Saarijärvi et al., 2017; Xie et al., 2016).

All the RL concepts reviewed here explicitly suggest that significant investment is needed to reverse the current antienvironment and social trends in RL in the UK. However, environmental, and social stewardship that promotes the long-term adaption of sustainable RL practices is required to make meaningful investments in the UK/EU in the long run. The themes (manufacturing, retail, health, and household) emphasised in this analysis represent both a challenge and an opportunity for sustainable developments across the industries/ sectors sampled in this study.

Conclusions and recommendations

Indeed, some form of effective, sustainable RL values exist which guarantee future improvements in practice; however, the scopes of the existing practice should be revisited, encompassing knowledge restriction of the environmental strategies (lack of awareness and priority and difficulties in measuring the environmental effects) and profit-oriented trade-off limiting environmental friendly practice (the complexity of product returns and decision making and choosing the right path for each returned product) (Zhang et al., 2023). Sustainability-sensitive organisational leadership is vital here (accounting for value preservation of returned items and collaboration with the third-party optimising return approach), so also are proactive policies (early-stage return prevention and indirect benefits of other effective return management strategies) (Zhang et al., 2023).

The following are proposed as ways in which new sustainable RL thinking (such as the incorporation of CE and CLSC principles into cross functional attributes of RL) can be pursued: (i) Promote the integration of sustainable RL principles and values into organisational strategic vision and delivery through portfolio initiatives, programs, and projects. (ii) Promote knowledge sharing. The local industry stakeholders need to develop their leadership potential; understand the laws and regulations guiding sustainable business practices and sustainability management strategies. Investment in professional development, research, and awareness creation are essential. (iii) Early and vigorously pursue sustainable business opportunities to facilitate the sustenance of sustainable RL practice. (iv) Ensure that local intervention approaches are collaborative. Proactive and people-centred initiatives should be pursued in agreement with the do-no-harm values. Sustainable RL, when fully in place, can serve as a means to an end, where the end is to improve CE, closed-loop supply chain, RSC, and RE through the integration of RE principles into the diverse industry/sector concepts where applicable. This outcome-oriented perspective can foster necessary political and organisational development in the UK/EU RL market.

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Appendix 1: Summary of reviewed studies

Theme	Author, year, and research title	Research method	Main research findings	Research limitations
Manufacturing	Lakpo et al. (2019). In Pursuit of Closed-Loop Supply Chains for Critical Materials	Single case study instrument. Manufacturing [Green energy technologies (photovoltaic panels and wind turbine), and reverse logistics, Europe	Firms adopt multiple CLSC adoption approaches for CRM, and thus, underlie the need to map the interaction among supply chain actors, competitive market environment for recycling process, and investment	Lack of broader range of companies, and exploration of contingencies specific to a specific industry, supply chain, critical material, applications, and their interrelationships.
	Stindt et al. (2017). On the Attractiveness of Product Recovery, The Forces that Shape Reverse Markets	Mixed method study (literature review; in-depth interviews of 12 companies). OEM, UK and Germany	Five forces influencing reverse market: access to recoverable products (+), threats of independent recovery companies' market entry (-), adverse effects on core business (-), and remarketing opportunities (+)	The developed model does not address every aspect of strategic decision around product recovery – e.g., resource capabilities.
	Trivyza et al. (2022). Designing reverse supply networks for carbon fibres: Enabling cross-sectoral circular economy pathways	Mixed-integer linear programming (MILP) optimisation model. Automotive/Aeronautic, UK + 27 EU countries.	Optimum reverse logistics network design is relatively centralised with processing facilities.	Limited exploration of the source and end user perspectives; lacks simultaneous explorations of environmental issues, including carbon footprint and other environmental objectives.

	Larsen et al. (2018). How the reverse supply chain contributes to a firm's competitive strategy: a strategic alignment perspective	Seven case studies. Manufacturing (OEM), Denmark	Study highlights the critical stake of RSC on mapping the strategic, tactical, and/operational capabilities of OEM firms.	Limited sample size and lack of exploration of the interaction among value creation factors.
Retail	Zhang et al. (2023). Strategies and practices to reduce the ecological impact of product returns: An environmental sustainability framework for multichannel retail.	Interview of multichannel retailers, retail experts, and return service providers. Multichannel Retailers, UK	Although retailers have started paying attention to the financial impact of returns, there is little awareness of the scale of environmental impacts	Limited scope of study
	Frei et al. (2020). Sustainable reverse supply chains and circular economy in multichannel retail returns.	In-depth and shorter interview, observations, secondary sources - retailer website reviews, and community workshops. Multichannel Retailers, UK	Sustainability, loss prevention, and profit optimisation go hand in hand with the right approach to the organisation of the reverse logistics (supply chain)	Lack of exploration of SMEs' practice
	Bernon et al. (2018). Aligning retail reverse logistics practice with circular economy values: an exploratory framework	Mixed method study (desktop research - 99 papers and 21 interviews). Retail, UK	Adoption of CE values (principles, intrinsic attributes, and enablers) in RRL stimulates application of multifaceted approaches.	Limited qualitative data; covers mainly large retailers

	Saarijärvi et al. (2017). Uncovering consumers' returning behaviour: a study of fashion e-commerce	21 set of semi-structured interviews. Fashion, Germany	10 categories of online returning behaviour are identified, including product defects, delivery of wrong products, etc.	Lacks investigation of fraudulent returning behaviours (returning used products – Harris 2008, 2010)
Healthcare	Papalexi et al. (2022). Pharmaceutical supply chains and management innovation?	Mixed method study (unstructured interviews and 130 questionnaires survey). Healthcare – pharmaceutical, UK/Greece	IT systems can help healthcare organisations to enhance quality of delivery, cost reduction, and waste management through enhanced visibility of service (real time) and speed of response.	Constrained by investigating two countries in Europe (Greece and UK)
	Xie et al. (2016). An exploratory study of reverse exchange systems used for medical devices in the UK National Health Service (NHS).	Mixed method study (questionnaire survey - 12 healthcare professionals and 2 case studies). Healthcare - NHS, UK	Operational attributes are causally linked with ICT implementation, and in turn, rate of RE performance.	Limited sample size; lack of definitive recommendations
House utility	Parry et al. (2016). Operationalising IoT for reverse supply: the development of use-visibility measures	Mixed method study (explorative case and questionnaire studies, covering 6 UK's households). Water`, UK	Proposes four generic measurement perspectives for operationalising the concept of use-visibility	Constrained by limited use context-bathroom and processes

Appendix 2: Acronym, meaning, and source.

Acronym	Meaning	Source
AFRA	Aircraft Fleet Recycling Association	Trivyza et al., (2022)
CE	Circular Economy	Bernon et al. (2018); Frei et al. (2020); Larsen et al. (2018)
CFRP	Carbon Fibre Reinforced Polymers	Trivyza et al. (2022)
CLSCs	Closed -Loop Supply Chains	Larsen et al. (2018); Lakpo et al. (2019)
CRM	Critical Raw Materials	Lakpo et al. (2019)
CSR	Corporate Social Responsibility	Frei et al. (2020)
EoL	End-of-Life	Trivyza et al. (2022); Bernon et al. (2018);
MELs	Medical Equipment Libraries	Xie et al. (2016)
OEMs	Original Equipment Manufacturers	Larsen et al. 2018)
PSC	Pharmaceutical Supply Chain	Papalexi et al. (2022)
PV	Photovoltaic	Lakpo et al. (2019)
R5F	Reverse Five Forces	Stindt et al. (2017)
RE	Reverse Exchange	Xie et al. (2016)
RL	Revere Logistics c	Larsen et al. (2018)
RRL	Retail Reverse Logistics	Bernon et a. (2018)
RSC	Reverse Supply Chain	Larsen et al. (2018)