

Remanufacturing through a marketing lens: an interaction approach to OEM-customer relationships and future research directions

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Abstract

Purpose – Using the interaction approach, the purpose of this study is to identify what is known about Original Equipment Manufacturer (OEM)-customer relationships in the context of remanufactured products (REMAN) and to create a future agenda for industrial marketing research.

Design/methodology/approach – A systematic literature review was conducted to analyse articles addressing REMAN in business fields. The interaction approach was used to systematise the articles and analyse the supplier-customer relationship.

Findings – The REMAN context requires the return of end-of-life (EOL) and end-of-use (EOU) products which is not encompassed by the interaction approach. Further areas of research are highlighted including understanding buyers' barriers to using REMAN, determining how to encourage the purchase of REMAN by examining the influence of the various exchanges of the interaction process, determining how the exchanges and relationship atmosphere interact and the effect of environmental influences such as government legislation.

Practical implications – This study offers B2B academics an outline of areas where research in REMAN is required.

Originality/value – The supplier-buyer relationship in REMAN is examined through a review of the existing literature utilising the interaction approach as a framework. The framework was used to identify key areas for future research and to propose an actionable research agenda to advance the current understanding of remanufacturing through an industrial marketing lens.

Keywords REMAN, Remanufacturing, Hybrid OEM, Systematic literature review, Industrial marketing, Interaction approach

Paper type Literature review

1. Introduction

Under pressure to meet legislative, social and economic demands dictated by the environmental crisis, suppliers and buyers are increasingly engaged in efforts to produce, sell and use sustainable products (Dominidiato *et al.*, 2023). To meet market demands, many manufacturers have adopted the remanufacturing process, thereby offering remanufactured products (REMAN) (Atasu *et al.*, 2008). Remanufacturing is an industrial practice through which end-of-life (EOL) and end-of-use (EOU) products are brought back to the new condition for resale in the market (Gaur *et al.*, 2019). Specifically, EOL and EOU products are disassembled, cleaned, repaired, and then reassembled to create REMAN (King *et al.*, 2006). REMAN are often mistakenly referred to as reconditioned, repaired, or recycled products (King *et al.*, 2006). A reconditioned product has undergone a complete overhaul which may include the replacement of multiple components, either for functional or aesthetic reasons (King *et al.*, 2006). Repair denotes a corrective action limited to the

replacement or mending of faulty components, without a complete renewal of the product (King *et al.*, 2006). Finally, recycling refers to the transformation of waste materials into new raw materials (Ijomah *et al.*, 1999). REMAN matches or exceeds the quality and reliability of their new counterparts.

In the closed-loop system of REMAN, an efficient, virtuous cycle of resource recovery and reuse is formed. REMAN preserves natural resources by reducing pollution levels generated by commercial operations and extends the lifecycle of previously manufactured products (Diener *et al.*, 2019). Compared to equivalent new products, REMAN consume up to 70% less raw materials, up to 60% less energy, and reduce emissions by up to 80% (Wang and Wang, 2016). The demand for these products is illustrated through a study by CLEPA (European Association of Automotive Suppliers) reporting that 4.7 billion euros of REMAN was sold in 2020, while the

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European Remanufacturing Network (2022) expects the European remanufacturing market to reach a value of around 90 billion euros by 2030 in the wake of firms' commitment to meet environmental and sustainable goals.

Besides its environmental benefits, REMAN provides positive outcomes for both manufacturers and buyers. It allows manufacturers to improve profit margins (Atasu *et al.*, 2008; Linton, 2008), reduce total production costs and positively enhance the brand (Wang and Wang, 2016). Buyers can purchase REMAN at a lower price (Wang and Wang, 2016), with the same quality as the new equivalent (Seitz and Peattie, 2004) and with warranties usually longer than those for new products (Ijomah, 2002). REMAN gives rise not only to sales relationships but also to post-sales collaboration as EOL and EOU products are returned to the seller. For the remanufacturing practice to be successful, it is necessary for the interaction between supplier and buyer to be circular (King *et al.*, 2006).

Research on remanufacturing has significantly increased in the last two decades (Kerin and Pham, 2020). Numerous studies across a range of disciplines have been conducted including operations management (e.g. Chen and Chen, 2019), logistics (e.g. Nikseresht *et al.*, 2024), and environmental economics (e.g. Korhonen *et al.*, 2018; D'Amato and Korhonen, 2021), to understand the processes involved but it has received almost no attention in industrial marketing research. Previous studies in other disciplines have outlined some implications that are pertinent for industrial marketing – illustrated next – but there is still a lack of research examining and analysing the relationship between OEMs, i.e. companies offering both new and REMAN to buyers.

Gaining a better understanding of the buyer-seller dyad from a marketing perspective is particularly important for enabling the adoption of REMAN in contemporary business practices. The limited attention given to this topic by the marketing research community is evident in the substantial lack of codified, shared, and empirically supported strategic and operational guidelines that could help buyers and sellers approach REMAN in a more informed and structured manner. For example, such guidelines could assist sellers in developing effective marketing strategies to shape REMAN's perceived value or help buyers strategically use REMAN purchasing to enhance their sustainable brand image and meet environmental expectations.

To address this gap, this research aims to conduct a systematic literature review to provide an in-depth overview of what is known about REMAN supplier-buyer relationships and to identify what areas of this B2B marketing practice need to be further investigated (Davis *et al.*, 2014). The retrieved articles were analysed using the interaction approach as a framework (Turnbull *et al.*, 1986, 1986; Håkansson and IMP Project Group, 1982) as it facilitates focusing on the dyadic relationship between the OEM and the buyer. Specifically, the interaction approach is made up of four main components:

- 1 the interaction process;
- 2 the participants in the interaction;
- 3 the environment in which the interaction takes place; and
- 4 the atmosphere affecting and affected by the interaction.

Four types of exchange occur in the interaction process:

- 1 product/service exchange;
- 2 information exchange;
- 3 financial exchange; and
- 4 social exchange.

These exchanges lead to the building of a relationship between the parties. The characteristics of the parties, which influence the interaction process, include technology, the organisations' size, structure and strategy, their experience and the individuals within the organisations (Håkansson and IMP Project Group, 1982). Environmental factors influence relationships such as the market structure, dynamism, internationalisation (Turnbull *et al.*, 1986). The atmosphere of the relationship is affected by the nature of the exchanges, the characteristics of the parties and can be described by the nature of the power balance and whether they are cooperative, close, trusting and committed (Håkansson and IMP Project Group, 1982). Using the interaction approach as a lens facilitates understanding the establishment and development of relationships between the OEM and the buyer (Lundmark *et al.*, 2009), the necessity for collaboration between REMAN suppliers and their customers (Subramoniam *et al.*, 2009) and sheds light on the factors influencing the actors and the relationship. These dyadic relationships exist and operate within a network of relationships (Håkansson and IMP Project Group, 1982).

The aim of this paper is to systematically examine the existing literature on REMAN and determine areas for future research within the B2B marketing domain. The following sections of this paper include the methodology, results of the systematic review, discussion and conclusions.

2. Methodology

2.1 First step: systematic review of the literature

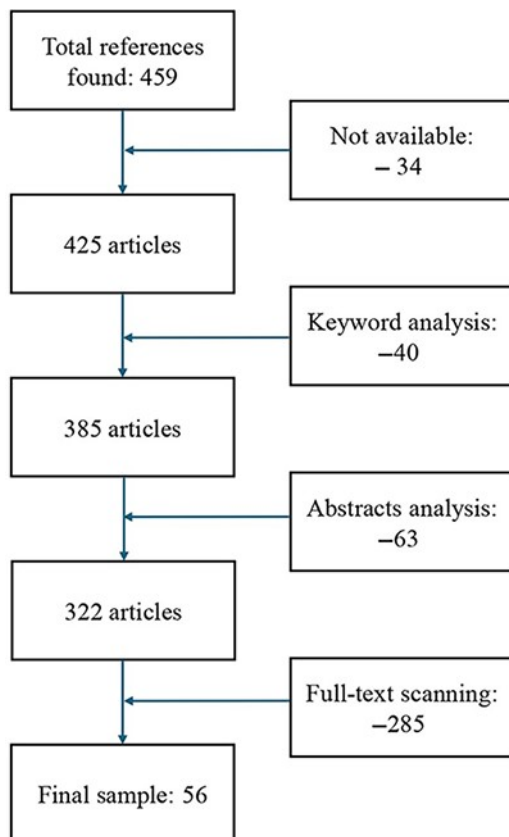
A systematic literature review was conducted which was comprised of three fundamental steps: 1) identification, 2) selection and 3) impartial, transparent and rigorous synthesis of relevant sources. It enabled the identification of future research directions by identifying gaps in the existing literature and is undoubtedly the most suitable method for synthesising knowledge in a specific disciplinary field (Linnenluecke *et al.*, 2020).

A systematic literature review was used to develop a comprehensive overview of REMAN, connecting seemingly disparate bodies of work, and identifying literature gaps to inform future research (Lindgreen *et al.*, 2021). The selected keywords for this review were “regeneration” and “remanufacturing” across all fields. The wildcard “*” character was used to increase research inclusivity and ensure the inclusion of REMAN-related words. Specific databases i.e. Web of Science (WoS) and Google Scholar were searched using specific inclusion and exclusion criteria (Snyder, 2019). The results were limited to the “Management”, “Business” and “Economics” fields. Early access documents available on WoS were also included. Regarding the WoS database the search formula used was as follows: reman* (all fields) OR re-manufacturing (all fields) INCLUDE remanufacturing (Keywords) refined by: articles OR early access (document types) AND management OR business OR economics (Web of Science Categories) AND English (languages). For Google Scholar, a similar search strategy was adopted to grant consistency. In this case, the terms “reman”,

“re-manufacturing” were combined with keywords related to the disciplines of interest, such as management, business, and economics. Peer-reviewed articles and early-access documents written in English were included in the bibliographic database if they focused on remanufacturing dynamics and had a clear emphasis on managerial, economic, and strategic aspects of this business practice, as well as the relationships between OEMs and buyers. In contrast, studies that were not available in full text, works that only marginally addressed remanufacturing, and purely technical or engineering contributions – such as those focused on improving remanufacturing quality through innovative production processes typical of the engineering domain – were deemed irrelevant to the industrial marketing context and thus excluded.

The initial sample of retrieved items included 459 articles. After excluding unavailable documents (34), the remaining 425 articles were analysed based on titles and keywords. Articles were selected that focused on REMAN which led to the elimination of 40 articles, leaving 385. Abstract analysis was then used to determine relevance which further reduced the pool of articles to 322. A full-text scan of each article was then conducted leading to the elimination of 285 articles marginally analysing REMAN resulting in a final sample of 56 articles (see Figure 1). The number of REMAN publications per year are shown in Figure 2, while the top ten most cited articles are shown in Table 1.

Figure 1 Inclusion and exclusion criteria



Source: Authors' own work

2.2 Second approach adopted: the interaction approach

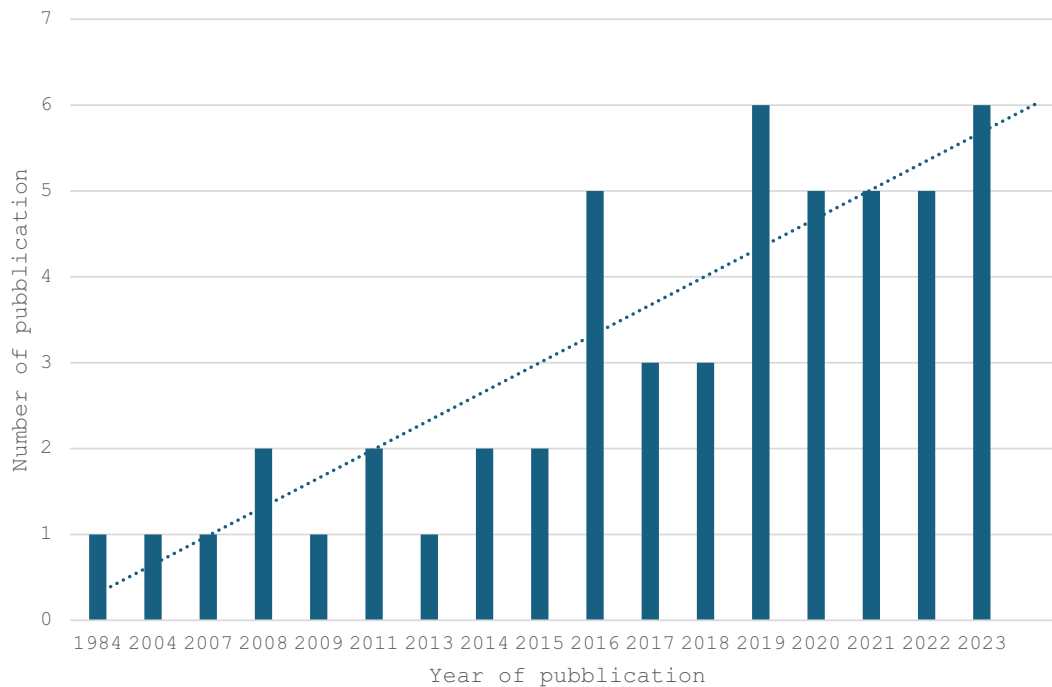
The systematic literature review allows for the simultaneous adoption of multiple approaches to provide a comprehensive reworking of knowledge (Snyder, 2019). Hybrid reviews are developed by integrating a framework to give an original and finer grained view of the literature (Snyder, 2019). The interaction approach (Turnbull and Cunningham, 1981; Håkansson and IMP Project Group, 1982) was used in this systematic literature review on remanufacturing. Previous research on REMAN was examined in relation to the four components of the interaction approach to identify and understand the current status of research on REMAN OEM – buyer relationships. Industrial buying decisions can be perceived as the outcome of four main areas interacting (Håkansson and IMP Project Group, 1982):

- *Actors.* The participants in the interaction, namely the actors are organisations, made up of individuals. Both suppliers and buyers are perceived as active participants, and the dynamics are influenced by the nature of the organisations (structure, size) and their members (attitudes, perceptions).
- *The Interaction Process.* During interaction episodes between suppliers and buyers, 4 types of exchanges may occur (product/service, financial, information and social). A series of episodes contribute to the formation and development of the relationship over time. Gradually these interactions become routine and influence the marketing and purchasing policies of the involved companies.
- *The Relationship Atmosphere.* The atmosphere is established over time and reflects the trust, commitment, cooperation, or conflict between the parties involved. The nature of the atmosphere may vary over time. Actors may aim to plan and manage the development of a close and positive relationship to obtain mutual benefits for both parties.
- *Environment.* Interaction occurs within an environmental context which establishes adopted values and behavioural norms. Relevant variables include the market structure, social systems, economic conditions, and legal regulations. These environmental factors influence the dynamics of the interactions.

The interaction approach recognises that industrial buying decisions are influenced by a complex interplay of factors and allows for the examination of not only the conventional exchange process but also the return and remanufacture mechanisms, which add complexity to the relationship (Guide and Van Wassenhove, 2009).

The interaction approach was adopted to conduct an in-depth qualitative analysis on the research topic using relevant information from a variety of fields to develop implications for industrial marketing and was chosen over other well-established frameworks, such as the ARA model, because it is better suited for understanding how relationships develop, adapt, and evolve over time. In contrast, the ARA model is more appropriate when the objective is to map and describe the structure of a business network.

Once identified and retrieved, the 56 selected articles were subjected to a detailed textual analysis. They were then

Figure 2 Number of publications per year

Source: Authors' own work

Table 1 First ten most cited articles

	Author	Journal	No. of citation	Year of publication
1	Atasu, A; Sarvary, M; Van Wassenhove, LN	<i>Management Science</i>	1,144	2008
2	Hazen, BT; Mollenkopf, DA; Wang, YC	<i>Business Strategy and the Environment</i>	458	2017
3	Webster, S; Mitra, S	<i>Journal of Operations Management</i>	422	2007
4	Michaud, C; Llerena, D	<i>Business Strategy and the Environment</i>	412	2011
5	Yenipazarli, A	<i>European Journal of Operational Research</i>	377	2016
6	Lund, RT	<i>The Word Bank, Washington D.C.</i>	245	1984
7	Hong, XP; Govindan, K; Xu, L; Du, P	<i>European Journal of Operational Research</i>	245	2017
8	Bag, S; Gupta, S; Foropon, C	<i>Management Decision</i>	191	2019
9	Diabat, A; Abdallah, T; Al-Refaie, A; Svetinovic, D; Govindan, K	<i>IEEE Transactions on Engineering Management</i>	188	2013
10	Khor, KS; Hazen, BT	<i>International Journal of Production Research</i>	163	2017

Source(s): Authors' own work

organised into categories, according to the interaction approach's components, i.e. actors, interaction process, atmosphere, and environment (see [Table 2](#)). The classification of the articles was carried out through careful evaluation of their relevance to the central aspects of the interaction approach. When the paper covered more than one relevant topic, it was included in multiple categories to reflect the breadth of topics covered.

3. Results

The results of the systematic literature review were incorporated into four sections: actors, interaction process, relational atmosphere and environmental factors.

3.1 The actors

3.1.1 The original equipment manufacturer

The OEM is the company that produces parts, components, or products to be used as part of a finished product by another company ([Vogt Duberg et al., 2020](#)). These products are subsequently sold under the buyers' own name. OEMs are introducing REMAN lines into their product range. From the systematisation of previous research, several factors have emerged that companies must address when introducing REMAN into their offerings. First, the OEM must choose the production mode for REMAN: outsourcing, licencing, or internalising ([Wu and Zhou, 2016](#); [Sakao and Sundin, 2019](#)).

The outsourcing of the remanufacturing process involves the total or partial delegation of remanufacturing operations to

Table 2 Articles included in this review

Interaction aspect	Article title	Author	Year	Journal	Key findings
Actors	Consumer markets for remanufactured and refurbished products	Abbey, JD; Meloy, MG; Blackburn, J; Guide, VDR	2015	California Management Review	Consumer segments play a significant role in the market structure of REMAN
Buyer	How product and process knowledge enable consumer switching to remanufactured laptop computers in circular economy	Wang, YC; Zhu, Q; Krikke, H; Hazen, B	2020	Technological Forecasting and Social Change	Knowledge discourages consumers from switching, and the perceived high price of new products does not alter this effect
	Consumer familiarity, ambiguity tolerance, and purchase behavior toward remanufactured products: the implications for remanufacturers	Wang, SY; Wang, J; Yang, F; Wang, Y; Li, J	2018	Business Strategy and the Environment	Purchase intention relies on attitude and perceived behavioural control, with familiarity and ambiguity tolerance strengthening attitude
	Green behaviour and switching intention towards remanufactured products in sustainable consumers as potential earlier adopters	Perez-Castillo, D; Vera-Martinez, J	2021	Asia Pacific Journal of Marketing and Logistics	Consumers' attitudes and green purchase behaviour positively influence intentions to switch to REMAN
	Green Consumer Behaviour: an Experimental Analysis of Willingness to Pay for Remanufactured Products	Michaud, C; Ilarena, D	2011	Business Strategy and the Environment	Quality and price drive purchasing decisions, while environmental awareness reduces willingness to pay
	Remanufacturing for the circular economy: an examination of consumer switching behavior	Hazen, BT; Mollenkopf, DA; Wang, YC	2017	Business Strategy and the Environment	Consumers' attitudes toward REMAN positively impact switching intentions and moderate price and environmental benefits
	Green product pricing with non-green product reference	Hong, ZF; Wang, H; Yu, YG	2018	Transportation Research Part E-Logistics and Transportation Review	REMAN sellers should adopt differentiated pricing strategies based on consumer purchasing behavior, which is influenced by levels of environmental awareness and the recognizability of the reference product
	Acceptance of remanufactured products in the circular economy: an empirical study in India	Singhal, D; Tripathy, S; Jena, SK	2019	Management Decision	Purchase intention is influenced by attitude, benefits, REMAN knowledge, risk perception, and subjective norms
	Strategic and operational remanufacturing mental models: A study on Chinese automotive consumers buying choice	Moosmayer, DC; Abdulrahman, MDA; Subramanian, N; Bergkvist, L	2020	International Journal of Operations & Production Management	Consumers associate reduced utility with REMAN, though a segment of about 30% prefers it
	Remanufactured products purchase intentions and behaviour: Evidence from Malaysia	Khor, KS; Hazen, BT	2017	International Journal of Production Research	Consumers are more likely to buy energy-efficient products, leading to positive attitudes toward REMAN
	Two-sided competition with vertical differentiation in both acquisition and sales in remanufacturing	Kleber, R; Reimann, M; Souza, G; Zhang, W	2020	European Journal of Operational Research	The advantage that remanufacturers have in selling products to consumers is more important than their advantage in collecting used products, allowing them to dominate the market even if their competitors collect used products more efficiently
	The mediating role of functionality orientation for purchasing remanufactured products: Cases in China, Indonesia, and Thailand	Chinen, K; Matsumoto, M; McQuitty, S; Kojima, M	2022	Journal of Industrial Ecology	Consumers' functional orientations mediate the link between environmental awareness and willingness to buy REMAN
	The role of part failure rates asymmetry and spare part proprietariness on remanufacturing decision making	Kleber, R; Neto, JQF; Reimann, M	2023	European Journal of Operational Research	Proprietary parts reduce remanufacturing but may increase collection
OEM	Prerequisite factors for original equipment manufacturer remanufacturing	Vogt Duberg, K; Gylling, M; Fredriksson, A	2020	Journal of Cleaner Production	The key factors to address when shifting towards remanufacturing can be managed
	Remanufacturing as a marketing strategy	Atasu, A; Sarvary, M; Van Wassenhove, LN	2008	Management Science	Remanufacturing decisions are driven by competition, cost savings, cannibalization and product life-cycle effects
	Industrial challenges within the remanufacturing system	Lundmark, P; Sundin, E; Björkman, M	2009	Swedish Production Symposium	Uncertainties and complexity are key challenges in the remanufacturing system
	Examining the role of dynamic remanufacturing capability on supply chain resilience in circular economy	Bag, S; Gupta, S; Foropon, C	2019	Management Decision	Companies that develop capabilities to rapidly adapt processes better meet the needs of REMAN
	How to improve remanufacturing? A systematic analysis of practices and theories	Sakao, T; Sundin, E	2019	Journal of Manufacturing Science and Engineering	Key success factors are addressing product value and maintaining a customer-oriented operation
	The more the better? The impact of the number and location of product recovery options on the system dynamics in a closed-loop supply chain	Yang, Y; Lin, J; Hedenstierna, CPT; Zhou, L	2023	Transportation Research Part E	Placing the recovery option nearest to the end customer reduces the bullwhip effect and inventory variance

(continued)

Table 2

Interaction aspect	Article title	Author	Year	Journal	Key findings
	Exploring inter-organizational relationships in automotive component remanufacturing	Lind, S; Olsson, D; Sundin, E	2014	<i>Journal of Remanufacturing</i>	The biggest challenge is aligning the ordered quantity with the delivered quantity
	Remanufacturing in Asia: location choice and outsourcing	Lu, Q; Goh, M; Garg, M; De Souza, R	2014	<i>Journal of Manufacturing Science and Engineering</i>	Firms investing in new remanufacturing sites consider the regulatory environment the most important factor
	Designing a reverse supply chain network with quality control for returned products: Strategies to mitigate free-riding effect and ensure compliance with technology licensing requirements	Bajgani, SE; Saberi, S; Toyasaki, F	2023	<i>Technological Forecasting & Social Change</i>	OEMs can maximise protection of their technology and control over the quality of returned products through strategic choices in supply chain design
	Feedback from remanufacturing: its unexploited potential to improve future product design	Lindkvist Haziri, L; Sundin, E; Sakao, T	2019	<i>Sustainability</i>	Barriers: awareness, lack of knowledge, incentives, feedback channels and non-supportive organisational structures
	Recycling channel selection for a manufacturer involving consumers' green-return behavior	Hong, Z; Chu, J; Zhang, LL; Wang, N	2023	<i>International Symposium on Environmentally Conscious Design and Inverse Manufacturing</i>	Recycling payment is crucial for OEMs to decide on REMAN and choose recycling channels
	Remanufacturing: the experience of the United States and implications for developing countries	Lund, RT	1984	<i>The World Bank, Washington D.C.</i>	Challenges and opportunities for developing countries in adopting REMAN to foster sustainability
	Reliability-informed end-of-use decision making for product sustainability using two-stage stochastic optimization	Ankush Kumar Mishra, Xinyang Liu, Chao Hu, Pingfeng Wang	2023	<i>Applied Mathematical Modelling</i>	It proposes a two-stage optimization model to address the Re-X decision problem. It develops a management strategy for end-of-use conditions, taking into account demand uncertainty, and verifies its effectiveness through a case study supported by a results analysis
	Four levels of remanufacturing maturity as a circular manufacturing indicator: a theoretical framework and practical assessment tool	Jelena Kurilova-Paliskaitiene, Johannes Matschewsky, Erik Sundin	2024	<i>Resources, Conservation and Recycling</i>	It proposes a maturity assessment model for remanufacturing for OEMs, enabling the identification and promotion of systematic improvements in the remanufacturing process through a structured approach based on 17 circular production factors
	Assessing the profitability of remanufacturing initiation: a literature review	Johan Vogt duberg, Erik Sundin e Ou tang	2023	<i>Journal of Remanufacturing</i>	It highlights the need for accessible and transparent economic models to support companies in initiating remanufacturing, helping to spread knowledge of the remanufacturing market even among firms without prior experience in the sector
	Assessing the economic rationality of remanufacturing products	Linton, JD	2008	<i>Journal of Product Innovation Management</i>	OEMs achieve higher overall profits by offering both new and REMAN versions
	Does the entry of third-party remanufacturers always hurt original equipment manufacturers?	Wu, X; Zhou, Y	2016	<i>Decision Sciences</i>	The entry of REMAN can bring benefits to OEM who sells both product lines
	Consumer's purchase intention towards remanufactured products: the influence of return policy	Wang, Y; Wang, J	2016	<i>Journal of Cleaner Production</i>	Educating buyers about product benefits and offering easy returns reduce perceived risks
	Consumer markets for remanufactured and refurbished products	Abbey, JD; Meloy, MG; Blackburn, J; Guide, VDR	2015	<i>California Management Review</i>	Consumer segments play a significant role in the market structure of REMAN
	Or FORUM – L'evoluzione della ricerca sulla supply chain a circuito chiuso	Guida Jr, V. D. R.; Van Wassenhove, L. N	2009	<i>Operational Research</i>	It traces the evolution of research on closed-loop supply chains, highlighting how the product return process can represent an obstacle for the customer and a barrier to the purchase of remanufactured products
	Determinants of consumer demand for circular economy products. A case for reuse and remanufacturing for sustainable development	Hunka, AD; Linder, M; Habibi, S	2021	<i>Business Strategy and the Environment</i>	Consumers are interested in high-quality REMAN at regular retail prices
	Differential pricing and production strategies for heterogeneous products under cannibalization and promotional effects	Liu, A; Jing, M; Miao, J; Li, Z; Yang, Y	2022	<i>Journal of Management Science and Engineering</i>	The cannibalization effect reduces the demand for new products
	Production and emissions reduction decisions considering the differentiated carbon tax regulation across new and remanufactured products and consumer preference	Wang, Y; Wang, F	2021	<i>Urban Climate</i>	A higher base rate of carbon tax encourages the manufacturer to introduce REMAN
	Information and reputation mechanisms in auctions of remanufactured goods	Casalin, F; Dia, E	2019	<i>International Journal of Industrial Organization</i>	Reputation mechanisms only play an important role for transactions in REMAN

(continued)

Table 2

Interaction aspect	Article title	Author	Year	Journal	Key findings
Environment	Adoption of circular economy: data-driven strategies based on empirical evidence from Indian consumers	Gaur, J; Pandey, J; Hungund, S	2024	<i>Journal of Strategic Marketing</i>	Government actions to educate and promote REMAN adoption encourage individuals to invest in it
	Strategic closed-loop facility location problem with carbon market trading	Diabat, A; Abdallah, T; Al-Refai; Svetinovic, Govindan, K Yenipazarli, a	2013	<i>IEEE Transactions on Engineering Management</i>	As carbon emission costs rise, companies increasingly choose environmentally conscious suppliers
	Managing new and remanufactured products to mitigate environmental damage under emissions regulation	Kurdhi, NA; Dabadghao, SS; Fransoo, JC	2016	<i>European Journal of Operational Research</i>	Imposing a charge on emissions can make REMAN profitable for OEM
	Revenue management in a refurbishing duopoly with cannibalization	Niu, B; Ruan, Y; Zeng, F	2023	<i>Journal of Operations Management</i>	Weaker firms should focus on surpassing stronger competitors in collection and remanufacturing
	Promoting remanufacturing through subsidy and environment tax: Channel co-opetition, incentive alignment and regulation optimization	Webster, S; Mitra, S	2022	<i>Transportation Research Part E</i>	OEMs prefer to buy REMAN when the environmental tax rate is high
	Competitive strategy in remanufacturing and the impact of take-back laws	Gaur, J; Mani, V; Banerjee, P; Amini, M; Gupta, R	2007	<i>Journal of Operations Management</i>	The law leads to the introduction of REMAN
	Towards building circular economy a cross-cultural study of consumers' purchase intentions for reconstructed products	De Silva, M; Wang, P; Kuah, ATH	2019	<i>Management Decision</i>	US consumers are eco-centric and follow socio-cultural norms, whereas Indian consumers exhibit utilitarian buying behaviour
	Why wouldn't green appeal drive purchase intention? Moderation effects of consumption values in the UK and China	Zhou, SX; Yu, Y	2021	<i>Journal of Business Research</i>	British consumers are more aware of the green benefits, perceive higher quality, lower risks in REMAN than Chinese
	Optimal product acquisition, pricing, and inventory management for systems with remanufacturing	Hong, Z; chu, J; zhang, LL; wang, N	2011	Operations Research	When pricing is an endogenous decision, the optimal policy becomes much more complicated
	Recycling channel selection for a manufacturer involving consumers' Green-Return behavior	Han, T; shang, J; wang, S	2023	International symposium on environmentally conscious design and inverse manufacturing	The payment of recycling is important for OEM to determine whether to perform or not REMAN
Atmosphere	The dual role of cooperation and competition in remanufacturing: a buyer-seller	Gao, J; liang, ZL; shang, J; Xu, ZS	2021	<i>Journal of Business Research</i>	There is a balance between cooperation and competition between two REMAN sellers
	Remanufacturing with patented technique royalty under asymmetric information and uncertain markets	Wu, X; Zhou, Y	2020	<i>Technological and Economic Development of Economy</i>	Advanced production ensures remanufacturing is more technically and economically feasible
	Does the entry of third-party remanufacturers always hurt original equipment manufacturers?	Yang, L; Gao, M; Feng, L	2016	<i>Decision Sciences</i>	The entry of REMAN can bring benefits to OEM who sells both product lines
	Competition versus cooperation? Which is better in a remanufacturing supply chain considering blockchain	Batabyal, AA; Beladi, H	2022	<i>Transportation Research Part</i>	Remanufacturers select competition mode based on patent fees, with brand advantage influencing the choice
	A game model of competition for market share between a new good producer and a remanufacturer	Batabyal, AA; Beladi, H	2016	<i>Economics Bulletin</i>	Analyse the duopolistic interaction between an OEM and a remanufacturer competing for dominance in the remanufactured parts market
	Advertising and competition for market share between a new good producer and a remanufacturer	Jena, SK; Meena, P	2018	<i>German Economic Review</i>	The iterated elimination of strictly dominated strategies predicts the outcome of the advertising game
	Competitive sustainable processes and pricing decisions in omnichannel closed-up supply chains under different channel power structures	Hong, XP; Govindan, K; Xu, L; Du, P	2022	<i>Journal of Retailing and Consumer Services</i>	The total omnichannel profit is the highest under the cooperation model
	Quantity and collection decisions in a closed-loop supply chain with technology licensing		2017	<i>European Journal of Operational Research</i>	Technology licensing in a closed-loop supply chain can increase both profits and collection levels, but the outcomes depend on cost conditions and the licensor's market power

Source(s): Authors' own work

third parties, this allows the OEM to retain control over design, branding and marketing strategy, while outsourcing operational activities to specialists. A strategic alternative consists of licencing the production and sale of REMAN, transferring the right to exploit intellectual property to the licensee who assumes much of the responsibility for production and marketing. The OEM is entitled to a royalty set by contract (Wu and Zhou, 2016). Finally, OEMs can internalise the process and adapt their structure to produce REMAN.

The literature suggests that the organisation's choice is not purely operational but also reflects the broader strategy. For example, internalisation can strengthen the consistency between new and remanufactured products but requires investments in facilities, capabilities, and specific planning. On the other hand, relying on external partners may accelerate entry into the REMAN market and reduce operational risk, at the cost of lower vertical integration and less control over quality (Wu and Zhou, 2016).

Research has identified several factors that OEMs must consider in this context when deciding to internalise the process:

- 1 Technology: Flexible technology is crucial to managing the complexity and uncertainty of remanufacturing. Technologies such as the Internet of Things (IoT) enhance data collection on product usage and facilitate problem diagnosis for remanufacturing (Sakao and Sundin, 2019). From a managerial point of view, investing in advanced technology allows for increased operational efficiency and differentiation in the market through innovative solutions.
- 2 Process structure:
 - *Core acquisition and reverse logistics.* Remanufacturing requires a reliable source of EOL and EOU products (Sakao and Sundin, 2019) from various sources (Lind et al., 2014; Bajgani et al., 2023). Efficient reverse logistics management is essential to ensure the return of EOL to the production chain.
 - *Remanufacturing facilities.* Plant location must balance cost, availability of skilled labour and proximity to target markets (Lu et al., 2014; Yang et al., 2022), with direct implications on delivery time and competitiveness.
 - *Design for remanufacturing and feedback.* Integrating the concept of Design for Remanufacturing into product development phases reduces operational costs and improves the perception of brand sustainability (Lundmark et al., 2009; Bag et al., 2019; Hong et al., 2023). However, appropriate design tools and approaches are often lacking (Lindkvist Haziri et al., 2019).
 - *Organization, planning, and control.* Proper organization and planning are essential to ensure an effective and efficient remanufacturing process. Clear decision-making procedures, performance measurement tools, and feedback are crucial for continuously monitoring and improving the remanufacturing process (Javadi et al., 2016). Another critical element concerns the configuration of facilities and production lines. Companies may

choose to integrate REMAN activities into existing facilities used for new product manufacturing, or to establish a dedicated, parallel structure. The former option allows leveraging economies of scale and existing infrastructure but can increase managerial and organisational complexity. The latter offers greater specialisation and control over the REMAN process but involves higher fixed costs and requires strategic coordination between different production units (Javadi et al., 2016; Mishra et al., 2023).

3 Strategy:

- *Workforce competence and availability.* remanufacturing requires highly skilled personnel (Sakao and Sundin, 2019), regularly undertaking training crucial to sustain product quality and reliability (Lund, 1985; Seitz and Peattie, 2004).
- *Remanufacturing process improvements.* Planning and control techniques adapted to remanufacturing are essential for managing challenges related to core acquisition and high labour intensity (Sakao and Sundin, 2019; Kurilova-Palisaitiene et al., 2024).
- *Market knowledge of remanufacturing.* Understanding the remanufacturing market is essential for effectively managing demand, price and perception of REMAN (Vogt Duberg et al., 2020). Furthermore, the co-production of new and remanufactured products requires strategic consideration of market segmentation, branding and pricing choices. The coexistence of the two lines can generate synergies but also tensions, especially when the target audiences and the positioning of the offering are not clearly differentiated (Vogt Duberg et al., 2020; Vogt Duberg et al., 2024).

A central concern identified in the literature regarding OEMs inclusion of REMAN into their offering is the cannibalisation effect, i.e. the potential reduction in sales of new products due to REMAN (Atasu et al., 2008). However, this dynamic can be turned into a competitive advantage if managed with a well-defined marketing strategy. The introduction of REMAN gives customers the option to choose between two comparable offerings of the same product, but with a significant difference in price. Despite the potential cannibalisation effect, it is necessary to consider that the introduction of REMAN allows access to and serves a portion of the market that could not be reached with new products due to their higher price (Linton, 2008). REMAN allows OEMs to target more price-sensitive customer segments, which would otherwise turn to low-cost competitors or the second-hand market (Linton, 2008). This means that, instead of eroding margins on new products, the remanufacturing market can be a lever for building customer loyalty and strengthening brand positioning. A strategic and integrated approach based on segmentation, smart pricing strategy, branding and effective communication cannot only mitigate the cannibalisation effect but also generate new value for the entire supply chain. From this perspective, the simultaneous production of new and REMAN products does not necessarily represent strategic overlap, but can be configured as a complementary offering, capable of expanding market coverage and strengthening the OEM's presence across multiple segments. The strategic implications of this dual

approach require further exploration but it provides a potential competitive advantage when supported by appropriate operational, managerial, and marketing arrangements.

3.1.2 The buyer

The customer decides to purchase REMAN from an OEM, either to integrate such products into their own offerings or for business use (Khor and Hazen, 2017). Despite the growing relevance of REMAN, the industrial marketing literature has overlooked B2B customers regarding REMAN. However, the REMAN literature has been examined from a B2C perspective. Use of the B2C perspective is feasible as the interaction approach considers companies as groups of individuals. It allows the drawing of some analogies between B2C and B2B decision-making and can facilitate exploring potential differences that may arise (Turnbull and Valla, 1986).

From the literature review, several key factors emerge regarding the perception of REMAN. One of the main obstacles to the uptake of REMAN is the lack of product knowledge. Many purchasers are not adequately informed about the features and benefits of remanufacturing, which hinders its adoption. Perceptions regarding the quality of REMAN remain fundamentally important (Hong *et al.*, 2018; Singhal *et al.*, 2019); however, there is a widespread belief that these products may be of lower quality compared to new ones (Abbey *et al.*, 2015). This prejudice can be overcome through targeted industry marketing strategies, such as the use of warranties, certifications and discounts (Kleber *et al.*, 2020; Chinen *et al.*, 2022; Kleber *et al.*, 2023). Furthermore, environmental sustainability characteristics play a decisive role, with awareness of the environmental benefits, such as energy savings and emission reductions, helping to improve the perceptions of REMAN and incentivising purchase (Wang *et al.*, 2018; Moosmayer *et al.*, 2020). However, for sustainability to become a competitive advantage, OEMs must integrate these aspects into a clear and effective communication strategy, avoiding the risk of greenwashing and ensuring transparency in the remanufacturing process.

Individual environmental behaviour has been identified as a key variable influencing the willingness to pay (Hong *et al.*, 2018) and to switch from new products to REMAN (Perez-Castillo and Vera-Martinez, 2021). However, research indicates that consumers tend to be less willing to pay for REMAN compared to new products. Hazen *et al.* (2017) found in ambiguous situations or when there was a lack of transparency regarding the remanufacturing process, the resulting perception of lower quality reduced the willingness to purchase (Hazen *et al.*, 2017). However, Michaud and Llerena (2011) demonstrated that the willingness to pay for REMAN increases when consumers are informed about its environmental benefits. Again, transparency about the production process and product quality is crucial to reduce the perception of risk and encourage purchase (Hazen *et al.*, 2017).

Emotional factors are relevant in the B2C context. For instance, B2C consumers' "disgust" bias towards REMAN, related to the fact that these products have been previously used, has been observed (Abbey *et al.*, 2015). However, this emotional aspect is less likely to have an impact in B2B, as the products are not purchased for personal use but for business purposes. B2B buyers are generally more rational and focused

on functional aspects of the remanufacturing process and the functional benefits such as quality, risk reduction and return on investment (Grewal *et al.*, 2015). Conveying these functional benefits is crucial when promoting the adoption of REMAN. OEMs need to focus their industrial marketing strategy on communicating the tangible benefits of REMAN, such as better value for money and increased cost efficiency.

3.2 The interaction process

In the emerging literature on REMAN, there is a noticeable lack of studies that examine in detail the B2B interactions between OEMs and buyers. To address this gap, insights can be drawn from existing studies in the B2C context for future research.

One of the critical aspects highlighted in B2C studies concerns the exchange of information about REMAN, particularly in relation to its functional characteristics (Abbey *et al.*, 2015). Buyers often have concerns about the quality and reliability of REMAN which can be addressed through targeted communications, e.g. educating customers about the functional and environmental benefits of the product, offering comprehensive training on product features and extending warranties. These strategies can reduce perceived risks and increase purchase intention (Wang and Wang, 2021). This is where effective marketing communications including the provision of workshops becomes essential for educating the customer on the benefits of REMAN, providing technical data and case studies. Provision of clear, detailed product information makes the advantages more readily understandable and tangible, reduces the perceived risks and expands the market size and improves OEM profitability (Wang and Wang, 2021).

Another key aspect of the interaction process involves the financial exchange, which includes how the supplier can reduce perceived risks for customers through pricing policies, discounts, and warranties (Hunka *et al.*, 2021). Previous studies have shown that offering moderate discounts and clearly differentiating the price between new products and REMAN can make the latter more attractive (Liu *et al.*, 2022), while simultaneously mitigating the risks of cannibalising new product sales (Hunka *et al.*, 2021). However, excessive discounts might lead to a perception of lower product quality, discouraging purchase (Abbey *et al.*, 2015). Offering moderate and structured discounts can foster adoption without making the product perceived as a fallback choice. Additionally, the OEM's reputation plays a crucial role in reassuring the customer: transparency in return policies, the presence of trustworthy certifications and positive reviews can reduce information asymmetry, strengthen customer trust and encourage more informed purchasing decisions mechanisms (Casalin and Dia, 2019).

The product return process is critical and largely underexplored in the literature. It is potentially a burden for the customer and an obstacle to purchasing REMAN (Guide and Van Wassenhove, 2009; Wang and Wang, 2016). To overcome this difficulty, OEMs need to simplify procedures, make take-back and replacement processes more efficient and develop incentives for returning EOLs. Working with specialised logistics operators and integrating value-added services can

make a difference, improving the overall customer experience and making the process smoother and more convenient.

3.3 The relationship atmosphere

The relationship atmosphere between the supplier and buyer is the result of interaction episodes that occur over time and is crucial for the development of business relationships. Originally, this concept focused on the balance of power between the parties (Håkansson and IMP Project Group, 1982), but it has evolved to also encompass elements such as trust, commitment, and cooperation, which are considered fundamental factors for building long-lasting, mutually beneficial relationships. In research on REMAN, the focus has been on two key aspects of the relational atmosphere: cooperation and competition.

Cooperation is central to the functioning of remanufacturing, as it requires a degree of collaboration between the OEM and the buyer. Buyers purchase REMAN from the OEM and, at the end of the product life cycle, return the EOL, which is remanufactured and reintroduced into the market, actively participating in a circular economy model (Gao *et al.*, 2020). This cooperative dynamic between the actors offers mutual benefits: the buyer can acquire solutions for their company at a lower price than new products, while the OEM can access market segments that are difficult to reach with new products (Kumar *et al.*, 2018; Yang *et al.*, 2022). In some cases, the customer can resell REMAN under the OEM's brand, increasing the OEM's visibility in unexplored markets. This synergy makes cooperation an effective tool for the growth of both parties. However, for this collaboration to work, it is crucial that OEMs implement strategies to incentivise the return of products, simplifying the reverse logistics process and ensuring advantageous conditions for buyers who choose to actively participate in the remanufacturing cycle.

Competition between the OEM and customer can undermine cooperation. Conflicts arise when the buyer and the OEM compete directly for REMAN sales. The buyer may choose to approach either the OEM or the OEM's customer for REMAN supplies, creating competitive tensions (Han *et al.*, 2021; Hong *et al.*, 2023). A risk is that the OEM, due to its lower production costs can offer lower prices and take sales from the customer-competitor and reduce their market share (Wu and Zhou, 2016; Jena and Meena, 2022). The concept of competition can also arise in the dynamics of acquisition and pricing, as companies face competition for the sourcing of "cores" (used products) and in setting competitive prices for their remanufactured products which could further damage the cooperation in the remanufacturing process (Zhou and Yu, 2011; Jena and Meena, 2022). However, it has been suggested that a customer with a strong brand can compensate for any price disadvantages (Hong *et al.*, 2023). The strategic management of competition is therefore necessary to avoid tensions that may jeopardise the stability of business relationships. OEMs should adopt transparent and differentiated pricing policies, avoid eroding their customers' profit margin and develop business models that allow for balanced growth for both parties.

Studies by Batabyal and Beladi (2016, 2018) analysed the competition between two remanufacturing vendors, focusing on advertising strategies. They found that positive advertising (emphasising environmental and cost advantages) helped to

build buyer trust and loyalty but was not always sufficient to influence undecided buyers. Negative advertising (aimed at reducing the perceived quality of the competitor) reduced overall buyer confidence in the market but succeeded in gaining a larger market share than the competitor when buyers were more sensitive to the comparative value of products.

From a management perspective, the main challenge in the REMAN market is to find a balance between cooperation and competition, so that the desire to optimise profits in the short term does not compromise strategic and sustainable business relationships. OEMs must adopt an approach that values cooperation with buyers, developing long-term partnerships based on transparency, differentiated pricing policies and incentives that make REMAN a cost-effective option without cannibalising the market for new products. On the other hand, buyers, as companies with decision-making power, can negotiate favourable conditions with OEMs, leverage their market positioning to differentiate themselves through REMAN and develop communication strategies that strengthen the perception of quality and reliability of REMAN. Both parties need to invest in careful relationship management, fostering trust and collaboration to turn REMAN into an opportunity for mutual growth, rather than a commercial battleground.

3.4 Environmental factors

The environmental factors that influence the dynamics of interaction between OEMs and customers include market structure, government regulations and social norms.

The government can directly influence market dynamics through regulations and laws aimed at promoting sustainability. For example, a carbon emissions tax is an effective fiscal policy that penalises the use of fossil fuels, pushing companies to consider sustainable alternatives (Yenipazarli, 2016; Niu *et al.*, 2022). This mechanism, as highlighted by international studies, makes the introduction of REMAN economically advantageous for OEMs, even when remanufacturing appears less profitable than selling new products. Carbon emissions regulations also drive demand, as companies tend to choose more sustainable suppliers when the cost of emissions increases (Diabat *et al.*, 2013; Kurdhi *et al.*, 2023). Another example of government regulation that promotes the use of REMAN is recall legislation. This regulation imposes the responsibility on manufacturers to collect and recycle EOL, thus encouraging them to design products that facilitate remanufacturing. Webster and Mitra (2007) demonstrated that this type of regulation incentivizes REMAN production and generates higher profits.

Social norms are a fundamental environmental factor influencing the demand for REMAN. They shape buyers' perceptions of REMAN and, in many cases, can represent a barrier. Gaur *et al.*'s (2024) study of B2C consumers in India found that the preference for luxury brands led to a lower demand for REMAN. In contrast, in the US, where social norms push sustainable behaviour, REMAN is viewed more positively (Gaur *et al.*, 2019). Differences in social norms also manifest in the relationship between environmental awareness and purchase intention (Gaur *et al.*, 2024). For instance, pro-sustainability social norms in the UK strengthen the link between environmental awareness and REMAN purchases,

while in China, where social status values prevail, the focus is more on the economic value of products (De Silva *et al.*, 2021).

OEMs must carefully consider the regulatory and social context in which they operate to maximise REMAN adoption. They need to adapt their marketing strategies to market specificities, taking into account the regulations and social norms around sustainability in countries. B2B buyers need to recognise the necessity or not of integrating REMAN into their operations and complying with the expectations of their stakeholders.

4. Discussion

The literature review on REMAN has allowed us to identify areas of research related to the actors, the interaction process, and the factors influencing the relational and environmental context. However, crucial questions remain that future research must address to fully understand REMAN dynamics and enable the development effective strategies. Based on the issues that have emerged, we propose a research agenda in relation to the interaction approach for industrial marketing scholars (see Table 3).

Actors – In a B2B context OEMs and buyers face different challenges in purchasing REMAN products compared to traditional new ones. Factors affecting OEMs REMAN strategy choice need to be investigated. Research needs to explore how OEMs are structured for REMAN, particularly how they manage

diversified production processes to improve operational efficiency. This research would assist companies with determining their optimal future REMAN strategy choices. Successful implementation REMAN would encourage further adoption and diffusion of REMAN practices among OEMs.

Purchasing new products requires the evaluation of functional aspects such as the technical specifications and performance and whilst evaluation of the functional aspects is also required when purchasing REMAN, research needs to determine the specific functional requirements for buyers when purchasing REMAN. For example, the purchase of REMAN raises concerns for buyers related to perceived quality (Abbey *et al.*, 2015) and trust in performance, often accompanied by doubts about reliability (Hazen *et al.*, 2017). As well as looking at the functional criteria for purchasing REMAN, research needs to examine whether buyers perceive a greater amount of risk in the purchase situation and whether they are more stringent in their evaluations. It could determine whether evaluation processes for REMAN products differ from new products. The role of buyers' emotions may be potentially greater when buying REMAN. Further research needs to identify the most appropriate strategies OEMs can use e.g. warranties and discounts to reduce the impact of buyers' negative emotions. Through obtaining a better understanding of buyers' perceptions of REMAN OEMs can develop marketing strategies that align the offering with buyers' needs satisfying their functional and emotional requirements. It is important to investigate the role of the buying centre, as a REMAN purchase may differ significantly from that of new products. It is crucial to understand how different actors in the buying centre, i.e. initiators, deciders, users, influencers, and gatekeepers perceive and influence the selection of these products. An appreciation of the internal dynamics of the buying centre will enable the development of strategies that address buyers' specific concerns and motivations related to REMAN purchases.

These topics could be investigated using a variety of different methodologies. The use of in-depth interviews would be suitable for addressing both OEM and buyers' issues as they would allow the collection of thick and dense data. Surveys specific to OEM and purchasing professionals would provide reliable quantitative data. Alternatively, choice experiments could be used to examine the efficacy of OEM strategies and provide a more detailed picture of buyers' behaviour in relation to REMAN. Textual data analysis techniques, such as content analysis of reviews or discussions on company websites and professional forums, could also provide additional insights into perceptions and barriers to purchase.

The Interaction Process – Traditionally, there is a one-way exchange of the product from the supplier to the buyer, but with REMAN, there is the return of the product at the end of its life or use. The return of EOL or EOU products is a distinctive feature of REMAN that requires investigating. Research needs to determine how this type of product exchange is established and maintained and how it affects information, financial, and social transactions. The current literature provides minimal guidance on how to conduct these exchanges in REMAN to facilitate mutual success.

Within the interaction process, information exchange is vital, and research is needed to identify the optimal communication strategies that OEMs should adopt to educate and raise awareness among buyers about the characteristics and

Table 3 Future agenda

Interaction approach	Priority questions for future research
Participants	
OEM	<ul style="list-style-type: none"> How do OEM employees perceive REMANs? What strategies can OEMs adopt to implement REMAN sales and improve buyers' knowledge and attitudes?
Buyers	<ul style="list-style-type: none"> What functional product qualities are considered when purchasing REMAN? What emotional qualities are useful when purchasing REMAN? What variables i.e. size of the decision-making unit, value of purchase, complexity of the purchase influence the purchase of REMAN?
Interaction process	<ul style="list-style-type: none"> What communication strategies can OEMs use to educate buyers and influence their perception of REMAN? What drives organizations to adopt REMAN? What is the nature of the financial, information and social exchanges in the REMAN context?
Relationship atmosphere	<ul style="list-style-type: none"> How does the relationship atmosphere (trust, commitment, power) influence the buyer's involvement with and purchase of REMAN? What is the nature of cooperation required to implement REMAN? How does the implementation of REMAN affect the relationship atmosphere?
Environment	<ul style="list-style-type: none"> What elements of the environment influence the interaction between OEMs offering REMAN and buyers uptake? How does regulation affect the relationship between OEMs and buyers? How is regulation affecting market structure? How is market structure influencing REMAN interactions between OEMs and buyers?

Source(s): Authors' own work

advantages of REMAN. To analyse the interaction dynamics between OEMs and buyers, the use of an ethnographic approach could be used. This method would enable a holistic picture of the relationship to be developed and the identification of the strengths and weaknesses of various communication and collaboration strategies. This might also be investigated through the use of diaries with OEM and buyers recording their observations of each of their interactions overtime in relation to tangible issues e.g. performance, and intangible issues e.g. cooperation, trust, commitment etc. Education of the marketplace is fundamental to changing buyers' perceptions of REMAN. Buyers have a number of concerns about REMAN e.g. its performance, sustainability credentials and research is needed to determine the optimal message content using objective evidence and taking into account a deep understanding of buyers' needs. Experiments could be used to evaluate the effectiveness of communication strategies, through testing the effect of varying functional and emotional message styles on buyer's perceptions of REMAN products.

Financial exchange is fundamental in the interaction process, and research has discovered how discounts, warranties (Hunka *et al.*, 2021), and transparent return policies (Casalin and Dia, 2019) can reduce risk. In REMAN, research has found that moderate discounts are more attractive than high ones, which raise suspicions about product quality (Abbey *et al.*, 2015) Further research must determine which pricing strategy is most effective for REMAN products e.g. the effect of varying discount levels and durations of warranty extensions on buyer perceptions of the product and purchase intention. Research could also examine whether particular combinations of pricing strategies are more successful. These avenues of research could be investigated through experiments.

Relationships are central to success therefore another relevant area for research concerns the analysis of relational processes through which OEMs build, maintain, and strengthen long-term customer relationships in the REMAN context. The current literature provides limited insight into how OEM-buyer relationships evolve over time, particularly in the face of challenges such as perceived risk, the need for product return, and performance uncertainty. Consequently, there is a need to explore more deeply the relational strategies adopted by OEMs, for example in terms of the specific information exchanged and the social exchange to foster trust and mutual commitment. Longitudinal methodological approaches could offer significant insights into the mechanisms through which supplier–customer relationships consolidate over time, considering the specificities of the REMAN context. These approaches might be qualitative e.g. periodic in-depth interviews, the completion of diaries or quantitative e.g. periodic short surveys. These would capture the dynamics of the relationships.

The Relationship Atmosphere – The industrial marketing literature highlights how cooperation, trust, commitment, and power are central elements of the relationship atmosphere in building long-lasting relationships between parties (Håkansson and IMP Project Group, 1982). The introduction of product returns potentially influences the development of the relationship atmosphere between the parties. In REMAN, the supplier relies on the buyer's collaboration for the return of

EOL and EOU products. The balance of power between actors and its use can influence the return of EOL and EOU; for example, a customer may feel more obliged to return products if a supplier is more powerful. Management of product returns may influence the relationship atmosphere which may impact the development of the relationship.

The relationship atmosphere may be influenced by other REMAN factors including, buyers' perceptions of the functional qualities of the product, the perceived risk. For example, where perceived risk is high cooperation, trust and commitment may take longer to develop. Building a positive relationship atmosphere is vital; uncertainty is reduced through cooperation and building trust, while commitment represents a willingness to invest resources in the relationship, making it more stable. It is therefore essential to investigate the relationship atmosphere and how cooperation trust, commitment, and power operate in the REMAN purchase context.

Research could determine strategies that positively develop the relationship atmosphere, for example, being transparent about remanufacturing processes, performance certification etc. could increase cooperation and trust and reduce perceived risk. Surveys measuring these variables combined with structural equation modelling (SEM) could be used to identify causal relationships and quantify these variables impact on purchase intentions.

The Environmental Context – The literature lacks research on how the environmental context influences the OEM-buyer interaction. The remanufacturing market is influenced by market structures, regulations, economic and social factors that can facilitate or hinder the spread of sustainable practices. It is necessary to explore how environmental factors influence the interaction between OEMs and buyers. Government policies and environmental regulations that encourage circular economy practices will influence organizations' actions, the market structure, and the nature of competition. These actions will be crucial in determining the value of such relationships between OEMs and buyers and their success.

While research into REMAN has been conducted in related business contexts it is evident that there is a dearth of it within B2B marketing. The REMAN context requires systematic research to be performed to fully understand both the specificities of separate components of the interaction approach and their interrelationships.

5. Conclusion

This study aimed to identify what is known about OEM-customer relationships concerning REMAN and create a future agenda for research in industrial marketing.

A systematic analytical approach to the existing literature on remanufacturing was taken in conjunction with the interaction approach to provide a framework to organise the extant articles and identify areas for further research. These areas require a deeper understanding to enhance the practice of remanufacturing in the industrial domain. Specifically, the literature review has highlighted the need to better understand buyers' needs both individually and as a buying centre and their barriers to adopting REMAN. This is vital for OEMs if they want to grow their REMAN offering. Analysis of the literature

has reinforced the need to explore the nature of various exchanges, and their influence on the relationship atmosphere in the interaction process. The need to assess the impact of environmental factors like government legislation on these relationships is also highlighted. The study provides B2B researchers with a number of critical questions related to the components of the interaction approach where further research is required. REMAN is growing in its importance as a topic in B2B marketing research due to the unique challenges that it brings to industrial relationships. The research agenda provided here is thus intended to spark theoretical and empirical debate around the remanufacturing practice in the domain of industrial marketing research where knowledge on REMAN is still lacking.

The results of this study must be viewed in light of the study's limitations. First, the articles retrieved and analysed were limited to those classified in the fields of management, business and economics. We cannot exclude that further findings and implications could have been drawn based on what studies in other fields such as engineering have found. Second, the systematic literature review performed was organised using the interaction approach as a framework. This approach was the most suitable for understanding both the state of the art of current research in REMAN dyads as well as identifying what needs to be known about them. The usage of other theoretical lenses e.g. the ARA model (Håkansson and Johanson, 1992) would have led to different results and to a different agenda. Finally, this study has intentionally focused on the OEM–customer relationship, it did not consider the influence of additional upstream and downstream actors in the network. This choice supported the objective of developing our knowledge and understanding of the OEM-buyer dyad prior to extending our knowledge of the REMAN network. We acknowledge that the network perspective remains a critical yet underexplored dimension in REMAN literature, and we believe it should be a priority for future business-to-business investigations.

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Further reading

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