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Toward sustainable automobility: Insights from a stewardship literature review of the industry

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Abstract

The automotive industry is actively pursuing a course of sustainable development; however, to date, progress has been limited. This is because a truly sustainable future requires a substantial and transformative approach to automobility. Some scholars argue that this transformative approach might be found by exploring an industry transition based on stewardship rather than the current status quo of incremental change. Hence, as a way of offering new insights to stimulate action for sustainability, this study presents the first comprehensive review of stewardship in the automotive sector. From an analysis of 161 peer-reviewed articles published between 1990 and 2022, we identified two underconceptualized forms of stewardship—environmental and social—both of which have an interconnected relationship. Environmental stewardship involves actions that address ecological challenges, while social stewardship pertains to broader, positive impacts on communities. We argue that understanding the interplay between these different forms of stewardship is crucial for achieving comprehensive sustainability outcomes. Additionally, this research identifies gaps in the literature and outlines areas for future research to help both managers and society navigate the complex sustainability issues facing the automotive industry.

KEYWORDS
automobility, corporate social responsibility, problematizing review, stewardship, sustainability

1 | INTRODUCTION

The automotive industry is associated with numerous environmental and social challenges. It encompasses organizations involved in the design, manufacture, and sale of commercial and private vehicles, as well as auto parts, and accounts for the largest share of air pollution among all industrial sectors—pollution that is primarily caused by the combustion of fossil fuels in private vehicles (Richnák et al., 2020). The industry is also linked to other environmental and ethical concerns, including climate change, toxic pollutants, and human rights violations in supply chains (Lee & Tan, 2019; Staniszewska et al., 2020). Automobility, which refers to the technical and social systems associated with automobiles, currently perpetuates these challenges rather than ameliorating them (Sovacool & Axsen, 2018). For example, due to factors like urban sprawl, inadequate public transport planning, and consumer demand, global sales of personal vehicles that rely on fossil fuels are projected to grow by 2% per annum (McKinsey & Company, 2016).

The far-reaching impact of automobility constitutes a pressing social issue, given the anticipated growth in automobile-related

Abbreviations: TCCM, Theory, Construct, Characteristics and Methodology; UNEP, United Nations Environment Programme.

greenhouse gas emissions is unsustainable (Climate Council, 2022; Friedrich et al., 2020). Scientists predict that, without urgent action, the world will exceed the Paris Agreement target of a 1.5°C increase in global average temperatures by 2050—a limit essential for a livable future (United Nations Environment Programme [UNEP], 2022). As Antonio Guterres, Secretary General of the United Nations, pithily put it at COP27 in Egypt, "We are on a highway to climate hell with our foot still on the accelerator" (Guterres, 2022). UNEP (2022) calls on high-polluting sectors, like the automotive sector, to avoid locking in infrastructure that intensively relies on fossil fuels. However, to date, action within the industry has been incremental at best, and managers appear ill-prepared to respond (Lopes & Pires, 2020; Sonar et al., 2022).

Today, consumers generally accept the need to address anthropocentric climate change. Moreover, many demand new ways of working that reduce our reliance on fossil fuels and privately owned vehicles. To this end, the automotive industry faces a pressing need for radical transformation (IDEO, 2023; Lyons, 2018). Moreover, globally, the sector has significant resources with which to respond to these calls. For example, the automotive industry invests over US $100 billion in R&D annually (Refinitiv, 2021), making it one of the largest global contributors to research (Grassano et al., 2021). Yet, despite its leading role in innovation (Cano-Kollmann et al., 2018) and strides toward sustainable alternatives like zero-emission vehicles (Greene, 1990; Lopes & Pires, 2020; Rosales-Tristancho et al., 2022), the industry continues to exacerbate many environmental and social issues (Smith & Crotty, 2008; Sonar et al., 2022).

The broader literature suggests that stewardship may offer critical and actionable insights into managerial strategies for addressing the sector's sustainability challenges (Marshall et al., 2005). Stewardship extends organizational accountability into spheres where companies care for environmental and social resources for the benefit of current and future generations. In turn, this tends to inspire "economic and organizational transformations" (Bebbington et al., 2019, p. 168). Prior scholarship indicates that stewardship is already being considered in the automotive industry (De Stefano et al., 2016). However, scholars such as Subramoniam et al. (2009), who have examined remanufacturing, claim that a holistic view of stewardship is still lacking. This leaves academics and practitioners without a clear roadmap to guide future research on the urgent transformation needed. Given the industry's focus on incremental rather than transformational change, it is unclear whether the concept of stewardship in automobility aligns with the definition offered by Bebbington et al. (2019) or if it refers to deceptive practices akin to greenwashing, socialwashing, and the like (see Aßländer et al., 2016; Balakrishnan et al., 2017; Neckebrouck et al., 2017).

To provide one of the first comprehensive reviews and an accompanying conceptual framework, we therefore ask:

> How can stewardship be conceptualized to drive transformative change toward sustainability?

To answer this question, we conducted a problematizing review of the prior literature on stewardship in the automobility sector (Alvesson & Sandberg, 2020; Durach et al., 2021; Seuring et al., 2020). Our research is abductive in nature. Although it begins with an examination of the concept of stewardship as defined by scholars like Bebbington et al. (2019), we do add new insights to this body of work by analyzing its application in the specific context of sustainability transitions in automobility.

To probe the underlying insights offered in terms of managerial practices that prior scholars and practitioners have labeled as "stewardship," we sourced 161 peer-reviewed articles from Scopus, the Web of Science, and a selected set of transport journals. Through abductive analysis, we juxtaposed the established definition of stewardship with the standard practices, behaviors, and initiatives of the automotive industry. Our aim was to bridge the gap between the theoretical foundations of stewardship and its practical manifestations within automobility. Here, we see that theory sometimes achieves social and environmental goals consistent with sustainable development (as outlined by scholars like Bebbington et al., 2019), but sometimes it does not. Hence, within this exploration, we sought to explore the potential discrepancies, nuances, and novel interpretations that might arise when stewardship is applied to the complex and multifaceted challenges of the automotive sector.

It is also worth noting that while the automotive sector serves as an instructive case study for understanding stewardship's role in sustainability transitions, it is not the only industry that needs to undergo a substantial and transformative change in this regard. Therefore, in the discussion section of the paper, we consider the broader implications of our work. This discussion underscores the need for researchers to adapt and apply a stewardship framework that integrates environmental and social considerations across a diverse range of industry settings. To this end, we hope this study expands scholarly understanding of stewardship's applicability and its prospective influence on sustainability efforts beyond the automotive arena.

The rest of this paper is organized as follows. The next section provides an overview of stewardship in the automobility sector. Then, we elaborate on the methodology supporting our review and our findings. The paper concludes with a discussion that outlines a future research agenda geared toward advancing sustainability in light of our conceptual framework, along with the limitations of the paper.

2 | STEWARDSHIP AND THE AUTOMOBILITY SECTOR

As noted above, our theoretical lens on stewardship follows scholars such as Bebbington et al. (2019), Heuer (2012), and Maas et al. (2014). It relates to business practices in accounting designed for, and with the aim of protecting, social and environmental resources. While this definition aligns with the principles of sustainable development—that is, meeting the needs of current generations "without compromising the ability of future generations to meet their own needs" (World Commission on Environment and Development, 1987, p. 15)—there is a gap in the literature exploring how work related to stewardship and automobility could help managers and society address the environmental and social challenges facing the sector.

Beyond the realm of automobility, researchers have examined how industrial growth can become sustainable in ways that redress past issues and avoid future negative consequences (Awan & Sroufe, 2020)—themes that underscore the relevance of stewardship solutions in the automotive industry (Goodpaster et al., 2018). For instance, Fan and Zietsma (2017) explore how collective action through a stewardship council has worked to conserve water assets in Canada. Lees-Marshment et al. (2020) extended this insight to demonstrate how a focus on stewardship can foster a social commons ethos in decision-making (also see Cullen, 2020; Maxwell-Smith et al., 2018). This line of inquiry is also consonant with studies outside the stewardship field, such as those by Centobelli et al. (2022) and Shashi et al. (2020), which highlight how business practices like implementing sustainability policies or investing in sustainability-related training can improve practices both within a single company and across an industry network (see also Armstrong & Grobbelaar, 2022).

However, more work is needed, as scholars have only recently begun to extend the concept of stewardship beyond the limited definitions offered by researchers like Davis et al. (1997). These definitions focus exclusively on governance in the context of employer/employee relations, and while some studies consider managerial care for the environment and social resources, most are segmented into separate stakeholder groups: employees (Neckebrouck et al., 2017), suppliers (Aßländer et al., 2016), and society as a whole (Balakrishnan et al., 2017). Both within and beyond the field of stewardship, scholars are calling for work that expands our perspective—work that integrates the more complex dimensions of stewardship that emerge when a broader definition is applied. Centobelli et al. (2022) argue that this kind of integrated approach should be used for a detailed exploration of different markets to grasp how stewardship, as defined in this expanded manner, might scale across economies. As we will demonstrate, the automobility sector presents a compelling context for such an exploration.

2.1 | Environmental challenges related to the automobility sector

Transport is among the world's leading sources of greenhouse gas emissions (Friedrich et al., 2020), ranking as the second-largest contributor in Australia and the United States (Australian Government, 2020; Friedrich et al., 2020). While transport includes shipping and aviation emissions in the form of carbon dioxide, land vehicles represent over half of the transport-related greenhouse gas emissions contributing to human-induced climate change (Climate Council, 2022). Current global estimates indicate approximately 1.4 billion passenger cars, trucks, and buses are on the road today—almost one vehicle for every five inhabitants of the earth (Chesterton, 2018). In fact, private car ownership and the production of new vehicles along with associated greenhouse gas emissions are expected to grow over the next decade (Australian Government, 2020; Friedrich et al., 2020). Annual new car sales are projected to rise from the current 70 million per year (Staniszewska et al., 2020) to 105 million by 2030 (McKinsey & Company, 2016). As a result, we can expect to see 2.8 billion vehicles on the world's roads by 2036 (Chesterton, 2018).

In addition to their role in generating greenhouse gases, fossil fuel-powered vehicles are also significant contributors to other forms of pollution, including exhaust particles and waste products from grease, oil, and rubber production (Lopes & Pires, 2020; Staniszewska et al., 2020). The automotive industry therefore not only poses an ecological threat but also constitutes a significant public health risk, contributing to an estimated 3.3 million premature deaths globally each year (Luo et al., 2021; Staniszewska et al., 2020). This intersection of environmental and social challenges is just one illustration of the many complex sustainability issues facing the industry.

2.2 | Social issues related to the automobility sector

The automotive industry is confronted with a multitude of social challenges, ranging from community safety and product design issues to recalls (Bernon et al., 2018; Wood et al., 2018) to high-profile management failures and scandals, such as Volkswagen's manipulation of carbon dioxide emissions data (De Stefano et al., 2016; Sarkis et al., 2010). Even companies such as Tesla that purport to be environmentally conscious have been implicated in human rights violations within their supply chains (Business & Human Rights Resource Centre, 2020).

Although sustainable alternatives like zero-emission and electric vehicles are emerging (Rosales-Tristancho et al., 2022) along with improved production processes (Lopes & Pires, 2020), these innovations do not entirely address the social challenges associated with the industry. For instance, producing zero-emission and electric vehicles requires copious amounts of natural resources like cobalt and lithium, which are not only geologically scarce but their supply chains are also fraught with high risks (Kennedy & Linnenluecke, 2022; Olivetti et al., 2017). Moreover, these vehicles use materials such as textiles, plastics, steel, and aluminum, many of which have low recycling rates despite their intrinsic value (The McKell Institute, 2021). Existing recycling processes in the sector are energy-intensive, complicated, and inefficient (Staniszewska et al., 2020). Consequently, substantial changes within the sector are imperative if the sector is to achieve genuine sustainability (Hoffmann et al., 2017; Sheller & Urry, 2000).

The automotive industry presents a conundrum for scholars wishing to better understand stewardship. The sector has generated many societal benefits, such as revolutionizing transportation, accelerating economic development, and facilitating critical services like emergency health care (Lopes & Pires, 2020; Sonar et al., 2022). Additionally, many organizations within the sector play a pivotal role in the development of regional communities across the world by offering meaningful employment, training, and education (Bag et al., 2020; Blanas et al., 2012). These organizations often invest in cultural activities and attempt to mitigate the environmental and social harms they cause (Lee & Tan, 2019). However, the sector remains enmeshed in numerous controversies, including human-induced climate change,

environmental degradation, and human rights violations within supply chains (Sovacool & Axsen, 2018).

Stewardship offers a compelling framework for transforming the automotive industry (Hoffmann et al., 2017; Luo et al., 2021; Riggs, 2015), yet the existing literature does not fully explore this concept in an integrated manner. To address this shortcoming, our study aims to provide a comprehensive analysis by reviewing the existing scholarship and identifying gaps and tensions in how prior research has conceptualized stewardship in the automotive sector.

Our study employs an abductive approach, building upon scholarly definitions of stewardship as business practices that responsibly manage social and environmental resources (Bebbington et al., 2019; Cullen, 2020; Heuer, 2012; Maas et al., 2014). By integrating these definitions, we aim to investigate how stewardship can be applied to address the myriad challenges facing the automotive industry. Specifically, we seek to augment the literature by examining how stewardship principles applied to automobility could help managers and society to confront the prevalent issues in the sector. Through this abductive approach, we seek to generate a conceptual framework that explains the role stewardship might play in aligning the principles of sustainable development with responsible resource management in the automotive industry.

3 | METHOD

The articles reviewed were sourced through a series of extensive searches of Scopus, the Web of Science, and selected transport journals. Appendix A provides a detailed overview of the search strategy; a summary follows. The initial search, completed in November 2021 by the first author, employed three key terms: "automotive product stewardship," "steward*," and "automotive," yielding 44 articles. No time limit was placed on the search, but the fields of research were limited to the social sciences, business, management, and accounting.

After removing duplicates, gray material (such as conference papers), non-peer-reviewed articles, and articles not published in English, 26 articles remained. Then, from a review of the full titles and abstracts, seven more papers were excluded for lack of relevance. The criteria for exclusion included limitations in scope, such as a focus on a singular technology without reference to broader stewardship principles (e.g., Chen et al., 2021). This left 19 articles deemed pertinent to our research question. These articles were loaded into NVivo12 and analyzed by the first author.

In this first round of review, we identified six supplementary search terms related to stewardship as outlined by De Stefano et al. (2016, p. 1439). These were "eco-design," "efficiency," "end-of-life treatment," "hybrid," "natural gas," and "reverse logistics." A second search using these terms (Search 2a) was completed in December 2021, yielding a voluminous output of 31,870 articles. Search 1 had illustrated to us that searching the keywords was not material as all articles had either stewardship or automotive in the title or abstract. Hence, Search 2a was refined to only the title and abstract fields, producing 584 results. Upon a full-text review, 131 articles were deemed relevant.

Search 2 was expanded in May 2022 (Search 2b) to include the terms "stewardship" and "battery," "electric," "hydrogen," "fuel cell," "zero-carbon," "car-related solar energy systems," and "plug-in systems." These terms were initially omitted from Search 2a as De Stefano et al. (2016, p. 1439) classify these as "clean technologies" rather than stewardship practices. Consistent with De Stefano et al. (2016), we found that these terms were not significant: Out of 146 results, 39 were duplicates (e.g., Sovacool & Axsen, 2018), 96 were unrelated to our focus (e.g., Huang et al., 2020), and only seven were included (e.g., Lyons, 2018).

A third and final search was completed in May 2022, incorporating the terms "tire," "tyre," and "steward*" to capture literature on the recently emerging tire stewardship initiatives in the automotive sector (Tyre Stewardship Australia, 2022). Seven more articles were found from this search.

Given the comprehensive nature of our final sample (161 articles), we did not pursue additional searches, such as snowballing references. This approach aligns with our study's objective of conceptual theory building, requiring a representative sample of published work for analytical insights, as opposed to a meta-analysis aimed at providing statistical inferences.

The first author uploaded all relevant articles into NVivo12 and initiated abductive coding following the methodologies outlined by Cornelissen and Durand (2014) and Dubois and Gadde (2014). This coding approach involved three stages.

In the first stage, the primary author read all the articles line by line to identify first-order codes, using sentences as the unit of analysis. As shown in Appendix B, these initial codes captured crucial descriptive elements within the articles, such as methodological approaches like case studies (e.g., Ahmadjian & Lincoln, 2001) or economic modeling (e.g., Jiao et al., 2017). They also pinpointed the theoretical frameworks used, such as actor–network theory (e.g., Pohl & Yarime, 2012). First-order codes were also used to identify pertinent ideas and phenomena related to the theme of stewardship, like climate change action (e.g., Becherif et al., 2019).

In the second stage of coding, the authors came together to finalize the naming conventions for the first-order codes and aggregate similar codes into second-order themes. At this stage, the authors drew on prior work (e.g., Lee & Tan, 2019, p. 268), suggested themes like the consumption of resources, diversity in the workplace, efficient supply chains, electric cars/autonomous cars, emissions reduction, employee protection and workplace conditions, materials recycling, renewable energy use, safety issues, and community programs. Reviewing these themes against the detailed list of codes developed across all articles (shown in Appendix B) revealed greater alignment with the first-order codes than the second-order themes. Where the language offered by Lee and Tan (2019) aligned to first-order codes, we adopted it (e.g., "diversity in the workplace"). Where Lee and Tan (2019) did not offer a suitable term (e.g., aluminum and steel alternatives), we used the language within the body of work where the idea was discovered (e.g., see Agapiou, 2014; Kastensson, 2014). Given

the absence of a suitable framework, we clustered similar first-order codes and used abstraction to develop labels for second-order themes, for example, "Circular Economy" and "Closed-Loop Distribution."

In the final stage, we distilled the 11 second-order themes into three overarching third-order concepts: "Current Conceptual Boundaries to Stewardship," "Environmental Stewardship," and "Social Stewardship." The names for these concepts mirror the broader stewardship literature (e.g., Bebbington et al., 2019).

"Current Conceptual Boundaries to Stewardship" includes 5 second-order themes (Article Information, Conceptual Papers, Deductive Papers, Inductive Papers, and Theoretical Perspectives). "Environmental Stewardship" includes 3 second-order themes (Table 1). The first of these, titled "Green Industry Transformation," covers environmentally conscious industry evolution, including redesigning the industry to optimize resource use to more closely mirror a circular economy. The second theme, "Advanced Mobility Solutions," focuses on innovative transportation technologies that address environmental and energy challenges, including transformative technologies like electric vehicles. The final theme, "Other Significant Impacts," relates to the importance of sustainability in mitigating climate change and the degradation of ecosystems.

The third concept, "Social Stewardship," also covers 3 second-order themes (Table 2). The first of these, "Ethical Business Practices and Social Responsibility," concerns ethical conduct, diversity, governance, and responsible behavior within the automotive sector that has a positive impact on both internal and external stakeholders. The second theme, "Organizational Governance and Sustainable Growth," centers on the automotive industry's role in engaging with communities and enhancing consumer relationships. It emphasizes responsible business behavior that contributes to social well-being and safety. The last theme, "Human Capital Development and Education Initiatives," involves skills development, educational outreach, and opportunities for professional growth. It underscores the industry's dedication to nurturing human capital to advance both personal development and industry progress.

As introduced above, our coding process was transparent and heuristic and relied on abductive reasoning (Cornelissen & Durand, 2014; Dubois & Gadde, 2014). We began the investigation with an inductive exploration of the data and then melded insights from the corpus with language and concepts from the broader stewardship literature. Through this iterative process, we refined and broadened our understanding of stewardship as it pertains to automobility, shedding light on both its potential to drive sustainability transitions and the challenges associated with applying the principles of sustainability accurately and appropriately.

Following a structured, rigorous, and transparent coding procedure has increased the review's reproducibility and credibility. It has also enhanced the reliability and validity of our findings by offering substantive contributions to how knowledge from one domain, automobility, can inform and extend our understanding of the broader conceptions of stewardship.

TABLE 1 Core themes within the concept of environmental stewardship.

Themes	Description	Example codes and citations[a]
Green industry transformation	Reimagining and redesigning industry products to minimize negative impacts on the environment and to optimize resource use.	Circular Economy (Alonso et al., 2006; Demirel et al., 2016), Eco-Design (Zhang, Shao, et al., 2021; Le Duigou & Baley, 2014)
Advanced mobility solutions	Innovative new technologies and strategies that aim to revolutionize the way people and goods are transported while addressing environmental and energy-related challenges.	Autonomous EVs (Chen et al., 2021), Plug-in and Hybrid Electric Vehicle (Montazeri-Gh & Mahmoodi-K, 2016)
Other significant impacts	Adopting sustainability principles to mitigate climate change and ecosystem degradation.	Ecosystem Protection (Aaldering et al., 2019), Land and Water Use (Jiao et al., 2017; Mueller et al., 2015)

[a]The complete list of codes is provided at Appendix B.

TABLE 2 Core themes within the concept of social stewardship.

Themes	Description	Example codes and citations[a]
Social engagement and mobility impact	Engaging with communities, enhancing consumer relationships, and addressing the social challenges that arise in automotive transportation.	Safety Issues (Lee & Tan, 2019), Social Community Programs (Lee & Tan, 2019), Travel Costs (Nurhadi et al., 2017)
Organizational governance and sustainable growth	Industry efforts to foster ethical conduct, social responsibility, and transparency, thus contributing to positive social impacts and sustainable growth.	Regulative Compliance (Avadikyan & Llerena, 2010), Measuring Innovation (Alonso et al., 2006; Kastensson, 2014)
Human capital development and education initiatives	The industry's role in contributing to human development as a valuable asset that not only benefits individuals but also enhances the overall competency and sustainability of the automotive industry.	Capabilities (Bag et al., 2020; Blanas et al., 2012; Jang et al., 2018), Educational Programs (Lee & Tan, 2019)

[a]The complete list of codes is provided in Appendix B.

4 | FINDINGS

In this review, we examined how stewardship might be conceptualized to drive a transformative transition to sustainability. Our analysis begins with the "Current Conceptual Boundaries to Stewardship" because the findings for this theme provide a solid context to the two following themes: "Environmental Stewardship" and "Social Stewardship."

4.1 | The current conceptual boundaries of stewardship

Our corpus consisted of 161 articles published between 1990 and 2022 across 87 outlets—predominantly journals with a management and transport focus. Other spheres of interest included marketing, technology, organizational behavior, manufacturing, logistics, and multidisciplinary journals. Just under half of all articles were published in 10 journal outlets, each of which published three or more papers. Around half were also published in the past 5 years, indicating increased interest in the topic.

While some articles examined the operations of a specific car manufacturer, such as Mitsubishi, Toyota, or Volkswagen (e.g., Cho et al., 2021; Nunes et al., 2010), the predominant focus of the corpus was on industry-level analyses. Eighty-five percent of the articles examine a phenomenon from a macro-industry perspective across the globe, including in organizations based in the United States, Europe, and China (e.g., Ahmadjian & Lincoln, 2001; Maia et al., 2010; Wang et al., 2020).

A small number of articles were conceptual in nature, with the remainder empirical (83%). Conceptual papers included case studies that did not include primary data, such as interviews (see Aitken & Murray, 2010; Blanas et al., 2012), nor conceptual frameworks, such as those developed by Sovacool and Axsen (2018). Of the empirical papers, 55 were deductive and 78 were inductive. The primary methods used in the deductive papers were life cycle analysis, factor and regression analysis, and sensitivity analysis. Most inductive papers were case studies involving primary data, such as interviews and document analysis. A range of theoretical perspectives were taken: actor–network theory (e.g., Hoffmann et al., 2017; Pohl & Yarime, 2012), institutional theory (e.g., Ebrahimi & Koh, 2021; Wang & Tanaka, 2011), systems theory perspectives (e.g., Liu et al., 2020; Nunes et al., 2010), and utility theory (e.g., de Lara & Marx, 2018; Guo et al., 2013). Appendix B provides a list of all theories used within the studies analyzed. The diverse perspectives we found in the sample created a rich tapestry of views on environmental and social stewardship and highlighted key gaps, the most obvious of which was a lack of cross-connection between these two forms of stewardship. Before analyzing the gaps in the literature and the need for further attention to the interconnected nature of environmental and social stewardship, we first present the dominant themes that emerged within each form.

4.2 | Environmental stewardship

Scholars have considered an array of issues and phenomena related to environmental stewardship, which we clustered into three themes: "Green Industry Transformation," "Advanced Mobility Solutions," and "Other Significant Impacts."

4.2.1 | Green industry transformation

This theme concerns reimagining and redesigning various aspects of existing industry products to minimize negative impacts on the environment and optimize resource use. The codes within this theme are generally aspirational in that they each capture some part of transforming the industry in a way that aligns with the principles of a circular economy (e.g., Passarini et al., 2012; Silva-Magalhães et al., 2019; Spreafico, 2021). For example, responsible practices with batteries are covered extensively, with the authors developing and recommending models to illustrate closed-loop distribution supply-chain networks (see Sasikumar & Haq, 2011). Other issues are also discussed—for example, converting waste, like used tires, into energy, like biofuels (Rowhani & Rainey, 2016); making plans for how to use more renewable energy (Lee & Tan, 2019); and better planning to reduce our reliance on rare-earth materials (Alonso et al., 2006; Ciacci et al., 2010; Mayyas et al., 2019; Mikkola, 2001; Parker et al., 1997).

There is also a notable tension within the literature between the urgent need for radical innovation (Hoffmann et al., 2017; Pinkse et al., 2014; Sovacool & Axsen, 2018) and the dominant course of research reflected in the vast majority of articles—incremental innovation. For example, De Stefano et al. (2016, p. 1436) observe that "product stewardship innovations are characterized by incremental changes in product components, with no substantial modifications of the core product concept." A quarter of the articles examining such incremental innovations cover issues such as remanufacturing (Subramoniam et al., 2013), reverse logistics (Abdulrahman et al., 2014; Johnson, 1998), and extended producer responsibility (Carrasco-Gallego et al., 2011). Many authors who examine the industry's design, such as Daaboul et al. (2016) and Ebrahimi and Koh (2021), overlook any detailed consideration of the "cradle-to-grave" thinking that needs to surround the design, manufacture, use, and disposal of assets, even though scholars such as Kumar and Putnam (2008) highlight the basic necessity for such approaches. Indeed, only a few articles examine radical transformation (Kaviani et al., 2020; Magnusson & Berggren, 2011).

4.2.2 | Advanced mobility solutions

A number of vehicular technologies associated with environmental stewardship are considered in the literature, which we labeled "Advanced Mobility Solutions." These solutions cover clean technologies like hybrid vehicles (e.g., Avadikyan & Llerena, 2010; Pohl

et al., 2009), alternative fuel vehicles (e.g., Chi et al., 2012; Jiao et al., 2017; Keith et al., 2017), and autonomous electric vehicles (e.g., Chen et al., 2021). Electric vehicles and electromobility have received a great deal of attention (e.g., de Lara & Marx, 2018; de Luca & Di Pace, 2020; Montazeri-Gh & Mahmoodi-K, 2016). Accordingly, some of the surrounding issues have also been discussed, such as charging requirements (Knapčíková, 2019; Randy, 2011b) and EV batteries (Garcia et al., 2017; Hojas Baenas et al., 2011). Other technologies that have been explored include biofuels (e.g., Jiao et al., 2017; Rowhani & Rainey, 2016), gas vehicles (e.g., Chi et al., 2012), and hydrogen (e.g., Schjølberg & Østdahl, 2008), illustrating that a diverse range of options are being considered along the pathway away from fossil fuels.

Work is also emerging on how we might go about managing the tensions that can result from innovations—for example, how might we balance any trade-offs required between reducing carbon emissions and reducing waste and water use? Alonso et al. (2006) examine electrical and electronic components in the automobility sector. These authors draw on life-cycle assessment and life-cycle costing case studies to illustrate that innovation toward sustainability should also consider improvements on the "end-of-life" and "individual life cycle stages of a product" (p. 328). Mueller et al. (2015) offer insights into some of the other trade-offs that need to be considered with a water assessment tool that can be used to guide improvements to production practices. Staniszewska et al. (2020) add that such decision tools could be usefully extended to consider other sustainability issues, such as ensuring that recycling processes in automobility are energy efficient. As highlighted by Jiao et al. (2017), biodiversity concerns, such as land and water grabs associated with alternative fuels, would also need to be considered.

4.2.3 | Other significant impacts

Understanding and managing the areas of most significant impact is the last theme under the umbrella of environmental stewardship (e.g., Mueller et al., 2015). This theme largely covers discussions on how and why adopting sustainability principles is important in our fight to mitigate climate change and stop ecosystems from degrading. Notably, authors such as Staniszewska et al. (2020) acknowledge the vast scale of issues that must be considered, which include reducing carbon dioxide to address human-induced climate change, making design improvements, reducing our dependence on nonrenewable materials and resources, and considering "manufacturing and distribution and end-of-life" (also see Aitken & Murray, 2010; Eckstein, 2012; Simić et al., 2017). However, few studies take this approach. Instead, they typically only examine a singular element, such as the use of nonrenewable materials like aluminum (e.g., see Li et al., 2020; Passarini et al., 2012; Silva-Magalhães et al., 2019). Although these authors and others (see Aaldering et al., 2019; Lee & Tan, 2019) highlight that the industry cannot sustain the use of such resources and that we should be seeking out sustainable alternatives (e.g., Cheramin et al., 2021; Kastensson, 2014), little guidance is offered on how this might be achieved at scale. Similarly, while many authors point to the need to improve recycling practices in the industry to ensure that the critical materials used in vehicle manufacturing can be recycled, tangible examples of best practices are rare (for some examples, see Eckstein, 2012; Simić et al., 2017).

Overall, the current studies highlight problems more than solutions. For example, authors such as Passarini et al. (2012) and Ciacci et al. (2010) focus on the negative environmental impact of how some materials are treated at the end of their life, such as automotive shredder residue, which contains hazardous materials. It also appears well known within the industry that greater attention to environmental stewardship is required, especially over issues like climate change (e.g., Ahmadjian & Lincoln, 2001; Becherif et al., 2019; Rebitzer & Buxmann, 2005) and resource use (e.g., Abdulrahman et al., 2014; Bag et al., 2020), but an overarching consensus on how such issues might be approached in an integrated fashion has not yet been reached.

4.3 | Social stewardship

Social stewardship is an equally diverse theme that covers 3 second-order topics: "Social Engagement and Mobility Impact," "Organizational Governance and Sustainable Growth," and "Human Capital Development and Education Initiatives."

4.3.1 | Social engagement and mobility impact

This theme relates to industry activities intended to engage with communities, enhance consumer relationships, and address the social challenges arising from transportation. Again, the literature highlights a tension between how new technologies impact social equity and the effects of policies designed to improve environmental performance—policies on automobile prices (Daaboul et al., 2016; Feltus, 2008; Jindal & Sangwan, 2015), travel costs (Nurhadi et al., 2017), and consumer choices (Govindan et al., 2019; Keith et al., 2017; Sarkis et al., 2010). In some studies, such as those pointing to carsharing as a solution (de Lara & Marx, 2018), the consumers hold a stewardship role (e.g., Riggs, 2015). In others, such as Sovacool and Axsen (2018), private vehicles are deeply enmeshed in issues related to personal identity and social status. That said, few scholars tackle these social issues. Instead, most focus on the technological aspects of change (e.g., see Blanas et al., 2012; Christopher & Towill, 2001).

Of the studies that do consider social enablers of change, Lee and Tan (2019) and others (see Hoffmann et al., 2017; Magnusson & Berggren, 2011) point to several promising developments, all of which seek to place consumers at the center of stewardship efforts. For example, authors such as Wiedmann et al. (2011) provide examples of car manufacturers who have invested in initiatives that build ties with consumers in the hopes of building brand loyalty alongside a greater acceptance of change. They also highlight initiatives to help consumers understand the environmental impacts of automobility.

Scholars have also examined other means of facilitating stewardship, including eco-labeling (Staniszewska et al., 2020; Villanueva-Rey

et al., 2018) and publicly disclosing environmental and social performance information (Cho et al., 2021; Ohvanainen & Hietikko, 2012). These studies commonly report that the kind of regulatory pressure that influences fossil fuel prices (Avadikyan & Llerena, 2010; Keith et al., 2017) and disclosure (e.g., Cho et al., 2021) also encourages consumers and manufacturers to pay greater attention to environmentally friendly products (also see Dijk & Yarime, 2010; Govindan et al., 2019; Hojas Baenas et al., 2011). Additionally, there are other social issues, such as product recalls, that influence social perceptions within the industry. For example, Bernon et al. (2018) find that supply-chain failures, which lead to product recalls are costly for car manufacturers and tend to result in a lowering of share prices. As seen below, these authors and others (e.g., De Stefano et al., 2016) show that stewardship within the industry requires considerable attention be paid to governance.

4.3.2 | Organizational governance and sustainable growth

The literature also discusses a range of issues related to organizational governance and sustainable growth within the industry (e.g., Dyer, 1996). Hence, this theme captures industry efforts to foster ethical conduct, social responsibility, and transparency, all of which contribute to a positive social impact and sustainable growth (e.g., see Cho et al., 2021). Tensions that managers face when acting in the long-term interests of a firm are also discussed within this theme (e.g., Powers & Steward, 2010). Several authors highlight that, while a business's longevity should be the ultimate aim for companies, managers still face constant pressure to produce favorable returns in the short term (e.g., Costello et al., 2013). Often, such results are expressed through share prices (e.g., Powers & Steward, 2010; Subramoniam et al., 2009, 2013). This pressure can impact investment in stewardship initiatives, including improving environmental performance (e.g., Abolhassani et al., 2019) and maintaining long-term relationships with employees and suppliers during times of crises (e.g., Ahmadjian & Lincoln, 2001). Further, while employee issues such as the need to increase diversity in the workplace are discussed, they are only explored conceptually (e.g., Lee & Tan, 2019), and empirical data on the implications of any current action (or inaction) are seldom provided. Thus, while other social issues, such as reducing environmental fraud, corporate misconduct and scandals (Avadikyan & Llerena, 2010; Wood et al., 2018), and responsible data stewardship (Daaboul et al., 2016; Soley et al., 2018; Sütőová, 2018), are covered in the literature, they are not yet connected to a deep understanding of the broader employee and governance issues facing the industry.

4.3.3 | Human capital development and education initiatives

Our final theme concerns the industry's role in contributing to human development. Human capital is a valuable asset, and cultivating it not only benefits individuals but also increases the overall competency and sustainability of the automotive industry. While Sarkis et al. (2010) highlight that some kind of radical transformation might be achieved through greater training and skills development, few studies examine how workforce development can improve environmental and social practices. The field acknowledges that the automotive industry can positively affect individuals by, say, developing employee capabilities (Bag et al., 2020; Blanas et al., 2012). Indeed, Lee and Tan (2019) and others (e.g., see Abolhassani et al., 2019; Gupta & Prasad, 2011) provide many examples of how car manufacturers can promote social well-being by investing in training and education programs for employees. However, scholars such as Fried and Tiegs (1993, p. 481) highlight that working in this industry can cause also employees "stress and strain." Hence, they argue for social support programs beyond skills development and training. Further, the literature highlights that the industry needs to pay more attention to using human capital to improve environmental stewardship (Sarkis et al., 2010). In the following section, we draw on the insights generated from our findings to offer just such an expanded conceptualization.

5 | DISCUSSION

This review enriches the literature by broadening our conceptualizations of stewardship beyond the traditionally limited focus of employees and firm relations (Davis et al., 1997). In our expanded framework, stewardship begins to encompass concepts like environmental conservation and social impact and the transition toward sustainability (see Bebbington et al., 2019). These are just a few among many more elements that ought to be included in an expanded conceptualization of stewardship.

5.1 | The transition to sustainability as a concept of stewardship

This review highlights that stewardship can manifest through more advanced product designs that attempt to integrate the principles of a circular economy (e.g., Demirel et al., 2016; Eckstein, 2012). Stewardship may also extend to the types of technological innovations associated with novel vehicle types and alternative fuel options (e.g., Chen et al., 2021; Zapata & Nieuwenhuis, 2010), or it might involve strategies aimed at minimizing significant impacts on the environment (e.g., Aaldering et al., 2019).

In the context of social stewardship, our analysis highlights that organizations need to be attentive to consumer needs (e.g., Bernon et al., 2018) and that sound governance can help to avoid scandals and the need for greenwashing (e.g., Wood et al., 2018). In fact, we found dozens of initiatives and ideas that would fall under an expanded definition of stewardship that researchers might look to explore further in future.

We also observed a notable lacuna in scholarly focus on the interplay between environmental and social stewardship. For instance,

while better recycling practices may help to improve environmental management, they can also produce hazardous materials (see Ciacci et al., 2010). Yet most studies in our review only examine one side of the coin, neglecting data related to potential synergies or trade-offs with other areas of stewardship. In Section 5.2, we have specifically highlighted a number of promising areas to explore. For example, most studies on reducing carbon emissions do not discuss whether the processes used have positive or negative implications for other resources, such as water (e.g., de Lara & Marx, 2018). Another area that requires deeper investigation is engaging with investors and shareholders to balance the demand for better environmental and social standards while also delivering profits and solid returns for shareholders (e.g., Wood et al., 2018).

Figure 1 depicts an extended version of the stewardship framework. Its extended reach to different contexts holds many promising avenues for future research. Moreover, this model is highly generalizable and could apply to many diverse sectors beyond the automotive industry, where the need for a transformative change toward sustainability is equally pressing (e.g., Dodd & Yengin, 2021; Tsoi & Loo, 2021). By investigating the overlaps between environmental and social stewardship, scholars are not only likely to acquire valuable perspectives on how stewardship can drive the transition to sustainability in a range of settings, they may also find solutions to previously unaddressed challenges.

5.2 | Significant areas for future research

Within our review, and as shown in Figure 1, many academics have called for future research to explore and improve how we, as a field,

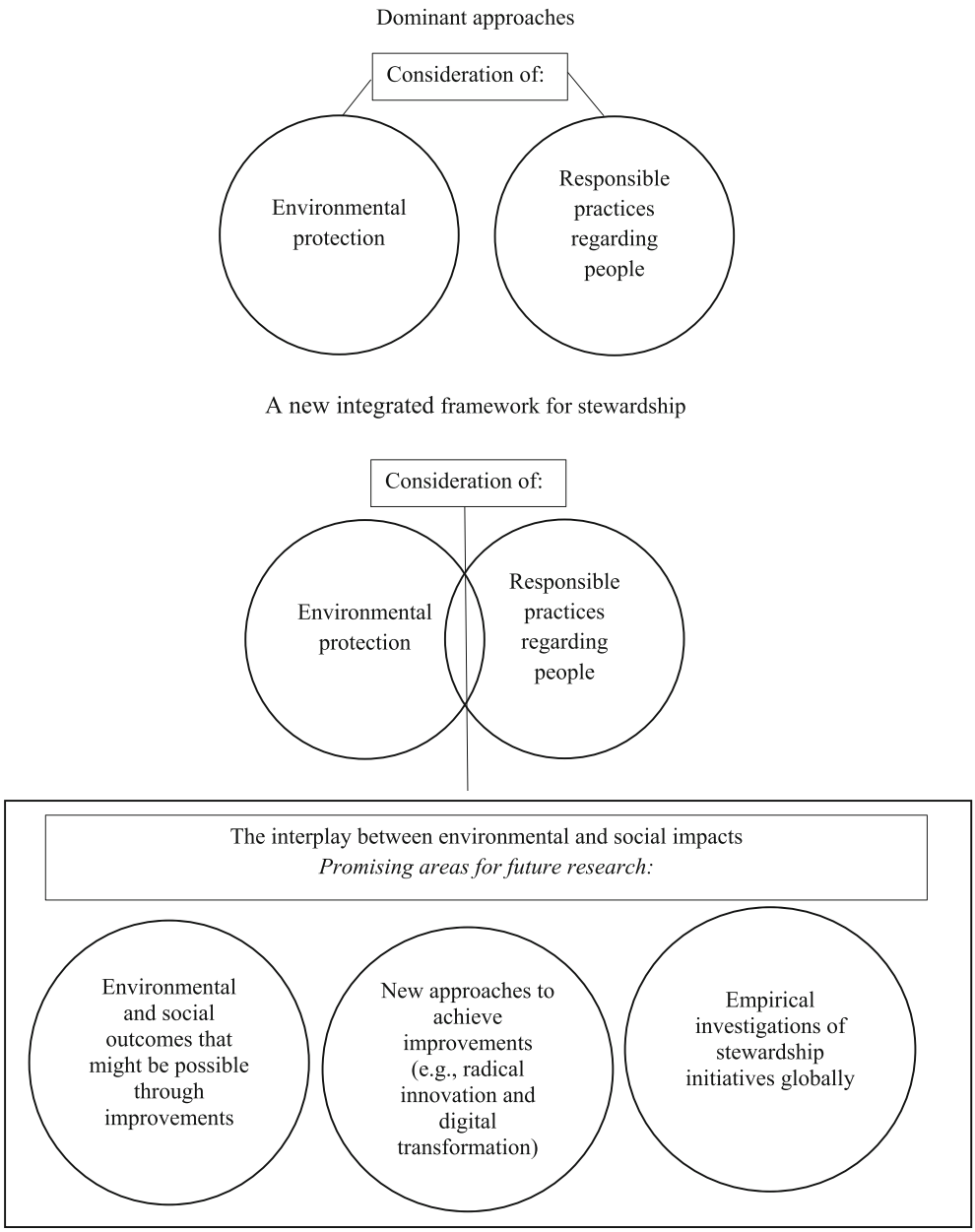

FIGURE 1 Framework for stewardship for sustainable business practices.

assess and report the environmental and social implications of innovation for better decision-making (e.g., Alonso et al., 2006; Kastensson, 2014). This finding aligns with those outside the review who suggest the need for further innovations to business models (e.g., Armstrong & Grobbelaar, 2022; Kennedy & Linnenluecke, 2022; Shashi et al., 2021). Moreover, these calls are particularly pertinent to new data-driven innovations that can help to create more sustainable products and processes (e.g., Centobelli et al., 2022; Daaboul et al., 2016; Neto & Dutordoir, 2020; Soley et al., 2018). For instance, Baehr and Fliaster (2023) argue that while digital technology harbors the potential to reshape business models to offer sustainability improvements, these innovations are often underexploited. Our review identifies a dearth of research in this regard, which suggests a promising area for future attention (for recent work in this field, see Awan & Sroufe, 2020).

Notably, most of the articles in our review appear to reinforce rather than challenge current paradigms and mental models of automobility. The broader research shows that these views are counterproductive to the radical transformation required to reduce the environmental and social harm of human activity (Hoffman, 1999; Maguire & Hardy, 2013), including automobility (Smith & Crotty, 2008; Sonar et al., 2022). The articles within our review also show that further work and action is required to educate consumers on the tensions and trade-offs associated with automobility to help them make more sustainable decisions (Riggs, 2015).

One notable omission in the corpus pertains to empirical investigations of emerging stewardship initiatives, such as those mounted by the Battery Stewardship Council (2022) and Tyre Stewardship Australia (2022). Further work is required to examine whether and how these programs can shift the current paradigm toward more of a circular economy model. As The McKell Institute (2021) notes, such a paradigm would place greater value on the resources used, which are often high in value and useable beyond the vehicle's lifespan. This call for scholarly attention aligns with the broader academic discourse that begs for more work to understand the antecedents of effective stewardship—and, in particular, how the interplay between individual and institutional considerations might inform transformational innovation (Awan, 2019; Awan & Sroufe, 2022; Begum et al., 2022).

5.3 | Research gaps across the corpus and implications for academia

Several noteworthy research gaps emerged under the "Environmental Stewardship" theme that warrant further scholarly investigation. Under "Green Industry Transformation," we observed a distinct lack of research into radical innovations. Most studies focus on incremental innovations to a product's components, often bypassing substantial alterations to the core product itself. Further, we noted the conspicuous absence of detailed "cradle-to-grave" perspectives despite the critical role this kind of comprehensive thinking plays in the transformation to sustainability (Pohl, 2012; Suo et al., 2020; Zhu et al., 2015).

Our analysis of "Advanced Mobility Solutions" also underscores a need to delve deeper into the challenges and trade-offs that arise when different clean technologies are integrated. While a range of innovative clean technologies, such as electric vehicles, biofuels, gas vehicles, and hydrogen, have been examined (see Appendix B), we have not yet formed a comprehensive understanding of how these technologies might be harmonized. Additionally, an intriguing gap exists in terms of how to scale such sustainable alternatives up to the industry level.

Lastly, our analysis of "Other Significant Impacts" highlights the need for integrated solutions that bridge both the environmental and social dimensions. Although the literature recognizes the imperative of reducing carbon emissions, improving resource utilization, and embracing the principles of a circular economy, the absence of holistic strategies to manage significant impacts in an integrated and sustainable manner is palpable. A comprehensive exploration of the intersection between environmental and social concerns remains elusive, as studies often focus on environmental factors without fully integrating the socio-economic aspects of the problem.

Equally noteworthy within the "Social Engagement and Mobility Impact" theme is the salient role consumers play in the stewardship equation. Tensions surface around issues like the dynamics of how automobiles are priced and the deep-rooted association between private vehicles, personal identity, and social status. Empirical explorations of these social dynamics are limited, which hints at uncharted territory requiring further investigation. Emerging strategies like eco-labeling and publicly disclosing environmental and social performance data are indicative of the evolving landscape of corporate-social engagement. They also offer a window into how regulatory frameworks and market dynamics can stimulate environmentally friendly consumer choices. Nevertheless, a cohesive framework that fully incorporates consumers into the sustainability fold has not been developed and remains a salient priority for future research.

In the domain of "Organizational Governance and Sustainable Growth," our analysis highlights the complexities of fostering ethical conduct, social responsibility, and transparency. A tension exists for managers between pursuing long-term sustainability and short-term financial performance. While studies acknowledge the importance of cultivating long-standing relationships with employees and suppliers, we observed a notable gap in empirical explorations of their dynamics. Moreover, the relatively untapped field of business model innovation and digital technology-enabled transformations offers fertile ground for future research.

Our review also sheds light on the industry's role in shaping "Human Capital Development and Education Initiatives." Workforce development plays a critical role in improving environmental and social practices. However, most investigations only skim the surface, primarily focusing on skills development while neglecting the broader realm of employee well-being. Although a handful of studies do showcase instances where car manufacturers have invested in training and education programs and scholarships, a more holistic consideration of workforce dynamics, stress, and well-being presents a promising avenue for future research.

As shown in Figure 1, our analysis underscores the pressing need for integrated solutions that bridge the gap between environmental and social dimensions. While recognizing the imperatives of reducing carbon emissions, optimizing our use of resources, and adopting the principles of a circular economy, the scarcity of holistic strategies emerges as a key gap. Our review highlights that existing studies tend to address environmental issues in isolation without fully integrating the socio-economic dimensions of the problems faced. This is a chasm in thinking that calls for an integrated scholarly approach—one that not only acknowledges the symbiotic relationship between society and the environment but also includes strategies that align and harmonize these dimensions for more effective and sustainable outcomes (Harvey, 2023).

5.4 | Research implications for managers

Our study yields valuable insights for managers in the automotive sector. Specifically, we emphasize the importance of recognizing the emerging tensions and trade-offs when considering the links between environmental and social issues. For example, the legislated definitions of stewardship, such as that provided by the Australian *Recycling and Waste Reduction Bill 2020* (Commonwealth of Australia, 2020), apply a narrow definition to the design and manufacture of products. Such definitions may lead managers to limit investment and funding by omitting complex environmental and social considerations relating to our needed transition to a circular economy (Awan & Sroufe, 2022). This limitation was seen in 2022 when the Australian Government allocated $1 million to the Federal Chamber of Automotive Industries to "ensure that more components of Australia's waste vehicles can be recycled" (Evans, 2022, para 2), but overlooked the social issues inherent to recycling supply chains, such as human rights. This may seem to be a cup-half-empty view, but this omission is particularly salient given that the links between recycling and modern slavery are well documented—particularly when Western waste is recycled in jurisdictions where questionable practices exist (Sims Limited, 2020).[1] Further work is required to examine these tensions to develop an expanded understanding of how an integrated vision of environmental and social stewardship can be applied.

5.5 | Limitations and other areas for future research

Our research is not without limitations, but these conditions offer opportunities for future research. Most notably, the scope of our review is confined to the stewardship literature published in academic journals that specifically pertain to the automotive industry and automobility. Non-industry-specific stewardship literature as well as "gray" literature, such as industry reports and conference papers, may add further insight that could enrich our work. Our review and findings are also largely conceptual and merit further empirical examination. Future reviews seeking to provide advice to the industry on the antecedents and consequences of adopting an integrated approach could do so through meta-analytic examinations, while other important issues, such as digital transition issues, could also be considered.[2] Moreover, we examine only one area of transport, namely, automobility, leaving room for scholars to examine our framework in other critical areas, such as air travel (Dodd & Yengin, 2021) and shipping (Tsoi & Loo, 2021), which face different, but equally important, environmental and social challenges.

6 | CONCLUSION

From a comprehensive analysis of the literature on stewardship in the automotive industry, we developed an expanded conceptualization of this prescient topic. Our revised framework showcases the burgeoning academic interest in stewardship within the context of automobility. It also extends our current body of knowledge in this field with the aim of safeguarding our environmental and social resources. From our analysis, we discerned that there are two facets to stewardship—environmental and social—each of which contributes to a more nuanced understanding of the concept. Importantly, our investigation not only reveals gaps in our current understanding of stewardship but also yields fertile ground for future research endeavors. As we pave the way toward a sustainable future, we underscore the significance of holistic strategies that will help to bridge the gap between the environmental and the social. The hope is that, by marrying these two dimensions, we will come upon integrated approaches to addressing the automotive industry's multifaceted sustainability challenges.

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REFERENCES

Articles marker with an Asterix are included in the 161 articles reviewed.

Aaldering, L. J., Leker, J., & Song, C. H. (2019). Competition or collaboration?—Analysis of technological knowledge ecosystem within the field of alternative powertrain systems: A patent-based approach. *Journal of Cleaner Production*, *212*(2019), 362–371.

Abdulrahman, M. D., Gunasekaran, A., & Subramanian, N. (2014). Critical barriers in implementing reverse logistics in the Chinese manufacturing sectors. *International Journal of Production Economics*, *147*, 460–471.

[1]Modern slavery "includes illegal workplace practices, such as trafficking in persons, [traditional] slavery, servitude, forced marriage, forced labor, debt bondage, [the worst forms of] child labor, and deceptive recruiting for labor or services" (Dodd et al., 2022, p. 1).

[2]Thank you to the anonymous reviewer who made this suggestion.

Abolhassani, A., James Harner, E., & Jaridi, M. (2019). Empirical analysis of productivity enhancement strategies in the North American automotive industry. *International Journal of Production Economics*, *208*, 140–159.

Agapiou, J. S. (2014). Inertia welding for assembly of copper squirrel cages for electric motors. *Journal of Manufacturing Processes*, *16*(2), 276–283.

Ahmad, S., & Mohsin Butt, M. (2012). Can after sale service generate brand equity? *Marketing Intelligence & Planning*, *30*(3), 307–323.

Ahmadjian, C. L., & Lincoln, J. R. (2001). Keiretsu, governance, and learning: Case studies in change from the Japanese automotive industry. *Organization Science*, *12*(6), 683–701.

Aitken, J., & Murray, A. (2010). Crash repair in the UK: Reusing salvaged parts in car repair centres. *International Journal of Logistics Research and Applications*, *13*(5), 359–372.

Aleyari, A., Majidi, O., Bombardier, N., Pham, X.-T., & Jahazi, M. (2020). Finite element and experimental analysis of the preheating stage of high speed blow forming (HSBF) process. *Journal of Manufacturing Processes*, *49*, 10–17.

Alonso, J. C., Dose, J., Fleischer, G., Geraghty, K., Greif, A., Rodrigo, J., & Schmidt, W.-P. (2006). Electrical and electronic components in the automotive sector: Economic and environmental assessment. *The International Journal of Life Cycle Assessment*, *12*(5), 328–335.

Alvesson, M., & Sandberg, J. (2020). The problematizing review: A counterpoint to Elsbach and Van Knippenberg's argument for integrative reviews. *Journal of Management Studies*, *57*(6), 1290–1304.

Andriankaja, H., Bertoluci, G., & Millet, D. (2013). Development and integration of a simplified environmental assessment tool based on an environmental categorisation per range of products. *Journal of Engineering Design*, *24*(1), 1–24.

Armstrong, R. M., & Grobbelaar, S. S. S. (2022). Sustainable business models for social enterprises in developing countries: A conceptual framework. *Management Review Quarterly*, *2022*, 1–54.

Aßländer, M., Roloff, J., & Nayır, D. (2016). Suppliers as stewards? Managing social standards in first-and second-tier suppliers. *Journal of Business Ethics*, *139*(4), 661–683.

Australian Government. (2020). Australia's emissions projections 2020. https://www.industry.gov.au/sites/default/files/2020-12/australias-emissions-projections-2020.pdf. Accessed 16 September 2022.

Avadikyan, A., & Llerena, P. (2010). A real options reasoning approach to hybrid vehicle investments. *Technological Forecasting and Social Change*, *77*(4), 649–661.

Awan, U. (2019). Effects of buyer–supplier relationship on social performance improvement and innovation performance improvement. *International Journal of Applied Management Science*, *11*(1), 21–35.

Awan, U., & Sroufe, R. (2020). Interorganisational collaboration for innovation improvement in manufacturing firms's: The mediating role of social performance. *International Journal of Innovation Management*, *24*(05), 1–23.

Awan, U., & Sroufe, R. (2022). Sustainability in the circular economy: Insights and dynamics of designing circular business models. *Applied Sciences*, *12*(3), 1–30.

Azevedo, S. G., Carvalho, H., & Cruz Machado, V. (2011). The influence of green practices on supply chain performance: A case study approach. *Transportation Research Part E: Logistics and Transportation Review*, *47*(6), 850–871.

Baehr, K., & Fliaster, A. (2023). The twofold transition: Framing digital innovations and incumbents' value propositions for sustainability. *Business Strategy and the Environment*, *32*(2), 920–935.

Bag, S., & Gupta, S. (2019). Examining the effect of green human capital availability in adoption of reverse logistics and remanufacturing operations performance. *International Journal of Manpower*, *41*(7), 1097–1117.

Bag, S., Gupta, S., & Luo, Z. (2020). Examining the role of logistics 4.0 enabled dynamic capabilities on firm performance. *The International Journal of Logistics Management*, *31*(3), 607–628.

Bai, C., Dallasega, P., Orzes, G., & Sarkis, J. (2020). Industry 4.0 technologies assessment: A sustainability perspective. *International Journal of Production Economics*, *229*, 1–15.

Balakrishnan, J., Malhotra, A., & Falkenberg, L. (2017). Multi-level corporate responsibility: A comparison of Gandhi's trusteeship with stakeholder and stewardship frameworks. *Journal of Business Ethics*, *141*(1), 133–150.

Battery Stewardship Council. (2022). What is battery stewardship? https://bsc.org.au/what-is/. Accessed 16 September 2022.

Bebbington, J., Österblom, H., Crona, B., Jouffray, J. B., Larrinaga, C., Russell, S., & Scholtens, B. (2019). Accounting and accountability in the Anthropocene. *Accounting, Auditing & Accountability Journal*, *33*(1), 152–177.

Becherif, M., Ramadan, H. S., & Cai, S. (2019). How nonlinear control can enhance the automobile efficiency and reduce harmful emissions: China case study. *Journal of Cleaner Production*, *212*, 70–80.

Bedoya-Villa, M. A., & Escobar-Sierra, M. (2018). Impact of employees' attitudes and leader's role on the innovation management linked to social responsibility. *Quality Innovation Prosperity*, *22*(2), 65–81.

Begum, S., Ashfaq, M., Xia, E., & Awan, U. (2022). Does green transformational leadership lead to green innovation? The role of green thinking and creative process engagement. *Business Strategy and the Environment*, *31*(1), 580–597.

Bernon, M., Bastl, M., Zhang, W., & Johnson, M. (2018). Product recalls: The effects of industry, recall strategy and hazard, on shareholder wealth. *International Journal of Business Science & Applied Management*, *13*(1), 1–14.

Biondi, S., Calabrese, A., Capece, G., Costa, R., & Di Pillo, F. (2013). A new approach for assessing dealership performance: An application for the automotive industry. *International Journal of Engineering Business Management*, *5*(18), 1–8.

Biswas, T. K., & Das, M. C. (2018). Selection of hybrid vehicle for green environment using multi-attributive border approximation area comparison method. *Management Science Letters*, *8*(2018), 121–130.

Blanas, G., Koukoumialos, S., & Kylindri, S. (2012). Reverse logistics strategic antinomies: The case of the automotive sector. *International Journal of Business Science & Applied Management (IJBSAM)*, *7*(3), 3–11.

Business & Human Rights Resource Centre. (2020). Tesla secures cobalt sourcing deal with Glencore, despite human rights concerns linked to cobalt mining. https://www.business-humanrights.org/en/latest-news/tesla-secures-cobalt-sourcing-deal-with-glencore-despite-human-rights-concerns-linked-to-cobalt-mining/. Accessed 10 April 2023.

Cano-Kollmann, M., Awate, S., Hannigan, T. J., & Mudambi, R. (2018). Burying the hatchet for catch-up: Open innovation among industry laggards in the automotive industry. *California Management Review*, *60*(2), 17–42.

Carrasco-Gallego, R., Delgado-Hipólito, J., & Ponce-Cueto, E. (2011). Reverse logistics in the automotive industry: Organizational models for waste generated in repair shops. *Information Technologies in Environmental Engineering*, *3*(2011), 569–578.

Centobelli, P., Cerchione, R., Oropallo, E., El-Garaihy, W. H., Farag, T., & Al Shehri, K. H. (2022). Towards a sustainable development assessment framework to bridge supply chain practices and technologies. *Sustainable Development*, *30*(4), 647–663.

Chan, F. T. S., Chan, H. K., & Jain, V. (2012). A framework of reverse logistics for the automobile industry. *International Journal of Production Research*, *50*(5), 1318–1331.

Chang, N. B. (2008). Economic and policy instrument analyses in support of the scrap tire recycling program in Taiwan. *Journal of Environmental Management*, *86*(3), 435–450.

Chen, Y., Feng, G., Wu, S., Tan, X., & Yu, B. (2021). A new hybrid model predictive controller design for adaptive cruise of autonomous electric vehicles. *Journal of Advanced Transportation*, *2021*, 1–25.

Cheramin, M., Saha, A. K., Cheng, J., Paul, S. K., & Jin, H. (2021). Resilient NdFeB magnet recycling under the impacts of COVID-19 pandemic:

Stochastic programming and benders decomposition. *Transportation Research Part E: Logistics and Transportation Review*, *155*(2021), 1–24.
Chesterton, A. (2018). How many cars are there in the world? https://www.carsguide.com.au/car-advice/how-many-cars-are-there-in-the-world-70629. Accessed 16 September 2022.
Chi, C., Ma, T., & Ning, F. (2012). Technology/infrastructure diffusion of natural gas vehicles: The case of Shanghai. *International Journal of Energy Sector Management*, *6*(1), 33–49.
Cho, S.-H., DeMiguel, V., & Hwang, W. (2021). Cover-up of vehicle defects: The role of regulator investigation announcements. *Management Science*, *67*(6), 3834–3852.
Christensen, T. B. (2011). Modularised eco-innovation in the auto industry. *Journal of Cleaner Production*, *19*(2–3), 212–220.
Christopher, M., & Towill, D. (2001). An integrated model for the design of agile supply chains. *International Journal of Physical Distribution and Logistics Management*, *31*(4), 235–246.
Ciacci, L., Morselli, L., Passarini, F., Santini, A., & Vassura, I. (2010). A comparison among different automotive shredder residue treatment processes. *The International Journal of Life Cycle Assessment*, *15*(9), 896–906.
Climate Council. (2022). What's the deal with transport emissions? https://www.climatecouncil.org.au/resources/transport-emissions-and-climate-solutions/. Accessed 16 September 2022.
Commonwealth of Australia. (2020). Recycling and Waste Reduction Bill 2020. https://www.aph.gov.au/Parliamentary_Business/Bills_Legislation/Bills_Search_Results/Result?bId=r6573. Accessed 4 May 2022.
Cornelissen, J. P., & Durand, R. (2014). Moving forward: Developing theoretical contributions in management studies. *Journal of Management Studies*, *51*(6), 995–1022.
Costello, S. B., Bargh, L. S., Henning, T. F., & Hendry, M. (2013). Targeting transportation cost reductions through maintenance-a proposed new pavement performance measure. *Road & Transport Research: A Journal of Australian and New Zealand Research and Practice*, *22*(1), 3–13.
Cullen, J. G. (2020). Moral recovery and ethical leadership. *Journal of Business Ethics*, *175*(3), 1–13.
Daaboul, J., Le Duigou, J., Penciuc, D., & Eynard, B. (2016). An integrated closed-loop product lifecycle management approach for reverse logistics design. *Production Planning and Control*, *27*(13), 1062–1077.
Dai, J., Li, R., Liu, Z., & Lin, S. (2021). Impacts of the introduction of autonomous taxi on travel behaviors of the experienced user: Evidence from a one-year paid taxi service in Guangzhou, China. *Transportation Research Part C: Emerging Technologies*, *130*, 1–16.
Davis, J., Schoorman, F., & Donaldson, L. (1997). Toward a stewardship theory of management. *Academy of Management Review*, *22*(1), 20–47.
de Lara, F. F., & Marx, R. (2018). Comparative positioning between Brazilian subsidiaries and European matrices on electromobility and carsharing technologies. *Research in Transportation Business & Management*, *27*, 67–74.
de Luca, S., & Di Pace, R. (2020). Did attitudes interpret and predict "better" choice behaviour towards innovative and greener automotive technologies? A hybrid choice modelling approach. *Journal of Advanced Transportation*, *2020*, 1–22.
de Souza, L. P., Lora, E. S., Palacio, C. E., Rocha, M. H., Renó, L. G., & Venturini, O. J. (2018). Comparative environmental life cycle assessment of conventional vehicles with different fuel options, plug-in hybrid and electric vehicles for a sustainable transportation system in Brazil. *Journal of Cleaner Production*, *203*, 444–468.
De Stefano, M. C., Montes-Sancho, M. J., & Busch, T. (2016). A natural resource-based view of climate change: Innovation challenges in the automobile industry. *Journal of Cleaner Production*, *139*, 1436–1448.
Demirel, E., Demirel, N., & Gökçen, H. (2016). A mixed integer linear programming model to optimize reverse logistics activities of end-of-life vehicles in Turkey. *Journal of Cleaner Production*, *112*, 2101–2113. https://doi.org/10.1016/j.jclepro.2014.10.079
Dijk, M., & Yarime, M. (2010). The emergence of hybrid-electric cars: Innovation path creation through co-evolution of supply and demand. *Technological Forecasting and Social Change*, *77*(8), 1371–1390. https://doi.org/10.1016/j.techfore.2010.05.001
Dodd, T., Guthrie, J., & Dumay, J. (2022). Management controls and modern slavery risks in the building and construction industry: Lessons from an Australian social housing provider. *The British Accounting Review*, *101*(098), 1–19.
Dodd, T., & Yengin, D. (2021). Deadlock in sustainable aviation fuels: A multi-case analysis of agency. *Transportation Research Part D: Transport and Environment*, *94*, 1–14. https://doi.org/10.1016/j.trd.2021.102799
Dubois, A., & Gadde, L. E. (2014). "Systematic combining"—A decade later. *Journal of Business Research*, *67*(6), 1277–1284. https://doi.org/10.1016/j.jbusres.2013.03.036
Durach, C. F., Kembro, J. H., & Wieland, A. (2021). How to advance theory through literature reviews in logistics and supply chain management. *International Journal of Physical Distribution and Logistics Management*, *51*(10), 1090–1107. https://doi.org/10.1108/IJPDLM-11-2020-0381
Dyer, J. H. (1996). Does governance matter? Keiretsu alliances and asset specificity as sources of Japanese competitive advantage. *Organization Science*, *7*(6), 649–666. https://doi.org/10.1287/orsc.7.6.649
Ebrahimi, S., & Koh, L. (2021). Manufacturing sustainability: Institutional theory and life cycle thinking. *Journal of Cleaner Production*, *298*(2021), 1–10.
Eckstein, B. (2012). From your car to your patio: Using recycled tire products in building projects. *Journal of Green Building*, *7*(3), 16–31. https://doi.org/10.3992/jgb.7.3.16
Evans, T. (2022). $3 million to help Australians recycle better. https://minister.awe.gov.au/evans/media-releases/3-million-help-australians-recycle-better. Accessed 16 September 2022.
Fan, G. H., & Zietsma, C. (2017). Constructing a shared governance logic: The role of emotions in enabling dually embedded agency. *Academy of Management Journal*, *60*(6), 2321–2351. https://doi.org/10.5465/amj.2015.0402
Feltus, A. (2008). What's driving the US? *Petroleum Economist*, *75*, 20–22.
Ferguson, N., & Browne, J. (2010). Issues in end-of-life product recovery and reverse logistics. *Production Planning and Control*, *12*(5), 534–547. https://doi.org/10.1080/09537280110042882
Fried, Y., & Tiegs, R. B. (1993). The main effect model versus buffering model of shop steward social support: A study of rank-and-file auto workers in the USA. *Journal of Organizational Behavior*, *14*(5), 481–493. https://doi.org/10.1002/job.4030140509
Friedrich, J., Ge, M., & Pickens, A. (2020). *World's top emitters interactive chart*. World Resources Institute. https://www.wri.org/insights/interactive-chart-shows-changes-worlds-top-10-emitters. Accessed 16 September 2022.
Ganesarajan, D., Simon, L., Tamrakar, S., Kiziltas, A., Mielewski, D., Behabtu, N., & Lenges, C. (2022). Hybrid composites with engineered polysaccharides for automotive lightweight. *Composites Part C*, *7*(22), 100222. https://doi.org/10.1016/j.jcomc.2021.100222
Garcia, J., Millet, D., Tonnelier, P., Richet, S., & Chenouard, R. (2017). A novel approach for global environmental performance evaluation of electric batteries for hybrid vehicles. *Journal of Cleaner Production*, *156*(2017), 406–417. https://doi.org/10.1016/j.jclepro.2017.04.035
González-Torre, P., Álvarez, M., Sarkis, J., & Adenso-Díaz, B. (2010). Barriers to the implementation of environmentally oriented reverse logistics: Evidence from the automotive industry sector. *British Journal of Management*, *21*(4), 889–904. https://doi.org/10.1111/j.1467-8551.2009.00655.x
Goodpaster, K. E., Maines, T. D., Naughton, M., & Shapiro, B. (2018). Using UNPRME to teach, research, and enact business ethics: Insights from the catholic identity matrix for business schools. *Journal of Business Ethics*, *147*(4), 761–777. https://doi.org/10.1007/s10551-017-3434-5

Govindan, K., Azevedo, S. G., Carvalho, H., & Cruz-Machado, V. (2014). Impact of supply chain management practices on sustainability. *Journal of Cleaner Production*, *85*(2014), 212–225. https://doi.org/10.1016/j.jclepro.2014.05.068

Govindan, K., Kadziński, M., Ehling, R., & Miebs, G. (2019). Selection of a sustainable third-party reverse logistics provider based on the robustness analysis of an outranking graph kernel conducted with ELECTRE I and SMAA. *Omega*, *85*, 1–15. https://doi.org/10.1016/j.omega.2018.05.007

Govindan, K., Mina, H., Esmaeili, A., & Gholami-Zanjani, S. M. (2020). An integrated hybrid approach for circular supplier selection and closed loop supply chain network design under uncertainty. *Journal of Cleaner Production*, *242*(2020), 1–16.

Grassano, N., Hernandez Guevara, H., Fako, P., Tübke, A., Amoroso, S., Georgakaki, A., Napolitano, L., Pasimeni, F., Rentocchini, F., Compaño, R., Fatica, S., & Panzica, R. (2021). The 2021 EU Industrial R&D Investment Scoreboard, EUR 30902 EN, Publications Office of the European Union, Luxembourg, 2021, ISBN 978-92-76-44399-5, doi:https://doi.org/10.2760/559391

Greene, D. L. (1990). Fuel choice for multi-fuel vehicles. *Contemporary Economic Policy*, *8*(4), 118–137. https://doi.org/10.1111/j.1465-7287.1990.tb00306.x

Guo, L., Huang, S., & Sadek, A. W. (2013). A novel agent-based transportation model of a university campus with application to quantifying the environmental cost of parking search. *Transportation Research Part A: Policy and Practice*, *50*, 86–104. https://doi.org/10.1016/j.tra.2013.01.045

Gupta, J., Reynolds, N., Chiciudean, T., & Kendall, K. (2020). A comparative study between epoxy and vinyl ester CF-SMC for high volume automotive composite crash structures. *Composite Structures*, *244*, 112299. https://doi.org/10.1016/j.compstruct.2020.112299

Gupta, S., & Prasad, A. (2011). Productivity-based hybrid model: Learning from the indo-Japanese and Indian auto sector. *Journal of Advances in Management Research*, *8*(1), 158–171. https://doi.org/10.1108/09727981111129354

Gupta, S., Soni, U., & Kumar, G. (2019). Green supplier selection using multi-criterion decision making under fuzzy environment: A case study in automotive industry. *Computers & Industrial Engineering*, *136*, 663–680. https://doi.org/10.1016/j.cie.2019.07.038

Guterres, A. (2022). Secretary-General's remarks to High-Level opening of COP27. https://www.un.org/sg/en/content/sg/speeches/2022-11-07/secretary-generals-remarks-high-level-opening-of-cop27. Accessed 24 February 2023.

Hair, J., Wood, B., & Sharland, A. (2019). Toward a better understanding of the Australian Business Deans Council (ABDC) list and its rankings. *International Journal of Educational Management*, *33*(4), 644–650.

Hall, D. E., & Moreland, J. C. (2001). Fundamentals of rolling resistance. *Rubber Chemistry and Technology*, *74*(3), 525–539. https://doi.org/10.5254/1.3547650

Hao, H., Zhang, Q., Wang, Z., & Zhang, J. (2018). Forecasting the number of end-of-life vehicles using a hybrid model based on grey model and artificial neural network. *Journal of Cleaner Production*, *202*, 684–696. https://doi.org/10.1016/j.jclepro.2018.08.176

Harvey, W. S. (2023). *Reputations at stake*. Oxford University Press. https://doi.org/10.1093/oso/9780192886521.001.0001

Heuer, M. (2012). Sustainability governance across time and space: Connecting environmental stewardship in the firm with the global community. *Business Strategy and the Environment*, *21*(2), 86–97. https://doi.org/10.1002/bse.712

Hoffman, A. J. (1999). Institutional evolution and change: Environmentalism and the US chemical industry. *Academy of Management Journal*, *42*(4), 351–371. https://doi.org/10.2307/257008

Hoffmann, S., Weyer, J., & Longen, J. (2017). Discontinuation of the automobility regime? An integrated approach to multi-level governance. *Transportation Research Part A: Policy and Practice*, *103*, 391–408. https://doi.org/10.1016/j.tra.2017.06.016

Hojas Baenas, J. M., de Castro, R., Gomes Battistelle, R. A., & Gobbo Junior, J. A. (2011). A study of reverse logistics flow management in vehicle battery industries in the midwest of the state of São Paulo (Brazil). *Journal of Cleaner Production*, *19*(2–3), 168–172. https://doi.org/10.1016/j.jclepro.2010.08.018

Horváthová, M., Lacko, R., & Hajduová, Z. (2019). Using industry 4.0 concept—Digital twin—To improve the efficiency of leather cutting in automotive industry. *Quality Innovation Prosperity*, *23*(2), 1–12. https://doi.org/10.12776/qip.v23i2.1211

Huang, H., Xing, X., He, Y., & Gu, X. (2020). Combating greenwashers in emerging markets: A game-theoretical exploration of firms, customers and government regulations. *Transportation Research Part E: Logistics and Transportation Review*, *140*(101), 976.

IDEO. (2023). The Future of Automobility. https://automobility.ideo.com/moving-together/flexible-storage-options. Accessed 24 February 2023.

Jain, V., & Khan, S. A. (2017). Application of AHP in reverse logistics service provider selection: A case study. *International Journal of Business Innovation and Research*, *12*(1), 94–119. https://doi.org/10.1504/IJBIR.2017.080711

Jang, T. K., Lim, B. S., & Kim, M. K. (2018). The canonical steward platform as a six DOF pose sensor for automotive applications. *Journal of Mechanical Science and Technology*, *32*(12), 5553–5561. https://doi.org/10.1007/s12206-018-1101-0

Jayakrishna, K., Vimal, K. E. K., & Vinodh, S. (2015). ANP based sustainable concept selection. *Journal of Modelling in Management*, *10*(1), 118–136.

Jeong, Y. C., Cho, Y. T., & Jung, Y. G. (2016). Design of stitch welded shape with laser-ARC hybrid welding for ultra-high strength steel. *International Journal of Precision Engineering and Manufacturing-Green Technology*, *3*(2), 193–197. https://doi.org/10.1007/s40684-016-0026-2

Jiao, J., Zuo, F., Li, L., Yuan, H., & Li, J. (2017). Estimation of China's alternative policies of automotive fuels—A perspective of oil dependence. *Journal of Cleaner Production*, *161*, 698–707. https://doi.org/10.1016/j.jclepro.2017.05.107

Jindal, A., & Sangwan, K. S. (2015). Evaluation of collection methods in reverse logistics by using fuzzy mathematics. *Benchmarking: An International Journal*, *22*(3), 393–410. https://doi.org/10.1108/BIJ-05-2013-0062

Johnson, P. F. (1998). Managing value in reverse logistics systems. *Transportation Research Part E: Logistics and Transportation Review*, *34*(3), 217–227. https://doi.org/10.1016/S1366-5545(98)00016-7

Kalverkamp, M. (2018). Hidden potentials in open-loop supply chains for remanufacturing. *The International Journal of Logistics Management*, *29*(4), 1125–1146. https://doi.org/10.1108/IJLM-10-2017-0278

Kastensson, Å. (2014). Developing lightweight concepts in the automotive industry: Taking on the environmental challenge with the SåNätt project. *Journal of Cleaner Production*, *66*(2014), 337–346. https://doi.org/10.1016/j.jclepro.2013.11.007

Kaviani, M. A., Tavana, M., Kumar, A., Michnik, J., Niknam, R., & de Campos, E. A. R. (2020). An integrated framework for evaluating the barriers to successful implementation of reverse logistics in the automotive industry. *Journal of Cleaner Production*, *272*, 122714. https://doi.org/10.1016/j.jclepro.2020.122714

Keith, D. R., Naumov, S., & Sterman, J. (2017). Driving the future: A management flight simulator of the US automobile market. *Simulation & Gaming*, *48*(6), 735–769. https://doi.org/10.1177/1046878117737807

Keivanpour, S., Ait-Kadi, D., & Mascle, C. (2017). Automobile manufacturers' strategic choice in applying green practices: Joint application of evolutionary game theory and fuzzy rule-based approach. *International Journal of Production Research*, *55*(5), 1312–1335. https://doi.org/10.1080/00207543.2016.1203077

Kennedy, S., & Linnenluecke, M. K. (2022). Circular economy and resilience: A research agenda. *Business Strategy and the Environment*, *31*(6), 2754–2765. https://doi.org/10.1002/bse.3004

Knapčíková, L. (2019). Electromobility in the Slovak Republic: A green approach. *Acta Logistica*, *6*(2), 29–33. https://doi.org/10.22306/al.v6i2.116

Kong, Y., Le Vine, S., & Liu, X. (2018). Capacity impacts and optimal geometry of automated cars' surface parking facilities. *Journal of Advanced Transportation*, *2018*, 1–13. https://doi.org/10.1155/2018/6908717

Kuik, S. S., Nagalingam, S., Samaranayake, P., & McLean, M. W. (2017). Evaluation of recovery configuration options by product utilisation value. *Journal of Manufacturing Technology Management*, *28*(5), 686–710. https://doi.org/10.1108/JMTM-11-2016-0162

Kumar, A., Chinnam, R. B., & Murat, A. (2017). Hazard rate models for core return modeling in auto parts remanufacturing. *International Journal of Production Economics*, *183*, 354–361. https://doi.org/10.1016/j.ijpe.2016.07.002

Kumar, A., Mangla, S. K., Luthra, S., & Ishizaka, A. (2019). Evaluating the human resource related soft dimensions in green supply chain management implementation. *Production Planning and Control*, *30*(9), 699–715. https://doi.org/10.1080/09537287.2018.1555342

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

Kumar, S., & Yamaoka, T. (2007). System dynamics study of the Japanese automotive industry closed loop supply chain. *Journal of Manufacturing Technology Management*, *18*(2), 115–138. https://doi.org/10.1108/17410380710722854

Kuşakcı, A. O., Ayvaz, B., Cin, E., & Aydın, N. (2019). Optimization of reverse logistics network of end of life vehicles under fuzzy supply: A case study for Istanbul metropolitan area. *Journal of Cleaner Production*, *215*(2019), 1036–1051. https://doi.org/10.1016/j.jclepro.2019.01.090

Le Duigou, A., & Baley, C. (2014). Coupled micromechanical analysis and life cycle assessment as an integrated tool for natural fibre composites development. *Journal of Cleaner Production*, *83*, 61–69. https://doi.org/10.1016/j.jclepro.2014.07.027

Lee, J. W., & Tan, W. N. (2019). Global corporate citizenship: Cross-cultural comparison of best practices in the global automotive industry. *The Journal of Asian Finance, Economics and Business*, *6*(1), 261–271. https://doi.org/10.13106/jafeb.2019.vol6.no1.261

Lees-Marshment, J., Huff, A. D., & Bendle, N. (2020). A social commons ethos in public policy-making. *Journal of Business Ethics*, *166*, 761–778. https://doi.org/10.1007/s10551-020-04577-3

Li, P., Chen, S., Dong, H., Ji, H., Li, Y., Guo, X., Yang, G., Zhang, X., & Han, X. (2020). Interfacial microstructure and mechanical properties of dissimilar aluminum/steel joint fabricated via refilled friction stir spot welding. *Journal of Manufacturing Processes*, *49*, 385–396. https://doi.org/10.1016/j.jmapro.2019.09.047

Li, Y. (2014). Green competitiveness research on Chinese automotive enterprises. *Journal of Industrial Engineering and Management*, *7*(2), 559–572. https://doi.org/10.3926/jiem.1032

Lin, R.-J., Chen, R.-H., & Huang, F.-H. (2014). Green innovation in the automobile industry. *Industrial Management & Data Systems*, *114*(6), 886–903. https://doi.org/10.1108/IMDS-11-2013-0482

Liu, J., Hu, H., Tong, X., & Zhu, Q. (2020). Behavioral and technical perspectives of green supply chain management practices: Empirical evidence from an emerging market. *Transportation Research Part E: Logistics and Transportation Review*, *140*, 102013. https://doi.org/10.1016/j.tre.2020.102013

Lopes, L. J., & Pires, S. R. (2020). Green supply chain management in the automotive industry: A study in Brazil. *Business Strategy and the Environment*, *29*(6), 2755–2769. https://doi.org/10.1002/bse.2541

Lucio Maia, J., Lamon Cerra, A., & Gomes Alves Filho, A. (2010). Exploring variables of transaction costs in Brazilian automotive supply chains. *Industrial Management & Data Systems*, *110*(4), 567–590. https://doi.org/10.1108/02635571011039034

Luo, R., Fan, Y., Yang, X., Zhao, J., & Zheng, S. (2021). The impact of social externality information on fostering sustainable travel mode choice: A behavioral experiment in Zhengzhou, China. *Transportation Research Part A: Policy and Practice*, *152*, 127–145. https://doi.org/10.1016/j.tra.2021.07.003

Lyons, G. (2018). Getting smart about urban mobility–aligning the paradigms of smart and sustainable. *Transportation Research Part A: Policy and Practice*, *115*, 4–14. https://doi.org/10.1016/j.tra.2016.12.001

Maas, S., Schuster, T., & Hartmann, E. (2014). Pollution prevention and service stewardship strategies in the third-party logistics industry: Effects on firm differentiation and the moderating role of environmental communication. *Business Strategy and the Environment*, *23*(1), 38–55. https://doi.org/10.1002/bse.1759

Magnusson, T., & Berggren, C. (2011). Entering an era of ferment—Radical vs incrementalist strategies in automotive power train development. *Technology Analysis & Strategic Management*, *23*(3), 313–330. https://doi.org/10.1080/09537325.2011.550398

Maguire, S., & Hardy, C. (2013). Organizing processes and the construction of risk: A discursive approach. *Academy of Management Journal*, *56*(1), 231–255. https://doi.org/10.5465/amj.2010.0714

Marshall, R. S., Cordano, M., & Silverman, M. (2005). Exploring individual and institutional drivers of proactive environmentalism in the US wine industry. *Business Strategy and the Environment*, *14*(2), 92–109. https://doi.org/10.1002/bse.433

Masoud, S. A., & Mason, S. J. (2017). A bi-criteria hybrid metaheuristic for analysing an integrated automotive supply chain. *Journal of the Operational Research Society*, *67*(3), 516–526. https://doi.org/10.1057/jors.2015.75

Maxwell-Smith, M. A., Conway, P. J., Wright, J. D., & Olson, J. M. (2018). Translating environmental ideologies into action: The amplifying role of commitment to beliefs. *Journal of Business Ethics*, *153*, 839–858. https://doi.org/10.1007/s10551-016-3404-3

Mayyas, A., Steward, D., & Mann, M. (2019). The case for recycling: Overview and challenges in the material supply chain for automotive li-ion batteries. *Sustainable Materials and Technologies*, *19*, e00087. https://doi.org/10.1016/j.susmat.2018.e00087

McKinsey & Company. (2016). Automotive revolution—Perspective towards 2030. https://www.mckinsey.com/~/media/mckinsey/industries/automotive%20and%20assembly/our%20insights/disruptive%20trends%20that%20will%20transform%20the%20auto%20industry/auto%202030%20report%20jan%202016.pdf. Accessed 16 September 2022.

Mikkola, J. H. (2001). Portfolio management of R&D projects; implications for innovation management. *Technovation*, *21*(7), 423–435. https://doi.org/10.1016/S0166-4972(00)00062-6

Montazeri-Gh, M., & Mahmoodi-K, M. (2016). Optimized predictive energy management of plug-in hybrid electric vehicle based on traffic condition. *Journal of Cleaner Production*, *139*, 935–948. https://doi.org/10.1016/j.jclepro.2016.07.203

Mueller, S. A., Carlile, A., Bras, B., Niemann, T. A., Rokosz, S. M., McKenzie, H. L., Chul Kim, H., & Wallington, T. J. (2015). Requirements for water assessment tools: An automotive industry perspective. *Water Resources and Industry*, *9*, 30–44. https://doi.org/10.1016/j.wri.2014.12.001

Muñoz, I., Rieradevall, J., Domènech, X., & Gazulla, C. (2005). Using LCA to assess eco-design in the automotive sector: Case study of a polyolefinic door panel. *The International Journal of Life Cycle Assessment*, *11*(5), 323–334.

Neckebrouck, J., Schulze, W., & Zellweger, T. (2017). Are family firms good employers? *Academy of Management Journal*, *61*(2), 553–585.

Neto, J., & Dutordoir, M. (2020). Mapping the market for remanufacturing: An application of "Big Data" analytics. *International Journal of Production Economics*, *230*(2020), 1–13.

Nunes, B., Sarkis, J., & Bennett, D. (2010). Green operations initiatives in the automotive industry. *Benchmarking: An International Journal*, *17*(3), 396–420. https://doi.org/10.1108/14635771011049362

Nurhadi, L., Borén, S., Ny, H., & Larsson, T. (2017). Competitiveness and sustainability effects of cars and their business models in Swedish small town regions. *Journal of Cleaner Production*, *140*, 333–348. https://doi.org/10.1016/j.jclepro.2016.04.045

Ohvanainen, J., & Hietikko, E. (2012). Building competitive advantage through platform-based product family thinking: Case powerpacks. *Journal of Industrial Engineering and Management*, *5*(1), 180–197. https://doi.org/10.3926/jiem.438

Olivetti, E. A., Ceder, G., Gaustad, G. G., & Fu, X. (2017). Lithium-ion battery supply chain considerations: Analysis of potential bottlenecks in critical metals. *Joule*, *1*(2), 229–243. https://doi.org/10.1016/j.joule.2017.08.019

Ouyang, T., Xie, S., Wu, W., & Tan, J. (2021). A novel design of cold energy cascade utilization with advanced peak-shaving strategy integrated liquid air energy storage. *Journal of Cleaner Production*, *327*, 129493. https://doi.org/10.1016/j.jclepro.2021.129493

Panahifar, F., Byrne, P. J., & Heavey, C. (2015). A hybrid approach to the study of CPFR implementation enablers. *Production Planning and Control*, *26*(13), 1090–1109. https://doi.org/10.1080/09537287.2015.1011725

Park, S., & Lee, J. H. (2017). Supplier selection and stepwise benchmarking: A new hybrid model using DEA and AHP based on cluster analysis. *Journal of the Operational Research Society*, *69*(3), 449–466. https://doi.org/10.1057/s41274-017-0203-x

Parker, R. S., Fletchall, H., & Pettijohn, C. E. (1997). Truck operators' perspectives on use of alternative fuels. *Transportation Research Part E: Logistics and Transportation Review*, *33*(1), 73–78. https://doi.org/10.1016/S1366-5545(96)00002-6

Parthiban, P., Amalaldhasan, S., & Dhanalakshmi, R. (2017). Fuzzy quantitative approach to prioritize green factors in supply chain. *Journal of Scientific and Industrial Research*, *76*(1), 401–407.

Passarini, F., Ciacci, L., Santini, A., Vassura, I., & Morselli, L. (2012). Auto shredder residue LCA: Implications of ASR composition evolution. *Journal of Cleaner Production*, *23*(1), 28–36. https://doi.org/10.1016/j.jclepro.2011.10.028

Paul, J., & Criado, A. R. (2020). The art of writing literature review: What do we know and what do we need to know? *International Business Review*, *29*(4), 101717. https://doi.org/10.1016/j.ibusrev.2020.101717

Pinkse, J., Bohnsack, R., & Kolk, A. (2014). The role of public and private protection in disruptive innovation: The automotive industry and the emergence of low-emission vehicles. *Journal of Product Innovation Management*, *31*(1), 43–60. https://doi.org/10.1111/jpim.12079

Pohl, H. (2012). Japanese automakers' approach to electric and hybrid electric vehicles: From incremental to radical innovation. *International Journal of Technology Management*, *57*(4), 266–288. https://doi.org/10.1504/IJTM.2012.045546

Pohl, H., Styhre, A., & Elmquist, M. (2009). The concept of interessement: The story of a power-split technology for hybrid electric vehicles. *International Journal of Innovation Management*, *13*(01), 47–64. https://doi.org/10.1142/S1363919609002236

Pohl, H., & Yarime, M. (2012). Integrating innovation system and management concepts: The development of electric and hybrid electric vehicles in Japan. *Technological Forecasting and Social Change*, *79*(8), 1431–1446. https://doi.org/10.1016/j.techfore.2012.04.012

Potter, A., & Graham, S. (2019). Supplier involvement in eco-innovation: The co-development of electric, hybrid and fuel cell technologies within the Japanese automotive industry. *Journal of Cleaner Production*, *210*, 1216–1228. https://doi.org/10.1016/j.jclepro.2018.10.336

Powers, T. L., & Steward, J. L. (2010). Alfred P. Sloan's 1921 repositioning strategy. *Journal of Historical Research in Marketing*, *2*(4), 426–442. https://doi.org/10.1108/17557501011092475

Ramdas, K., Fisher, M., & Ulrich, K. (2003). Managing variety for assembled products: Modeling component systems sharing. *Manufacturing & Service Operations Management*, *5*(2), 142–156. https://doi.org/10.1287/msom.5.2.142.16073

Randy, F. (2011a). Motion controls move vehicles in a new direction-engineering feature-semiconductor and other suppliers have listened to carmakers, and the latest products for electric and hybrid automobiles show the results. *Electronic Design*, *59*(10), 1–7.

Randy, F. (2011b). The plug replaces the pump. *Electronic Design*, *59*(8), 1–6.

Ravi, V., & Shankar, R. (2005). Analysis of interactions among the barriers of reverse logistics. *Technological Forecasting and Social Change*, *72*(8), 1011–1029. https://doi.org/10.1016/j.techfore.2004.07.002

Rebitzer, G., & Buxmann, K. (2005). The role and implementation of LCA within life cycle management at Alcan. *Journal of Cleaner Production*, *13*(13–14), 1327–1335. https://doi.org/10.1016/j.jclepro.2005.05.003

Reeves, K. A., Caliskan, F., & Ozcan, O. (2010). Outsourcing distribution and logistics services within the automotive supplier industry. *Transportation Research Part E: Logistics and Transportation Review*, *46*(3), 459–468. https://doi.org/10.1016/j.tre.2009.10.001

Refinitiv. (2021). Refinitiv workspace, https://www.refinitiv.com/en/products/refinitiv-workspace. Accessed 3 May 2022.

Richnák, P., Gubová, K., & Fabianová, J. (2020). The application of total cost of ownership method to automotive industry. *LOGI—Scientific Journal on Transport and Logistics*, *11*(2), 100–109. https://doi.org/10.2478/logi-2020-0019

Riggs, W. (2015). Testing personalized outreach as an effective TDM measure. *Transportation Research Part A: Policy and Practice*, *78*(2015), 178–186.

Ro, Y. K., Liker, J. K., & Fixson, S. K. (2008). Evolving models of supplier involvement in design: The deterioration of the Japanese model in U.S. auto. *IEEE Transactions on Engineering Management*, *55*(2), 359–377. https://doi.org/10.1109/TEM.2008.919733

Romero, V. J., Sanchez-Lite, A., & Liraut, G. (2021). Development of a multicriteria design optimization methodology for automotive plastics parts. *Polymers*, *14*(1), 156. https://doi.org/10.3390/polym140-10156

Rosales-Tristancho, A., Brey, R., Carazo, A. F., & Brey, J. J. (2022). Analysis of the barriers to the adoption of zero-emission vehicles in Spain. *Transportation Research Part A: Policy and Practice*, *158*, 19–43. https://doi.org/10.1016/j.tra.2022.01.016

Rowhani, A., & Rainey, T. (2016). Scrap tyre management pathways and their use as a fuel: A review. *Energies*, *9*(11), 888. https://doi.org/10.3390/en9110888

Sabolová, V., Cagáňová, D., & Makyšová, H. (2020). Leaning of processes and improving the working conditions of the newly created working zone. *Acta Logistica*, *7*(4), 283–290. https://doi.org/10.22306/al.v7i4.193

Saidani, M., Kendall, A., Yannou, B., Leroy, Y., & Cluzel, F. (2018). What about the circular economy of vehicles in the U.S.? An extension of the analysis done in the EU by Saidani et al. (2017). *Resources, Conservation and Recycling*, *136*, 287–288. https://doi.org/10.1016/j.resconrec.2018.05.007

Sarkis, J., Gonzalez-Torre, P., & Adenso-Diaz, B. (2010). Stakeholder pressure and the adoption of environmental practices: The mediating effect of training. *Journal of Operations Management*, *28*(2), 163–176. https://doi.org/10.1016/j.jom.2009.10.001

Sasikumar, P., & Haq, A. N. (2011). Integration of closed loop distribution supply chain network and 3PRLP selection for the case of battery recycling. *International Journal of Production Research*, *49*(11), 3363–3385. https://doi.org/10.1080/00207541003794876

Schjølberg, I., & Østdahl, A. B. (2008). Security and tolerable risk for hydrogen service stations. *Technology in Society*, *30*(1), 64–70. https://doi.org/10.1016/j.techsoc.2007.10.009

Schöggl, J.-P., Baumgartner, R. J., & Hofer, D. (2017). Improving sustainability performance in early phases of product design: A checklist for sustainable product development tested in the automotive industry. *Journal of Cleaner Production*, *140*, 1602–1617. https://doi.org/10.1016/j.jclepro.2016.09.195

Schweiger, B., Albers, S., Vanderstraeten, J., & Gibb, J. (2020). A capabilities perspective on membership management in franchise networks. *Industrial Marketing Management*, *90*, 60–78. https://doi.org/10.1016/j.indmarman.2020.06.006

Seitz, M. A. (2007). A critical assessment of motives for product recovery: The case of engine remanufacturing. *Journal of Cleaner Production*, *15*(11–12), 1147–1157. https://doi.org/10.1016/j.jclepro.2006.05.029

Seňová, A., Štofová, L., Szaryszová, P., & Dugas, J. (2021). Superstructure of ISO/TS 16949 for the measurement of material-technological parameters of the products in automotive production. *Management Systems in Production Engineering*, *29*(3), 178–183.https://doi.org/10.2478/mspe-2021-0022

Seuring, S., Yawar, S. A., Land, A., Khalid, R. U., & Sauer, P. C. (2020). The application of theory in literature reviews–illustrated with examples from supply chain management. *International Journal of Operations & Production Management*, *41*(1), 1–20. https://doi.org/10.1108/IJOPM-04-2020-0247

Shashi, S., Centobelli, P., Cerchione, R., & Mittal, A. (2021). Managing sustainability in luxury industry to pursue circular economy strategies. *Business Strategy and the Environment*, *30*(1), 432–462. https://doi.org/10.1002/bse.2630

Shashi, S., Cerchione, R., & Bansal, H. (2020). Measuring the impact of sustainability policy and practices in tourism and hospitality industry. *Business Strategy and the Environment*, *29*(3), 1109–1126. https://doi.org/10.1002/bse.2420

Sheller, M., & Urry, J. (2000). The city and the car. *International Journal of Urban and Regional Research*, *24*(4), 737–757. https://doi.org/10.1111/1468-2427.00276

Silva-Magalhães, A., Cederqvist, L., De Backer, J., Håkansson, E., Ossiansson, B., & Bolmsjö, G. (2019). A friction stir welding case study using temperature controlled robotics with a HPDC cylinder block and dissimilar materials joining. *Journal of Manufacturing Processes*, *46*, 177–184. https://doi.org/10.1016/j.jmapro.2019.08.012

Simić, V., Dabić-Ostojić, S., & Bojović, N. (2017). Interval-parameter semi-infinite programming model for used tire management and planning under uncertainty. *Computers & Industrial Engineering*, *113*, 487–501. https://doi.org/10.1016/j.cie.2017.09.013

Sims Limited. (2020). Modern Slavery Statement. https://smm-corporate.s3.amazonaws.com/Sims_ModernSlaveryStatement_122320.pdf. Accessed 16 September 2022.

Smith, M., & Crotty, J. (2008). Environmental regulation and innovation driving ecological design in the UK automotive industry. *Business Strategy and the Environment*, *17*(6), 341–349. https://doi.org/10.1002/bse.550

Soley, A. M., Siegel, J. E., Suo, D., & Sarma, S. E. (2018). Value in vehicles: Economic assessment of automotive data. *Digital Policy, Regulation and Governance*, *20*(6), 513–527. https://doi.org/10.1108/DPRG-05-2018-0025

Sonar, H., Mukherjee, A., Gunasekaran, A., & Singh, R. K. (2022). Sustainable supply chain management of automotive sector in context to the circular economy: A strategic framework. *Business Strategy and the Environment*, *31*, 1–14. https://doi.org/10.1002/bse.3112

Sovacool, B. K., & Axsen, J. (2018). Functional, symbolic and societal frames for automobility: Implications for sustainability transitions. *Transportation Research Part A: Policy and Practice*, *118*, 730–746.

Spreafico, C. (2021). Can modified components make cars greener? A life cycle assessment. *Journal of Cleaner Production*, *307*, 1–18.

Staniszewska, E., Klimecka-Tatar, D., & Obrecht, M. (2020). Eco-design processes in the automotive industry. *Production Engineering Archives*, *26*(4), 131–137.

Subramoniam, R., Huisingh, D., & Chinnam, R. B. (2009). Remanufacturing for the automotive aftermarket-strategic factors: Literature review and future research needs. *Journal of Cleaner Production*, *17*(13), 1163–1174.

Subramoniam, R., Huisingh, D., Chinnam, R. B., & Subramoniam, S. (2013). Remanufacturing Decision-Making Framework (RDMF): Research validation using the analytical hierarchical process. *Journal of Cleaner Production*, *40*(2013), 212–220.

Sujová, E., & Čierna, H. (2018). Optimization and improvement of test processes on a production line. *Management Systems in Production Engineering*, *26*(2), 88–92.

Sun, J., & Zhu, Q. (2018). Organizational green supply chain management capability assessment: A hybrid group decision making model application. *IEEE Engineering Management Review*, *46*(1), 117–127.

Suo, D., Siegel, J., & Soley, A. (2020). Driving data dissemination: The "Term" governing connected car information. *IEEE Intelligent Transportation Systems Magazine*, *13*(1), 20–30.

Sütőová, A. (2018). Improving information flow for decision making on product quality in the automotive industry. *Quality Innovation Prosperity*, *22*(1), 71–78.

The McKell Institute. (2021). Capitalising on the lithium-ion waste resource challenge in South Australia. https://www.greenindustries.sa.gov.au/lithium-ion-battery-recycling-opportunities-SA.pdf?downloadable=1. Accessed 6 May 2022.

Tian, G., Zhang, H., Feng, Y., Jia, H., Zhang, C., Jiang, Z., Li, Z., & Li, P. (2017). Operation patterns analysis of automotive components remanufacturing industry development in China. *Journal of Cleaner Production*, *164*, 1363–1375.

Tsoi, K. H., & Loo, B. P. (2021). Cutting the loss: International benchmarking of a sustainable ferry business model. *Transportation Research Part A: Policy and Practice*, *145*, 167–188.

Tyre Stewardship Australia (TSA). (2022). About TSA https://www.tyrestewardship.org.au/about-tsa/. Accessed 16 September 2022.

United Nations Environment Programme. (2022). Emissions Gap Report 2022: The closing window—Climate crisis calls for rapid transformation of societies. Nairobi. https://www.unep.org/emissions-gap-report-2022. Accessed 24 February 2023.

Vahidi, A., & Sciarretta, A. (2018). Energy saving potentials of connected and automated vehicles. *Transportation Research Part C: Emerging Technologies*, *95*, 822–843.

Villanueva-Rey, P., Belo, S., Quinteiro, P., Arroja, L., & Dias, A. C. (2018). Wiring in the automobile industry: Life cycle assessment of an innovative cable solution. *Journal of Cleaner Production*, *204*, 237–246.

Wang, M., Tian, Y., Liu, W., Zhang, R., Chen, L., Luo, Y., & Li, X. (2020). A moving urban mine: The spent batteries of electric passenger vehicles. *Journal of Cleaner Production*, *265*, 1–9.

Wang, Y., & Tanaka, A. (2011). From hierarchy to hybrid: The evolving nature of inter-firm governance in China's automobile groups. *Journal of Business Research*, *64*(1), 74–80.

Wiedmann, K.-P., Hennigs, N., Pankalla, L., Kassubek, M., & Seegebarth, B. (2011). Adoption barriers and resistance to sustainable solutions in the automotive sector. *Journal of Business Research*, *64*(11), 1201–1206.

Williams, A. (2006). Product-service systems in the automotive industry: The case of micro-factory retailing. *Journal of Cleaner Production*, *14*(2), 172–184.

Wood, L. C., Wang, J. X., Duong, L. N. K., Reiners, T., & Smith, R. (2018). Stock market reactions to auto manufacturers' environmental failures. *Journal of Macromarketing*, *38*(4), 364–382.

World Commission on Environment and Development. (1987). *Our common future: The Brundtland report*. United Nations.

Xylia, M., Leduc, S., Patrizio, P., Kraxner, F., & Silveira, S. (2017). Locating charging infrastructure for electric buses in Stockholm. *Transportation Research Part C: Emerging Technologies*, *78*, 183–200.

Yadav, G., Luthra, S., Jakhar, S. K., Mangla, S. K., & Rai, D. P. (2020). A framework to overcome sustainable supply chain challenges through solution measures of industry 4.0 and circular economy: An automotive case. *Journal of Cleaner Production*, *254*, 1–15.

Yadav, G., Mangla, S. K., Luthra, S., & Jakhar, S. (2018). Hybrid BWM-ELECTRE-based decision framework for effective offshore outsourcing adoption: A case study. *International Journal of Production Research*, *56*(18), 26259–26278.

Zapata, C., & Nieuwenhuis, P. (2010). Exploring innovation in the automotive industry: New technologies for cleaner cars. *Journal of Cleaner Production*, *18*(1), 14–20.

Zhang, B., Wang, L., Li, L., Lei, X., Ju, Y., & de Oña, R. (2021). Vehicle assignment considering battery endurance for electric vehicle carsharing systems. *Journal of Advanced Transportation*, *2021*, 1–17.

Zhang, L., Shao, S., Chen, S., Li, X., Jiang, R., & Li, Z. (2021). Individualized and accurate eco-design knowledge push for designers: A CAD-based feedback knowledge push method for the eco-design. *Concurrent Engineering*, *29*(2), 153–168.

Zhu, Q., Sarkis, J., & Lai, K.-H. (2015). Reprint of "Supply chain-based barriers for truck-engine remanufacturing in China". *Transportation Research Part E: Logistics and Transportation Review*, *74*, 94–108.

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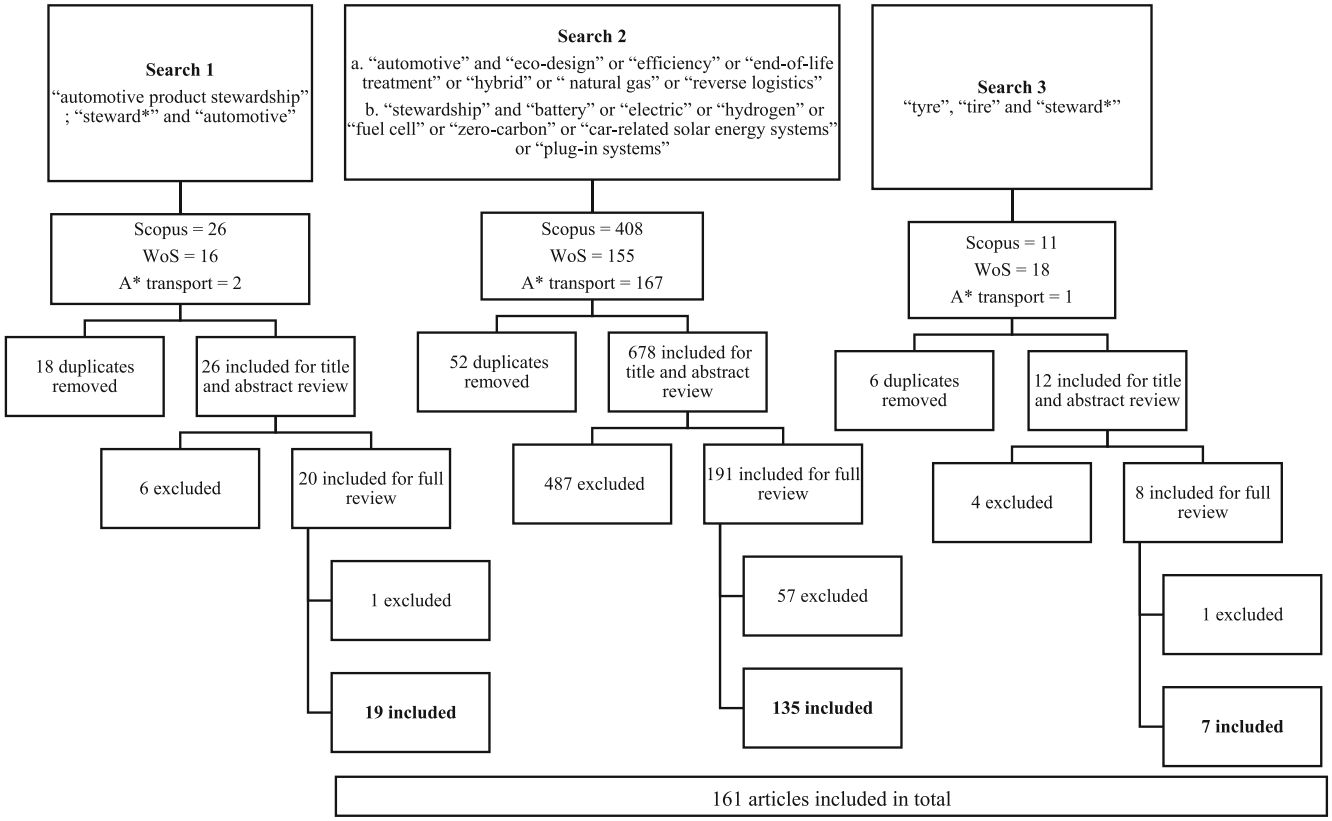
APPENDIX A: SEARCH STRATEGY AND RESULTS[3]



[3]Scopus and the Web of Science were selected as they are two of the largest databases in social sciences and are commonly used in literature reviews (see Paul & Criado, 2020). However, as shown in Appendix A, these databases return different results and can omit work covered in relevant scholarly sources. To avoid this limitation, a third source of transport journals was added. This included the following journals, which are ranked A* in the Australian Business Deans Council (ABDC) journal list: *Transportation Research Part A: Policy and Practice*, *Transportation Research Part C: Emerging Technologies*, and *Transportation Research Part E: Logistics and Transportation Review*. The ABDC list was selected as it identifies highly impactful outlets (Hair et al., 2019).

APPENDIX B: CODEBOOK

B.1 | Third-order concept: Current Conceptual Boundaries to Stewardship

Second-order theme	First-order codes (illustrative text and citations)
Article information	• **Journal.** Journals with three or more articles included: ○ *Journal of Cleaner Production* (Aaldering et al., 2019; Becherif et al., 2019; de Souza et al., 2018; De Stefano et al., 2016; Hojas Baenas et al., 2011) ○ *International Journal of Production Economics* (Abdulrahman et al., 2014; Abolhassani et al., 2019; Bai et al., 2020) ○ *Transport Research Part E* (Cheramin et al., 2021; Liu et al., 2020; Reeves et al., 2010) ○ *Journal of Advanced Transportation* (Chen et al., 2021; de Luca & Di Pace, 2020; Kong et al., 2018) ○ *Journal of Manufacturing Processes* (Agapiou, 2014; Aleyari et al., 2020; Li et al., 2020) ○ *Production Planning & Control* (Daaboul et al., 2016; Ferguson & Browne, 2010; Kumar et al., 2019) ○ Quality Innovation Prosperity (Bedoya-Villa & Escobar-Sierra, 2018; Horváthová et al., 2019) ○ *Technological Forecasting & Social Change* (Avadikyan & Llerena, 2010; Dijk & Yarime, 2010; Pohl & Yarime, 2012) ○ *Transportation Research Part C* (Dai et al., 2021; Vahidi & Sciarretta, 2018; Xylia et al., 2017) • **Car manufacturers** mentioned in the article (e.g., Aston Martin, Audi, BMW, Chrysler, Citroen, Daihatsu, Daimler, Ferrari, Fiat, Ford, General Motors, Honda, Hyundai, Jaguar, Kia, Lamborghini, Lexus, Mercedes Benz, Mitsubishi, Nissan, Peugeot, Renault, Saab, Skoda, Suzuki, Tesla, Tianjin Automotive Group, Toyota, Volkswagen Audi Group, Volvo; see Abolhassani et al., 2019; Nunes et al., 2010; Cho et al., 2021) • **Countries mentioned** in the article (Asia, Australia, Brazil, Canada, China, Colombia, Europe, France, Germany, Global, India, Iran, Italy, Japan, New Zealand, North America, Norway, Not specified, Pakistan, Poland, Portugal, Slovak Republic, South America, South Korea, Spain, Sweden, Taiwan, Turkey, US, UK) (e.g., Ahmadjian & Lincoln, 2001; Maia et al., 2010; Wang et al., 2020) • **Level of analysis:** ○ CEOs (Saidani et al., 2018; Schweiger et al., 2020; Villanueva-Rey et al., 2018) ○ Consumers (Ahmad & Mohsin Butt, 2012; Dijk & Yarime, 2010; Wiedmann et al., 2011) ○ Employees (Azevedo et al., 2011; Bag & Gupta, 2019; Bedoya-Villa & Escobar-Sierra, 2018) ○ Firm (Azevedo et al., 2011; Bag & Gupta, 2019; Bedoya-Villa & Escobar-Sierra, 2018) ○ Industry (Abdulrahman et al., 2014; Abolhassani et al., 2019; Agapiou, 2014; Sabolová et al., 2020; Schöggl et al., 2017; Seňová et al., 2021)
Conceptual papers	• **Conceptual case studies**, meaning no data collected (e.g., Aitken & Murray, 2010; Blanas et al., 2012) • **Conceptual framework** (e.g., Sovacool & Axsen, 2018)
Deductive papers	• **Composition Analysis** (Bai et al., 2020; Chen et al., 2021; de Lara & Marx, 2018) • **Constraint Programming and CSP Modeling** (Garcia et al., 2017) • **Correlation Matrix** (Christensen, 2011) • **Data Envelopment Analysis** (Biondi et al., 2013; Dai et al., 2021) • **Experiment** (Agapiou, 2014; Potter & Graham, 2019) • **Factor Analysis** (Abdulrahman et al., 2014; Bernon et al., 2018; Gupta & Prasad, 2011) • **Grey System Model** (Hao et al., 2018) • **Hesitant Fuzzy Set** (Bai et al., 2020; Govindan et al., 2020; Jindal & Sangwan, 2015) • **Hybrid Group Decision-Making Method** (Sun & Zhu, 2018) • **Life Cycle Analysis** (Ganesarajan et al., 2022) • **Linear Regression Analysis** (Bedoya-Villa & Escobar-Sierra, 2018; Soley et al., 2018) • **MICMAC Analysis** (Ravi & Shankar, 2005) • **Microstructural Analysis** (Gupta et al., 2020) • **Particle Swarm Optimization** (Hao et al., 2018) • **Process Models Simulations** (Sütőová, 2018) • **Quantitative Data** (Biswas & Das, 2018; Parthiban et al., 2017) • **Scenario Analysis** (Ferguson & Browne, 2010; Kumar & Yamaoka, 2007)
Inductive papers	• **Case study** based on interview data (Ahmadjian & Lincoln, 2001; Andriankaja et al., 2013) • **Comparative Analysis** (Bai et al., 2020; Chen et al., 2021; de Lara & Marx, 2018) • **Economic Modeling** (Chang, 2008; Cho et al., 2021; Jiao et al., 2017) • **Experimental Analysis** (Aleyari et al., 2020) • **Grounded Theory** (Kalverkamp, 2018) • **Multi-attributive Border Approximation Area Comparison** (Kumar et al., 2019) • **Network Analysis** (Knapčíková, 2019) • **Sensitivity Analysis** (Alonso et al., 2006; Gupta et al., 2019; Jain & Khan, 2017) • **Social Network Analysis; Stochastic Multi-criteria Acceptability Analysis** (Aaldering et al., 2019)

(Continues)

Second-order theme	First-order codes (illustrative text and citations)
	• **Patent Analysis** (Aaldering et al., 2019) • **Propositions** (Cho et al., 2021) • **Total Cost of Ownership Calculation** (Richnák et al., 2020)
Theoretical perspectives	• **Actor–Network Theory** (Hoffmann et al., 2017; Pohl & Yarime, 2012) • **Agency Theory** (Schweiger et al., 2020) • **Analytic Hierarchy Process Theory** (Subramoniam et al., 2013) • **Cumulative Prospect Theory** (Bai et al., 2020) • **Fuzzy Set Theory** (Becherif et al., 2019; Gupta et al., 2019; Jayakrishna et al., 2015) • **Game Theory** (Keivanpour et al., 2017; Ro et al., 2008; Simić et al., 2017) • **Grey System Theory** (Hao et al., 2018) • **Industrial Ecology Theory** (Seitz, 2007) • **Institutional Theory** (Ebrahimi & Koh, 2021; Wang & Tanaka, 2011) • **Legitimacy Theory** (Bai et al., 2020) • **Marketing Theory** (Ahmad & Mohsin Butt, 2012; Wood et al., 2018) • **Natural-Resource-Based View Theory** (Ahmadjian & Lincoln, 2001) • **Pontryagin Minimum Theory** (Chen et al., 2021) • **Principle-Agent Theory** (Jeong et al., 2016) • **Resources Based of the Firm** (Bag et al., 2020; Bag & Gupta, 2019; Lin et al., 2014) • **Socio-Technical Systems Theory** (Liu et al., 2020) • **Stakeholder Theory** (Ebrahimi & Koh, 2021; González-Torre et al., 2010) • **Sustainable Triple Bottom Line Theory** (Govindan et al., 2019) • **swarm optimization theory** • **Systems Theory** (Nunes et al., 2010) • **Theory of Planned Behavior** (Luo et al., 2021) • **Transaction Cost Economics** (Ahmadjian & Lincoln, 2001; Reeves et al., 2010) • **Utility Theory** (de Lara & Marx, 2018; Guo et al., 2013)

B.2 | Third-order concept: Environmental stewardship

Second-order theme	First-order codes (illustrative text and citations)
Green industry transformation	• **Circular Economy** (Alonso et al., 2006; Demirel et al., 2016; Eckstein, 2012) • **Closed-Loop Distribution** (Sasikumar & Haq, 2011) • **Eco-Design** (Zhang, Shao, et al., 2021; Andriankaja et al., 2013; Le Duigou & Baley, 2014; Muñoz et al., 2005) • **End-of-Life Treatment** (Aitken & Murray, 2010; Alonso et al., 2006; Blanas et al., 2012) • **Energy Efficiency** (Abolhassani et al., 2019; Chen et al., 2021; Horváthová et al., 2019; Kong et al., 2018; Ouyang et al., 2021; Sujová & Čierna, 2018) • **Extended Producer Responsibility** (Carrasco-Gallego et al., 2011; Tian et al., 2017) • **Incremental Innovation** (Avadikyan & Llerena, 2010; Chi et al., 2012) • **Lean and Agile** (Christopher & Towill, 2001; Govindan et al., 2014) • **Micro - Factory Retailing** (Williams, 2006) • **Networks in the tire industry (**Schweiger et al., 2020) • **Product Design** (Zhang, Shao, et al., 2021; Staniszewska et al., 2020) • **Productivity Improvements** (Abolhassani et al., 2019) • **Partner Selection** (Park & Lee, 2017) • **Radical Transformation** (Hoffmann et al., 2017; Sovacool & Axsen, 2018) • **Remanufacturing** (Kumar et al., 2017; Seitz, 2007; Subramoniam et al., 2009) • **Reducing Automotive Plastics Parts** (Romero et al., 2021) • **Reducing Product Defects** (Aitken & Murray, 2010; Bernon et al., 2018; Cho et al., 2021) • **Reverse Logistics** (Aitken & Murray, 2010; Bag et al., 2020; Bag & Gupta, 2019; Blanas et al., 2012; Carrasco-Gallego et al., 2011; Chan et al., 2012; Daaboul et al., 2016; Demirel et al., 2016; Ferguson & Browne, 2010; González-Torre et al., 2010; Govindan et al., 2019; Hojas Baenas et al., 2011; Kuşakcı et al., 2019) • **Supply Chain** (Ahmadjian & Lincoln, 2001; Aitken & Murray, 2010; Azevedo et al., 2011; Chan et al., 2012; Cheramin et al., 2021; Hojas Baenas et al., 2011; Masoud & Mason, 2017; Panahifar et al., 2015; Ramdas et al., 2003; Randy, 2011a; Yadav et al., 2020) • **Waste Composition Evolution** (Abdulrahman et al., 2014; Ahmadjian & Lincoln, 2001; Aitken & Murray, 2010)
Advanced mobility solutions	• **Alternative Fuel Vehicle Diffusion** (Chi et al., 2012; Jiao et al., 2017; Keith et al., 2017) • **Autonomous EV** (Chen et al., 2021) • **Autonomous Taxi** (Dai et al., 2021) • **Batteries** (Christensen, 2011; Garcia et al., 2017; Hojas Baenas et al., 2011) • **Biofuels** (Jiao et al., 2017; Rowhani & Rainey, 2016; Zapata & Nieuwenhuis, 2010) • **Charging Stations and Practices** (Knapčíková, 2019; Randy, 2011b) • **Electric Bus** (Xylia et al., 2017) • **EVs and Electromobility** (de Lara & Marx, 2018; de Luca & Di Pace, 2020; Montazeri-Gh & Mahmoodi-K, 2016) • **Gas Vehicles** (Chi et al., 2012) • **Hybrid Composites** (Ganesarajan et al., 2022) • **Hybrid Vehicle** (Agapiou, 2014; Avadikyan & Llerena, 2010; Christensen, 2011; Yadav et al., 2018) • **Hydrogen** (Schjølberg & Østdahl, 2008; Zapata & Nieuwenhuis, 2010) • **Plug-in and Hybrid Electric Vehicle** (Montazeri-Gh & Mahmoodi-K, 2016) • **Renewable Energy Use** (Lee & Tan, 2019)
Other significant impacts	• **Air Pollution** (Kastensson, 2014; Kumar et al., 2019; Nurhadi et al., 2017) • **Automotive Shredder Residue (**Passarini et al., 2012) • **Aluminum (**Agapiou, 2014; Aleyari et al., 2020; Daaboul et al., 2016; Ebrahimi & Koh, 2021; Li et al., 2020; Passarini et al., 2012; Silva-Magalhães et al., 2019; Spreafico, 2021) • **Climate Change Action** (Ahmadjian & Lincoln, 2001; Becherif et al., 2019; Rebitzer & Buxmann, 2005) • **Consumption of Resources** (Lee & Tan, 2019) • **Ecosystem Protection** (Aaldering et al., 2019) • **Emission Reduction** (Lee & Tan, 2019) • **Land and Water Use** (Jiao et al., 2017; Mueller et al., 2015) • **NdFeB Magnet** (Cheramin et al., 2021) • **Recycled Tire Products** (Eckstein, 2012) • **Recycling of Materials** (Aitken & Murray, 2010; Alonso et al., 2006; Cheramin et al., 2021; Ciacci et al., 2010; Lee & Tan, 2019) • **Steel Alternatives** (Kastensson, 2014) • **TechMetals** (Alonso et al., 2006) • **Tire Management** (Hall & Moreland, 2001; Rowhani & Rainey, 2016) • **Used Tires** (Simić et al., 2017)

B.3 | Third-order concept: Social stewardship

Second-order theme	First-order codes (illustrative text and citations)
Social engagement and mobility impact	• **Arts and Culture Activities** (Lee & Tan, 2019) • **Carsharing & Car Leasing** (de Lara & Marx, 2018); (Nurhadi et al., 2017); (Zhang, Wang, et al., 2021) • **Community Development Programs** (Lee & Tan, 2019) • **Competitiveness and Prices** (Daaboul et al., 2016; Feltus, 2008; Jindal & Sangwan, 2015) • **Consumer Choice** (Govindan et al., 2019; Keith et al., 2017; Sarkis et al., 2010) • **Consumer Relationships** (Ahmad & Mohsin Butt, 2012) • **Consumer Stewardship** (Riggs, 2015) • **Dealership Performance** (Ahmad & Mohsin Butt, 2012; Bag et al., 2020; Biondi et al., 2013) • **Product Recalls/Safety Recalls** (Bernon et al., 2018; Wood et al., 2018) • **Safety Issues** (Lee & Tan, 2019) • **Social Community Programs** (Lee & Tan, 2019) • **Travel Costs** (Nurhadi et al., 2017) • **Traffic Conditions** (Montazeri-Gh & Mahmoodi-K, 2016)
Organizational governance and sustainable growth	• **Business Longevity** (Powers & Steward, 2010) • **Employee Protection and Workplace Conditions** (Lee & Tan, 2019) • **Data Processing** (Daaboul et al., 2016; Sütőová, 2018) • **Diversity in the Workplace** (Lee & Tan, 2019) • **General Governance** (Dyer, 1996) • **Industry and Investor Returns** (Powers & Steward, 2010; Subramoniam et al., 2009, 2013) • **Reducing Greenwashing** (Wood et al., 2018) • **Regulative Compliance** (Avadikyan & Llerena, 2010) • **Measuring Innovation** (Alonso et al., 2006; Kastensson, 2014) • **Responsible Data Stewardship** (Soley et al., 2018) • **Reducing Environmental Fraud and Corporate Scandals** (Wood et al., 2018) • **Strategy & Long-Term Growth and Market Share** (Powers & Steward, 2010; Subramoniam et al., 2009, 2013)
Human capital development and education initiatives	• **Capabilities** (Bag et al., 2020; Blanas et al., 2012) • **Educational Programs** (Lee & Tan, 2019) • **Scholarships and Internships** (Lee & Tan, 2019) • **Skill Development** (Lee & Tan, 2019)