

Article

Value Creation for Sustainability in Port: Perspectives of Analysis and Future Research Directions

Marcella De Martino 

Institute for Research on Innovation and Services for Development, National Research Council, 80134 Naples, Italy; m.demartino@iriss.cnr.it

Abstract: The paper offers a theoretical advancement on sustainable port development strategies adopting a relational perspective, emphasizing the importance of collaboration and stakeholder interaction in achieving sustainable value creation. It provides a comprehensive overview of the concept of value creation, highlighting its evolution and the different perspectives of analysis in business model research: the conventional value creation perspective, where customers and suppliers are considered key stakeholders in the supply chain, and the sustainability-oriented one, which extends value creation processes to other stakeholders, such as civil society, policy makers, financial stakeholders, and employees. Based on the main gaps of the literature review and drawing on the previous progress on the sustainable business model, this paper develops a theoretical framework, which structures the relationships between the port business operator and its stakeholders at two interconnected levels: the supply chain and the institutional environment. These levels identify core value creation activities and resources, relational governance models, and the value created with and for different stakeholders. However, its implementation opens new avenues for future research that are currently lacking in port research.



Citation: De Martino, M. Value Creation for Sustainability in Port: Perspectives of Analysis and Future Research Directions. *Sustainability* **2021**, *13*, 12268. <https://doi.org/10.3390/su132112268>

Academic Editors: Christa Sys and Alessio Tei

Received: 30 September 2021
Accepted: 29 October 2021
Published: 6 November 2021

Publisher's Note: MDPI stays neutral with regard to jurisdictional claims in published maps and institutional affiliations.



Copyright: © 2021 by the author. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>).

Keywords: value creation; sustainability; port business operator; business model

1. Introduction

In the current volatile and globalized competitive environment, researchers acknowledge the importance of collaboration in addressing many of society's complex challenges [1–3] because when the collaboration is synergic and win-win, the value creation can be multi-faceted, involving the economic, social, and environmental dimensions [4]. Customer and supplier interactions have been the focus of research in the field of environmentally sustainable supply chains [5]; however, the engagement of different stakeholder groups, rather than just customers, is an approach that is increasingly used in corporate sustainability and reporting processes [6], as well as by port authorities [7,8]. An area currently attracting the interest of scholars concerns the sustainability-oriented business models, which views value creation as a process resulting in different outcomes (economic, social, and ecological) for different stakeholders, and value capture deriving from power relationships between focal firms and stakeholders' groups [9,10].

Collaborative and multi-stakeholder governance approaches are, indeed, at the heart of the recent debate on the value creation and value capture strategies in designing regional policies [11]. Place-based approaches enable policy makers to generate value-creation opportunities for local business actors by exploiting local resources and capabilities, which emerge from local contexts, cultures, traditions, and histories [12]. In this regard, regional policy makers can perform the role of network orchestrators and value creation shapers, working in close collaboration with local stakeholders. The OECD [13] and EU [14] stressed the importance of implementing collaborative and place-based strategies to increase shared value creation as well as the multi-stakeholder governance approach for implementing the 2030 Sustainable Development Agenda [15].

Sustainability has been the interest of increasing research in the port literature and recent studies have addressed the three pillars of port sustainability through the definition of appropriate performance indicator systems [16]. Recently, a comprehensive corporate sustainability measurement framework was proposed to support port authority in quantifying value creation in economic, social, and environmental terms [17]. The sustainability measurement system has also been extended to port–hinterland interactions [18] and, extensively, to port cities [19], adopting a circular regeneration approach [20]. The transition towards a circular economy is a major driver for European ports to mitigate the social and economic impacts of port activities [21]. Stakeholder engagement is crucial, in this regard, for minimizing conflicts and for approaching win-win strategies for the long-term benefit of a port city [22]. The building of a shared vision of port sustainability and the strengthening of cooperation with partners in the supply chain are also the aim of the World Ports Sustainability Program, set up by the International Association of Ports and Harbors (IAPH) in 2018 and then signed up by other international associations, such as the European Sea Ports Organization (ESPO) and the International Association of Cities. However, while the quantification of sustainability has attracted great attention from researchers and policy makers, very few studies have addressed the organizational complexity in implementing sustainability principles in port governance and business models.

With the aim of addressing this gap, this paper presents a theoretical and methodological advancement on sustainable port development strategies by adopting a relational perspective, emphasizing the importance of collaboration and stakeholder interaction in achieving sustainable value creation. It proposes a theoretical framework, which structures the relationships between the port business operator and its stakeholders at two interconnected levels: the supply chain and the institutional environment. These levels identify core value creation activities and resources, potential relational governance models, and the value created with and for different stakeholders. By addressing value creation processes from a multi-stakeholder perspective, the framework integrates the conventional value creation perspective, where customers and suppliers are considered key stakeholders in the supply chain, with the sustainability-oriented one, which extends value creation processes to other stakeholders, such as civil society, policy makers, financial stakeholders, and employees. It can support port business operators in redesigning their business models towards more sustainable service supply chains. However, its implementation opens new avenues for future research that are currently lacking in port research streams.

The paper is structured as follows: in the next section, a comprehensive overview of the concept of value creation is provided, highlighting its evolution and the different perspectives of analysis in business model research: the conventional and the sustainability-oriented ones. Section 3 focuses on reviewing studies dealing with corporate sustainability and governance in ports, with the aim of shedding light on the progress as well as the gaps that this research intends to fulfill. Section 4 is dedicated to the theoretical framework used for designing sustainable business models in ports. Conclusions and future research agenda are provided in the last section.

2. Sustainable Value Creation: A Relational Perspective

The concept of value has been discussed and debated for centuries, but there is still little agreement about its meaning and how to measure it. The difficulties involved in its definition stem from [23]: subjectivity of value interpretation, i.e., the perspective from which value can be defined, such as the firm, supplier, buyer, customer, policy maker, and shareholder; variations between typologies of customers, in the sense that different services and products will determine different paths of value creation; variations within the same customers' segment, as service's and product's attributes change according to different geographical markets, cultures, and behaviors; and finally, the difference between tangible and intangible offerings.

The concept of value has been historically theorized in the form of “value-in-exchange” and “value-in-use” [24]. Value in exchange is associated with the monetary value of a

commodity while value in use expresses the utility received by consuming or holding a commodity. In classical economics, value creation is equal to the transactions by which these commodities have been exchanged.

During the 1960s and 1970s, the concept of value has been utilized in “adding value” sense [25]: “the value added equals the total value created with the inclusion of a particular partner or action minus the total value created without a specific partner or action”. The value added represents, so far, an important ingredient of a firm’s competitive advantage and from the 1980s onwards, scholars devoted attention to the link between value creation and firm competitiveness. In particular, the contribution of Michael Porter [26] with the concept of value chain was decisive in defining a new approach to business management of the firm in the industry, leading to cost leadership and differentiation strategies.

The collaborative and relational perspective in the analysis of value creation was strengthened during the 1990s, leading to new conceptualizations, such as value constellation [27], value network [28], shared value [29], blended value [30], mutual benefit [31], and sustainable value [32]. The concept of value constellation has been a central theme in the service literature as the customer plays an active role in the service delivery process, impacting on service outcome quality [33]. According to the service-dominant logic [34], value is experiential, contextual, and idiosyncratic and it is determined by the consumer on the basis of “value in use”. The concept of value creation has thus been replaced by value co-production as the customer is actively participating in the realization of the company’s value proposition. Companies provide their customers with resources, thus facilitating value creation; this activity can be labeled value facilitation [35]. Value creation, on the other hand, takes place in the customers’ sphere and it is determined, specifically, in the firm–customers interactions.

Currently, value creation is the centerpiece of the business model research stream [36]. Two perspectives contribute to identifying the underlying logics behind the value creation process (Figure 1): the conventional (supply chain) perspective of analysis of value creation, which focuses on value created for the customer and the focal business, and the sustainability-oriented perspective, which also includes ecological and social outcomes that benefit other stakeholders. In this regard, the contribution of stakeholder theory, as a complementary perspective of value creation [10], asks with and for whom value is being created. Both perspectives are useful for the understanding of the drivers and sources of value creation for different stakeholder groups, in the strategy-structure-performance paradigm [37].

2.1. The Conventional Value Creation Perspective

According to the conventional value creation perspective, the understanding of customers’ needs is crucial for the definition of the competitive priorities, such as cost, quality, flexibility, delivery, speed, time, and innovation [38]. According to [39], cost orientation and customer orientation appear to be the most critical strategic priorities that impact on the coordination along the supply chain. While operational excellence strategy can support the cost leadership strategy, by seeking ways to minimize costs and eliminate intermediation, customer closeness strategies can support service differentiation through service customization, quality, and interactive communications with customers [40].

Two main theoretical foundations can be recalled when approaching value creation according to the supply chain perspective: the industry organization perspective [26,41] and the resource-based view (RBV) [42,43].

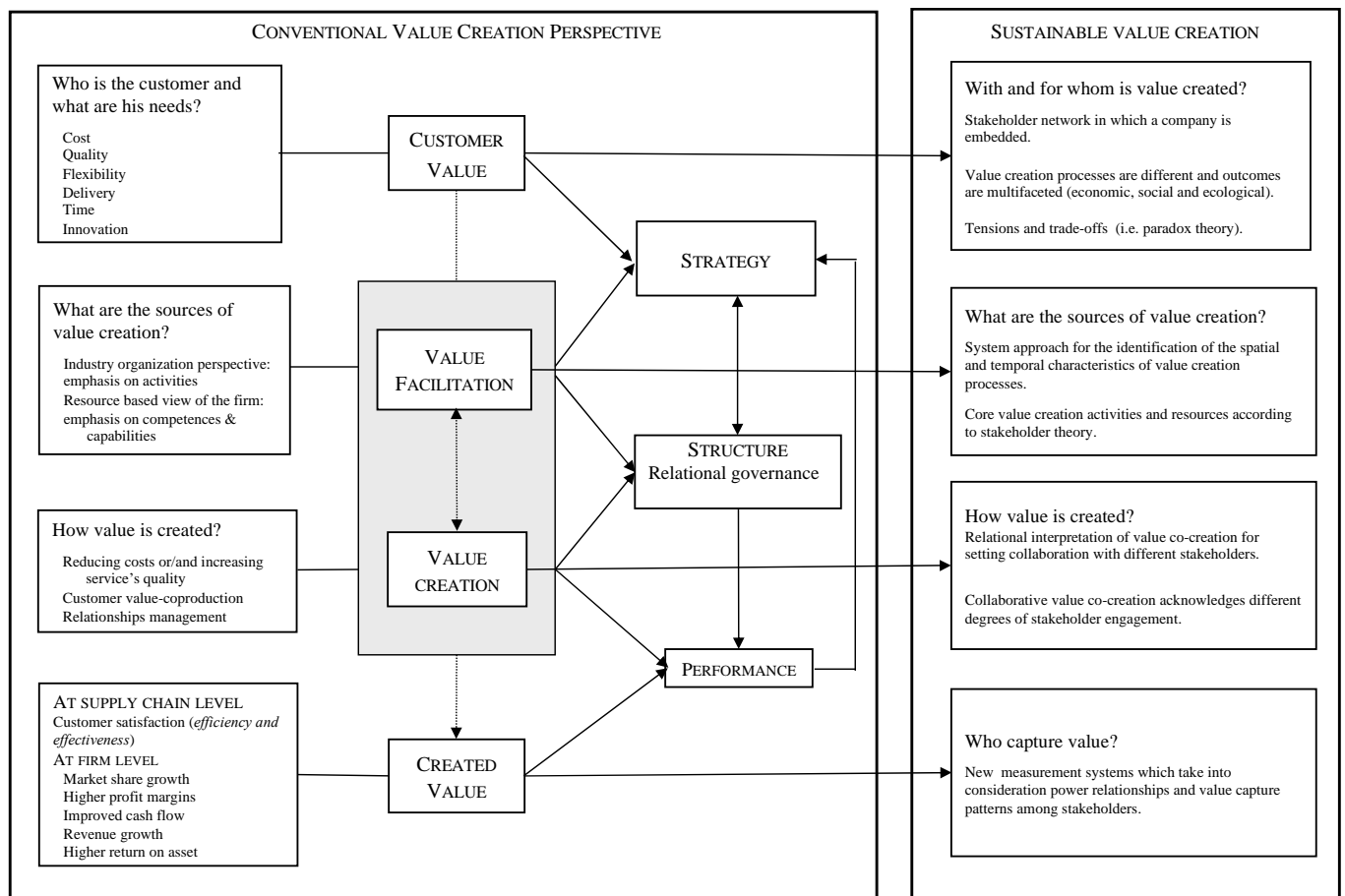


Figure 1. Conventional and sustainability-oriented approaches to value creation. Source: own elaboration.

The industry organization perspective focuses on activities that can be a source of competitive advantage for firms in the specific industry. Value creation can be achieved by reducing costs (cost leadership) or providing customers with products and services (differentiation strategy) that they are willing to pay a higher price for [26]. Value is further created through vertical linking to the value chains of suppliers and buyers (value chains system).

The resource-based view implements the view of customer value creation by focusing on the capability and ability of the firms and it considers resources—human capital, equipment, facilities, knowledge, and competencies—as a medium of value exchange [44,45]. According to this perspective, firms create value by combining their resources, especially the knowledge-based one, with those of other firms through relationship management [46].

Relationship management is crucial in the process of value creation [47,48]; different typologies of coordination mechanisms can be considered [49], which present an increasing level of partner interactions and engagement in the value creation process: transactional relationship, information sharing alliance, collaborative operation alliance, collaborative network alliance, partnership, and vertical integration.

Transactional relationships entail only buy-and-sell activities in a traditional arms-length relationship. In alliances, two or more partners share values and interests, and perform a variety of coordination activities that determine resource complementary and dependency in value creation processes [50]. In the information sharing alliance, partners maintain their resources' independence and share information. This represents the case where partners are in the early stages of developing a relationship, or where they have limited engagement in value creation.

In the collaborative operations alliance, partners share goals, and each partner commits dedicated resources to create and maintain an active process coordination along the

supply chain. Collaborative network alliance entails long-term agreements and includes open and active information sharing, supply network coordination, and common financial decisions, such as mutual investments in joint assets, balancing financial risk and rewards. Partnerships can be considered alliances, which entail some equity ownership and where coordination is exercised by control of the business. Some examples can be found in subsidiaries, joint ventures, and equity interest cases. In vertical integration, the coordination of the supply network is determined through control and ownership of all the value-adding entities.

Finally, performance is the extent to which a firm's goals are achieved [51]. These can be economic rents [52]; thus, measures, such as profitability, sales volume, and return on investment, are used to evaluate a firm's financial performance. At the supply chain level, market share and customer satisfaction are good indicators of a firm's competitiveness [44].

2.2. The Sustainability-Oriented Approach to Value Creation

In the last decade, new and alternative approaches to value creation have been discussed and developed in the management literature, aimed at including the social and ecological dimensions into strategic decision-making processes and at discussing the tensions and possible trade-off with the economic value [53]. The most prominent approaches in the sustainable business model research field appear to be the triple bottom line (TBL) and the stakeholder theory perspectives [10]. A central underpinning in the theorization of "sustainable value creation" is a systemic understating of value that includes a broader range of stakeholders, rather than just customers and suppliers. Thus, moving from a conventional to a sustainability-oriented approach to value creation calls for [10,54] a stakeholder-responsive definition and understanding of the recipients of value (with and for whom value is created), a systems approach for the identification of the spatial and temporal characteristics of value creation processes (what the sources of value creation are), a relational interpretation of value co-creation for setting collaboration with different stakeholders (how value is created), and a measurement of created value—in economic, social, and ecological terms—which takes into consideration power relationships and value capture patterns among stakeholders.

Sustainable value creation requires the understanding of the stakeholders' network in which a company is embedded. The boundaries of this network (in terms of time, space, and actors) determine which stakeholders are directly or indirectly involved and affected along value creation processes at different levels (from local markets to global ecosystems). In this regard, the company can interact differently with stakeholder groups, varying the degree of engagement from reactive to more proactive [55,56]:

1. Information sharing and feedback from stakeholders via dialogue and surveys, which entail a low degree of interaction and engagement.
2. Consultation and repeated interactions with specific groups of stakeholders on certain topics, which entail a medium degree of interaction and engagement in decision making.
3. Co-production and collaboration with stakeholders aimed at creating sustainable value and fostering changes towards sustainability, which entail a high degree of interaction and engagement.

A relational interpretation of value creation is associated with processes in which stakeholders can play different roles and have a variety of degrees of engagement. The "how value is created" focuses on resources, activities, and business processes underlying the value creation logics, which can be related to value chains, shops, and networks [28,57]. While chain logic creates value for customers and producers by converting inputs into higher-value outputs, the value shop addresses emerging social issues creating value for the community, and the network creates value by mediating between stakeholders. In this regard, the proposed framework combines the supply chain and the institutional environment levels. The integration and specification of value creation logics during its

implementation would provide more comprehensive and systemic solutions to creating ecological and social outcomes while maintaining financial viability.

Finally, outcomes are multiple but often conflicting. For this reason, measurement systems should exceed the scope of the traditional ones, mainly based on economic and financial performance indicators, and include ecological and social dimensions too. These systems are important not only to quantify the “value created” for and with different typologies of stakeholders but also to better mitigate the tensions and trade-offs among multiple and divergent goals. Value creation measurement should be combined with an analysis of the power relationships amongst stakeholders [10], which lead to patterns of value capture within a stakeholder network.

3. Sustainable Value Creation in Port Studies

This section focuses on reviewing recent studies dealing with corporate sustainability and governance in ports with the aim of shedding light on the theoretical progresses and empirical evidence. Based on main gaps, it addresses the concept of sustainable value creation in ports, taking the perspective of the port business operator.

3.1. Literature Review

Some recent studies have addressed ports’ sustainable development and corporate sustainability from a relational perspective of analysis, emphasizing the key role of stakeholders’ interaction and engagement in building common and sharing values, and in obtaining the legitimacy and the “license to operate” from local community and environmental groups [8]. These studies propose alternative approaches of analysis of sustainable value creation, based on the port actor in charge of defining port sustainability strategies (unit of the analysis) and the different categories of stakeholders involved in the decision-making processes (Table 1).

Table 1. Corporate sustainability in port studies.

Paper	Unit of Analysis	Main Stakeholders	Framework of Analysis
Ashrafi, et al. [58]	Port managing companies and authorities	Government/policy makers and customers; Local communities and industry associations; Contractors, competitors, suppliers, internal business units, and NGOs.	Motivations/driving factors and key challenges/barriers to integrate sustainability in ports. Empirical analysis: Canadian and US maritime ports
Schrobback and Meath [59]	Environmental/sustainability managers of port	Internal, core business partners/customers, financial partners, local communities, regulatory institutions, other.	Conceptional framework for corporate sustainability governance Empirical analysis: Australian and New Zealand ports
De Martino [60]	Port authorities and port business operators	Service supply chain’s customers	Multi-level framework of analysis of port value creation Empirical analysis: Italian ports
Fobbe and Hilletoft [56]	Port authorities	Employees, Suppliers, Customers; Port organizations; Governmental institutions; Community, NGOs, Universities; Other ports; Experts	Analytical framework of organizational sustainability in port Europe, Asia, North and South America, and Oceania.
Langenus and Doms [61]	Port authorities	European Commission; Regional and local governments; Port managing bodies; Other port industry supply chain stakeholders.	Virtual learning model for the creation of an interorganizational network (ION) European ports (PORTOPIA project).

Source: own elaboration.

Ashrafi, et al. [58] analyzed port sustainability strategies and practices, as well as factors influencing the adoption and implementation of corporate sustainability (CS) in ports. Most port authorities under investigation adopted CS practices, such as training programs and sustainability reporting. However, sustainability is not fully integrated in strategic decision making processes and operations. In this regard, effective stakeholder relation management, which takes into account context-specific influencing factors, can allow ports to identify sustainability goals, and to develop and prioritize CS strategies and actions. Port sustainability strategies differ from port to port given their location, as well as the socio-political environment.

Schrobback and Meath [59] proposed a theoretical framework for the identification of appropriate and effective sustainability governance strategies based on the understanding and balancing of stakeholders' pressure/power structures (organizational legitimacy). Based on the investigation of Australian and New Zealand port authorities, including environmental and/or sustainability managers working in the board of directors, the study suggests that general corporate governance practices and environmental management practices have been adopted by almost all ports. However, stakeholder awareness and engagement, including sustainability performance disclosure, remain limited.

Drawing on the network theory and supply chain analysis, De Martino [60] developed a multi-perspective approach of analysis of value creation at firm, supply chain, and port authority levels in order to frame sustainable development strategies in the Italian port system. The study focused mainly on the social and economic dimensions of sustainability. The results show that collaborative practices positively impact on sustainable performance at the firm and supply chain levels. At the port authority's level, policy actions should be based on the understanding of relational dynamics and power structures characterizing port service supply chains, including a plurality of stakeholders and their relationships in the analysis of value creation [62].

Fobbe and Hilletoth [56] proposed a theoretical framework for the implementation of sustainability-oriented business models. Based on the analysis of sustainability reporting, the study highlights that port authorities recognize the importance of stakeholders' relationships. However, depending on the sustainability dimension and stakeholder group, the study identifies different interaction degrees (such as consulting, creating a dialogue; project participation; knowledge exchange and resource sharing; cooperation and collaboration), which allow ports to be distinguished and classified according to their organizational sustainability.

Finally, Langenus and Doods [61] investigated the role of European port authorities as net brokers in initiating inter-organizational and collaborative networks for port transaction towards sustainability. Building a shared vision beyond the network members' individual boundaries is a key issue for engaging industrial stakeholders in collaborative sustainable practices. Based on the experience of the PORTOPIA Consortium, the authors showed that distrusting relationships in the port authorities' role acted as a barrier to building collaboration with industrial stakeholders. Future research should investigate which factors enhance trust, and which functions and initiatives should be undertaken by a net broker in the starting and developing phases.

From this focused review, the port authority undoubtedly has a central role in driving port transaction towards sustainability, setting appropriate sustainable development goals, adopting consistent policy actions, and tracking progress to steer impacts. However, the main challenge in building trusting and collaborative relationships is to align the port authority's policy actions and business strategies toward a common vision of a resilient and sustainable port [63]. Ports are very often perceived as sources of value destruction, caused by terminal inefficiency, damage or loss of cargo, shipment delays, congestion, collisions, and pollution [64]. These events potentially lead to value disruptions in supply chains, with negative impacts on local economic and social development. The quantification of sustainable performance can certainly contribute to resolving the conflicting interest of different public and private stakeholders, improving ports' social legitimacy and reputation [16].

However, a more collaborative approach among port stakeholders in the service supply chain is required to build a common vision and shared values for an effective achievement of sustainable development. The conceptual framework developed in this study is aimed at designing a sustainable-oriented business model, where port business operators consider new value propositions for local stakeholders with and for whom value can be created. Value capture will depend on power relationships amongst port stakeholders. In the next section, sustainable value creation is approached from the perspective of the port business operator, highlighting the stakeholders with and for whom value can be created.

3.2. Sustainable Value Creation: The Port Business Operator's Perspective

In one of the first books on “port competitiveness” [65], the authors questioned the meaning of “port”, given the highly organizational complexity marked by conflicting interests between public and private port undertakings. This complexity determines different levels of analysis of competitiveness between port undertakings (terminal operators) within the same port, between ports of the same range, and between port authorities.

The emergence of the supply chain paradigm in the interpretation of port competitiveness [66] has contributed to enrich the perspectives and the unit of analysis of ports. A port consists of more than a port authority and terminal operators; it also includes port users and service providers [67]. Shipping companies are the main port users, but also shippers and industrial enterprises belong to this group. The service providers group is very heterogenous and, depending on the port functions can include pilotage, mooring, and towage services; maritime agents, freight forwarders, and logistics service providers; inland transport operators; and ship repairers, suppliers of spare parts, and bunkers.

In tackling this organizational complexity, scholars proposed new conceptualizations of ports as a value chain system [68,69], a logistics system/networking site [70–72], a bundle of resources and activities [73], an actor of the business relationships network [74], and an open system [75]. Drawing on the value constellation concept [27] and service-dominant logic [34], the port has been also interpreted as a network of stakeholders who co-produce value by exchanging resources, sharing knowledge, and building supply chain capabilities in the pursuit of customer satisfaction [76]. In the same vein, the port has been interpreted as regional ecosystems: “a group of interacting firms that depend on each other's activities in which different types of users benefit from complementarities and shared infrastructures” [21].

All these conceptualizations refer to business networks, where actors collaborate through vertical and horizontal relations for business opportunities. However, there are other stakeholders' groups with and for whom value can be created rather than just focusing on customers and suppliers [10]. These can include shareholders and financial stakeholders, employees, government, NGOs, local communities, knowledge institutions, port organizations (including port service providers, lease and concession holders, and shipping lines), and other ports [56]. In this study, stakeholder categories are defined according to the port business operator's perspective. In the landlord port model, a port business operator is any company that performs activity in the port perimeter, based on land concession from the port authority; beyond the terminal operating companies, these can be transport operators, freight, and logistics services providers. Furthermore, depending on the level of port integration in the service supply chains, customers and business partners vary in their contribution to the value co-creation processes [76].

Figure 2 provides an overview of stakeholders' interactions in the sustainable value creation from the perspective of the port business operator: customers, business partners, financial stakeholders, and civil society (citizen, consumers, NGOs). The port authority can be considered a stakeholder for and with whom sustainable value is created. In this regard, the port authority, in his role of regulator and/or community manager [77], can define environmental and social regulations to prevent environmentally unfriendly behaviors and to foster sustainability through appropriate policy actions.

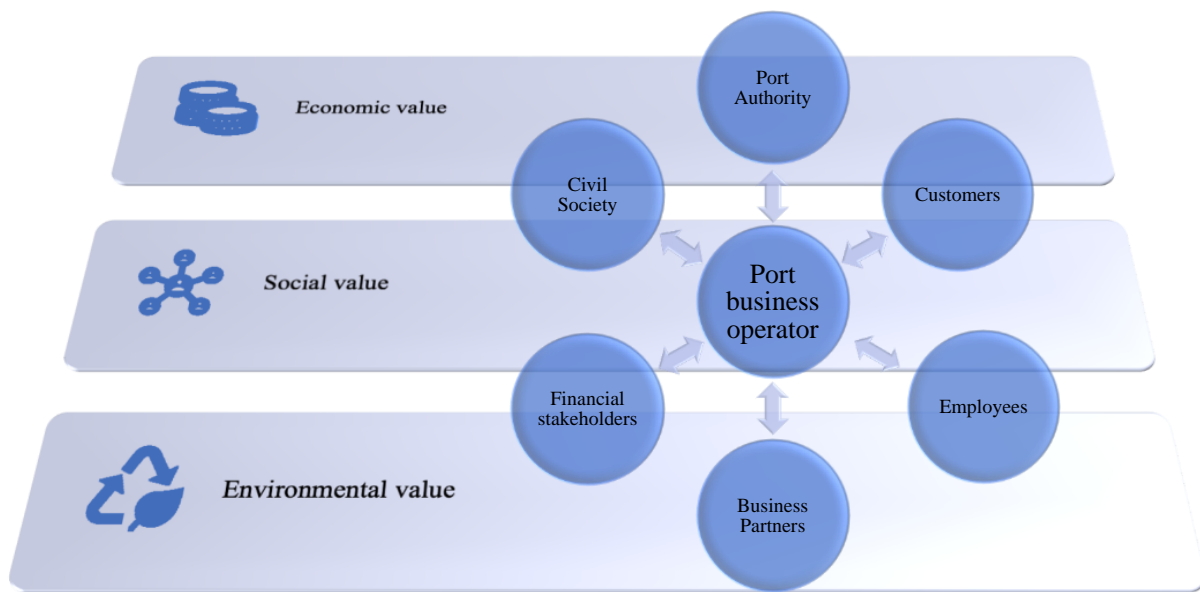


Figure 2. Stakeholders' interaction in sustainable value creation: the port business operator's perspective. Source: Own elaboration.

4. Port Sustainable Value Creation: A Conceptual Framework

The sustainability-oriented value creation framework considers stakeholder interaction as a key element in designing sustainable business models (Figure 3). It highlights new value propositions for stakeholders with and for whom value can be created, core value creation activities and resources, and potentially allows for alternative governance forms, such as collaboration, public private partnerships, or social businesses, thus overcoming profit-maximizing models.

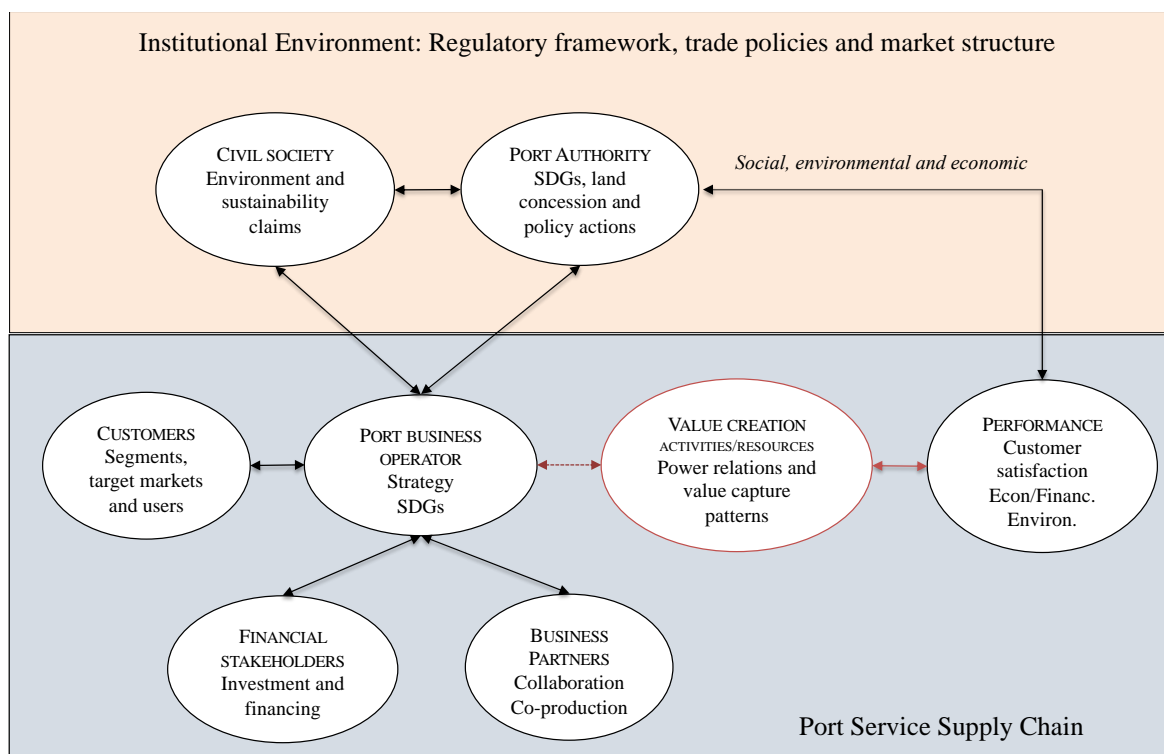


Figure 3. The conceptual framework for port sustainable value creation. Source: Own elaboration.

The framework considers two interconnected levels in which the port business operator and stakeholder interactions can develop: the port service supply chain and the institutional environment, represented in two different colored area in Figure 3. These levels affect the port business operator in designing a sustainability-oriented business model to create more stakeholder-sensitive and inclusive value creation activities and resources in pursuing sustainable development goals. Stakeholder interaction at the supply chain level focuses primarily on value propositions for customers, business partners, and financial stakeholders, while external to the supply chain, but relevant in shaping sustainable value creation, are the social stakeholders (civil society) and the port authority.

4.1. Stakeholder Groups

Customers represent a key stakeholder group in the business model literature. They are co-producers of value, providing data and information about service preferences or participating in open innovation initiatives. In the port context, three main groups of port customers have attracted the interest of researchers [78]: shipping companies, freight forwarders, and shippers. Shipping companies are customers in the dyad interaction with terminal operating companies, whose services characteristics shape value creation activities and resources. The advantages of providing value-added logistics services and diversifying port businesses to other customer groups, such as freight forwarders and shippers, depend on complementary resources and competencies from external business partners to efficiently and effectively manage services within the logistics supply chains.

Business partners are service or good providers that collaborate with the port business operator in the value creation activities. Depending on the typology of the provided services, which can be range from cargo handling to intermodality and integrated logistics services, different business partners can contribute to value creation processes: inland transport providers, multimodal transport operators, logistics service providers, and maritime agency.

Financial stakeholders are represented by actors whose main relationships with the port business operator are the financial stakes in the company. These are equity firms and financial corporations, whose prime interest is to generate shareholder value [79]. The “financialization” of the port and terminal industry while contributing to terminal operating companies’ expansion by providing them with capital, on the other side, it determines a lower level of involvement of the firms in port development at the regional level [80], thus jeopardizing future port development and its societal “license to operate”.

Social stakeholders are increasingly studied in the sustainability-oriented business model stream [81] as they contribute to sustainable value creation, particularly with regards to the environmental and societal impacts. Some port authorities were able to integrate social values in their sustainability practices through dialogue and participation of the local community in decision making processes [56]. Sustainability reporting has been increasingly used by port authorities to disclose sustainability-related information in order to foster trusting relations, loyalty, and confidence of different stakeholders [7].

The port authority can be an active and proactive stakeholder in the sustainable development of service supply chains as a facilitator/community manager and, to some extent, entrepreneur in government-owned landlord ports [78]. The community manager is essentially oriented towards finding an equilibrium between the economic and the social and ecological dimensions of the port development (taking into consideration environmental and sustainability claims of the civil society) and between the private interests of the port business operators and those of the local community in order to defend the “license to operate” [82]. The entrepreneur port authority will perform the facilitator/community manager function with a commercial attitude, as a service provider and investor.

4.2. Stakeholder Interaction and Business Model Characteristics

Stakeholder interaction is a key driver of sustainable value creation, which determines a portfolio or a value network, rather than a single outcome as approached through the

conventional perspective on value creation. In this value network, each stakeholder has a common interest in interacting and cooperating with the port business operator, along the specific dimension of sustainability. Value creation entails processes involving a variety of resources and activities carried out by different individuals and groups in the value network. Table 2 provides business model aspects for sustainability-oriented value creation. From a conventional (service supply chain) value creation perspective, depending on customer target groups, the port business operator builds relationships with business partners in order to develop efficiency-related and effectiveness-related capabilities [62]. Efficiency-related capabilities refer to the business operator's ability to obtain operational excellence (such as cost minimization), while effectiveness-related capabilities to fulfilling the customer's requirements (such as customer service differentiation).

Table 2. Sustainability-oriented value creation model.

Business Model Aspects	Port Service Supply Chain	External Environment
STAKEHOLDER (with and for whom value is created)	Customers, business partners, and financial stakeholders	Civil society and port authority
ACTIVITIES AND RESOURCES (value creation sources)	Efficient and effective competencies for new and improved transport and logistics services. Digital and green technologies (low- and zero-carbon technologies). Human resources: training courses; new skills and capabilities.	Responsible use of natural and local resources. Utilization of renewable resources. Digital port ecosystem. Resilient digital and physical infrastructures. Circular economy.
RELATIONAL MODEL (power relationships and patterns of value capture)	Vertical integration and strategic alliances. Selection of services providers based on environmental and social factors. Co-production and collaborative networks with customers and business partners for sustainable innovation.	Partnerships with port authorities, universities, and innovation incubators. Consultation and interactions with local stakeholders. Information sharing with local agencies and public.
VALUE CREATED (economic, social, and ecological)	Customer satisfaction: costs; frequency; reliability, service quality. Growth in the turnover and profitability. Growth in the market share. Growth in return on investment and dividend. Increase in safety and security. Increasing social well-being and cohesion. Reduced consumption and waste of raw materials, water, and energy sources.	Increase in the employment in the port-related activities and in the regional ecosystem. Growth in the number of creative and circular businesses in the regional ecosystem. Improved image and green reputation. Social cohesion and trust in the port community. Air, water, and noise pollution reduction.

Source: own elaboration.

Civil society and local communities appear to be relevant stakeholders in driving the port's transition to greener and more inclusive business. In this regard, sustainable value creation requires consideration and prevention of potential negative impacts through the responsible use of natural resources and the utilization of renewable resources [53]. Furthermore, port business operators may adopt new digital and green technology solutions that increase environmental well-being by addressing existing environmental problems such as: vessel speed reduction and efficient handling technologies; efficient truck operations and loading/unloading automation; artificial intelligence in logistics and transport chains. The spectrum of the initiatives currently undertaken by shipping companies, terminal operators, inland transport operators, and other transport and logistics service providers is very broad, as shown by the great number of EU-funded projects. These can be regrouped according to specific sustainable challenges [83]: resilient digital infrastructure (for example, SPEED project (Smart Ports Entrepreneurial Ecosystem Development); Maritime and Port Authority of Singapore (MPA) digital ecosystem); climate and energy (for example, Port of

Rotterdam—Zero Emission Services; The Northwest Ports Clean Air Strategy); community outreach and port city dialogue: social (for example, Hamburg Port Authority—homeport) and environmental dimensions (for example Port of Açu—Protecting Sea Turtles); health, safety and security (for example, Port of Antwerp—Wearable device program); governance and ethics (for example, Ports Australia—Port Sustainability Strategy Development Guide). Port business operators will play a significant role in the ports' transition toward a greener and more resilient society.

Port business operator and port authority interactions can be characterized by synergic and win-win relationships showing convergence on value creation and sustainable development goals. For example, the port authority may rely on port business operators' capabilities to identify the effective policy actions, such as tailored infrastructure development, public–private partnerships, informatized custom procedures, active promotion, and marketing policy. There are different European cases that show sustainable value creation based on collaborative practices, such as those related to the circular economy [21,84]. The circular economy offers new opportunities for port authorities and port business operators to redesign their business model toward more sustainable-oriented value creation activities [85]. In this case, it is the ecological value creation the major driver in redesigning the business model to reduce consumption and waste of raw materials, water, and energy sources. This requires common investments in terminal and port infrastructures, in human resources, and in building collaborative networks for circular supply chains. Some studies positioned the sustainability-oriented value creation model as a means to implement sustainable innovations or improve a part of the value chain or an activity [86].

It has already been mentioned that “value capture” depends on the relational governance model and power relationships in which the port business operator and specific stakeholder are involved. Considering the dyadic interactions between terminal operating companies and liner shipping, it is worth mentioning the extraordinary increase of mergers and acquisitions for controlling existing terminals located in the main maritime traffic routes, or the building of new terminal facilities in equity joint ventures [87]. The expansion strategies of international terminal operators are aimed at counterbalancing the consolidation trend in liner shipping while diversification strategies are aimed at capturing increasing value along the supply chain [88]. Although efficient and effective competencies are crucial in business partner selection, increasing attention is given to environmental criteria [8] for sustainable supply chains. However, sustainable innovations along the supply chain are very often the result of intense interactions and engagement of customers and business partners in new service co-designing [55]. The degree of involvement and engagement of external stakeholders within the sustainable business model can be different and take the form of partnerships with port authorities, universities, and innovation incubators; consultation and interactions with local stakeholders on specific topics and issues; and information sharing with local agencies and the public.

Finally, the value created can have different dimensions within the supply chain and in the external environment. The sustainability-oriented value creation model extends it by highlighting the potential to create other types of values rather than economic, such as reduced consumption and waste of raw materials, water, and energy sources, or sustainable innovation along the supply chain. From a social perspective, the health and safety of employees and customers, the respect of individuals' rights, and fair employment through non-discrimination (e.g., related to religion, nationality, gender, age, etc.), including payment of fair wages, are of crucial importance. Externally, it takes the form of growth in the number of creative and circular businesses in the regional ecosystem, improved image and green reputation, or increase of social cohesion and trust in the port ecosystem. Environmentally friendly processes and services reduce impacts and emissions that may harm people or the society.

5. Conclusions and Future Research Agenda

Sustainable value creation is at the heart of business model research [36] and it has been approached from different perspectives of analysis. While the conventional perspective emphasizes value creation for customers in the exchange of economic value from the business, alternative perspectives are based on the notion of value taking place in stakeholder networks, where economic, social, and ecological values interact [10]. However, sustainability-oriented business models are still debated, and new frameworks are needed to explore multi-directional value flows between a company and its stakeholders.

The present paper contributes to this research stream by addressing the value creation logics that drive port business operators in redesigning their business models. It develops a theoretical framework of sustainable value creation, which structures the relationships between the port business operator and its stakeholders at two interconnected levels: the supply chain and the institutional environment. These interconnected levels identify core value creation activities and resources, potential relational governance models, and the value created with and for different stakeholders. The framework acknowledges the dual nature of value creation because stakeholders are engaged in providing and receiving value. However, its implementation opens new avenues for future research that are currently lacking in both business model and port research.

First, the theoretical framework should be tested taking into account the characteristics of service supply chains in which the port business operator is involved, as these determine the categories of stakeholders with whom to interact with in the sustainable value creation processes. For example, in the case of terminal operators, and their main customers, shipping lines, the implementation of environmentally conscious practices, such as slow steaming practices or investments to reduce CO₂ emissions, can negatively affect the economic value, in terms of the costs and speed of transport services. Furthermore, digital transaction can increase the efficiency and the transparency along the supply chain but reduce the number of employees, with a negative impact on the sustainable social value. Case-specific research investigating different business model choices and their effects on sustainable value creation is needed to explain how different combinations of resources among partners co-create value and which resources are more critical for different pillars of sustainability, i.e., social, environmental, and economic. Additionally, given the shocks generated by the Covid-19 outbreak, a further emerging issue is the resilience capacity of port business operators based on appropriate strategies for improving the sustainability of port service supply chains [89].

The sustainability-oriented business model provides new opportunities to innovate in order to tackle specific societal and environmental challenges. Sustainability is an important area of innovation, and it requires effective collaboration among a wide range of stakeholders, including public authorities, business operators, financial stakeholders, civil society, and customers. Collaborative innovation networks can be formed through joint projects, often coordinated, and supported by the port authority, which can perform the role of a network orchestrator. This opens further research avenues on how to build trusting relationships with business operators [61], and which coordination mechanisms can ensure value creation and distribution, with implications for the specific business models of the participating actors.

Port authorities are called on to play an increasingly strategic role in identifying priorities and specific sustainable development goals based on the relational dynamics characterizing the territory and port ecosystems. Effective sustainable development strategies are the result of participatory processes, involving the civil society, local businesses, port private undertakings, and research institutions, in order to open up debate, expose issues to be addressed, and build consensus and support on actions. In this regard, future research should be oriented towards the definition of qualitative evaluation systems of value creation in inter-organizational collaboration, which could complement the current performance indicators.

As stakeholder interactions and relationships are core aspects in building sustainability, this means acknowledging stakeholders as fellow human beings, instead of as element of a business model [10]. This raises ethical issues and increasing concern about due diligence models for responsible business conduct along the supply chains (UNGP's OCSE and FAO guidelines). In this regard, attention should be given to establishing and clarifying the international legal framework on responsible business conduct and at defining corporate human rights due diligence models to support port business operators in respecting and implementing them. Issues concerning the implementation of internationally agreed principles of responsible business conduct should also be investigated to contribute to sustainable development and to prevent adverse impacts on human rights.

Finally, a further issue concerns the so-called “telecoupling”, an emerging key concept used to explore sustainability in a globalized world. Telecoupling encompasses a “broad range of socioeconomic and environmental interactions over distances, such as international trade, foreign direct investment, human migration, tourism, travel, transfers of pollutants and waste, payments for ecosystem services, technology, and knowledge transfer” [90]. No study so far has analyzed local and distant linkages between port business operators of global value chains and their consequences on sustainable development strategies. The telecoupling framework offers a new analytical lens for port sustainability in global supply chains, enabling investigation of the interactions among interrelated units of analysis, such as receiving and sending port systems, and the effects that spill over to other locations.

Funding: This research received no external funding.

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Not applicable.

Data Availability Statement: Not applicable.

Conflicts of Interest: The authors declare no conflict of interest.

References

1. Gray, B.; Stites, J.P. Sustainability through partnerships: Capitalizing on collaboration. Network for Business Sustainability. Available online: <http://www.wageningenportals.nl/sites/default/files/resource/nbs-systematic-review-partnerships.pdf> (accessed on 28 October 2021).
2. Austin, J.E.; Seitanidi, M.M. Collaborative Value Creation: A Review of Partnering between Nonprofits and Businesses: Part I. Value Creation Spectrum and Collaboration Stages. *Nonprofit Volunt. Sect. Quart.* **2012**, *41*, 726–758. [CrossRef]
3. Austin, J.E.; Seitanidi, M.M. Collaborative Value Creation: A Review of Partnering Between Nonprofits and Businesses: Part 2. Partnership Processes and Outcomes. *Nonprofit Volunt. Sect. Quart.* **2012**, *41*, 929–968. [CrossRef]
4. Le Pennec, M.; Raufflet, E. Value Creation in Inter-Organizational Collaboration: An Empirical Study. *J. Bus. Ethics* **2018**, *148*, 817–834. [CrossRef]
5. Chen, L.; Zhao, X.; Tang, O.; Price, L.; Zhang, S.; Zhu, W. Supply Chain Collaboration for Sustainability: A Literature Review and Future Research Agenda. *Int. J. Prod. Econ.* **2017**, *194*, 73–87. [CrossRef]
6. Bellucci, M.; Simoni, L.; Acuti, D.; Manetti, G. Stakeholder Engagement and Dialogic Accounting: Empirical Evidence in Sustainability Reporting. *Account. Audit. Account. J.* **2019**, *32*, 1467–1499. [CrossRef]
7. Geerts, M.; Dooms, M.; Stas, L. Determinants of Sustainability Reporting in the Present Institutional Context: The Case of Port Managing Bodies. *Sustainability* **2021**, *13*, 3148. [CrossRef]
8. Acciaro, M. Corporate Responsibility and Value Creation in the Port Sector. *Int. J. Logist. Res. Appl.* **2015**, *18*, 291–311. [CrossRef]
9. Joyce, A.; Paquin, R.L. The Triple Layered Business Model Canvas: A Tool to Design More Sustainable Business Models. *J. Clean. Prod.* **2016**, *135*, 1474–1486. [CrossRef]
10. Freudenreich, B.; Lüdeke-Freund, F.; Schaltegger, S. A Stakeholder Theory Perspective on Business Models: Value Creation for Sustainability. *J. Bus. Ethics* **2020**, *166*, 3–18. [CrossRef]
11. Bailey, D.; Pitelis, C.N.; Tomlinson, P.R. A Place-Based Developmental Regional Industrial Strategy for Sustainable Capture of Co-Created Value. *Camb. J. Econ.* **2018**, *42*, 1521–1542. [CrossRef]
12. Barca, F. Alternative approaches to development policy: Intersections and divergences. In *OECD Regional Outlook*; OECD Publ.: Paris, France, 2011; pp. 215–225.
13. OECD. *Collaborative Strategies for In-Country Shared Value Creation: Framework for Extractive Projects*; OECD Publishing: Paris, France, 2016. [CrossRef]

14. European Union (EU). Towards a Sustainable Europe by 2030. Contribution of the SDG Multi-Stakeholder Platform to the Reflection Paper. 2019. Available online: https://ec.europa.eu/info/sites/info/files/sdg_multi-stakeholder_platform_input_to_reflection_paper_sustainable_europe2.pdf (accessed on 28 October 2021).
15. United Nations (UN). Sustainable Development Goals 17. Strengthen the Means of Implementation and Revitalize the Global Partnership for Sustainable Development. 2021. Available online: <https://unstats.un.org/sdgs/report/2021/goal-17/> (accessed on 28 October 2021).
16. Lim, S.; Pettit, S.; Abouarghoub, W.; Beresford, A. Port Sustainability and Performance: A Systematic Literature Review. *Transp. Res. Part D Transp. Environ.* **2019**, *72*, 47–64. [[CrossRef](#)]
17. Stein, M.; Acciaro, M. Value Creation through Corporate Sustainability in the Port Sector: A structured literature Analysis. *Sustainability* **2020**, *12*, 5504. [[CrossRef](#)]
18. Gonzalez-Aregall, M.; Bergqvist, R.; Monios, J. A Global Review of the Hinterland Dimension of Green Port Strategies. *Transp. Res. Part D Transp. Environ.* **2018**, *59*, 23–34. [[CrossRef](#)]
19. Zheng, Y.; Zhao, J.; Shao, G. Port City Sustainability: A Review of Its Research Trends. *Sustainability* **2020**, *12*, 8355. [[CrossRef](#)]
20. Williams, J. The Circular Regeneration of a Seaport. *Sustainability* **2019**, *11*, 3424. [[CrossRef](#)]
21. de Langen, P.W.; Sornn-Friese, H.; Hallworth, J. The Role of Port Development Companies in Transitioning the Port Business Ecosystem: The Case of Port of Amsterdam's Circular Activities. *Sustainability* **2020**, *12*, 4397. [[CrossRef](#)]
22. Lam, J.S.; Yap, W.Y. A Stakeholder Perspective of Port City Sustainable Development. *Sustainability* **2019**, *11*, 447. [[CrossRef](#)]
23. de-Chernatony, L.; Harris, F.; Dall'Olmio Riley, F. Added Value: Its Nature, Roles and Sustainability. *Eur. J. Mark.* **2000**, *34*, 39–56. [[CrossRef](#)]
24. Smith, A. *An Enquiry into the Nature and Causes of the Wealth of Nations*; MetaLibri: Amsterdam, The Nederland, 1776.
25. Brewer, A.M. The concept of value: Symbolic artefact or useful tool. In *Handbook of Logistics and Supply Chain Management*; Brewer, A.M., Ed.; Elsevier Ltd.: Amsterdam, The Netherlands, 2001; pp. 127–139.
26. Porter, M.E. *Competitive Advantage: Creating and Sustaining Superior Performance*; The Free Press: New York, NY, USA, 1985.
27. Normann, R.; Ramirez, R. *Designing Interactive Strategy. From Value Chain to Value Constellation*; John Wiley & Sons: Chichester, UK, 1994.
28. Stabell, C.B.; Fjeldstad, O.D. Configuring Value for Competitive Advantage: On Chains, Shops, and Networks. *Strat. Manag. J.* **1998**, *19*, 413–437. [[CrossRef](#)]
29. Porter, M.E.; Kramer, M.R. Shared Value: How to Reinvent Capitalism and Unleash a Wave of Innovation and Growth. *Harv. Bus. Rev.* **2011**, *89*, 62–77.
30. Emerson, J. The Blended Value Proposition: Integrating Social and Financial Returns. *Calif. Manag. Rev.* **2003**, *45*, 35–51. [[CrossRef](#)]
31. London, T.; Hart, S.L. *Next Generation Business Strategies for the Base of the Pyramid: New Approaches for Building Mutual Value*; FT Press: Upper Saddle River, NJ, USA, 2010.
32. Wheeler, C.; Colbert, B.; Freeman, R.E. Focusing on Value: Reconciling Corporate Social Responsibility, Sustainability and A Stakeholder Approach in a Network World. *J. Gen. Manag.* **2003**, *28*, 1–28. [[CrossRef](#)]
33. Vargo, S.L.; Maglio, P.; Akaka, M.A. On Value and Value Creation: A Service Systems and Service Logic Perspective. *Eur. Manag. J.* **2008**, *26*, 145–152. [[CrossRef](#)]
34. Vargo, S.L.; Lusch, R.F. Evolving to a New Dominant Logic for Marketing. *J. Mark.* **2004**, *68*, 1–17. [[CrossRef](#)]
35. Grönroos, C. A Service Perspective on Business Relationships: The Value Creation, Interaction and Marketing Interface. *Ind. Mark. Manag.* **2011**, *40*, 240–247. [[CrossRef](#)]
36. Zott, C.; Amit, R.; Massa, L. The Business Model: Recent Developments and Future Research. *J. Manag.* **2011**, *37*, 1019–1042. [[CrossRef](#)]
37. Clifford Defee, C.; Stank, T.P. Applying the Strategy-Structure-Performance Paradigm to The Supply Chain Environment. *Int. J. Logist. Manag.* **2005**, *16*, 28–50. [[CrossRef](#)]
38. Miller, J.G.; Roth, A.V. A Taxonomy of Manufacturing Strategy. *Manag. Sci.* **1994**, *40*, 285–304. [[CrossRef](#)]
39. Chen, H.; Daugherty, P.J.; Landry, T.D. Supply Chain Process Integration: A Theoretical Framework. *J. Bus. Logist.* **2009**, *30*, 27–46. [[CrossRef](#)]
40. Morash, E.A.; Lynch, D.F. Public Policy and Global Supply Chain Capabilities and Performance: A Resource-Based View. *J. Int. Mark.* **2002**, *10*, 25–51. [[CrossRef](#)]
41. Caves, R.E.; Porter, M.E.; Spence, M.; Scott, T.J. *Competition in the Open Economy: A Model Applied to Canada*; Harvard University Press: Cambridge, UK, 1980.
42. Wernerfelt, B. A Resource-Based View of the Firm. *Strat. Manag. J.* **1984**, *5*, 171–180. [[CrossRef](#)]
43. Barney, J. Firm Resources and Sustained Competitive Advantages. *J. Manag.* **1991**, *17*, 99–121. [[CrossRef](#)]
44. Olavarrieta, S.; Ellinger, A.E. Resource-Based Theory and Strategic Logistics Research. *Int J. Phys Distrib. Logist. Manag.* **1997**, *27*, 559–587. [[CrossRef](#)]
45. Teece, D.J.; Pisano, G.; Shuen, A. Dynamic Capabilities and Strategic Management. *Strat. Manag. J.* **1997**, *18*, 509–533. [[CrossRef](#)]
46. Lavie, D.; Haunschild, P.R.; Khanna, P. Organizational Differences, Relational Mechanisms, and Alliance Performance. *Strat. Manag. J.* **2012**, *33*, 1453–1479. [[CrossRef](#)]

47. Oxley, J.E. Appropriability Hazards and Governance in Strategic Alliances: A Transaction Cost Approach. *J. Law Econ. Org.* **1997**, *13*, 387–409. [\[CrossRef\]](#)
48. Das, S.; Teng, B.S. A Resource-Based Theory of Strategic Alliances. *J. Manag.* **2000**, *26*, 31–61. [\[CrossRef\]](#)
49. Rice, J.B.; Hoppe, R.M. Supply Chain Versus Supply Chain: The Hype and the Reality. *Supply Chain Manag. Rev.* **2001**, *5*, 46–54.
50. Gulati, R.; Singh, H. The Architecture of Cooperation: Managing Coordination Costs and Appropriation Concerns in Strategic Alliances. *Admin. Sci. Quart.* **1998**, *43*, 781–814. [\[CrossRef\]](#)
51. Ellinger, A.E.; Daugherty, P.J.; Keller, S. The Relationship between Marketing/Logistics Interdepartmental Integration and Performance in U.S. Manufacturing Firms: An Empirical Study. *J. Bus. Logist.* **2000**, *21*, 1–22.
52. Lado, A.A.; Boyd, N.G.; Hanlon, S.C. Competition, Cooperation, and the Search for Economic Rents: A Syncretic Model. *Acad. Manag. Rev.* **1997**, *22*, 110–141. [\[CrossRef\]](#)
53. Bocken, N.; Short, S.; Rana, P.; Evans, S. A Value Mapping Tool for Sustainable Business Modelling. *Corp. Gov.* **2013**, *13*, 482–497. [\[CrossRef\]](#)
54. Lüdeke-Freund, F.; Rauter, R.; Gjerdrum Pedersen, E.R.; Nielsen, C. Sustainable Value Creation through Business Models: The What, the Who and the How. *J. Bus. Mod.* **2020**, *8*, 62–90. [\[CrossRef\]](#)
55. Sulkowski, A.J.; Edwards, M.; Freeman, R.E. Shake Your Stakeholder: Firms Leading Engagement to Cocreate Sustainable Value. *Organ. Environ.* **2018**, *31*, 223–241. [\[CrossRef\]](#)
56. Fobbe, L.; Hilletofth, P. Stakeholder Interaction for Sustainability in Seaports. Analysing the Implementation and Its Linkages to Overarching Interaction Efforts. *Eur. Bus. Rev.* **2021**, *33*, 693–724. [\[CrossRef\]](#)
57. Massa, L.; Tucci, C.; Afuah, A. A Critical Assessment of Business Model Research. *Acad. Manag. Ann.* **2017**, *11*, 73–104. [\[CrossRef\]](#)
58. Ashrafi, M.; Acciaro, M.; Walker, T.R.; Magnan, G.; Adams, M. Corporate Sustainability in Canadian and US Maritime Ports. *J. Clean. Prod.* **2019**, *220*, 386–397. [\[CrossRef\]](#)
59. Schrobback, P.; Meath, C. Corporate Sustainability Governance: Insight from the Australian and New Zealand Port Industry. *J. Clean. Prod.* **2020**, *255*, 120280. [\[CrossRef\]](#)
60. De Martino, M. Port Competitiveness and Value Creation: The Network Approach. Empirical Evidence from the Italian Port System. Ph.D. Thesis, University of Antwerp, Antwerpen, Belgium, 2018.
61. De Martino, M.; Magnotti, F.; Morvillo, A. Port Governance and Value Creation in the Supply Chain: The Case of Italian Ports. *Case Stud. Transp. Policy* **2020**, *8*, 373–382. [\[CrossRef\]](#)
62. Langenus, M.; Dooms, M. Creating an Industry-Level Business Model for Sustainability: The Case of the European Ports Industry. *J. Clean. Prod.* **2018**, *195*, 949–962. [\[CrossRef\]](#)
63. van Zanten, J.A.; van Tulder, R. Beyond COVID-19: Applying “SDG Logics” for Resilient Transformations. *J. Int. Bus. Policy* **2020**, *3*, 451–464. [\[CrossRef\]](#)
64. Loh, H.-S.; Thai, V.V. Cost Consequences of a Port-Related Supply Chain Disruption. *Asian J. Shipp. Logist.* **2015**, *31*, 319–340. [\[CrossRef\]](#)
65. Huybrechts, M.; Meersman, H.; Van de Voorde, E.; Van Hooydonk, E.; Verbeke, A.; Winkelmann, W. *Port Competitiveness: An Economic and Legal Analysis of the Factors Determining the Competitiveness of Seaports*; Editions De Boeck Ltd.: Antwerp, Belgium, 2002.
66. Meersman, H.; Van de Voorde, E. Cooperation and strategic alliances in the maritime sector and port industry. In Proceedings of the NAV & HSMV Conference, Sorrento, Italy, 18–21 March 1996.
67. Meersman, H.; Van de Voorde, E.; Vanlslander, T. Port Competition Revised. *Rev. Bus. Econ.* **2010**, *55*, 210–232.
68. Robinson, R. Ports as Elements in Value-Driven Chain Systems: The New Paradigm. *Marit. Policy Manag.* **2002**, *29*, 241–255. [\[CrossRef\]](#)
69. Yap, W.Y.; Lam, J.L.L. An Interpretation of Inter-Container Port Relationships from Demand Perspective. *Marit. Policy Manag.* **2004**, *31*, 337–355. [\[CrossRef\]](#)
70. Bichou, K.; Gray, R. A Logistics and Supply Chain Management Approach to Port Performance Measurement. *Marit. Policy Manag.* **2004**, *31*, 47–67. [\[CrossRef\]](#)
71. Mangan, J.; Lalwani, C. Port-Centric Logistics. *Int. J. Logist. Manag.* **2008**, *19*, 29–41. [\[CrossRef\]](#)
72. Paixao, A.C.; Marlow, P.B. Fourth Generation Ports- A Question of Agility? *Int J. Phys Distrib. Logist. Manag.* **2003**, *33*, 355–376. [\[CrossRef\]](#)
73. De Martino, M.; Morvillo, A. Activities, Resources and Inter-Organisational Relationships: Key Factors in the Port Competitiveness. *Marit. Policy Manag.* **2008**, *35*, 571–589. [\[CrossRef\]](#)
74. Harrison, D.; Håkansson, H. Activation in Resource Networks: A Comparative Study of Ports. *J. Bus. Ind. Mark.* **2006**, *21*, 231–238. [\[CrossRef\]](#)
75. Cetin, C.K.; Cerit, A.G. Organizational Effectiveness at Seaports: A System Approach. *Marit. Policy Manag.* **2010**, *37*, 195–219. [\[CrossRef\]](#)
76. De Martino, M.; Errichiello, L.; Marasco, A.; Morvillo, A. Logistics Innovation in Seaports: An Inter-Organizational Perspective. *Res. Trans. Bus. Manag.* **2013**, *8*, 123–133. [\[CrossRef\]](#)
77. Verhoeven, P. A Review of Port Authority Functions: Towards a Renaissance? *Marit. Policy Manag.* **2010**, *37*, 247–270. [\[CrossRef\]](#)
78. De Martino, M.; Carbone, V.; Morvillo, A. Value Creation in the Port: Opening the Boundaries to the Market. *Marit. Policy Manag.* **2015**, *42*, 682–698. [\[CrossRef\]](#)

79. Parola, F.; Satta, G.; Caschili, S. Unveiling Co-Operative Networks and ‘Hidden Families’ in the Container Port Industry. *Marit. Policy Manag.* **2014**, *41*, 384–404. [[CrossRef](#)]
80. Rodrigue, J.-P.; Notteboom, T.; Pallis, A.A. The Financialization of the Port and Terminal Industry: Revisiting Risk and Embeddedness. *Marit. Policy Manag.* **2011**, *38*, 191–213. [[CrossRef](#)]
81. Upward, A.; Jones, P. An Ontology for Strongly Sustainable Business Models: Defining an Enterprise Framework Compatible with Natural and Social Science. *Org. Environ.* **2016**, *29*, 97–123. [[CrossRef](#)]
82. Lam, J.S.L.; Ng, A.K.Y.; Fu, X. Stakeholder Management for Establishing Sustainable Regional Port Governance. *Res. Trans. Bus. Manag.* **2013**, *8*, 30–38. [[CrossRef](#)]
83. World Ports Sustainability Program. Available online: <https://sustainableworldports.org/iaph-sustainability-awards-2021> (accessed on 30 September 2021).
84. Gravagnuolo, A.; Angrisano, M.; Fusco Girard, L. Circular Economy Strategies in Eight Historic Port Cities: Criteria and Indicators towards a Circular City Assessment Framework. *Sustainability* **2019**, *11*, 3512. [[CrossRef](#)]
85. Mankowska, M.; Kotowska, I.; Plucinski, M. Seaports as Nodal Points of Circular Supply Chains: Opportunities and Challenges for Secondary Ports. *Sustainability* **2020**, *12*, 3926. [[CrossRef](#)]
86. Rosca, E.; Arnold, M.; Bendul, J.C. Business Models for Sustainable Innovation an Empirical Analysis of Frugal Products and Services. *J. Clean. Prod.* **2017**, *162*, 133–145. [[CrossRef](#)]
87. Notteboom, T.; Rodrigue, J.-P. The Corporate Geography of Global Container Terminal Operators. *Marit. Policy Manag.* **2012**, *39*, 249–270. [[CrossRef](#)]
88. Van Der Horst, M.R.; de Langen, P. Coordination in Hinterland Transport Chains: A Major Challenge for the Seaport Community. *Marit. Econ. Logist.* **2008**, *10*, 108–129. [[CrossRef](#)]
89. Taqi, H.M.M.; Ahmed, H.N.; Paul, S.; Garshasbi, M.; Ali, S.M.; Kabir, G.; Paul, S.K. Strategies to Manage the Impacts of the COVID-19 Pandemic in the Supply Chain: Implications for Improving Economic and Social Sustainability. *Sustainability* **2020**, *12*, 9483. [[CrossRef](#)]
90. Liu, J. Spillover Systems in a Telecoupled Anthropocene: Typology, Methods, and Governance for Global Sustainability. *Curr. Opin. Environ. Sustain.* **2018**, *33*, 58–69. [[CrossRef](#)]