Business Models in Logistics

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To make possible the integration and harmonization as well as the orchestration of independent logistics operations, smart platforms and platform ecosystems are necessary to effectively connect the providers of sustainable transport solutions and those who need them.

Keywords: logistics ; framework ; business model ; platform ; sustainability

1. Introduction

Well-integrated logistic networks are crucial for safe and resilient transport, as well as for smart mobility services for goods. These can also lead to creating efficient ways to store or transport materials and products. According to the Organization for Economic Co-operation and Development (OECD)—International Transport Forum data from 2019, each year, approximately 100 trillion ton-kilometers are logged globally to transport services. In 2020, over 5.3% of the total labor force in the European Union (EU) was employed in the field of logistics and freight transport. Around USD 650 billion (5% of the EU's gross domestic product) has been created by the transport and logistics industry and more than 1.15 million companies are active in this field [1].

Externality reduction is a major concern for logistics companies. The integration of logistics networks enables the accurate prediction of the customers' transport needs, scheduling purchase of raw materials and final product delivery. This consequently results in better utilization of cargo and warehouse space, time savings on loading and unloading activities and product delivery. The integration of logistics networks can also offer increased flexibility for logistics companies and businesses. The elements of difficulty for this issue are manifold, and the main challenges consist in (i) the integration, harmonization and orchestration of independent logistics operations due, in large part, to heterogeneous processes, and in (ii) the correct approach from the point of view of the drastic increase in the complexity of the problems due to extended logistics networks and large data volumes.

In order to make possible the integration, harmonization and orchestration of independent logistics operations, smart platforms and platform ecosystems are required, since these can effectively connect the providers of sustainable transport solutions together with those who need them. Virtual platforms in the field of logistics can function as marketplaces but these also have to ensure the access of third parties involved in the innovation by promoting the development of services and smart tools that are necessary to satisfy the dynamic needs of the logistic systems.

Most current business model research takes an economic-centered approach, and more focus should be applied to need instead of value, by identifying the requirements of the actors involved and trying to adapt to them. The main drawback is the poor coverage of the wider context, as well as the reduced integration of the potentially important factors that are necessary to support a sustainable model. The fitting of innovative collaborative logistics business models in possible forms of cooperation, horizontal, vertical, diagonal, integral or multi-modal digital marketplaces is still a neglected topic. Furthermore, the related literature is also limited in both practical and scientific aspects.

Furthermore, statistical data show that, at present, transportation is responsible for 25% of the total greenhouse gas emissions in Europe [2]. Since the incentives and constraints used to reduce pollution are more advanced in many industries, the challenge is that this share should increase in the field of transportation, too. Until now, most of the companies have concentrated on their primary (Scope 1) emissions together with the emissions caused by their energy use (Scope 2). These are the emissions that companies currently need to report, which due to public attention, many companies aim to decrease. However, these companies have rarely focused on emissions caused by subcontracting (Scope 3). This is because there is no need to report these emissions; thus, consequently, the companies do not collect data regarding them [3]. Even if, at a declarative level, many companies seem concerned about sustainability in supply-chain operations, at least in their sustainability reports, the reality in the logistics industry in general is that purchasing decisions are made by taking the costs as the primary factor when selecting different transport and logistics alternatives.

In the case that low-energy and low-polluting alternatives are more expensive than other alternatives, they are not chosen.

2. Business Models of Logistics

Collaborative logistics is a topic broadly dealt with both in practical and scientific literature, and it has become more and more obvious that it can be considered a critical factor in terms of increasing competitiveness [4][5]. The different types of collaboration, at the vertical level (supplier–client) and at horizontal level (integrator–integrator), lead companies to generate an exchange of information, knowledge and technology. Among these possible forms of cooperation in logistics—horizontal and vertical types of collaboration, integral to multi-modal digital marketplaces—horizontal collaboration is still a neglected topic and the related literature is yet limited [6]. The same situation is also found for lateral collaboration, integrating both the vertical and horizontal. The benefits of horizontal collaboration are generally recognized in the literature. The conducted studies show that a high percent of companies will implement in the future a form of collaboration strategy [7][8][9][10][11][12]. This requires the implementation of approaches that allow them to make decisions that influence the results expected. Often, horizontal collaboration can lead to substantial economic benefits such as risk sharing, cost savings, investments increasing and pooling know-how, in addition to the ecological benefit, for instance, CO_2 reduction [13][14][15].

A broad approach in order to understand the relevant factors needed for the analysis and the implementation of horizontal collaboration can be found in [6][13][16][17]. Cruijssen [8] identifies different typologies of horizontal cooperation in logistic activities. For each of them, the decision level (operational, tactical, strategic), competition among partners (presence/absence), combined assets (orders, logistic facilities, rolling stock, market power, supporting processes and expertise) and objectives (cost reduction, growth, innovation, quick response and social relevance) dimensions are investigated. For the most part, the focus lies on identifying the benefits of horizontal collaboration and the analysis factors necessary for its implementation, but the literature related to dedicated business modeling for logistic horizontal collaboration is, however, limited.

In the literature, business models are characterized from multiple perspectives, starting from the identification of a series of constituent elements and their association through the coordination and matching of these elements. The four elements constitutive model proposed by Hamel [18] and the nine-factor model proposed by Osterwalder [19] frequently appear to be highly recognized in the literature. The latter business model refers to the creation, transfer and acquiring of value, and it considers the process of business operations, the source of profit and strategic positioning.

Several studies provided taxonomies for business models in the logistics sector together with classifications extending classical business models of logistics [20]. There is no structural analysis explicitly examining the framework of digital business models in the logistics domain [21]. The existing conceptual frameworks for business models cover a multitude of elements, making the logical correlation between elements which are too complex, thus consequently increasing the difficulty of their application [22]. Some authors identify specific categories of logistics business models, in the form of cross-border business models, mutually beneficial business models, open business models [23], supply-chain integration services business models and multiple-platform business models. These can provide a reference for the logistics enterprises so as to carry out the business model innovation [24].

Digital marketplaces are generally seen as digital platform, allowing peers from both supply and demand sides to interact and initiate a transaction [25], as well permit both ownership transfer together with the temporary access of a product or a service [26][27]. At the industry level, practical solutions have been developed for digital marketplaces. For instance, freight marketplaces match companies looking to ship freight using one or multiple modes of transport (road, air, ocean and/or rail) with suppliers or brokers of logistics capacity; warehousing marketplaces facilitate responsive access to space and allow customers to flexibly distribute goods across locations. However, the related scientific literature for business models for multimodal marketplace is still missing.

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