HOW CAN LOGISTICS REAL ESTATE SUPPORT THIRD-PARTY LOGISTICS PROVIDERS?

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Abstract

In recent years the logistics outsourcing market has significantly expanded, driving also the growth of the logistics real estate sector. However, these subjects have been investigated separately, without empirical evidence on the assessment of warehouse features, nor studies matching those with 3PL providers' needs. This paper aims to fill this gap by providing a deeper understanding of the alignment between the 3PL industry's needs and the logistics real estate offering. An extensive literature review was used to investigate the characteristics of the logistics real estate industry and define the present and future challenges for the 3PL industry. Afterwards, 3PL warehouse features were analysed through data collected on 75 logistics buildings located in Italy. Results indicate that the logistics real estate seems relatively prepared to support the 3PL industry's needs. However, such alignment could be further strengthened through investments by the logistics real estate towards environmental sustainability and warehouse automation.

Article Classification: research paper
Keywords: Logistics outsourcing; Third-party logistics providers; Real Estate; Warehousing; Strategic alignment.

1. Introduction

The terms 'Third-Party Logistics' (3PL) and 'logistics outsourcing' are used to describe the organisational practice of sub-contracting part or all logistics activities previously performed in-house (Selviaridis and Spring, 2007; Aghazadeh, 2003; Lieb et al., 1993). From the origin of 3PL in the late 1980s, its importance has grown over time (Roy and Sengupta, 2018). The annual study conducted by Armstrong & Associates (2020) indicates that the overall market of logistics outsourcing services has increased over the years, generating revenue of more than $ 950 billion in

2019. Today, an increased number of companies are looking to external partners to achieve a higher level of customer satisfaction and survive in a strong competitive environment (Raut et al., 2018).

As the outsourcing demand has grown, 3PL providers need to find new solutions to increase their competitive advantage. The source of competitive advantage, as defined by the resourced-based view (RBV) theory, can be related to the resources of an organisation that are valuable, rare, inimitable, and non-substitutable (Penrose, 2009). For 3PL providers, one of these critical resources consists in physical assets, such as warehouses (Wong and Karia, 2010).

The recent transformation of the 3PL industry has affected warehouse demands: today, warehouses need to be larger, taller, and located in strategic places (Contract Logistics Observatory, 2019; Richards, 2018).

In fact, the logistics real estate sector and the 3PL industry are strictly related: the growth of the 3PL industry has also driven the expansion of the logistics real estate sector (Baglio et al. 2019). Today, this sector is considered to be one of the most attractive property sectors, with investments that are rising globally, reaching up to $153.62 billion (CBRE Research, 2019).

However, in the existing literature, except from general indications provided by sporadic contributions, no empirical studies have analysed the relationship between the needs of 3PL providers, in terms of warehousing, and the actual features of warehouses available on the logistics real estate market for 3PLs. This is seen as a significant gap, since the warehouse is one of those unique assets, which, when viewed through the RBV lens, can represent a competitive advantage to facilitate and support 3PL providers. In other words, for 3PL providers, having the 'right' warehouse that is able to fulfil current and potential future needs is essential to succeed and thrive in the marketplace (Makaci et al., 2017). Upon close investigation, the examined literature has revealed numerous studies regarding the 3PL industry. However, only few have tackled real estate issues, and none provide empirical evidence on the assessment of the features of logistics buildings, nor match those features with the prospective needs of 3PL providers. Consequently, the intended objective of the present research is to shed an initial layer of light on the identified gaps by exploring the alignment between the initiatives undertaken by the logistics real estate industry and the requirements of the 3PL industry. Therefore, the following research question (RQ) has been identified:

To what extent are the actions of the logistics real estate industry aligned with the general requirements of the 3PL providers' in terms of current and prospective logistics buildings features?

To address this RQ, we specifically focus our analysis on the Italian logistics real estate context, where the growth of both the 3PL industry and the logistics real estate sector is still ongoing (BNP Paribas Real Estate, 2019; JLL Italy Research, 2019).

The contribution of this study is twofold. From an academic perspective, building on this first exploration of the alignment of the initiatives of the logistics real estate sector with the general trends of the 3PL industry, the present research extends the current theory by linking two different streams of literature (i.e. the stream on the 3PL industry and the stream on the logistics real estate sector) and provides new insights in the logistics real estate industry, which has appeared to be scarcely investigated. From a managerial perspective, by leveraging the elements affecting the level

of alignment between the logistics real estate industry and the requirements of 3PLs, this study offers a guide for 3PL providers searching for logistics buildings that suit their needs and future requirements. In addition, the results are also of interest for logistics real estate companies that can invest in buildings, which are compliant with the demands of the 3PL industry.
The remainder of the paper is organised as follows. The next section includes a literature review of the main characteristics and trends that are affecting the 3PL and logistics real estate industries and takes a look at the influence these have on logistics buildings. A description of the logistics buildings features deemed to be of importance will be provided. The methodologies adopted are described in Section 3, and the findings are then presented in Section 4. Afterwards, Section 5 presents the discussion and conclusions, with recommendations for further studies in the field.

2. Literature review

In accordance with the aim of this study, the literature review is structured into two subsections: the first focuses on the 3PL industry, highlighting the trends and needs of 3PL providers; the second looks at the real estate industry, pinpointing the characteristics of logistics buildings.

2.1 Trends and needs of the 3PL industry

The 3PL emerged in the U.S. and Europe in the 1980s (Ecer, 2018), and the interest in this topic has grown over time, as shown by the increasing number of contributions in the literature (Roy and Sengupta, 2018; Aguezzoul, 2014; Marasco, 2008). Many definitions and interpretations can be found (König et al., 2019; Marasco, 2008; Selviaridis and Spring, 2007), with 3PL often being defined as the use of external companies to perform single or multiple logistics services that would have traditionally been managed in-house by manufacturing firms (Asian et al. 2019).
Over time, the growth of the 3PL industry has been driven by the increasing demand for outsourced logistics services (Hofmann and Osterwalder, 2017). Indeed, a growing number of companies have been progressively deciding to outsource their logistics activities to achieve benefits, such as reducing operational costs, and improving the performances and service level (e.g. reducing transport lead time), increasing flexibility, freeing up internal resources available for core activities, and - in some cases - building a strategic alliance to support the provision of a higher customer service level and increase their competitive advantage (Aguezzoul, 2014; Ecer, 2018; Marchet et al., 2018). To do so, 3PL providers should have the resources, scope, scale, and best practices experience in warehousing, distribution, and transport to offer logistics services that are more efficient and less expensive than what manufacturing companies can do in-house (Yang, 2014).
In recent years, the expansion of the 3PL market has contributed to the evolution of the industry itself. Historically, 3PL providers delivered traditional logistics services, such as transport and warehouse management activities (Aghazadeh, 2003; Zacharia et al., 2011). However, 3PL providers are changing their role due to increased volumes and scope of services demanded: today, they are engaged in strategic coordination of their customers' supply chain activities (Zacharia et al., 2011).

They have expanded their service content - which now involves more complex activities (Yeung et al. 2012), such as product marking, labelling and packaging, customer services, intermodal services, and reverse logistics services (Yang 2014) - to satisfy their customers' new operating requirements and an ever-growing demand for quality (Raut et al., 2018). These services are developed using physical resources, including logistics hubs, warehouses, and material handling devices. The physical resources are valuable in creating network coverage, maintaining control of the logistics activities, and improving the speed and reliability of delivery. They are also as well as inimitable, due to high capital investments (Yeung et al., 2012). For this reason, 3PL customers see physical resources as critical; therefore, 3PL providers will struggle to find clients if their warehouses and material handling devices are not seen as good enough (Asian et al., 2019). Moreover, according to RBV theory, physical resources can be used by 3PL providers to gain a sustainable competitive advantage (Wong and Karia, 2010). Despite their importance, the strategic role of physical resources in the 3PL industry - with a particular focus on warehouses and their features - has not been addressed in literature so far.

According to the scientific literature, the current challenges for the 3PL industry are mainly related to technology and innovation (Hofmann and Osterwalder, 2017), environmental sustainability (Roy and Sengupta, 2018), and the growth of e-commerce (Richards, 2018). These challenges are consistent with the trends provided by practitioners' studies.

The adoption of autonomous warehouse technologies, such as robots, autonomous guided vehicle (AGV) and automated storage and retrieval systems (AS/RS) is already been used by the 3PL providers to reduce costs and increase the efficiency of logistics activities (Hofmann and Osterwalder, 2017). Within the next five years, shippers and 3PL companies are expected to launch further optimisation initiatives and invest in autonomous vehicles and/or alternative fuels (Langley and Capgemini, 2019).

According to a recent study by Langley and Capgemini (2019), the most significant emerging global trend regards environmental sustainability. Sustainability affects all logistics functions and has become a challenging area for 3PL providers to face within a highly competitive market (Ali et al., 2019). Several sustainable initiatives have been carried out by 3PL providers to improve their performance (Perotti et al., 2012). Some are related to the warehouse and span from the design of the structure to its management and maintenance

Another huge challenge is the growth of e-commerce and the need for omnichannel distribution (Davarzani and Norrman, 2015). According to Richards (2018), this implies managing an increased number of smaller and more frequent orders, shorter order lead times, an increase in item customisation, and a higher number of stock-keeping units (SKUs), while optimising distribution among channels (online and offline).

Finally, practitioners' studies also highlight certain current challenges, such as economic uncertainty, shortage of skilled labour availability in the market (i.e. warehouse operators and drivers), and relationship issues between the client and provider (i.e. collaboration, alignment between companies, effective use of gainsharing) (Langley and Capgemini, 2019; Technavio, 2018).

Looking at the future trends for the 3PL industry, it appears that all aforementioned current challenges will be taken to the edge. Concepts such as fully-automated warehouses, carbon-neutral buildings, hybrid or full-electric trucks, robotics, drones, voice or optically guided warehouses operation will be part of everyday life in logistics (Richards, 2018). All these aspects should be taken into account since they represent the current and prospective 3PL providers' needs. The 3PL provider should seek out the 'right' warehouse, one that is able to support its future challenges (McKinnon, 2009). For example, the expansion of e-commerce volumes has reshaped the layout of operations inside a warehouse. The demand for mezzanines to build the 'picking towers' to handle the picking of a single unit has increased, as has the request for taller buildings (Baker, 2006; Richards, 2018). In particular, recent research identified five main drivers that are shaping the layout of logistics building in Italy (Contract Logistics Observatory 2019), which are similar to those mentioned above. They are: (i) the introduction of automated systems; (ii) distribution in different channels; (iii) attention to environmental sustainability; (iv) attention to safety; and (v) flexibility of the layout. These phenomena are affecting the demand for logistics buildings. For this reason, 3PL providers are asking for larger warehouses in terms of floor space (m^2), with greater clear building height, a higher number of unloading/loading bays per m^2, and new spaces to perform value-added activities (Richards, 2018). Lastly, it emerges that these logistics buildings should be located in the hinterlands, where the transport conditions are improved thanks to investments in transportation infrastructure (McKinnon, 2009).

2.2 Characteristics of the logistics real estate industry

Traditionally, the logistics real estate industry was characterised by few speculative developments, leases or rental contracts that lasted at least 10 years, local or national developers who were in charge of building the new facilities, and weak investments in the market (Hesse, 2004). In most cases, logistics was essentially considered to be a subsidiary of the commercial and industrial real estate sector (Bhutta and Migliorelli, 2015; Hesse, 2004). Investments were undertaken by real estate companies that employed developers to design and build general-purpose warehouses, which had to meet the needs of a significant part of the market (Yean Yng Ling et al. 2008). These investments were typically for speculative developments; therefore, real estate companies were unable to satisfy all specific needs displayed by the entirety of the market. Otherwise, few real estate companies used to invest in 'build-to-suit' warehouses, i.e. tailor-made developments based on specific requirements gathered by real estate brokers on behalf of their 3PL clients. In the past, a broker found 3PL providers or manufacturing firms that agreed to sign a lease for an extended period of time for a particular project, which, however, was generally based on particular features that might have been far from what the general 3PL market required (Hesse, 2004; Mattarocci and Pekdemir, 2017). In any case, real estate companies used to pay more attention to the financial investment rather than specific market needs (Yean Yng Ling et al. 2008), and particularly those of 3PL providers (Bhutta and Migliorelli, 2015).

In recent years, the logistics real estate industry has changed considerably. Specifically, it has been experiencing a rebirth (Baglio et al., 2019), with an increased number of lease contracts and a rising demand for quality spaces (Mattarocci and Pekdemir, 2017; Prologis, 2019a). This change is due to the progressive growth of the logistics market driven by e-commerce firms, traditional retailers and 3PL providers (Technavio, 2018). The growth has encouraged the need for new developments, which are definitely interesting for real estate companies (Bhutta and Migliorelli, 2015). Real estate investments are now focused equally on both speculative developments and 'built-to-suit' buildings (JLL Global Research, 2019) so that they may develop logistics buildings that meet the various requirements needed by e-commerce, retail, and 3PL industries (Prologis Research 2019a). Those buildings may differ due to location specificities, technical and/or construction features, and functionality - i.e. compatibility with a given logistics function (Baglio et al., 2019). For example, 'last touch' facilities are usually small, old buildings located in urban areas. They are used to reach the final consumer point in a few hours (Prologis Research 2019a). Instead, 'multi-market distribution' facilities are specialised to distribute products among different markets in one or more days by truck. These tend to be newer and larger buildings, located near strategic transport nodes (Prologis Research 2019a).

The warehouse has also evolved from being simple facility to becoming a more complex building: its primary role as a repository for inventory has turned into a multi-functional logistics hub (Baker, 2004) that must support the delivery of the right product, on time, and at the lowest logistics costs (Onstein et al., 2019). Modern warehouses perform other functions in addition to storage, such as goods receiving and handling, order picking, value-added activities, product customisation, return processing, information management, and recycling (Hesse, 2004; McKinnon, 2009; Richards, 2018). These logistics activities are affecting the types of features that are needed for a warehouse.

However, there has been little investigation into logistics real estate that focuses specifically on the warehouse features. Some studies focus on specific warehouse features and their relationship to the condition of the real estate market (Ma et al. 2018; Mattarocci and Pekdemir 2017; Oh and Shin 2016; Buttimer et al., 1997; Ambrose 1990), rather than providing a more holistic view. Table 1, adapted from Baglio et al. (2019), illustrates the list of the main features of logistics buildings. These features will be compared with the 3PL providers' needs to identify the level of alignment between logistics facilities and the requirements of 3PLs. The table includes the main warehouse features drawn from the literature and does not provide an extensive list of features.

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Table 1

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Looking at the future, studies performed by the leading real estate companies identify some challenges for the logistics market that the sector should be aware of. One of the hottest topics in the sector is environmental sustainability, due to the institutional pressure placed to increase the environmental performance of buildings (Zimmermann et al. 2005). New logistics facilities are built

assessing a structure's degree of sustainability by means of international assessment tools. These give rise to several building rating models, known as Green Building Rating Systems (GBRS). They assess the building's environmental performance by analysing gas emissions, energy consumption, and what green rules are applied during building design and construction (Ding, 2008). According to Cushman & Wakefield's report (2019), the increasing demand for freight transport, rising transport and real estate costs, labour shortages, and road congestion will all directly affect the logistics real estate sector (Cushman & Wakefield, 2019). These results are also confirmed by the existing literature. For example, Verhetsel et al. (2015) suggest that land rent plays a key role in determining location of logistics firms.

Specifically, these issues will have an impact on the value of the existing warehouse and requirements for the location and size of logistics buildings. For instance, the increased attention to cost reduction and an increase in flexibility is supposed to affect location requirements. From this viewpoint, logistics providers could find it preferable to settle into logistics clusters to benefit from geographical aggregation (Abushaikha, 2018; Sun et al., 2018; Hylton and Ross, 2017; Rivera et al., 2016).

According to the existing literature, logistics clustering can be defined as the agglomeration of firms that make logistics a part of their core activity in a geographic area. It may include logistics service providers (e.g. 3PL), packaging and maintenance firms, shipping agencies, distributors and wholesalers (Abushaikha, 2018). Several benefits are linked to the logistics clustering. First, the geographic location of the logistics cluster gives convenient access to intermodal transportation facilities and regional markets, consequently reducing operational and transportation costs (Sun et al., 2018). Proximity of firms also facilitates collaboration among them, as they serve different industries by sharing resources, thereby enhancing expansion opportunities (Rivera et al. 2016). Sun et al. (2018) show that productivity gain emerges as another important benefit associated with logistics agglomeration. Aggregation can also be boosted by policymakers, e.g. policy tax abatement or free trade zone within logistics clusters could encourage firms to operate closely. Logistics clustering could also positively affect regional economic developments (Rivera et al. 2016). Abushaikha (2018) highlights that logistics clustering is particularly convenient for the FMCG industry. He noticed that distributors were found to benefit extensively from logistics clustering for improving the innovation and performance of their warehouse operations. The results underline the role of warehousing as a value-adding capability, supporting the idea that the warehouse and the activities performed inside are key elements for the logistics activities and the firms' overall competitiveness (Abushaikha, 2018). However, at the same time, the ever-increasing consumption of logistics services, as McKinnon (2009) suggests, generates a large demand for logistics floor space, which consumes large amounts of land and potentially contributes to negative externalities, including higher land costs, wages and congestion (Sun et al., 2018; Hylton and Ross, 2017). Moreover, unbalanced competition could prevent logistics clustering in the short run, discouraging the expansion of the cluster (Sun et al., 2018; Hylton and Ross, 2017).

Table 2 illustrates the relationship between the current and future challenges also presented in the previous section and the warehouse's features defined in the real estate literature.

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Table 2

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3. Methodology

The research methodology was structured into two main phases, as shown in Figure 1.

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Figure 1

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3.1 Phase 1: Literature review

In Phase 1, an extensive literature review was used to define the characteristics of the logistics real estate industry, as well as the current and future challenges the 3PL industry faces. This choice was made in order to ensure the possibility to embrace an ample breadth of the views of the 3PL industry and of the real estate sector, given the global reach and strategies typical of both investigated sectors. In fact, as mentioned, the 3PL industry is populated mainly by multinational corporations, and the logistics real estate market is global by nature: the evolution of these sectors has occurred worldwide. The literature review was performed in line with the methodology applied by Marchet et al. (2018): scientific literature and secondary sources (e.g. reports and practitioner's studies) were examined. By analysing the published literature in an extensive way, it is possible to embrace those global trends and understand the requirements and needs from a whole body of global knowledge without limiting the potential scope of challenges of 3PLs to the views of a specific subset or sample of logistics companies or real estate operators, which in turn would limit the possibility to appreciate the variety of global trends and challenges. Hence, the decision to gather this sort of information from the existing body of published knowledge (taking into account the academic literature and practitioners' studies) gives a high-level global perspective rather than a country-specific or more local view on the 3PL industry needs. It would contrast with the global nature of today's 3PL industry and logistics real estate sector. This decision can serve well to the exploratory purpose of this first research endeavour in a novel stream that has received little attention so far by scholars and that would benefit from a high-level perspective adopted to shed light on the underlying mechanisms of the investigated topic. Specifically, the analysis was based on scientific papers, conference proceedings, books, and practitioners' studies, and covered the period from 1998 to 2019. Information was collected by using Scopus, which is one of the scholar citation databases most commonly used for field delineation (Strozzi et al., 2017).

Two sets of keywords and strings were identified to look at the two main topics studied in this paper: “trends and needs of the 3PL industry” and “characteristics of the logistics real estate industry”. For the first topic, the main keywords identified (such as ‘logistics outsourcing’, ‘3PL’, ‘needs’, ‘trend’ and their synonyms) and the associated combinations were used as search terms in both the abstract and the main body of the paper. Regarding the second topic, the same approach was used: the main keywords identified were “real estate”, “building”, “rating”, “evaluation”, “warehouse”, “logistics”, “design”, “location”, and their associated combinations. The set of papers that resulted were reduced by introducing some inclusion/exclusion criteria: the papers had to be written in English, the source consisted only of journals, and the subject areas were engineering and management.

The selected papers were primarily published in logistics journals (e.g., International Journal of Logistics Management, International Journal of Physical Distribution and Logistics Management, International Journal of Logistics Research and Applications), although publications were also found in real estate management (e.g. Land Use Policy, Journal of Real Estate Research and Facilities).

Finally, a series of papers and books were further included in the analysis through cross-referencing to improve the level of comprehension regarding the literature review. The entire analysis eventually led to the identification of 131 papers (36 papers were identified as the most appropriate for the topic discussed), 3 books, and 7 industrial reports, which, the authors believe, have provided useful insights on the topic. The main themes that emerged from the literature review were recorded and discussed previously in the Literature Review section.

3.2 Phase 2: Model application

In Phase 2, an analysis of 3PL warehouse features was performed using the rating model developed by Baglio et al. (2019). The model was applied to a sample of Italian logistics buildings. This model was chosen because it offers a holistic approach, as it takes into account 50 warehouse features - grouped into four main sections: location, surroundings and connections; external spaces; technical specifications of the building; and utilities and green systems – and incorporates the perspective of both academics and practitioners.

The decision to focus on the Italian context is twofold. First, in Italy, the growth the logistics real estate sector is still ongoing, thus offering the possibility to detect emerging trends and future evolutions (BNP Paribas Real Estate, 2019; JLL Italy Research, 2019). Indeed, Italian logistics real estate is in the early stages of the rent cycle, defined by Leccis (2017) as the “sequence of recurrent events affected by international and global forces that shape the supply and demand in the real estate industry” (p.28). In addition, the growth of the Italian 3PL industry is led by the increasing demand for outsourced logistics services, for a revenue equal to €84.9 billion in 2018 (Contract Logistics Observatory, 2020).

Second, in Italy, the 3PL industry has been found to be a specific and important driver for the development of the logistics real estate sector, especially for the city of Milan (Prologis, 2019a). Within the Italian territory, the ‘logistics region of Milan’ (Regione Logistica Milanese), which includes this northern Italian city and its surroundings, is particularly interesting with regards to its logistics

real estate (Dallari and Curi, 2010). The logistics region of Milan (LRM) is a 50 km radius area surrounding the city and takes in all the provinces of the Lombardy region. It also includes the nearby provinces of Novara and Piacenza, places with important nodes of national and international trade (Drewello and Scholl, 2015). According to some practitioner studies, the LRM is the cradle of central distribution in Italy (Prologis, 2019a). In actuality, it represents 26% of the logistics activities performed in Italy and holds 35% of the nation's floor space destined for logistics purposes (Dallari and Curi, 2010). The Italian logistics real estate sector can be considered representative of the general views and approaches of the worldwide logistics real estate industry due to the high number of global real estate companies involved (e.g. CBRE, Gazeley, Jones Lang LaSalle (JLL), Prologis), as highlighted by Baglio et al. (2019). Similarly, the presence of numerous primary multinational companies in the Italian 3PL industry makes the Italian context relevant to the worldwide context, as well as significant when highlighting its major 3PL industry trends (Marchet et al., 2018).

The sample of 3PL providers was created using the ORBIS database, one of the largest data sources on private companies, which includes data from more than 360 million enterprises from across the globe (Bureau van Dijk, 2020). This choice is in line with the methodology that was also applied by Solakivi et al. (2018). First, 3PL providers were selected by searching for the related 'Statistical Classification of Economic Activities in the European Community' code, commonly referred to as NACE (i.e. 4941 'Freight transport by road', 5210 'warehousing and storage', 5224 'cargo handling' and 5229 'other transportation support activities'). Second, a further filter was applied related to the geographical coverage of 3PL providers, with only those 3PL providers operating within the LRM region being considered. As such, a total of 1,300 3PL providers were identified with total revenues of €22.5 billion in 2017, representing 27% of the overall revenues generated by the 3PL industry in Italy (Contract Logistics Observatory, 2019). Third, a final filter was made based on searching for the top 3PL providers, using a ranking system carried out by the Politecnico di Milano Contract Logistics Observatory, which uses data from the balance sheets of organizations (i.e. revenue) to rank the most important 3PL providers in Italy. As an output, it was possible to identify the top 100 3PL providers operating within the LRM, which account for 10% of the number of 3PL providers operating in Italy and for 60% of the revenues generated in the LRM.

Given this sample of 100 3PL providers, an invitation was sent by e-mail to each, asking them to join the study. The respondents were preferably facility managers in charge of the warehouse under assessment. The facility manager is responsible for the management of the assets within them (Yean Yng Ling et al. 2008). If this specific figure was not available, the logistics manager was identified as the one with the most similar competences. Participants were requested to provide data answering a self-assessment questionnaire composed of 50 questions, as based on the rating model developed by Baglio et al. (2019). The data were asked only for those warehouses located in the LRM and compliant with the following inclusion criteria: (1) warehouses built or significantly refurbished after 1998, in order to exclude older buildings built before the rise of the 3PL industry; (2) building floor space equal to or larger than 4,000 m^2, which is the minimum size usually required by 3PL providers (Creazza et al., 2012).

By applying such inclusion criteria, data on 75 warehouses were collected from 49 3PL providers, with a response rate equal to 50%. The sample of logistics buildings included general-purpose warehouses that were owned or rented by 3PL providers and still in operation.
A total of 50 features were studied for each building assessed, and the results obtained were used to define the current characteristics of the Italian logistics real estate and its level of alignment (Alignment, Partial alignment, Misalignment) with the global requirements of the 3PL industry discussed in the previous stage of the research.
The data analysis was carried out using descriptive statistics, such as frequency distributions and correlations.

4. Findings

4.1. Sample analysis

As reported in Figure 2, the sample includes 75 warehouses. The buildings assessed were built from 1998 to 2018, and have a total floor space of between 5,000 m^2 and 60,000 m^2 (24,000 m^2 on average).

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Figure 2

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The model applied considers four main areas of analysis: location, surroundings and connections; external spaces; technical specifications of the building; and utilities and green systems. As far as location is concerned, the warehouses are mainly located close to the nearest city (81.3 % of the buildings are within 30 km of a city), a courier (90.7% of the buildings are within 15 km of the nearest courier facility), and a motorway junction (64% of the warehouses assessed are closer than 5 km). The warehouses are mainly concentrated around the city of Milan (28 facilities).
Looking at the external spaces – in terms of characteristics of the loading/unloading bays and the front/back yards – warehouses have, on average, a bay density equal to 800 m^2 per loading/unloading bay (Figure 4). In general, the lower the ratio between the floor space and the number of bays, the higher the number of bays in the warehouse. Typically, warehouses with a lower bay density are specialised in cross-docking activities (i.e. less than 200 m^2 per loading/unloading bay), while a higher bay density (i.e. more than 800 m^2 per loading/unloading bay) refers to buildings focused on storage activity (Baglio et al. 2019). The warehouses assessed have a flexible layout with a hybrid layout, i.e. when no clear primary function has been defined (Baglio et al., 2019).

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Figure 3

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Regarding the technical specifications of the building, the main features analysed are related to the characteristics of the building layout (e.g. building floor space, building clear height, warehouse layout, etc.), the type of construction materials used (e.g. cladding and roof structure) and the possibility of building fractioning or expansion (i.e. 31% of the warehouses can be fractioned and expanded).
Finally, in terms of utilities and green systems, the main features analysed regard the fire-fighting system; lighting system; Building Management System (BMS), which allows for managing all facilities and utilities using a single system, either on site, or from a distance; sustainability certifications; and the photovoltaic system. Of all these, LED lighting systems (52% of the warehouses assessed) and photovoltaic systems (45% of the warehouses assessed) appear to be those most frequently installed in the warehouses analysed.

4.2. Relationship between current and future challenges faced by 3PL providers and the offering of logistics real estate

Based on the study results, location emerges as the top strategic feature: it seems to be confirmed that close proximity to the most populated areas and transport nodes is fundamental to building an efficient logistics network, as highlighted by McKinnon (2009). According to the data collected, 3PL providers choose warehouses near the most populated cities. This choice helps them reach customers rapidly and allows for more possibilities to find available and qualified personnel. Moreover, most warehouses are located within 15 km of the nearest courier. Specifically, 3PL providers seem to choose to be close to couriers in order to limit the time required for picking up goods that are ready for delivery (Jakubicek and Woudsma, 2011). Additionally, some (32% of the warehouses assessed) prefer to stay inside a logistics park to benefit from the shared services (Higgins et al., 2012).
Regarding the transport infrastructure, the examined 3PL providers prefer warehouses located within 5 km of the nearest motorway junction, while airports and rail freight stations are not considered to be as strategic. This seems to be in line with the fact that roadway is the most used transport mode in Italy: 61% of Italian freight transport takes place on the road (Ministero dei Trasporti, 2019), and only 12 warehouses are located within an intermodal terminal.
Considering building size, recent studies have shown that 3PL providers look for new and larger logistics buildings. This would imply they are seeking newer warehouses with more floor space. Survey results seem to confirm this, where the total floor space (m^2) and size of the building plots (m^2) have increased over time, with the newest warehouses being on average three times bigger than the older ones (i.e. 37,000 m^2 in 2018 versus 12,000 m^2 in 1998). The graph displays the increase in trend towards variability of the building floor space over the years. A mix of warehouses has recently been built to meet a combination of different needs that have arisen due to an increased range of outsourced activities. In 2004, significant speculative investments were made by a leading real estate company, which led to an increase in the size of the warehouses built during that year. Recently,

although the size of warehouses is larger on average, smaller ones are still being developed as a solution to a variety of storage and distribution requirements.

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Figure 4

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Reflecting the increase in building size, building clear height is higher for the newer warehouses, thus confirming the literature. The newest logistics buildings exceed 12 m, while the older warehouses have less than 8 m clear height. The use of higher warehouses is the result of several factors. First, higher warehouses are used to maximise storage volume, hence improving space utilisation (Richards, 2018). Second, height can be exploited to obtain new spaces dedicated to value-added activities, such as re-packing and re-labelling (Contract Logistics Observatory, 2019; Richards, 2018). For example, warehouses with clear heights of over 8.5 m can be equipped with removable mezzanines, usually consisting of a metal structure. This type of mezzanine is found in the newest warehouses (i.e. built after 2010), as it allows for increasing the flexibility of the warehouse layout and for adaptive reuse of the building. This latter aspect is essential for the building's owner, who can find another tenant rapidly and reshape the warehouse as needed. Mezzanines, present in 31% of the warehouses assessed, were made of steel (12%) or concrete (19%), and are also useful to gain further space for value-added activities, or to build 'picking towers' used to handle the picking of single units; this answers the needs of e-commerce logistics (Richards, 2018; Baker, 2006). Third, building clear height is important for implementation of technological solutions to improve productivity. Automated warehouses need a clear height between 15 m and 30 m (Heragu et al., 2011) in the areas where automated storage and retrieval systems (AS/RS) are present. In the sample, only three warehouses have an area dedicated to operations with this technology. It should be noted that building mesh, and floor flatness and levelness, can affect the adoption of automation. On one hand, pillars need to be placed at a distance in accordance with the dimensions of the automated systems. In our sample, 52% of the warehouses have a building mesh in a range between 22 m and 25 m, which is suited to traditional pallet racking and handling equipment. On the other hand, a flat floor allows for avoiding vehicle staggering and collisions with internal structures (Valera et al., 2004). According to the data analysed, only 11% of the warehouses assessed have checked the flatness and levelness of their floor in the last 5 years.

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Figure 5

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Another relevant aspect of the warehouse layout is its shape. According to the data collected, in 84% of the cases analysed, 3PL providers prefer warehouses with a regular shape (i.e. rectangular). Any irregular layout is usually due to an asymmetrical configuration of the land plot. The possibility of fractioning or expanding the building is very important because it affects how flexibly the building can be used. However, only 31% of the warehouses assessed offer the possibility of both fractioning and expanding (Table 3), even if, generally, 3PL providers prefer this latter option. This is due to the different needs and perspectives of the logistics real estate and 3PL industries. Logistics real estate companies need to maximise the available building floor space in the entire plot to achieve higher profits from the lease. Conversely, 3PL providers prefer to use a portion of the building plot only, and leave extra space for further development according to future needs.

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Table 3

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Warehouses can have one or more sides equipped with loading/unloading bays. The data collected shows that this feature depends on the depth of the building: with a depth that is greater than 110 m, the warehouse usually has two opposite sides that are equipped with loading/unloading bays; in the case of a depth between 70 m and 110 m, generally only one side is equipped with loading/unloading bays. A depth of more than 70 m is typical of large logistics buildings (generally with floor space greater than 5,000 m^2), which are used mainly for storage and picking activities (Baglio et al. 2019). Warehouses with a depth smaller than 70 m are typically used by 3PL providers as cross-docking facilities. In this case, the external spaces are more important, given the increase in the number of in/out operations and related number of trucks (Baglio et al. 2019). As a result, the number of doors required is larger, and warehouses usually have two opposite sides (43.8% of assessed warehouses) or more sides (37.5%) equipped with loading/unloading bays. This applies well to the newer logistics buildings, while the older buildings show different configurations due to their smaller size and the diverse operating requirements presented in the market when they were built.

Regarding bays, they must be suitable for use by trucks, trailers, or vans depending on the operating needs of the 3PL provider. For instance, if the 3PL provider manages orders from multiple channels (i.e. offline and online), it should also be able to allow for the docking of both semi-trailers (e.g. for the bigger deliveries of the traditional channel) and vans (e.g. for last-mile, e-commerce deliveries) (Ladier and Alpan, 2016). Therefore, bays compliant with both trailers and vans increase the flexibility of the warehouse. For this reason, 3PL providers prefer warehouses equipped with dual functioning bays: in our sample, 61% of the warehouses assessed have loading/unloading bays compliant with the two types of vehicles). In a few warehouses, the loading/unloading bays are equipped with vehicle truck restraint systems (11%), which are effective safety systems. Even in this

case, the reason is linked to the difference in the interests of the two industries. Logistics real estate considers this safety system to be additional equipment that could be added by the 3PL provider according to its specific needs. On the other hand, the 3PL provider wants the warehouse to be 'ready-to-go', without having to make additional investments. Finally, the type of bays installed in the warehouse also depends on the type of product managed. Indeed, in our sample most of the warehouses were general purpose, without special needs for product conservation (e.g. temperature). For this reason, the most frequent type of bays is the flush loading dock.

Even the structure of the logistics building can be affected by the type of product that is managed. Indeed, the use of thermal insulation panels for both cladding and roof can decrease the amount of heat loss inside the warehouse. However, the two solutions are used only in 20% of the warehouses assessed. Moreover, to reduce energy consumption, LED lighting systems and photovoltaic systems seem to be widespread. LED lighting systems are in place in 52% of the warehouses assessed: this technology is installed in all warehouses built after 2014, as it is now considered to be a standard requirement, while in older buildings, it appears to be less common. The same occurs with the photovoltaic system, one of the most used self-production systems of electricity in Italy. The survey shows that 45% of the warehouses analysed have a rooftop photovoltaic system. For warehouses built after 2007 – when the Italian Ministry for Economic Development announced incentives for the use of photovoltaic systems (Di Dio et al., 2015) – this percentage rises to 65%.

Environmental sustainability certifications are used only in 10.3% of the warehouse assessed; this is a new practice (Bernardi et al., 2017) led by multinational companies that invest in the Italian logistics real estate market.

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Table 4

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As expected, all buildings are compliant with the standard requirements imposed by the Italian legislation in terms of earthquake-resistant preventions. However, more attention should be paid to upgrading older warehouses, for which the Italian legislation is less restrictive, in order to make them safer and more durable.

Finally, the last two systems of interest to be analysed are the fire-fighting and BMS systems. As far as fire-fighting systems are concerned, the warehouses assessed are mainly equipped with sprinkler systems (71%), which is a flexible method that can be designed and adjusted according to the specific characteristics of the product stored. Moreover, real estate companies are forced to comply with Italian legislation.

Based on the study sample, the BMS does not seem to be widely adopted, and only 16% of the warehouses have a BMS that is able to control all facilities and utilities directly. Indeed, it is normally

connected only to the building's energy or lighting system use, in line with the data reported by Hossain (2019).

4.3. Discussion

To what extent is the logistics real estate industry aligned with the 3PL providers' requirements in terms of current and prospective logistics buildings features? To answer the research question, the insights obtained were matched with the data on 75 warehouses of the top 3PL providers operating in the LRM region, with the requirements of 3PL providers that emerged from the literature. Empirical data analysis provided an extensive review of the warehouse features in the LRM region. In Table 5, the warehouse features have been classified according to their level of alignment with the requirements in comparison with the current and future challenges highlighted above.

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Table 5

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Overall, the empirical analysis confirmed a certain amount of alignment between the challenges of 3PL providers and the current features of warehouses. For 3PL providers, the location and building layout features (e.g. floor space and clear height) are basic requirements that are linked to the core business. In line with Richards (2018), 3PL providers are still asking for larger warehouses in terms of floor space (m^2), greater clear building height, a higher number of loading/unloading bays and new spaces to perform value-added activities. Moreover, these features are strictly related to land costs, which play a key role in determining the location of a 3PL provider, as shown by Verhetsel et al. (2015). Hence, real estate companies are encouraged to provide buildings with these attractive features. However, some misalignment regarding not so obvious features seems to surface and this requires specific attention.

First, the 'technology and automated systems' challenge requires improvements in 'technical/ construction specifications' and 'internal areas and utilities'. Therefore, warehouses are requested with a larger building mesh, flatter floors and fire-fighting systems sized to meet with the requirements of automated systems. In the literature, the design of automated systems is focused only on the operative needs of 3PL providers, while, the building constraints (e.g. building mesh and floor flatness) of the warehouses currently on the market are underestimated (Davarzani and Norrman, 2015). However, this issue may represent one of the reasons why automation in Italy is not highly developed. More precisely, given the current offering of warehouse features, 3PL providers need to invest in a new building that fits the requirements of automated systems. For example, to fully meet the 'technology and automated systems' needs, the use of the sprinkler as a fire-fighting system should be improved or changed. As discussed by AbdelGawad (2015), the automated warehouses can store more products and the high-storage capacity increases the fire load and risk. In addition, the sprinkler position and the high-storage capacity can prevent sprinkler

water from reaching the lower levels of the racks. In literature, there is still not a standard solution for the right type of fire-fighting system, since it depends on several factors (i.e. building clear height, storage methods, local regulations, etc.). However, it is recognised that the equipment requested by standards such as the National Fire Protection Association (NFPA, an American association) is strict enough to ensure the highest level of safety (Dinaburg and Gottuk, 2012).

Second, as far as 'environmental sustainability' is concerned, warehouses should be improved regarding 'location', 'technical/construction specifications' and 'internal areas and utilities'. Specifically, the results show that warehouses should be placed near sustainable transportation nodes, built with better construction materials, and equipped with environmentally-friendly facilities. Even if environmental sustainability is considered to be an important trend in recent years (Langley and Capgemini, 2019), the results show that warehouses are not aligned with this need. Looking to 'technical/construction specifications' and 'internal areas and utilities', a 'green' warehouse is built with high attention to construction materials (e.g. using recycled concrete, steel, asphalt, etc.), which must also ensure a high level of thermal insulation. They should also adopt energy-efficient lighting systems (e.g. LED), and use alternative energy sources (e.g. photovoltaic panels) (Perotti et al., 2012). Newer warehouses satisfy the sustainability requirements more than older buildings, since they were designed from the start to fit those requirements. On the contrary, older buildings need to be refurbished, and this involves investments that are hardly returned.

As far as 'location' is concerned, warehouses are situated near motorway junctions, and, even if this location allows 3PL providers to optimise road transportation, proximity to alternative forms of environmentally-friendly transportation (i.e. freight railway) will be required in the future (Perotti et al., 2012). The current location near the motorway junction is suited to the widespread use of the roadway as main transport mode in Italy. However, the roadway is not the most environmentally-friendly transportation mode. For this reason, the location in logistics parks should be taken into account, since it improves the adoption of alternative forms of environmentally-friendly transportation, or allows for more opportunities to start initiatives that help to reduce emissions (He et al., 2018). Like logistics clusters, logistics parks provide access to more reliable infrastructures and can share facilities, utilities and support services with several providers and have the possibility to combine transport flows, thereby reducing transportation costs and promoting the development of multimodal transport services (Abushaikha, 2018; He et al., 2018; Sun et al., 2018; Hylton and Ross, 2017; Rivera et al., 2016). However, the advantages of logistics clustering could be reduced by negative externalities, such as the rising price of land and labour, or the congestion of transport roads (He et al., 2018). Policy makers should prioritize putting cluster development investments on their agenda to remove the negative externalities previously mentioned (Sun et al., 2018). For example, He et al. 2018 suggest the use of financial or tax incentives to promote logistics agglomeration. Unfortunately, the results presented in this paper show that logistics parks are not considered to be a strategic location feature by 3PL providers (only 32% of the warehouses assessed are inside a logistics park). This is also due to the low presence of logistics parks in Italy.

Looking to the 'internal areas and utilities', a feature that is not aligned is the use of BMS. The results of the research are in line with the existing literature: the BMS system is normally connected to a

building's energy and lighting system (Hossain, 2019). However, it is neither widely studied nor adopted, and it seems that real estate companies do not consider investment in BMS to be as cost-effective. Thus, real estate companies should consider adopting it because BMS provides easier management of the facilities in the warehouse, which includes the lighting and photovoltaic systems.

As it would be expected, in terms of technical features and utilities, new warehouses appear to be more aligned than the older ones with regards to environmental sustainability. For example, all warehouses built after 2014 have LED lighting systems installed. Therefore, real estate companies are putting more effort into new warehouses rather than into older ones, heeding the 3PL providers' demands. This is also made evident by the trends in the real estate industry: the hottest topic is environmental sustainability, and this is due to the institutional pressure placed on the industry to increase the environmental performance of buildings (Zimmermann et al. 2005). New warehouses could be certified using innovative rating systems, such as LEEDS and BREEAMS, since the green rules must be applied during both building design and construction (Ding, 2008).

However, to minimize the vacancy rates of existing older buildings and to maximize their utilization, real estate companies and/or 3PL providers should invest in refurbishing the older warehouses to increase their attractiveness, also in terms of building sustainability performance. This would reduce the social and environmental impact caused by the construction of new warehouses. As highlighted by He et al. (2018), the demand for logistics space is increasing, and this is associated with higher land cost. This issue makes older warehouses attractive for real estate companies, for these buildings are normally located close to urban areas where there is no longer any land available for industrial purposes, or they may be found in strategic locations where land prices are very high, making new building unaffordable.

Third, 'location', 'external spaces', and 'technical/construction specifications' features support the 'e-commerce and omni-channel distribution' challenge. Whereas, the presence of a mezzanine is not verified in all the warehouses assessed (31% of warehouses have a mezzanine and only 12% have a removable type), despite its importance in improving layout flexibility and floor area space, as reported by Richards (2018), which are needed to carry out value-added logistics activities. Indeed, according to Davarzani and Norrman (2015), logistics managers are asking for increased flexibility of the warehouse layout in order to deal with the unpredictable flows to different distribution channels. However, from a real estate perspective, the mezzanine is another investment that matches the needs of retailers and 3PL providers but no other industries. For this reason, real estate companies are not encouraged to invest in them, since they tend to build warehouses that meet general needs, leaving further investments to the tenants. Therefore, 3PL providers prefer the 'build-to-suit' model in order to have the opportunity to adapt the building to their specific needs right from the design phase (Mattarocci and Pekdemir, 2017).

Fourth, as far as the 'safety and labour' challenge is concerned, the location features are in line with the needs of a wider catchment area for available and qualified personnel. Nevertheless, location inside a logistics park should be considered, as it allows 3PL providers to benefit from greater availability of a skilled labour force that is attracted there by the high demand for work. In addition,

the costs can be shared with other companies (He et al., 2018). As far as safety systems are concerned, both fire-fighting and truck restraint systems are present in the warehouse. The fire-fighting systems satisfy the requirements established by Italian legislation, and newer warehouses have better equipment required by certain customers, mainly multinational companies that must adhere to the standards set by internationally recognised associations (e.g. NFPA) or suggested by some insurance firms (e.g. FM GLOBAL). On the other hand, loading/unloading bays equipped with vehicle truck restraint systems are only found in 11% of the warehouses assessed, even if they are important and effective safety systems, given the rise in traffic outside the warehouse. This might be due to the differences in the interests of the real estate industry and 3PL providers: real estate companies normally build speculative development that must meet the various requirements of different customers (JLL Global Research, 2019), while 3PL providers want a 'full-optional' warehouse that is ready from the start, without having to make extra investments. Davarzani and Norrman (2015) explained this difference in interests using the words of a logistics manager: the manager states that real estate firms focus on minimising the financial risk and maximising their return on investment, whereas 3PL providers are looking for warehouses that respond to their operating requirements. In the example given in the interview, real estate companies want a long-term contract to cope with financial risk, while 3PL providers prefer a short-term contract because they cannot predict what will happen in the long term. Logistics real estate considers safety systems to be additional equipment that require higher investments and which could be left to the 3PL provider to add on at a later date as they see fit and in accordance with their actual needs.

Moreover, there are not any standards or guidelines to follow to ensure the right level of safety. Literature does not suggest which type of safety systems should be adopted by a 3PL provider in a warehouse, while it focuses more on identifying the right factors needed to build a safety culture inside the company (e.g. Hosfra et al., 2018).

Finally, regarding earthquake-resistant precautions, more attention should be paid to upgrading older warehouses, even if all buildings are compliant with the standard requirements defined by regulations.

Fifth, land cost is an important part of operating costs for both real estate companies and 3PL providers that want to build a warehouse. As shown by Verhetsel et al. (2015), land cost plays a key role in determining the location of logistics firms: land cost and lease rates make logistics parks more expensive than 'stand-alone' buildings, even if the former provide available skilled personnel, resource sharing, value-added service, and perfect infrastructure designed specifically for 3PL providers (He et al., 2018). To reduce the impact of the land cost for the 3PL provider, in addition to refurbish older buildings as discussed previously, the warehouse should be built by maximising its utilisation in terms of total floor space against the plot surface and clear building height. As presented in the literature section, 3PL providers are asking for taller and bigger warehouses in order to face the increasing cost of the lease rate (Richards, 2018). This issue is in line with the results obtained in this research: new warehouses have higher building clear height and exploit mezzanines to obtain new spaces dedicated to value-added activities. The same cannot be stated for the 'possibility to expand', which is another warehouse feature that is appreciated by 3PL

providers because it improves the layout flexibility of the warehouse. Indeed, it is presented in the literature as one the most important drivers that is shaping the layout of logistics building in Italy for Italian 3PL providers (Contract Logistics Observatory 2019). However, only 31% of the warehouses assessed offers the possibility of both fractioning and expansion. This is due to the different needs and perspectives foreseen by the logistics real estate and 3PL industries, as explained previously for the safety system. The same logic can be applied to expansion: real estate companies want to maximise the building floor space available in the entire plot to achieve higher profits from the lease, while 3PL providers prefer to use only a portion of the building plot, and leave extra space for further development, according to future needs.

To summarise, the present research highlights a good level of alignment between 3PL industry challenges and warehouse features. By recalling the results of our investigation and by engaging with the existing literature on the topic, three main issues are inferred and elaborated from the previous discussion.

First, real estate companies are developing new warehouses in response to 3PL industry needs. However, the importance given to some warehouse features by 3PL providers and real estate companies does not always coincide: for example, real estate companies want to build warehouses that can satisfy a wider range of demand (‘one warehouse fits all’), while 3PL providers prefer 'full-optional' warehouses that are ready to start operations without further investments. The different degree of importance given to the mezzanine (affecting the ‘e-commerce and omni-channel distribution’ challenge), expansion (affecting the ‘cost of land and lease rate’ challenge), and vehicle truck restraint system (affecting the ‘safety and labour’ challenge) are examples of the two opposing perspectives.

Second, even if old warehouses are smaller and have lower clear heights, they can still be interesting for 3PL providers, since they are located near important cities and strategic transport nodes, where vacant land is no longer available. Real estate companies should invest in these buildings, refurbishing facilities in terms of sustainability and safety systems, thus, making them even more attractive.

Third, automation and environmental sustainability are more recent trends that will shape future warehouse features. Real estate should focus more on these two aspects, providing buildings that are able to host automated systems and reduce energy consumption and carbon emissions. This feature can also be obtained thanks to locations nearer to sustainable transport modes (e.g. freight railways and intermodal terminals) and inside logistics parks, which provide higher possibility to optimise transportations and share sustainable initiatives.

Indeed, as reported by Richards (2018), the future warehouse will be a fully-automated, carbon-neutral one, equipped with hybrid or full-electric trucks, robotics, drones, and voice- or optically-guided operating systems.

5. Conclusions

Although the 3PL industry has been studied broadly in the last few years, very little attention has been given to its relationship with the logistics real estate sector. Specifically, the literature has shown a recent transformation of the 3PL industry, which has also affected the demand of warehouses (Contract Logistics Observatory, 2019; Richards, 2018). However, no empirical studies have analysed the alignment between current and prospective needs of 3PL providers and the features of buildings available on the logistics real estate market.

The paper started with a literature review that identified five main challenges for 3PL providers: (1) an increase in the adoption of technology and automated systems (Contract Logistics Observatory 2019; Langley and Capgemini, 2019; Richards, 2018; Hofmann and Osterwalder, 2017); (2) attention to environmental sustainability (Contract Logistics Observatory 2020; Langley and Capgemini, 2019; Ali et al., 2019; Roy and Sengupta, 2018; Perotti et al., 2012); (3) growth of e-commerce and omnichannel distribution (Richards, 2018; Davarzani and Norrman, 2015); (4) a shortage in skilled labour and a request for improvement for safety systems (Contract Logistics Observatory 2019; Cushman & Wakefield, 2019; Langley and Capgemini, 2019; Technavio, 2018); and (5) an increase in costs of land or building lease rate (Cushman & Wakefield, 2019; Verhetsel et al., 2015). To answer the research question (to what extent is the logistics real estate industry aligned with the 3PL providers' requirements in terms of the current and prospective logistics buildings features?), the rating model by Baglio et al. (2019) was applied to a sample of 75 warehouses. The logistics buildings assessed are owned or rented by leading 3PL providers operating in Italy and are located in the LRM, the most important area in terms of both density of population and logistics activities (Dallari and Curi, 2010).

Are warehouses ready to face the challenges of 3PL providers? Yes and no. The empirical data analysis seems to indicate that warehouse features are to a certain extent in line with the 'e-commerce and omni-channel distribution', 'safety and labour', and 'cost of land and lease rate' challenges. Old warehouses should be improved because they are still appealing for 3PL providers, thanks to their strategic location. Finally, environmental sustainability and automation systems will shape the future challenges of 3PLs: real estate companies should not underestimate these issues. The empirical evidence that has been presented and discussed provides a picture in which the warehouse is seen as unable to express its full potential as a competitive lever due to there being only a partial alignment of the available current offering of logistics buildings in the real estate market with the 3PL providers' needs. In this sense, the empirical evidence presented only partially confirms the view of the RBV theory, showing that the warehouse is important for 3PL providers but not as much as the theory would suggest. As pointed out by Wong and Karia (2010), the RBV helps detect physical assets (such as warehouses) as critical resources, which could generate competitive advantage, and, consequently, should be considered important by 3PL providers. However, the RBV literature recognises that the identified 'critical resources' are not of much use by themselves, if not combined with the capability to exploit them. In fact, owing the 'critical resources' is not sufficient to generate competitive advantage and the capability to exploit them therefore plays an equally important role towards the achievement of competitive advantage (Barney, 1991). Taking this perspective to analyse and interpret the empirical results, it can be said that the identified

misalignments among the features of the existing warehouses (built by real estate companies) and the features of those desired by 3PL providers reduce the capability of 3PL providers to fully exploit warehouses as 'critical resources'. In other words, the mismatch of the perspective of real estate companies and 3PL providers leads to misalignments among some trends and warehouse features, which leads to reducing the potential of 3PL providers to generate competitive advantage. For example, our results show that the 'technology and automated systems' challenge requires improvements in 'technical/ construction specifications' and 'internal areas and utilities'. This means that 3PL providers are not currently capable of increasing their competitive advantage opportunities since they cannot enhance their productivity through the exploitation of automated systems or other warehouse technologies. In turn, this is because the warehouses at their disposal are in general built with a small building mesh, non-flat floors and insufficient fire-fighting systems. All these issues prevent 3PL providers from adopting automated solutions and warehouse technologies, thus limiting on one hand their exploitation capability, and on the other hand the role as 'critical resource' played by warehouses.

Our research identifies those areas of mismatch and indicates areas for determining the pathway towards higher levels of alignment for exploiting the warehouse at its full potential for 3PL providers.

5.1. Research implications

The results of this study provide both academic and practical implications. From an academic perspective, the paper extends the current theory on warehousing, real estate, and logistics outsourcing by linking two different streams of literature that appear to be scarcely investigated jointly, even if they are strictly related. In addition, it provides an extensive analysis of the current and prospective 3PL needs for warehousing. Finally, it gives insight into the characteristics of the features of the principal warehouses, explaining their relations with the operating activities of 3PL providers.

From a practical viewpoint, several managerial implications have emerged. For the 3PL industry, by providing an overview of the current and prospective requirements, the present research offers a guide for 3PL providers seeking logistics buildings that suit their needs. Moreover, the results presented may also be useful for 3PL providers to strategically improve the quality of their existing logistics buildings by identifying the weakest elements and evaluating the potential technical improvements necessary to gain value in the marketplace.

Instead, for the logistics real estate sector, the results detail those warehouse features that meet the 3PL providers' expectations and those that need to be further developed to generate interest from 3PL providers in terms of investment and future interventions. In this way, a pathway can be defined that could lead to better alignment between the needs of 3PL providers and real estate companies, consequently increasing the value of the logistics real estate market and the potential of warehouses to better support the activities of 3PL providers. From a policymaker point of view, the results presented represent a starting point to define new strategies for land development to attract further growth and agglomeration. As the existing literature on logistics clusters has proven, local

governments should encourage the agglomeration of logistics firms knowing that the early investment would reap long-term benefits (He et al. 2018; Sun et al., 2018; Hylton and Ross, 2018). At this moment, 3PL providers are not able to see the benefits of logistics clusters and policy makers should put more effort in developing clusters, using for example financial incentives, (He et al., 2018), in order to remove the negative externalities and promote the advantages (Sun et al., 2018).

5.2. Research limitations and future directions

As noted above, this is the first attempt to combine two different streams of literature together, explaining such a relationship through collection and analysis of data coming from a global body of knowledge (taking into account the academic literature and practitioners' studies) and empirical data. Although this study produced interesting initial findings, limitations do exist. First, the sample size should be increased to strengthen the findings. More warehouses from other Italian regions could be added to the present sample in order to collect more insights into the actual situation of the logistics real estate market. Second, in line with the previous comment, the examined list of warehouse features is strictly related to the Italian context. Adding new considerations from the analysis of other countries could help to reinforce the discussion in terms of higher generalisability of the findings. Third, the needs of 3PL providers were derived from an in-depth analysis of the literature, which well served to the aim of this initial study that built on the global perspectives, trends and requirements found in the published body of knowledge to generate high-level insights on an underdeveloped research area. Interviews with both 3PL providers and logistics real estate companies could be conducted to validate and further develop the global trends and requirements found in the literature to provide the practitioners' point of view on the topic and further relevant considerations.

Starting from this current endeavour, additional research is recommended to overcome the above-mentioned limitations and extend the results of this study. Scholars could also embrace the point of view of the industrial community and compare it to the academic perspective presented in this research, thus extending the results provided herein. Moreover, vertical studies focusing on different product types stored in warehouses can be added to pinpoint what warehouse features are also affected by product-specific storage and handling challenges.

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