THE ROLE OF URBAN LOGISTICS REAL ESTATE IN LAST MILE DELIVERIES: OPPORTUNITIES, CHALLENGES AND SUCCESS FACTORS FOR INTEGRATION

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Abstract

Rising urbanization, growing share of e-commerce sales, high-frequency and customer-specific deliveries as well as increasing urban access regulations lead to higher requirements for logistics service providers in supplying the urban last mile. Despite space scarcity, logistics service providers have to move closer to customers in order to provide high service levels in distribution. Hence, urban logistics facilities gain strategic importance. This paper aims to present the current status of urban distribution network structures and related logistics facility design, as well as current challenges and relevant success factors for developing sustainable and future-oriented last mile distribution systems. Based upon a literature-based description and assessment model, an explorative study of 38 German participants has been conducted. The main results indicate a particular lack of collaboration among all stakeholders in urban distribution working together on solutions for efficient urban logistics. This is for instance reflected in bureaucratic constraints, complicating tender and approval procedures on governmental level. Our results provide three distinct hypotheses for successfully designing and implementing urban logistics real estate into urban logistics systems. Practitioners may find new approaches for designing their own distribution structures, just as public institutions may find suggestions on how they can support urban distribution through process adaptations and thereby increase social well-being of inhabitants.

Key words: urban logistics, logistics real estate, last mile delivery

1. INTRODUCTION

Currently, more than 55 percent of the world's 7.5 billion population live in cities. Until 2050 this proportion is expected to rise up to 67 percent - from a predicted 9.3 billion population (Prange, 2018). Hence, living space, work environment and existing infrastructure needs to be adapted. More and more goods are distributed in metropolitan areas, consequently, transport volume is increasing (BIEK, 2018). In 2017, 3.35 billion single shipments were distributed in German B2C retail, corresponding to 11 million shipments per delivery day. For 2021, 4.15 billion shipments are forecasted (BIEK, 2018). Although only about 30 percent of urban traffic is commercial traffic, increasing shipment volumes from retailers or the hospitality industry lead to a heavy traffic load (Schmid, 2018), pushing the capacities of cities to their limits (Bernsmann, 2017). This results in increased noise, emission and particulate matter levels (Kiwitt, 2010).

Due to the increasing range of services, such as same-day delivery or flexible delivery points, structures and procedures of logistics service providers are reaching their limits, as the complexity of delivery increases and greater flexibility is required (PwC, 2017). The growth in delivery frequency and the small size of shipments represents a particular challenge in operations for logistics service providers on the last mile which requires alternative concepts (PwC, 2017). Despite urban space shortages, the proximity to customers is becoming essential. Urban logistics properties are gaining strategic importance to meet the demand for environmentally friendly and fast deliveries. Though, the acceptance of the logistics sector is growing, it is competing intensively with more attractive asset classes such as office or residential real estate in urban areas with limited space (Kille & Nehm, 2017).

The technical perspective in urban logistics is a frequently discussed aspect, especially regarding vehicle routing problems (e.g. Crainic et al., 2004; Taniguchi and Shimamoto, 2004; Ando and Taniguchi, 2006). Also the stakeholder perspective is explored in various studies, as the collaboration of involved parties (e.g. traders, couriers, logistics service providers) is considered as a main success factor for implementing new urban logistics solutions (Hensher and Puckett, 2005; Holguín-Veras, 2008). Stakeholder management on the one hand can be structured to involve the opinions of key stakeholders (Bourne, 2008; Statopoulos et al., 2012), on the other hand project owners can actively influence the attitude of stakeholders towards such projects, heightening the acceptance of urban logistics solutions (Dablanc et al., 2011). This can be done in a progressive approach, heightening the complexity of collaboration, starting from data sharing up to a commonly used urban distribution center (Pinto et al., 2015). A key challenge regarding urban logistics is the role of public authorities, as their actions are affecting urban logistics projects with legislation and structural interventions (Statopoulos et al., 2012), but often they do not fully understand the urban logistics issues, as they are complex in nature and involve conflicting stakeholder interests (Ballantyne et al., 2013).

To the best of our knowledge the topic of urban logistics assets as part of the urban distribution network and the associated involvement of stakeholder is not specifically covered in scientific literature. Due to this gap and the increased relevance of new logistics structures, the aim of this paper is to outline the role of urban logistics

real estate as well as the interaction of involved stakeholders. Focusing on the urban network configuration of parcel service providers (CEP) to supply the last mile to end customers, the following research questions arise:

RQ I: How and why do which urban stakeholders interact in urban logistics real estate projects?

RQ II: Which success factors need to be considered in order to improve urban distribution networks?

In order to answer the above mentioned research questions in a structured way, the remainder of this paper is structured as follows: In the following section, the theoretical and conceptual foundation of urban logistics networks is outlined. Next, the methodology applied is described. Afterwards, the findings gathered are presented, guided by dimensions emerged from the data. These will be amalgamated in the following chapter and condensed into three hypotheses regarding urban logistics real estate projects. Finally, we continue to discuss open research gaps.

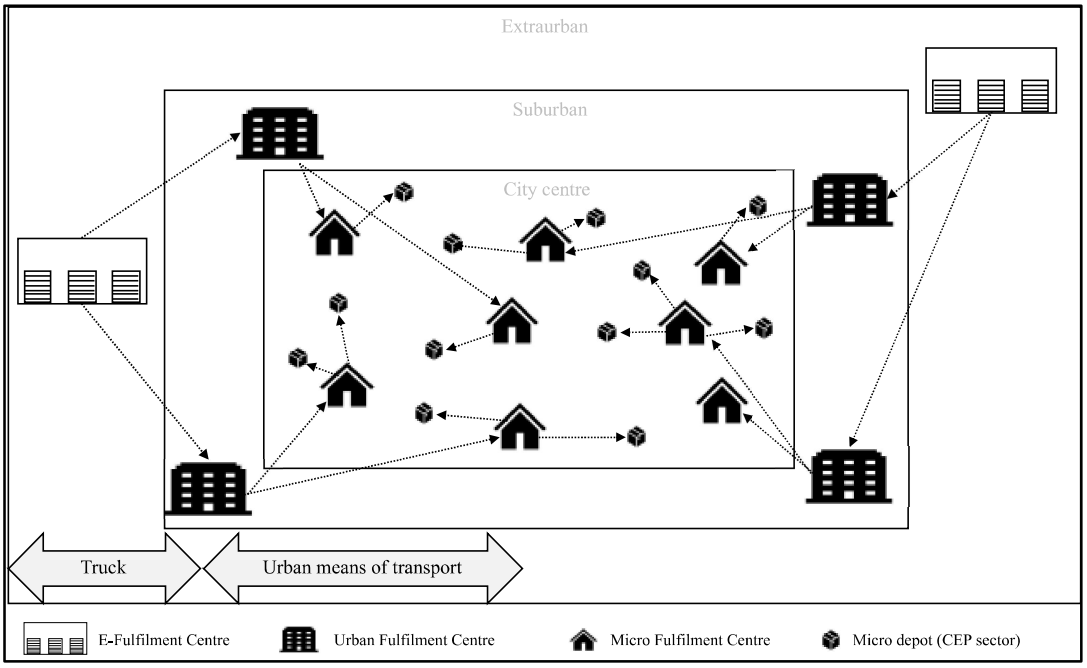
2. THEORETICAL FOUNDATION

2.1. Overview of urban network structures

Logistics is responsible for the spatial-temporal transformation of goods within the entire value chain through storage and movement processes. For this purpose, it uses function-specific subsystems that ensure the core task of efficient goods distribution through systemic interaction. Logistics systems are efficient when the highest possible delivery service can be achieved at the lowest possible cost. Storage and movement processes take place in logistics network structures that connect the source of a shipment with its final destination. Additional network nodes can be integrated between the two, which temporarily receive goods in order to tranship, consolidate, separate and transfer them to another network path. The transport between the nodes takes place via transport edges in the network (Pfohl, 2016; 2018).

As part of the urban logistics network, logistics real estate plays an important role. However, the shortage of urban space makes the construction of pure logistics real estate more difficult. Urban logistics requires multi-level, flexible and dynamic distribution and warehousing structures in the form of larger logistics properties outside the city and (flexible) smaller micro depots (PwC, 2017) which can be found in a cascade structure (Bulwiengesa AG, 2017).

Figure 1. Cascade structure of an urban logistics network



Source: Own illustration based on Bulwiengesa AG, 2017; Bu et al., 2012.

2.2. Urban distribution center concepts

In the cascade-shaped urban network structures, it is possible to differentiate between four different types of distribution centres based on their location, size, number of employees and functionality.

- Large, extra-urban transhipment centres, **E-Fulfilment Centres**, are used by (online) retail companies for standard dispatch. These have an area of between 25,000 and 150,000 m² on which between 500 and 1,000 employees work. They supply a radius between 100 and 250 km (Bulwiengesa AG, 2017).
- **Urban Fulfilment Centres** enable direct delivery of (online) orders in a radius of 10 km. An operations area between 4,000-6,000 m² require approximately 30-250 employees (Bulwiengesa AG, 2017).
- The urban **Micro Fulfilment Centres** serve the direct delivery of orders from online retail companies to customer. These logistics properties require between 30-50 employees in 1,000-3,000 m² and serve a radius of 1-5 km (Bulwiengesa AG, 2017). Regional depots, e.g. Urban Consolidation Centre (UCC), are located outside and inside the city and are responsible for standard shipping in the CEP sector, retail logistics as well as for internal deliveries. Between 100 and 200 employees work on approximately 15,000 m², covering an area of 50-70 km. Due to the direct customer delivery they still belong to Micro Fulfilment Centres (Lehmacher, 2015).
- Urban **micro depots** are often relatively small (15-25 m² CEP area / 200-500 m² retail), therefore, they are quite easy to operate. Accordingly, the

number of employees is low (2-5 CEP / 15-20 retail) and they can supply only a small radius (1 km CEP / 2-4 km retail) (Bulwiengesa AG, 2017).

2.3. Transport systems in urban logistics

Smaller shipment sizes present challenges in terms of a higher volume of shipments and the associated increased volume of traffic, which needs to be integrated into existing traffic (Kille & Nehm, 2017). Particularly on the last mile, the focus is on the use of environmentally friendly transport technologies to make more efficient use of infrastructure (Deckert, 2016). Urban access restrictions for conventional, diesel-powered delivery vehicles in city centres can be circumvented with **electric vehicles**. The use of **load bicycles** is another way to use other transport routes (Kloeckner, 2017), especially for relatively light, non-bulky shipments from nearby depots in the city centre (Johanning, 2017).

2.4. Actors in urban logistic networks

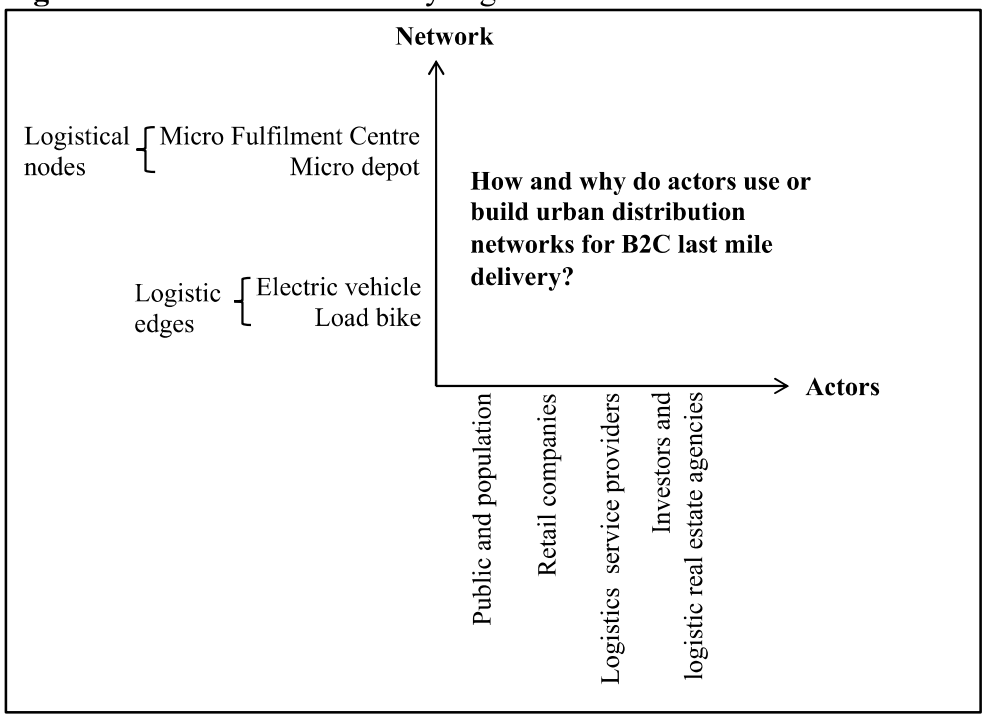
Different actors influence urban logistics networks:

- The **public** basically pursues the increase of local economic power without restricting the quality of inhabitants' life (Veres-Homm & Weber, 2017).
- The demands of the **local population** on the economic system are influenced by the perceived quality of life, in terms of the availability of adequate jobs, the satisfactory supply of goods and the involvement in political decisions (Veres-Homm & Weber, 2017).
- In the context of logistics, **urban planners** are more and more involved in the planning of logistics areas in order to meet the demands of both, citizens and business, which often leads to a tension between the urbanisation of cities and the globalisation of retail (LogReal World GmbH, 2018).
- **Retail companies**, as clients, often seek and award supply contracts to logistics service providers and thus influence urban supply.
- **Logistics service providers** demand a long-term development perspective from cities with regard to sufficient regional staff with appropriate qualifications and the opportunity to grow in terms of area. Good infrastructural connections and support for municipal policy are also important (Veres-Homm & Weber, 2017).
- **Investors** act as lenders and are usually only interested in a (logistics) real estate if it is profitable (Bulwiengesa AG, 2017).
- As operational extension, **logistics real estate agents and developer** provide the location, the capital and the concept in a defined period of time and realize logistics real estate projects. In addition to initiating new projects, they also develop, modernise or revitalise existing areas and act as intermediaries for the various players (Rottke, 2017).

3. METHODOLOGY

As the role of urban logistics assets is scarcely covered in academic literature, an exploratory study needs to be conducted. We used a grounded theory inspired research approach, in which we inductively gathered insights about the urban logistics real estate by interviewing 38 experts in the field. Interviewing experts is a common method for data collection, as they have valuable insight in a research topic and provide information about actual processes and structures (Creswell, 2012). After reviewing grounded theories in literature, we followed the action and processes-oriented Strauss and Corbin approach (Corbin & Strauss, 2008) because it allowed us more flexibility and procedural guidance. Moreover, it allows us to adopt a conceptual framework from theory, developed within a preliminary study and consists of the determinants of networks and actors (Yahşi, 2017). The above described urban logistics network in combination with the changing requirements of urban environment lead to the following framework.

Figure 2. A framework for analysing urban real estate



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3.1 Data Collection

In order to determine the role and function of actors in urban distribution, a total of 38 interviews with different backgrounds were conducted. The experience of practitioners is a relevant source of data in research, as they are well informed about current practices and future challenges (Flynn et al., 1990; Trautrims et al., 2012). Due to the distance between interviewer and interviewee, as well as the high quantity of interviews, only four interviews were conducted face-to-face, the rest was conducted by phone. In terms of the interview structure, semi-standardised interviews

were selected for the previously little explored subject of urban logistics space, so that individual problems could be examined in greater depth, but at the same time the interviewee was given the opportunity to speak freely (Lindlof & Taylor, 2011). An interview guideline including open and closed questions as well as the likert scale as a scale instrument (Raab-Steiner & Benesch, 2015) was used to conduct the semi-structured interviews, which had been tested several times and continuously developed and adapted beforehand. The interview questionnaire was splitted into three main categories: Urban logistics and delivery concepts, challenges in the integration of logistics real estates in urban areas and possibilities and fields of action for the integration of urban logistics real estates.

The attendees of the survey were split into different groups: 20 largest German cities, representatives of research institutions (2) and chambers of industry and commerce (3), lawyers with focus on logistical real assets (2), CEP providers (3), companies with logistics focus (6), logistics real estate developer (4), logistics real estate broker (3).

Figure 3. Categorization of interview partner

Category	Interview number
Logistics real estate developer	16, 22, 23, 26
Logistics real estate broker	1, 28, 37
Company with logistics focus	2, 4, 18, 31, 34, 35
City representative	3, 5, 6, 9, 10, 11, 12, 13, 15, 17, 19, 20, 21, 25, 27, 29, 33
Logistics Service Provider	7, 14, 30
Lawyer	8, 38
Research Institution	24, 32
Chambers of industry and commerce	36

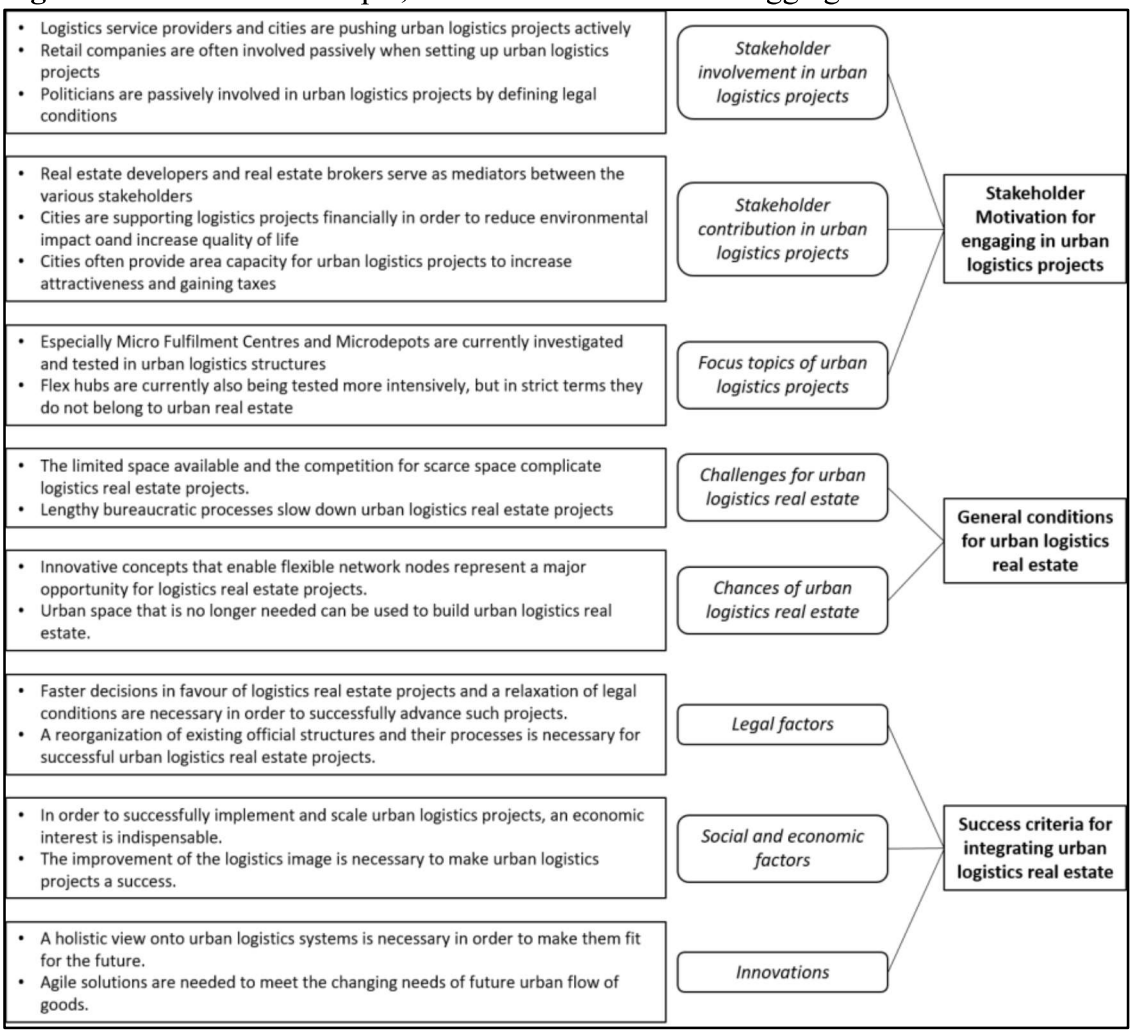
Source: Own figure

3.2 Data Analysis

We used a grounded-theory inspired, qualitative research approach to create a data-based theory, as there is not enough theoretical material available to formulate a theory. Accordingly, we used an interpretative research approach based on interviews with experts from the field. Our task as researchers is to gain deeper theories by interpreting the results obtained (Bryman & Bell, 2011). We followed the procedures recommended by Corbin and Strauss (2008).

Each interview was documented in writing and then coded according to core statements. Based on underlying similarities among them, we were able to create 18 relevant first order concepts. We then searched for connections between the individual concepts in order to create 8 second-order themes at a higher level. Finally, we classified these into 3 aggregated dimensions that define the structure of our framework. Figure 4 shows the data structure and our first order concepts, second order themes and the aggregated dimensions.

Figure 4: First order concepts, second order themes and aggregated dimensions



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4. RESULTS

In this section, the role of different stakeholders in urban logistics real estate projects is outlined, based on our empirical findings gathered. The aim is to find out, how and why stakeholders engage in urban logistics real estate projects. In addition, we want to determine which challenges have to be considered when integrating urban logistics real estate, and which opportunities are available to drive such projects. Ultimately, success criteria should be examined which have to be considered when designing and implementing urban logistics real estate projects. We use the structure explored in section 3 as guideline for presenting our findings. First, the stakeholder motivation for engaging in urban logistics projects is analysed. Following, main conditions for integrating urban logistics real estate in urban network structures are examined. Lastly, success factors for integrating urban logistics real estates in urban network structures are investigated.

4.1. Motivation for urban logistics projects

4.1.1. Stakeholder involvement in urban logistics projects

The different stakeholders of urban logistics projects have either an active or passive influence. Due to their position as infrastructure users and providers, logistics service providers and cities are actively involved in such projects and consistently drive their further development.

Retail companies that require logistics space are passively involved (28, 30). Their role is that of demanders of logistics performance, whereby they define specific logistical performance requirements. In addition, they themselves compete for space in urban regions.

As further passive parties, politics can be identified which define the legal framework conditions of infrastructure and can thus either accelerate or hamper logistics projects (13, 14).

4.1.2. Stakeholder contribution in urban logistics projects

Different actors contribute in different ways to the development of urban logistics real estate projects. Cities in particular play a major role here, as they support projects financially and with resources. Due to their elevated position as land owners and infrastructure providers, they often taking the lead in project management. Logistics real estate developer and logistics real estate broker act as mediators between logistics service provider and cities in projects (22, 26, 28). Nevertheless, logistics service provider and cities are in a general exchange (7, 14).

The survey shows that projects are actively promoted or financially supported by various specialist groups on the part of the cities (20, 25). Financial support usually aims at two goals. On the one hand, cities want to reduce the environmental impact of logistics processes. On the other hand, the quality of life in cities should be improved by a properly operating infrastructure (12).

In addition to financial support, cities also provide support in the form of areas for urban logistics real estate projects. This is not always completely voluntary, as land use plans by higher authorities force cities to act. However, there is also a self-interest, since such projects increase both the attractiveness for investors and can increase tax revenues (27, 33).

4.1.3. Focus topics of urban logistics projects

Stakeholders in urban logistics projects are involved in alternative transport or innovative network concepts. Regarding the mode of transport, the interview partners generally see electric vehicles and load bicycles as major options in urban areas (7, 14, 19, 24, 27) and are willing to support these. Reasons for this are traffic reduction (18, 20, 28, 29, 30, 35-37) and the integration into cities by using low-emission and quiet logistics (12, 13, 16, 21, 24, 25, 38).

In the area of logistic nodes, both Micro Fulfilment Centre and micro depot projects are ongoing or carried out. Micro Fulfilment Centres can be used in new

mixed-use properties through the use of brownfields. This can be used to revitalize existing areas that are currently underutilized. At the moment, urban retail spaces are interesting, which are less needed due to increasing online commerce (Bulwiengesa AG, 2017; Kille and Nehm, 2017). The conversion of (future) unused areas, as vacant commercial properties in the city centre, also plays an important role in the area of micro depots (BIEK, 2017b).

Flex hubs are actually not real estates because they consist of mobile units such as containers. In the area of Micro Fulfilment Centres, projects were primarily mentioned in the area of new construction and conversion as e.g. sorting centres such as DPDHL's MechZB (6, 11, 16, 28, 29, 37). In the area of micro depots, flex hub solutions such as the GLS and DPD project in Nuremberg (21, 25), the flex hub project KoMoDo in Berlin (12, 14) and the UPS project in Hamburg (14, 18) were mentioned.

4.2. Conditions for the integration of urban logistics real estates

4.2.1. Challenges for urban logistics real estate

The greatest challenges for urban logistics networks can be found in the scarcity of space and complex approval procedures. Competition is fierce for scarce urban space. The low image of logistics among the general population reduces the chances of a land contract, as more prestigious projects are often awarded the tender (7, 8, 14, 19, 20, 26, 31, 37). In addition, the shortage of space increases investment and rental costs, which means that logistics projects can often no longer pay off on the cost side (2, 5, 8, 12, 14-17, 20-22, 26, 27, 29, 33, 36).

Bureaucratic processes slow down the implementation of urban logistics projects, although these are included in urban land-use plans (20, 31). In addition to mandatory approval procedures, regulations such as territorial compatibility or a large number of noise protection requirements in urban areas pose challenges (1, 8, 38). Although regulatory laws make the operational business of logistics service providers more difficult, they are also seen as an opportunity to develop innovative logistics concepts (14, 24, 32, 34).

4.2.2. Chances for urban logistics real estate

New concepts for urban logistics networks are a key opportunity for last mile delivery. Flexible network nodes in the form of micro depots as well as new approaches to land utilisation need to be differentiated.

In the CEP sector in particular, Micro depots above-ground and underground parking areas can act as a supplement to night-time transhipment. This is especially the case with decreasing numbers of private vehicles in the future (3, 18, 24, 27). Multi-storey car parks pose challenges, due to low ceiling height and safety considerations (3, 5-7, 16, 17, 21) as well as high requirements in terms of fire protection (20, 25). Therefore, containers as flex hubs provide a temporary solution for exploiting fluctuation times and testing processes (4, 9, 18, 21, 23, 37). However, lengthy approval procedures, high costs and the integration into existing cityscape aggravate the usage of flex hubs (8, 20, 22, 25, 32).

In addition to new concepts, the efficient use of space is of great importance. Depending on the land use plan, cost-intensive measures (e.g. land revitalisation, fire protection regulations, conversion measures, rents) and profitability must be taken into account (6, 12, 14, 17, 20, 26). By defining logistical areas in the land-use plan, cities can simplify the process of finding areas and also regulate the rent level, resolving potential conflicts (10, 23, 24, 26, 28, 38). In the area of new space solutions, new logistics properties can be built in height or depth due to automation, enabling plots to be equipped with adaptable logistics properties (11, 20). To justify the high construction costs, it must be ensured that traffic savings and process improvements can be generated (7, 12, 18, 20, 24, 26, 30, 32, 34).

4.3. Success criteria for the integration of urban logistics real estates

4.3.1. Legal factors

Bureaucratic processes were cited as a major challenge for the success of urban logistics real estate projects. The interview partners identified the relaxation of complex legal bases as a major success factor. A simpler approval procedure for urban areas is explicitly required, as is a simpler approval procedure for multi-storey logistics properties. This is associated with simpler approval procedures for testing innovative logistics concepts.

The overall requirement is that there should be a reorganisation of governmental structures and associated processes to accelerate and improve cooperation. The land use plans used so far must be adapted to the new requirements of urban logistics. In addition, it is proposed to review the overall legal framework, for example in order to allow longer delivery times in urban regions (18, 21).

4.3.2. Social and economic factors

To lead urban logistics real estate projects to success, it is indispensable that the economic viability is clearly recognizable from the very beginning. This is necessary to find fitting investors, in favour of support projects financially. Corresponding projects must meet the requirements of logistical efficiency, as they must also be scalable in large quantities.

The interviews show that the improvement of the logistics' image coupled with the increasing necessity and innovative strength of logistics service providers may be an important aspect in convincing politicians and citizens (33, 37). So far, despite regular exchanges between stakeholders, the promotion of logistics space has hardly been actively pursued. This can be explained by the fact that urban areas are scarce and the need for urban logistics real estate projects is apparently not yet acute.

4.3.3. Innovations

Innovative, but also holistically thought-out concepts are core prerequisites for the success of urban real estate projects. Electromobility has often been mentioned as an example; although it is innovative, it cannot be used without a suitable charging

infrastructure. Accordingly, such infrastructure must be created at an early stage (6, 20, 22, 23). Applied to urban logistics projects, this means that the existing logistics system needs to be rethought. Several concepts are to be interlinked here in order to be viable for the future as a whole. This includes the multi-use of existing areas as well as the integration of smaller micro depots (13, 31, 36, 38). The interviewees see the combination of both kind of logistical nodes in a cascade system (9, 20, 21, 24, 25, 29, 30, 34) which includes small customized solution (5, 8, 30, 33, 38) in urban areas. In addition, new and more flexible framework solutions need to be created, such as delivery periods, e.g. in connection with preferential treatment for electric vehicles or the systematic organisation of delivery zones (8, 11, 15).

Although the infrastructures in cities can usually only be further developed over a period of 20 - 30 years, cities are constantly evolving and need to become more agile in their adaptability (31, 35). Regarding the urban network delivery infrastructure, rising parcel volume can be mastered with the help of innovative and mass-produced concepts (14). Individual characteristics of the area as legal restrictions, parcel volume, typography and population density need to be taken into account (14, 20, 34, 37).

5. HYPOTHESES FOR URBAN LOGISTICS REAL ESTATE PROJECTS

Our empirical results gathered illustrate three dimensions of urban logistics projects: a) the motivation of involved stakeholders to participate in urban logistics projects, b) the challenges and chances of urban logistics real estate projects, and c) success criteria to be considered when realizing urban logistics real estate projects. In the following, the core statements for each dimension are summarized and associated hypotheses are derived.

a) Motivations and objectives of stakeholders in urban logistics projects

A large number of players are actively and passively involved in urban logistics real estate projects. Logistics service providers and cities have a symbiotic connection to actively promote such projects. Retail companies are passively involved by defining logistical requirements and demanders of urban space. Politicians are responsible for creating legal framework conditions for such projects. The different actors participate in urban logistics real estate projects in order to enable faster delivery, enabling future viable infrastructure and at the same time improving quality of life in cities. To this purpose, cities in particular provide financial and resource-based support. Both are used in innovative warehousing and transport concepts, which are developed in particular by logistics service providers. Following hypothesis is derived in this dimension:

H1: In order to enable sustainable urban logistics real estate projects, several stakeholders need to work together, with cities in particular playing a central role as infrastructure providers and coordinators.

b) Opportunities and challenges of urban logistics real estate projects

The shortage of space in urban regions is the biggest challenge for urban logistics real estate projects, as they have to compete with many more prestigious projects. In addition, lengthy bureaucratic processes hamper the implementation of projects that have already been decided. These challenges are countered with innovative concepts that can use declining urban areas for logistics processes with small, flexibly adaptable solutions. This makes it possible to conquer urban areas without major competition by intelligently revitalizing areas of future declining business models. In order to achieve this, adaptations to the legal framework need to be realised. This leads to the following hypothesis:

H2: Innovative logistics concepts can help with the revitalization of areas of future declining business model, although this will require the reduction of bureaucratic obstacles.

c) Success Criteria for urban logistics real estate projects

In order to successfully implement urban logistics real estate projects, several key factors have to be considered and adjusted. First of all, legal regulations, bureaucratic structures and their processes need to be adapted. The aim here must be to accelerate and simplify the approval procedures, especially in order to be able to test innovative concepts. In addition to this factor, economic and social aspects must also be taken into account. A clear profitability statement of urban logistics real estate projects is necessary. Measures to improve the logistics image are also needed to illustrate the necessity of such projects. As a final success factor, innovations can be mentioned that are needed in any case in order to set up future-capable urban logistics concepts. It is important to consider that these are developed and implemented as part of a holistic overall concept. Likewise, both the overall framework and each innovation concept must be created under the premise of adaptability in order to enable increased agility of urban infrastructure as a whole.

P3: A holistic view and conception regarding legal framework conditions, economic efficiency and innovative concept proposals is necessary to establish sustainable urban logistics systems, with urban logistics real estate as one important component of it.

6. CONCLUSION

Increasing urbanisation of cities and the associated gains in parcel volumes, urban distribution concepts gain strategic importance. High customer requirements regarding delivery services, as well as increasing eCommerce sending volumes lead to complex logistics structures and processes, ultimately resulting in urban infrastructure reaching its capacity limits. Hence, business models and associated logistics network structures must be adapted at high cost. Cost-intensive urban

logistics areas, enabling fast delivery to customers while simultaneously reducing transport costs and emissions, occupy a key position in the logistics network. This paper aimed to examine the role of urban logistics real estate in Germany, identify the stakeholders involved, as well as their motivations for engaging in those. Moreover, challenges, chances and success criteria for integrating urban logistics real estate were examined. For this we used an empirical approach by interviewing 38 experts in the field.

Our main findings can be summarized as follows: A variety of stakeholders is involved in urban logistics real estate projects, with cities in particular playing a central role as infrastructure providers and coordinators. It is important to involve all parties concerned in projects at an early stage in order to achieve quick results. The biggest hurdle here is the bureaucratic effort that hampers and slows down approval procedures. Likewise, urban logistics real estate projects have to compete with more prestigious projects for the scarce space. In order to improve this situation, innovative concepts rely on the use of less popular areas, which are currently still occupied by declining business models, such as large retail space or multi-storey car park. For successful implementation of such concepts, it is necessary to adapt the legal framework conditions. In addition, it is important that the economic viability consideration is addressed from the outset. All in all, sustainable urban logistics require a holistic approach consisting of interlocking concepts, with flexible and adaptable logistics real estate playing a central role.

There are some limitations of our research, allowing further investigations in the future. We only used insights of German experts. Hence, the geographical component limits the research expressiveness. Other urban areas with different conditions may have other stakeholders involved, as well as different procedures regarding urban logistics real estate projects. This is especially in less developed regions with other urbanization rates and different governmental structures and bureaucratic processes. Moreover, we used a qualitative research approach focusing on motivations and behaviour of urban stakeholders. Quantitative models focusing on profitability and efficiency of urban logistics real estate projects are available as a research field for further studies. Furthermore, we find that a common understanding of urban logistics and its objectives is necessary. The clear definition of urban logistics properties and areas as well as their characteristics is necessary in order to achieve a common understanding and possibly to classify previously unused areas. Depending on the city, the individual stakeholders can take on a different role. Based on experience, a definition of "fixed" project stakeholders and their expectations for an efficiently procedure should be done.

7. REFERENCES

Ando, N. and Taniguchi, E. (2006). Travel time reliability in vehicle routing and scheduling withtime windows., *Networks and Spatial Economics.*, 6 (6), p. 293-311

Ballantyne, E.E.F., Lindholm, M. and Whiteing, A. (2013). A comparative study of urban freight transport planning: addressing stakeholder needs., *Journal of Transport Geography*., 32, p. 93-101.

Bennühr, S. (2017). Richtiger Kurs für die Zukunft gesucht., *Deutsche Verkehrs-Zeitung, 26*, p. 2.

Bernsmann, A. (2017). Urbane Logistik: Die Stadt als Innovationstreiber., *Magazin Innenstadt, 1*, p. 4-7.

(BIEK) Bundesverband Paket und Expresslogistik e. V. (2018). *Digitaler, Effizienter. KEP-Studie 2018 – Analyse des Marktes in Deutschland.* Berlin.

Bourne, L. (2008). *Stakeholder Relationship Management: A Maturity Model for Organizational Implementation*, Cornwall: MPG Books Ltd.

Bryman, A. & Bell, E. (2011). *Business research methods.*, 3rd Edition. New York: Oxford University Press.

Bu, L., Van Duin, J., Wiegmans, B., Luo, Z. & Yin, C. (2012). Selection of city distribution locations in urbanized areas., *Procedia - Social and Behavioral Sciences, 39*, p. 556-567.

Bulwiengesa AG. (2017). *Logistik und Immobilien 2017. Citylogistik. Mit neuen Ideen in die Stadt.*

Crainic, T.G., Ricciardi, N. and Storchi, G. (2004). Advanced freight transportation systems forcongested urban areas., *Transportation Research Part C*, 12 (2), p. 119-137.

Creswell, J. (2009). *Research design: Qualitative, quantitative, and mixed methods approaches*., 3rd Edition, Los Angeles: Sage.

Dablanc, L., Diziain, D. and Levifve, H. (2011). Urban freight consultations in the Paris region., *European Transport Research Review.*, 3 (1), p. 47-57.

Deckert, C. (2016). Nachhaltige Logistik. In: Deckert, C. (Ed.). *CSR und Logistik: Spannungsfelder Green Logistics und City-Logistik.* Berlin Heidelberg: Springer Verlag. p. 3-41,

Flynn, B. B., Sakakibara, S., Schroeder, R. G., Bates, K. A. & Flynn, E. J. (1990). Empirical research methods in operations management. *Journal of Operations Management,* 9 (2), p. 250–284.

Hensher, D.A. and Puckett, S.M. (2005). Refocusing the modelling of freight distribution:development of an economic-based framework to evaluate supply chain behaviour inresponse to congestion charging., *Transportation*, 32 (6), p. 573-602.

Holguín-Veras, J. (2008). Necessary conditions for off-hour deliveries and the effectiveness ofurban freight road pricing and alternative financial policies in competitive markets., *Transportation Research Part A: Policy and Practice*, 42 (2), p. 392-413.

Johanning, R. (2017). *Cities brauchen neue Konzepte gegen den Verkehrskollaps.* [available at: : https://www.dvz.de/rubriken/logistik/detail/news/staedte-brauchen-neue-konzepte-gegen-den-verkehrskollaps.html , access June 11, 2018]

Kille, C. & Nehm, A. (2017). Initiative Logistikimmobilien Logix., *Zukunft der Logistikimmobilien und Standorte aus Nutzersicht. Mythen. Moden. Trends.* Weiterstadt.

Kiwitt, P. (2010). City Logistics – Distribution in wachsenden Ballungsgebieten., *Delivering tomorrow. Zukunftstrend Nachhaltige Logistik.* Bonn: Deutsche Post AG.

Kloeckner, N. (2017). *Innenstadtlogistik. Lastenräder im Einsatz: Wendig, flexibel, emissionsfrei*. [available at: https://newsroom.hermesworld.com/lastenraeder-in-innenstadt-wendig-flexibel-emissionsfrei-13093/ , access July 12, 2018]

Lehmacher, W. (2015). *Logistik im Zeichen der Urbanisierung. Versorgung von Stadt und Land im digitalen und mobilen Zeitalter.* Wiesbaden: Springer Gabler.

Lindlof, T.R. & Taylor, B.C. (2011). *Qualitative Communication Research Methods*., 3rd Edition. Thousand Oaks: Sage.

LogReal.World GmbH. (2018). Logistik im Spannungsfeld zwischen Stadtplanung und Globalisierung., *LogReal.Direkt, 1*, p. 16-19.

Pfohl, H. (2016). *Logistikmanagement: Konzeption und Funktion*., 3rd Edition, Berlin Heidelberg: Springer.

Pfohl, H. (2018). *Logistiksysteme: Betriebswirtschaftliche Grundlagen*., 9th Edition, Berlin: Springer Vieweg

Pinto, R., Lagorio, A. and Golini, R. (2015). Urban freight transport in an Italian mid-sized city:the Bergamo case from inception to stakeholders'involvement., *URban Freight and BEhaviour change Conference (URBE).*, Rome,1-2 October. [available at: http://host.uniroma3.it/eventi/urbe/apfp.php, accessed May 18, 2018]

Prange, C. (2018). Hoher Anspruch, knappe Flächen., *LogReal.Direkt, 1*, p. 32-33.

(PwC) PricewaterhouseCoopers GmbH. (2017). *Aufbruch auf der letzten Meile. Neue Wege für die städtische Logistik.*

Raab-Steiner, E. & Benesch, M. (2015). *Der Fragebogen: Von der Forschungsidee zur SPSS-Auswertung.* 4th Edition. Wien: Facultas Verlags- und Buchhandels AG.

Rottke, N. B. (2017). Institutionen im Modell immobilienwirtschaftlicher Aktivität. In: N. B. Rottke & M. Thomas (Ed.), *Immobilienwirtschaftslehre. Management.*, Wiesbaden: Springer Fachmedien Verlag, p. 173-190.

Schmid, A. M. (2018). *Metropolen: Kein Verkehrskollaps durch Onlinehandel.* [available at: https://www.transport-online.de/Transport-News/Wirtschaft-Politik/17962/Metropolen-Kein-Verkehrskollaps-durch-Onlinehandel, access January 24, 2018]

Suksri, J. & Raicu, R. (2012). Developing a conceptual framework for the evaluation of urban freight distribution initiatives., *Procedia - Social and Behavioral Sciences, 39*, p. 321-332.

Stathopoulos, A., Valeri, E. and Marcucci, E. (2012). Stakeholder reactions to urban freight policyinnovation., *Journal of Transport Geography, Special Section on Rail Transit Systems and High Speed Rail*., 22 (1), p. 34-45.

Strauss, A.L. & Corbin, J.M. (2008). *Basics of Qualitative Research: Techniques and Procedures for Developing Grounded Theory*., Thousand Oaks: Sage Publications.

Taniguchi, E. and Shimamoto, H. (2004). Intelligent transportation system based dynamicvehicle routing and scheduling with variable travel times., T*ransportation ResearchPart C: Emerging Technologies, Intelligent Transport Systems: Emerging Technologies and Methods in Transportation and Traffic*, 12 (3/4), p. 235-250.

Trautrims, A., Grant, D. B., Cunliffe, A. L. & Wong, C. (2012). Using the "documentary method" to analyse qualitative data in logistics research., *International Journal of Physical Distribution and Logistics Management,* 42 (8/9), p. 828–842.

Veres-Homm, U. & Weber, N. (2017). *Logistikimmobilien. Dreh- und Angelpunkt der Supply Chain. Bedeutung, Funktion und Ansiedlungseffekte*. 2nd Edition, Weiterstadt: Initiative Logistikimmobilien Logix GmbH.

Yahşi, B. (2017). *Financial Supply Chain Management: Erfolgsfaktoren der Gestaltung von Finanznetzwerken.* (Doctoral dissertation). TU Darmstadt, Germany.