Strategy of Selected Cities of the Czech Republic in the Field of Transport from the Perspective of City Logistics: Qualitative Comparative Analysis

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Abstract

The issue of city logistics is very current topic not only from the point of view of city dwellers, but also from the perspective of state administration and self-government and other stakeholders. Transport and transport management are the key pillars of the city logistics system. Cities regularly develop strategies and strategic documents in the field of transport. The Czech Republic is administratively divided into fourteen regions with twelve regional capitals and the capital city Prague. Each city develops transport strategies and related strategic documents. The aim of the article is to analyse strategies of these cities of the Czech Republic in the field of transport from the perspective of city logistics. The method of content analysis was used to analyse strategic documents of selected cities and the method of qualitative comparative analysis was used to analyse and compare the strategic documents of selected cities.
KEY WORDS: *transport management, city logistics, strategic documents*

1. Introduction

The modern logistics industry has become an increasingly important part of the modern economy, which is flourishing worldwide with the rapid development of the world economy and the development of technology and science [1-3]. The logistics industry is the leading sector in the development of the national and international economy. The challenges of coordinated development of the city economy and logistics have attracted great attention [4].

Due to the increasing volume of traffic and the limited capacity of the road network, congestion in urban areas has become an everyday phenomenon. Congestion creates a significant change in vehicle speed on city roads, especially during peak hours of the morning and evening. In real life, traffic conditions change throughout the day, so the routes of vehicles in the transport network have different levels of congestion depending on the time of the day [5-6].

Daytime congestion in urban areas has significantly increased fuel consumption and carbon emissions from vehicles, resulting in poor air quality, late arrivals and additional rental costs for vehicle drivers. According to the International Energy Agency, the transport sector was the second largest contributor to CO_2 emissions in 2015 [6-7].

Congestion and pollution problems caused by the increasing demand for city freight transport have led researchers and public authorities to involve their efforts in city logistics initiatives in recent years [8]. City logistics supports the development of integrated logistics systems, where all stakeholders are coordinated to reduce the negative impact of city transport distribution on citizens [9-10]. Local authorities seek to reduce pollution and congestion by implementing public policies that reduce the number of vehicles traveling inside the city centre, such as low-emission zones [11] or delivery windows [12]. Freight carriers play an important role in fulfilling the main tasks of the city logistics process and their daily activities can be largely influenced by city logistics initiatives aimed at reducing the negative impact of the city logistics operations [12-14].

The aim of this paper is to analyse strategies of these cities of the Czech Republic in the field of transport from the perspective of city logistics.

2. Theoretical Background

City logistics introduces a new concept that integrates urban planning and management of city logistics flows to address the cause of cargo transportation problems by acting on factors that characterize each context, such as: organization, planning, land use, vehicle routing, number of trips and vehicle carrying capacity [15-16]. Stakeholders are entities that are involved or interested in the results of city logistics initiatives and city logistics too. This share is based on a variety of stakeholders' motives that could influence decision-making when implementing

city logistics solutions [17-18].

City logistics is one of the most serious problems in most cities around the world in terms of recent phenomena such as urbanization or increasing the expected level of well-being of citizens [19-20]. City logistics is described as: "The process of optimizing the logistics and transport activities performed by private companies in urban areas, taking into account the traffic situation, congestion and energy consumption in a market economy" [21]. The basic philosophy of city logistics is to propose the right planning of goods distribution in the city [22]. It aims to optimally plan and manage freight movements within the logistics network in the metropolitan area with a view to integration and coordination between stakeholders [23].

The negative shown externalities are some of the most disturbing effects of the flow of goods in the city logistics. In response to these problems, city logistics is emerging to improve logistics systems in the urban area by monitoring costs and benefits and how to plan, organize, coordinate and manage physical flows and information aimed at protecting the environment [24-26]. Despite efforts to reduce congestion associated with the transport of people or materials and emissions of gases less harmful to the environment and social and economic activities in cities, it is still a challenging issue [27]. City logistics is a complex area characterized by many actors and stakeholders, and therefore many interests are at the stake [28]. Efficient and environmentally friendly logistics systems contribute to the competitiveness of businesses in terms of economic development. Due to the expansion of urban areas and the relative growth of economic activities, the logistics facility finds space and location in areas immediately outside the city centre and on the periphery [29-30]. The problems of transport and logistics have existed for a long time. The history of transport and logistics and shows that transport science, which has changed since the 1960s, has experienced a huge change with the development of information and communication technologies. Today, many scientists are discussing this and innovating from a variety of perspectives, such as studying different auction mechanisms, considering time-effect transport, and analysing the impact of reducing transportation costs or environmental pollution through collaboration. All these researches help to improve the efficiency of logistics operations in the reality [31-32].

3. Methods and Data

The method of content analysis and qualitative comparative analysis were used in this paper. The analysis processing procedure is shown in Fig. 1. Firstly, relevant strategic documents of selected cities (twelve regional capitals: Brno, České Budějovice, Hradec Králové, Jihlava, Karlovy Vary, Liberec, Olomouc, Ostrava, Pardubice, Plzeň, Ústí nad Labem, Zlín and the capital city Prague) were identified from publicly available databases. Subsequently, the method of content analysis was used to identify relevant documents in the field of transport. The method of content analysis is a research technique for making replicable and valid inferences from texts or other meaningful matter to the context of their use [33]. Furthermore, the method of qualitative comparative analysis of these documents was used to analyse and compare strategies of selected cities in the field of transport from the perspective of city logistics. The method of qualitative comparative analysis is a non-statistical research data analysis technique for determining which logical conclusions a data set supports [34].

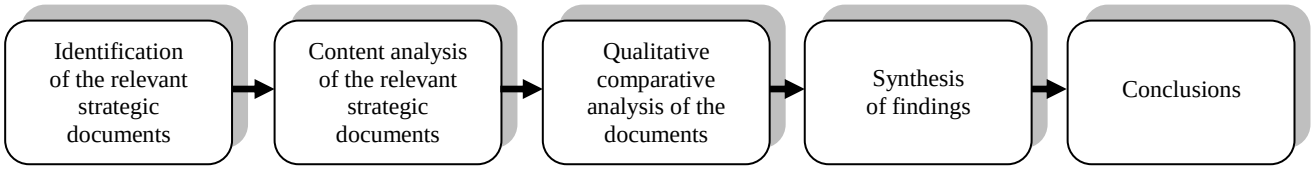

Fig. 1 Analysis processing procedure [authors]

A total of 22 relevant strategic documents were identified, there were: Sustainable City Mobility Plan of the City of Brno 2017, Tourism Development Program of the City of Brno 2016-2020, Strategic Plan of the City of České Budějovice 2017-2027, Strategic Development Plan of the City of Hradec Králové until 2030, Strategic Development Plan of the City of Jihlava until 2020, Strategic Plan for Sustainable Development of the City of Karlovy Vary 2014-2020, Update of the Strategy of Development of the City of Liberec 2014-2020, Strategic Development Plan of the City of Olomouc 2017-2023, Strategy of the Administrative District of Olomouc 2015-2024, Strategic Development Plan of the City of Pardubice 2014-2025, Strategic Development Plan for the Prague 7 District 2016-2022, Strategy of Public Space in Prague 10 District, Strategic Plan for Sustainable Development of Prague 12 District 2013-2020, Strategic Plan of Prague 13 District 2018-2024, Strategic Development Plan of Prague 14 District 2015-2025, Strategic Development Plan of Prague 20 District 2013-2020, Concept of Cycling Transport of Prague 20 District, Strategic Development Plan of Prague 21 District 2012-2022, Strategic Development Plan of Prague-Libuš District, Strategic Development Plan of Prague-Slivenec District, Strategy of Development of the City of Ústí nad Labem 2015-2020 and Strategy of Development of the City of Zlín until 2020 – "ZLÍN 2020" [35].

A total of eight areas were identified using content analysis of the relevant strategic documents in the relation to the field of transport and city logistics by three independent researchers, there were:

- Transport planning including mobility planning, transport services planning, city logistics planning, traffic system planning

- Transport infrastructure including roads, railways, airports, ports
- Pedestrian transport including sidewalks, barrier-free measures
- Public transport including urban public transport, passenger rail transport, regular passenger services
- Sustainability including environmental issues, greenhouse gas emissions, noise, vibration
- Cycle transport including bicycle paths
- Traffic safety including traffic accidents, protection of traffic participants
- Static transport including parking, parking spaces

4. Results and Discussion

Based on the synthesis of data obtained by the method of content analysis and qualitative comparative analysis by three independent researchers, the following conclusions can be presented. The analysed cities have a total of 126 strategic measures in the relation to the field of transport and city logistics in their strategic documents, but some of these strategic measures may span more than one of the identified thematic areas; as a result Table 1 contains a total of 221 strategic measures of the cities analysed.

The capital city Prague and its related districts have the largest number of measures in its documents (120 measures in total, which is 54.30% of all measures). This is understandable and predictable, because it is the capital city and also the most important centre of the Czech Republic in terms of tourism and economy with more than 1.3 million inhabitants. The second largest city in the Czech Republic and the most important centre of the Moravia region Brno has 26 strategic measures (11.76% of all measures) in the relation to the field of transport and city logistics in its strategic documents. It is remarkable that in some areas (pedestrian transport, cycle transport and transport infrastructure) Brno has only one measure compared to Prague.

The other analysed cities have between 2 and 14 strategic measures in their strategic documents except for the city of Ostrava, which has no strategy in the relation to the field of transport and city logistics (included in descriptor “transport”).

Table 1 The overview of the number of strategic measures of the individual cities and thematic areas [authors]

City / Area	Traffic safety	Static transport	Pedestrian transport	Cycle transport	Transport infrastruct.	Public transport	Sustaina-bility	Transport planning	Total
Prague	11	5	22	10	31	11	10	20	120
Brno	2	2	1	1	1	5	5	9	26
Olomouc	1	1	2	2	2	1	2	3	14
Pardubice	1	1	1	---	1	2	1	5	12
Liberec	1	---	2	1	2	---	1	5	12
Hradec Králové	---	1	1	1	---	2	---	3	8
Karlovy Vary	---	1	1	1	2	1	---	1	7
Ústí nad Labem	---	---	---	---	---	2	1	3	6
Plzeň	---	---	1	1	---	---	1	2	5
České Budějovice	---	---	---	---	---	1	---	4	5
Zlín	---	---	---	---	---	1	1	2	4
Jihlava	---	---	---	---	---	---	1	1	2
Ostrava	---	---	---	---	---	---	---	---	---
Total	16	11	31	17	39	26	23	58	221

Only three cities have prepared strategic measures for all identified areas, it is the capital city Prague, Brno and Olomouc. The capital city Prague has the most strategic measures in the area of transport infrastructure (31 measures), pedestrian transport (22 measures) and transport planning (20 measures). On the contrary, the least strategic measures were identified in relation to the static transport (only 5 measures). In other thematic areas (traffic safety, cycle transport, public transport, sustainability), the capital city adequately has the same number of defined measures (between 10 and 11 strategic measures).

Brno, the second largest city in the Czech Republic, focuses on transport planning area in terms of strategic measures (a total of 9 measures); it also deals with sustainability and public transport (both equally 5 measures). In other thematic areas, Brno has one or two measures. The last city for which measures have been identified in all the examined thematic areas is the city of Olomouc, which has prepared one to three strategic measures in all thematic areas. The city of Pardubice does not have prepared strategic measures in only one area, which is the area of cycle transport, which is understandable, because this city has a sufficient and densest network of cycle paths from all cities of the Czech Republic. In other areas, the city already has defined strategic measures, with most in the area of transport planning.

The analysis of strategic documents for the remaining cities revealed that these cities (Liberec, Hradec Králové, Karlovy Vary, Ústí nad Labem, Plzeň, České Budějovice, Zlín, Jihlava and Ostrava) do not have any strategic measures in at least two or more thematic areas. The city of Liberec has not prepared any strategic measures in the thematic area of static transport and public transport. The city of Karlovy Vary does not focus on the thematic areas: traffic safety, sustainability. The city of Hradec Králové is in a similar position to the city Karlovy Vary, but in addition to those

already mentioned it has no transport infrastructure strategic measures.

Cities Ústí nad Labem, Plzeň, České Budějovice, Zlín and Jihlava have developed strategic measures in only one to four thematic areas. Most often it is the area of transport planning (all cities), sustainability (four cities) and public transport (three cities). As already mentioned, the city of Ostrava has not processed the strategy in the relation to the field of transport and city logistics.

The division of the 126 identified strategic measures in the relation to the passenger and freight transport measures is presented in Fig. 2. It is clear that cities have defined more strategic measures in the relation to the passenger transport (a total of 96 measures, 76% of all measures). The remaining 30 measures (24% of all measures) are linked to the freight transport. All analysed cities have defined strategic measures in the relation to the passenger and freight transport. The division of the strategic measures to the identified thematic areas is presented in Fig. 3.

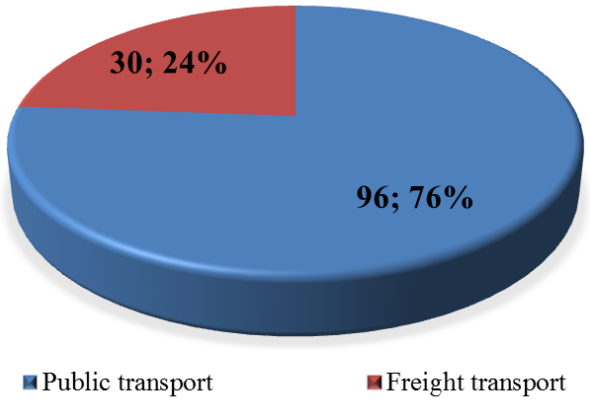

Fig. 2 The division of the strategic measures in the relation to the passenger and freight transport measures

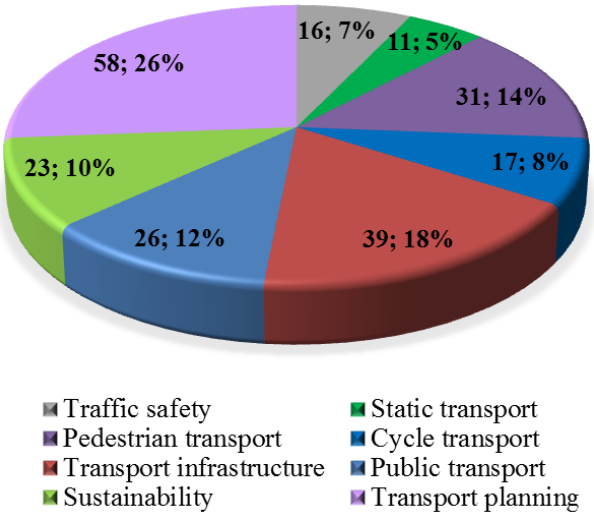

Fig. 3 The division of the strategic measures to the identified thematic areas

It is evident that the most strategic measures have been identified in the relation to the transport planning thematic area (a total of 58 measures, 26% of all measures). Furthermore, it is necessary to state that the thematic area of transport planning is the only thematic area where each of the analysed cities (except the city of Ostrava) have defined strategic measures. Subsequently, the cities in their strategic documents focus mainly on the area of transport infrastructure (a total of 39 measures, 18% of all measures), pedestrian transport (a total of 31 measures, 14% of all measures), public transport (a total of 26 measures, 12% of all measures) and sustainability (a total of 23 measures, 10% of all measures). Other thematic areas (cycle transport, traffic safety and static transport) individually account for less than 10% of the total. The analysed cities are least concerned with the strategic measures in the field of traffic safety (only five cities have defined some measures), static transport and transport infrastructure (only six cities have defined some measures).

Based on the presented results it is possible to reach the following findings. It was to be expected that, in the strategic documents of the analysed cities. Cities would mainly address thematic areas where they had shortcomings and space for improvement. Furthermore, it was possible to assume that the capital city Prague will have the most strategic documents and strategic measures, which was also confirmed. In terms of number of the strategic documents and the strategic measures, the capital city Prague was followed by the second largest city in the Czech Republic, Brno which is not surprising. However, much more interesting results have been identified in other regional cities of the Czech Republic.

The most shocking fact is that the city of Ostrava has any strategic documents with a descriptor “transport”. Given the fact that Ostrava is the centre of the Silesian region, it is burdened with the poor state of the environment, it is connected to two highways (D1 and D56) and to one of the main railway corridors of the Czech Republic, so it should have developed some strategic documents with strategic measures in the relation to the field of transport and city logistics.

The fact that most of the cities (except Prague, Karlovy Vary and Ostrava) are dominated by the strategic measures in the field of transport planning is understandable, because the importance of this area is indisputable. The transport planning area including mobility planning, transport services planning, city logistics planning and traffic system planning uses many optimization tools to achieve a sustainable transport system for all stakeholders nowadays. It is also understandable that the city of Pardubice does not have prepared strategic measures in only one area, which is the area of cycle transport, because this city has a sufficient and densest network of cycle paths.

Given the problems of most cities in the static transport area should all cities to establish strategic measures for this area, because only six analysed cities have defined measures in their strategic documents. Furthermore, cities

should more focus on the traffic safety area and prepare a series of strategic measures, because the number of traffic accidents is increasing. The last area that should be given more attention in the strategic documents is the area of the transport infrastructure, especially the planning of new transport infrastructure and modernization of existing transport infrastructure.

Not surprisingly, more measures have been identified in the relation to the passenger transport than freight transport. Given the fact that individual strategic documents are prepared by cities and their representatives, who are elected by citizens, it is understandable that more measures will be linked to the passenger transport.

5. Conclusion

Transport and hence city logistics is one of the key pillars of every country's economy. Creating, setting up, optimizing and maintaining of the transport system is today crucial not only from the perspective of the state, but also from the perspective of individual regions, agglomerations, cities, municipalities and their citizens. Many stakeholders are dependent on a functioning transport system that is why strategic documents and strategic measures in this area are also important. These documents can affect the design of the transport system and city logistics for a very long period. These are strategic decisions in the areas of investment, transport infrastructure, transport planning, modal split etc.

The aim of the article was to analyse strategies of the twelve regional capitals and the capital city Prague in the field of transport from the perspective of city logistics with the use of the method of content analysis and the method of qualitative comparative analysis. The analysis showed which thematic areas each city is paying more attention and less attention too. Furthermore, the results of individual cities were compared with each other.

The results of the analysis and key findings can serve as an inspiration for cities in developing further strategic documents and strategic measures in this area, with the aim of improving the existing transport system. Most cities should consider whether they should also address thematic areas where no strategic measures are currently defined. The city of Ostrava should prepare a strategic document in the relation to the field of transport and city logistics.

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