

THE CONCEPT OF RESEARCH ON LOGISTICS MANAGEMENT IN PUBLIC NETWORKS

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The search for possibilities to increase the efficiency of implementing public services creates prospects for the use of logistics management. However, research on this subject is sporadic. This has been the reason for undertaking research in this area and attempting to develop a concept for the research of logistics management in public networks, which is the purpose of this article. In the course of the analyses, logistics management and public networks were characterised. The focus is on the complexity and problems of public networks, which determine their specificity. Getting to know public networks' specifics is facilitated by the developed map of relations in public networks and the model of public institution sub-networks. The nature of this article is conceptual and its result is setting the directions and procedure of researching logistics management in public networks.

Keywords: logistics management, logistics networks, network approach, public management, public networks.

JEL Codes: H11, L14, O38, R58.

1. Introduction

In contemporary public management, especially in the New Public Governance model, the network paradigm is increasingly underlined, which results from the growing importance of inter-organisational relations in the effective functioning of public organisations. However, the subject literature lacks well-established research, both theoretical and empirical, aimed at determining the importance of the network paradigm in improving public management oriented on the needs of citizens as members of the political and territorial community. Moreover, the role of logistics management in improving the effectiveness of public sector organisations is increasingly recognized, which creates interest in researching this issue (Kozuch, 2018).

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However, research in this area, which is still at its early stage, is dispersed in various areas of knowledge and is primarily of a theoretical nature. While the literature devoted to general logistic management is rich, there is a research gap in the use of this concept in the public sector. Public networks are studied to a greater extent, but there is also a lack of research in the field of logistic flows.

The initial stage of logistics development in public management gave rise to two approaches, namely public logistics (Kauf, 2014) and social logistics (Szołtysek, 2016; 2018). However, these approaches are not yet fully developed, there is a lack of a clear border between them, as well as the lack of a clear statement of exactly what public and social problems they deal with. Therefore, there is a research gap and the need to develop a concept for the use of logistics management in public networks, which is the purpose of this article.

2. Research methodology

The purpose of this article is to develop a concept for the use of logistics management in public networks. It has been achieved on the basis of the desk research method including publications in the field of three theories: foundations of public management, logistics management, and network theory. The present the research results the mind-mapping method, that allows showing relationships between groups of public organisations, has been used. Focusing on the research gap, the method of systematic review of literature included in the Web of Science database was used. This review was conducted according to the topics of the articles and key words. The review was carried out according to two key areas: public logistics and public network logistics. This criterion also allowed to trace the publications on the subject of logistics in public administration. The obtained results in the second group of publications were divided into five substantive areas of research: logistics in healthcare networks (hospitals, health centres, etc.), city logistics in terms of passenger transportation, city logistics in terms of freight transportation, logistics in the public administration network, logistics information platform for administration (and more broadly for the city). As a result, the conceptualisation research on logistics management in public networks was developed (comp. Fig. 1).

The contemporary approach to public management is focused on creating public value based on decisions taken jointly with citizens and creating structures that facilitate cooperation. It is based on a network approach and interactions taking place in public networks (Osborne, 2009; Skelcher, 2005). This approach creates the need to refer to the network theory that in the field of organisation management “refers to the mechanisms and processes that interact with network structures to yield certain outcomes for individuals and groups” (Borgatti, 2011, p. 1).

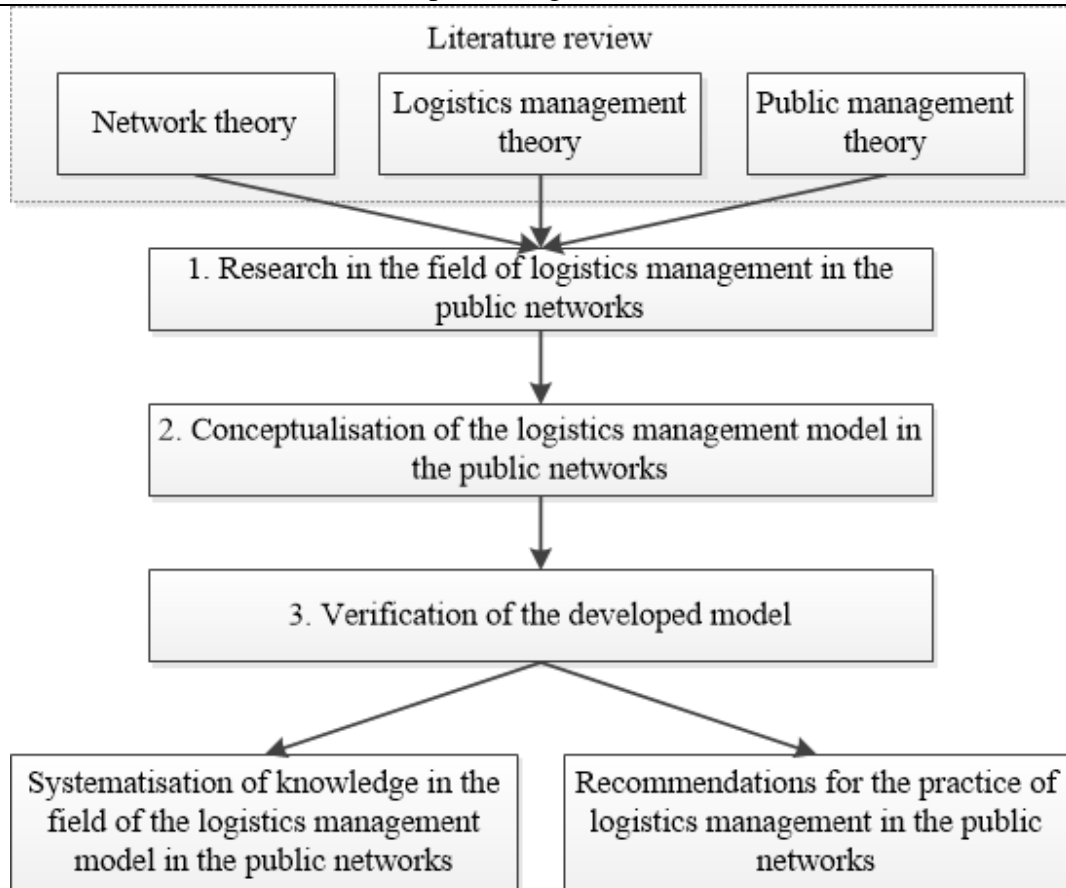


Fig. 1. The research model

This theory studies the ties between actors or nodes, emerging structures, their distinguishing features and benefits that may be achieved thanks to them. Last but not least, the theory used in this article is logistics management. It plays an increasingly important role in building customer satisfaction. The Council of Logistics Management defines logistics management as: “part of supply chain management that plans, implements, and controls the efficient, effective forward and reverses flow and storage of goods, services and related information between the point of origin and the point of consumption” (Coyle, 2002, p. 51–52). This theory dominates in the private sector, but there is a visible growing need to implement it in public management (Jüriado, 2016; Kauf, 2018).

The results obtained in this article constitute the implementation of a wider research concept, shown in Figure 1 and they refer to points 1 and 2 of the research model developed. Further research will enable empirical verification of the results obtained in the selected public management areas, furthermore an in-depth analysis of the data will enable future verification of the results obtained.

3. Theoretical background

3.1. Logistics management in networks

The success of logistic operations consists in ensuring the synchronisation of material flows thanks to the coordination of processes and the use of resources in the company and the supply chain, and as a consequence ensuring the availability of goods in the place and time expected by the customer. An extremely important dimension of logistics management success is also the cost level, both logistic and manufacturing costs as well as transaction costs (Witkowski, 2010; Pfohl 1998). The impact of material flow organisation on transaction and production costs is a consequence of the nature of logistics processes the task of which is to support both production processes as well as transactions and customer service.

In this context, managing logistics is sometimes distinguished from logistics management (Szołtysek, 2015). Then, logistics management is defined as the information and decision influence of the machinery managing the logistics sphere on the organisational units of the real sphere (positions implementing logistic processes and activities), transmitted through information channels shaped by organisational rules. These impacts cause that the tasks carried out by these units in the scope of shaping material and information flows ensure achievement of the organisation's goals. Managing logistics, however, means in this context shaping the machinery managing the logistics sphere in the organisation, including activities aimed at determining the scope of logistics activities and the location of logistics in the organisational structure of the entity as well as the creation of organisational rules and setting the rules of organisational units, including the selection of competences of employees of logistics departments. Such an approach to managing logistics and logistics management is not, however, well-established in international literature. It seems that the scope of managing logistics quoted here is included in logistics management – as a function of organisation.

In this article, logistics management means planning, organising material flows, the purpose of which is to ensure the availability of products and services in accordance with the needs of customers, while taking into account costs as the economic result of decisions made. Thus, the assumptions of the interpretation of logistics management given by the Council of Logistics Management in 1998 are considered.

Nowadays, literature focuses more strongly on the interpretation of supply chain management than on logistics management. However, it should be remembered that supply chain management is a much broader concept and includes integrated management of key organisational processes (including: manufacturing, trade, logistics, marketing, product design, etc.) starting from the customer through distribution and manufacturing companies to the suppliers (Lambert, 2008). Thus, logistics management is part of the concept of the supply chain but it is its specification in the area of logistics processes.

At the same time, the consideration of logistics management from the supply chain perspective points to two key aspects: integration and coordination. This understanding of integration processes and activities in the supply chain refers to harmonizing information streams, material streams and logistic functions that make up the supply chain (Klimas, 2015). Integration in the subjective sense boils down to harmonising (1) logistics areas within a single entity, (2) major logistics subsystems, and (3) entities collaborating on the market (procurement and/or distribution).

Logistics management at the level of a single organisation is a complex problem and requires the coordination of many tasks carried out as part of material flows as well as the integration of these activities with the organisation's other functional areas (especially manufacturing, finances, and marketing). Decision-making complexity increases when moving to the supply chain level as coordination concerns many different organisations bound by different types of relationships. A particularly complex system is the supply network and the logistics network.

The supply network can be understood as a system of collaborating manufacturing, trade and service organisations, in which the relationships between organisations are both horizontal and vertical and the main goal is to manufacture and deliver the product to the customer. However, the logistics network is limited to the collaboration of organisations implementing logistics processes, and thus mainly organisational relations between logistics service providers (Kramarz, 2015). Thus, the logistics network is part of the supply network, providing support in the implementation of manufacturing and commercial processes through the comprehensive implementation of logistics processes. The network structure (Provan, 2007), taking into account relations both with the organisations in the added value stream as well as at a given value creation level, is usually very complex and the relationships between organisations have different strength and form and some of the links are pulsing links, and thus they work temporarily with the network's core. Therefore, it is extremely difficult to demarcate the network boundaries for the purposes of material flow analysis.

The particular complexity of the supply network as a system for manufacturing and delivering products to customers translates as a consequence into difficulties in the logistics management of such structure. The basic difficulty is the coordination of many different organisations bound by different types of relationships within material flows. The coordinator must take into consideration the differences in business models of individual network participants as well as different logistics strategies. While it is possible to speak of a coherent logistics strategy of the supply chain, a common strategy of a network the actors of which can be participants in various supply chains is not mentioned. The premise of network collaboration is very often acquiring resources of partners (both substitutable and complementary resources). Another problem that the material flow coordinator must deal with in networks is therefore the conflict in access to resources. The challenge is also to identify and analyse the risks in material flows in the supply network.

Nowadays, the problematic aspects of the network are a research area that is intensively explored from the perspective of many fields and scientific disciplines. In the network management sciences' terms, they constitute "a group of three or more organisations connected in ways that facilitate achievement of a common goal" (Provan, 2007, p. 482). The relationships between these organisations are multifaceted, enabling facing up to complex and wicked problems, beyond the capabilities of one entity. The network approach is widely applied not only in the private sector, but also in the public and non-governmental sectors. Considering the growing role of organisational networks in the provision of public services, it is important to focus on logistics management implemented within these structures.

3.2. Public network specificity

Public management is a detailed discipline of management science, which main objective of research is management of individual organisations of the public sphere, primarily public institutions and macrosystems or macroorganisations, such as the national economy and the state, as well as mesosystems, e.g. regions and individual areas of public life. It deals with researching the resources and scope of harmonising the activities that ensure proper setting of organisational objectives that make up the public sphere and optimal use of the possibilities of organised human action, aimed at creating public values and pursuing public interest (Kożuch, 2004). It covers the totality of individual actions of individuals and public and private institutions that collaborate in order to achieve the intended effects. It focuses primarily on the creation of a socio-economic system that guarantees the effectiveness of public services and on the pursuit of optimal macroeconomic policy. The public authority creates the appropriate political and legal foundations necessary for the proper functioning of the socio-economic system. Both public and non-governmental organisations and private organisations are the entities of the public management process.

Network relations in public management have been studied for over 25 years (Provan, 2012). During this time, their role in the implementation of policies, services, and public tasks has significantly increased. Nowadays, the public management paradigm is based on the network approach, which is a mechanism encouraging collaboration, building community potential, and improving organisational results (Kenis, 2009). Public networks are created that include organisations from different sectors, take into account many levels of management and focus on a specific problem. Isett et al. (2011, p. 161) defines these networks as "a group of goal-oriented interdependent but autonomous actors that come together to produce a collective output (tangible or intangible) that no one actor could produce on its own". In these networks, organisations consciously agree to collaborate, solve problems, provide information, and acquire necessary resources. Public networks are analysed from three perspectives, namely: as policy networks, collaborative networks, and governance networks (Isett, 2011). The first approach refers to institutions and organisations from various sectors the functioning of which depends on a specific field of public policy

and which are interested in establishing favourable legal regulations. In turn, collaborative networks are focused on creating temporary inter-organisational teams the purpose of which is to jointly supply public goods in line with society's expectations. Governance networks, on the other hand, are oriented on inter-organisational coordination manifested through the provision of public services together with the formulation of common policies. Different levels of analysis of public networks underline their complexity and multidimensionality of projects implemented in them.

This results, among other things, from the wide range of services provided to the public (administrative, technical, and social services) and the diversity of organisations forming public networks. In addition to locating in various sectors, the units that create these networks also function at different levels of state organisation, have a different organisational structure and culture, have different goals, internal rules and procedures, and different expectations. These differences create the need for appropriate management methods that will be able to take better account of the needs and capabilities of all organisations. However, the network approach does not mean implementation of traditional management techniques in the new context, but the development of new methods (Provan, 2012). For this reason, this article focuses on the use of modern concepts of public networks.

In the study of public networks, it is also important whether the nature of a specific network is formal or informal. Informal (voluntary) networks are created from the bottom up by managers of specific public organisations, and formal networks (mandated) result from legal regulations, existing public policies, and signed and legally sanctioned arrangements, agreements, and contracts (Isett, 2011; Provan, 2012). In the public sector, formal networks are the preferred method of providing services, because it is easy to identify the roles and responsibilities of the participants, the rules of collaboration, or the consequences of defaults. On the other hand, informal networks in the public sector are characterised by emergence and stem from the need to exchange information and solve current problems. They can appear periodically, disappear after implementation of a certain action, but they also tend to formalise over time (Imperial, 2005; Isett, 2011).

The features of public networks and the scope of their application make them struggle with many different problems. Among them, one can distinguish inter alia, a varied level of involvement of individual organisations, loss of autonomy by these organisations, high costs of joint decisions and actions, dispersion of responsibility, or complexity of management, as well as paradoxes such as to cooperate or to compete in public networks (Provan, 2012). Therefore, the challenges facing public networks require a comprehensive approach. This facilitates the application of logistics management principles.

4. Research results

4.1. The scope of logistics implementation in public networks

Recently, more and more researchers have been dealing with the issues of logistics in the public sector, although not in each case calling the subject of their analysis "logistics". In international literature on this subject, examples of research relating to "coordination of flows", "material flow", "time-space transformation", or "flow control" can be found. They fit in the logistics research area, although they are not directly called "logistics", "supply chain", "logistics network", or "supply network". Research in this area includes the optimisation of material, human, and waste flows in the processes of public services, along with the accompanying information. The literature studies conducted include the Web of Science database, which is an international database of peer-reviewed publications recognized worldwide. A three-stage search process was carried out. In the first stage of the study, up to a total of three of the following words were described in the publications: "public" * network * logistics". At the first stage, only 4 publication indications were obtained (Majchrzak-Lepczyk, 2016; Yokoi, 2011; Brunetti, 2011; Spens, 2001).

The obtained results are therefore very few. Two of them concern logistics aspects in the hospital network. The publications concern the period from the years 2001 to 2017, and the authors do not repeat. Publication No. 3 is distinguished by the highest number of citations (24). The obtained results at this stage prompted to expand the search, which at the second stage was conducted for the Keywords: "Public" * "Logistics". At this stage, 80 indications of publications were obtained. They concerned a wide range of logistics application in the public sector and, according to the subject matter, were broken down into 5 thematic areas, where the 5th group is the remaining topics (not included in the first 4). The thematic areas separated in the second stage are: hospital logistics, passenger transportation, freight transportation in cities, logistics information platform in cities, and other publications. The division into the indicated groups was connected with the issues that dominate in the publications. Analysis of the selected thematic groups constituted the 3rd stage of literature research (tabl. 1).

Tabl. 1. Results of the 3rd stage of literature research

Thematic area	Number of publications	Time period of the publications	Number of citations	Key authors (number of citations)
Hospital logistics in the healthcare sector	12	1998–2018	38	Brunetti et al., 2011 (24)
Passenger transportation	5	2005–2017	30	Young et al., 2016 (13)
Freight transportation	16	2005–2017	131	Taniguchi et al., 1999 (95)
IT platform	20	2002–2017	38	Hu and Sheng, 2014 (11)
Other publications	27	1991–2018	209	Forrester, 1999 (26) Eisenstein, 1996 (5)

The "other" group of thematic areas is dominated by topics from broadly understood urban logistics and general interpretation of logistics in the public sector. Some articles deal with discussions in the area of Public and Private Partnership in the logistics sector, including both logistic parks and logistic centres. It should be underlined that all the areas discussed are limited to those publications in which the key words were combined: logistics with the public sector. The area itself, e.g. public transport, develops very strongly in literature in various perspectives. It can be considered that the publications are scattered both in terms of the author (a small percentage of publications with a repetitive author and thematically, especially in the last group). In addition to the areas mentioned above, it is possible to indicate interest in humanitarian logistics.

First publications on the use of logistic concepts in the healthcare sector began to appear. In the years 2014–2018, the trend of research on logistic information platforms for local government units or more widely for public administration has been developing very strongly. Research on the development of public and freight transport is in great progress, and in the last two years there have been publications on solutions for broadly understood cross-border logistics. In this context, additional publications appear in which the importance of the development of freight transport, logistic centres, and trans-shipment terminals is mentioned. The conducted review of the publications in the Web of Science database allows for drawing conclusions of great interest in two areas: logistics management in the health care sector and the development of freight transport in terms of city logistics and cross-border logistics. The stronger development of these two areas compared to the others is evidenced not only by the number of publications but also by the number of citations. On the other hand, there is a lack of systematised research on logistics management in public networks. For comparison, the public networks themselves are considered widely by many authors – the number of publications in the WoS database is 2,990. However, logistical issues related to the elimination of time-space gaps in these networks are very rarely discussed, as evidenced by only 4 publications obtained at the first stage. The results obtained allow us to conclude that there is insufficiency of both theoretical and empirical research in the field of comprehensive logistics management in public networks, which raises the need to develop a concept for researching logistics management in public networks.

4.2. The conceptualisation of the logistics management model in public networks

In the conceptualisation of the logistics management model in public networks, the starting point is their natural convergence, including the high level of complexity of both systems, the need for advanced instruments to coordinate the integration of these activities with other functional areas.

The complexity of public networks increases at the local level. Depending on the identified flows between the actors of such a network, the significance of logistic

management is variable. As Michał Kulesza writes, "a significant part of enterprises in today's world can be undertaken only on a scale of 50–150 thousand inhabitants. Only this scale creates demographic, organisational, intellectual, institutional, and also economic conditions for management. The district system, where there are several, a dozen or so rural communes and one, two, three cities, is a certain universe in which everything that is needed for the collective life of the local community is already present today" (Kulesza, 2008. p. 354). In addition, local authorities know the needs of their residents and have the capability of taking appropriate actions in the shortest possible time to meet these needs. The central level, on the other hand, is responsible for initiating state policy, continuity of activities carried out at lower levels of state organisation, monitoring the implementation of legal acts, and supporting local government activities, should such a need arise.

In the public networks at the most general level, three groups of actors can be identified: public institutions, non-governmental organisations, and private enterprises. Information and financial flows can be identified between these actors. Bilateral material flows occur between private enterprises and public institutions and non-governmental organisations. However, between public institutions and non-governmental organisations, these flows are unilateral (Figure 2). Material flows are generated by private enterprises by powering other network actors. An example of material flows is the provision of non-governmental organisations and public institutions, but also, for example, the implementation of flows to food banks. In these flows the recipient is the food banks, while the supplier of products are manufacturers or retailers and the flow itself is carried out by logistics service providers.

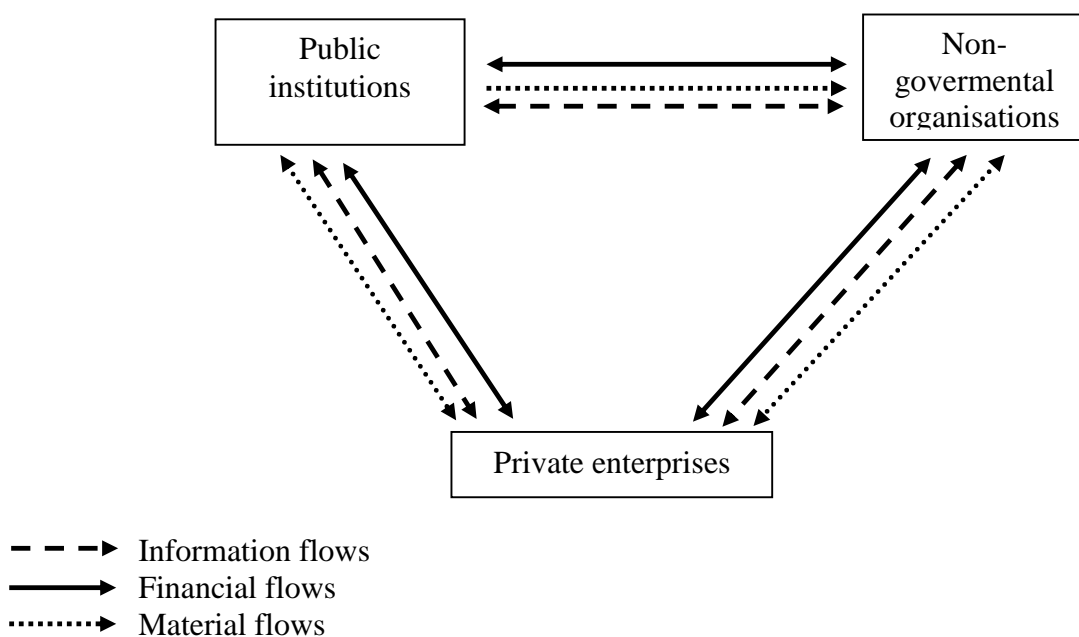


Fig. 2. Map of relationships in public networks

The issue of the functioning of public networks is not diagnosed, but previous experiences in this area indicate that public institutions create a legal and organisational framework for flows within these networks. For this reason, they are of key importance in the area under investigation. On this basis, the public institution sub-networks have been subject to further analysis as they form the basis for the analysis of entire public networks. Non-governmental sub-networks and private enterprise sub-networks are of less importance in the area under examination.

In this article, in order to identify public institutions in the networks under analysis, the classification was adopted in accordance with the provisions of the Act of 27th August 2009 on public finances (Journal of Laws of 2009 No. 157 item 1240). However, legal regulations relating to their activity have been used to identify the relationships between particular groups of entities. The results of the considerations carried out in the form of a model of public institution sub-networks are shown in Figure 3.

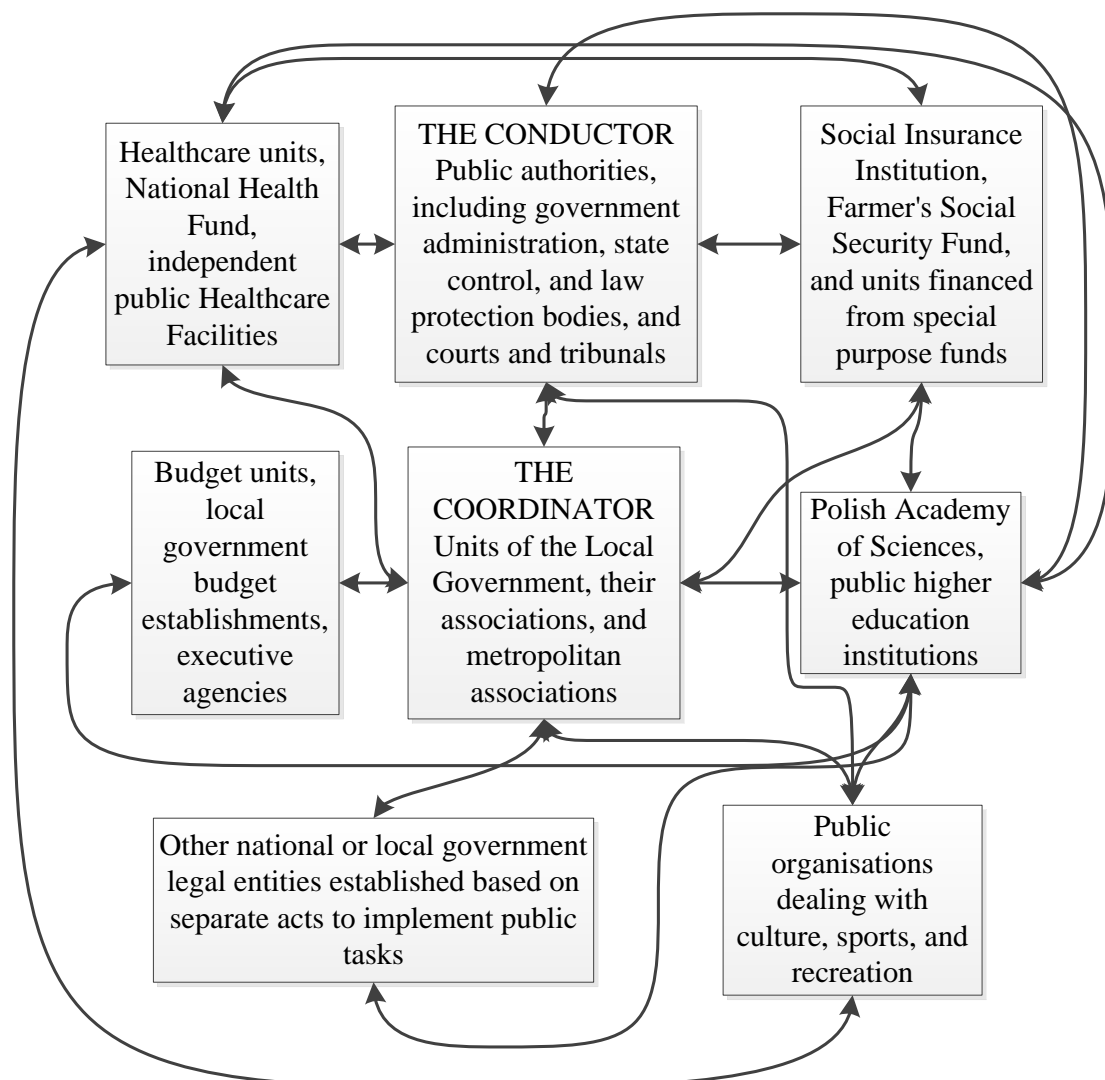


Fig. 3. The concept of the public institution sub-network model

Public authorities, including government administration bodies, state control and law protection bodies as well as courts and tribunals formulate public policies, exercise public authority and protect the law. For this reason, they are the conductor of public networks since they define the possibilities of action and are the creators of relationships in public networks. However, the decentralisation of public authority assigned responsibility for the implementation of public tasks in a given administrative area to local government units. These units autonomously make decisions related to endeavours undertaken in their area of operations, and combine them with all other groups of entities. Based on their competences and responsibilities, they have been considered to be the coordinator of public networks. The relationships between individual entities stem from their statutory tasks and obligatory performance of these tasks in cooperation with other units, as well as from the need to respond to the emerging needs of local communities. These factors form the basis for shaping inter-organisational relationships in public networks. Moreover, in public networks, logistics management is oriented on increasing the efficiency of material flows between public network actors, taking into account the specificity of public institution sub-networks.

In the concept of logistics management research, it is necessary to consider logistic management goals. Assuming that the logistic management goals are set by the 7R concept: the right product should be delivered to the customer in the right place and time in the required quantity and quality at the right cost, the goals between those network actors who are connected with material flows should be examined, according to the network paradigm taking into account the common impact of other actors of this network on the relationships between any two actors. The goals of logistics management in the network under study will depend on the identified characteristics of material flows as well as the determinants of these flows (including in particular legal regulations). These goals will not be synonymous with the goals of logistics management in enterprise networks. Therefore, the following steps are assumed in the research procedure of public institution sub-networks:

- 1) identification and characterisation of material and information flows between the participants in the public institution networks;
- 2) analysis of the impact of other public network participants on identified material flows;
- 3) identification of barriers and limitations in material flows in the networks under study;
- 4) clarification of the goals of logistics management in public networks;
- 5) establishing organisational rules of flows in public networks;
- 6) selection of mechanisms for coordination of material flows in public networks.

By proposing this procedure, it was assumed that solutions developed for logistics management in a network of enterprises (including coordination mechanisms) would not always be adequate to logistics management in public networks. The implementation of tasks and related flows in the public sector is primarily the result of applicable legal regulations, and their main goal is to provide high quality public services, not profit and profitability. For this reason, the use of logistics management in

public networks requires adaptation to the logic of functioning of public organisations and each time to identified internal and external conditions.

5. Conclusions

As a result of the analyses presented in this article the initial systematisation in the field of logistics management in public networks was provided and the directions and procedure of searching in that new field was set. It was found that:

1. The functioning of public networks faces on a daily basis many problems resulting from the complexity and multi-directionality of flows in these networks. This creates the need to search for new methods to increase the efficiency of public tasks. The adaptation of the logistics management concept to the specifics of public networks is of significant importance in this respect.

2. Logistics management in public networks is an unrecognized research problem. It focuses on the complexity of flows existing between public sector entities, which is the basis for the analysis of entire public networks.

3. The developed concept of the public institution sub-network is based on the transparency of interactions between these entities, their roles, and level of functioning. On its basis, a procedure for examining logistics management in public institution' networks has been proposed.

4. In public networks logistics management should be oriented on to management of material flows between private and public organisations as well as between private and non-governmental organisations.

5. In the public institution sub-network, logistics management has a much smaller range, however, it requires clarification of logistics management goals, indicating priorities in accordance with superior regulations and requirements for individual actors of this network and, as a consequence, selection of material flow coordination mechanisms.

6. The developed conceptualisation of research on logistics management requires empirical verification. This will enable identifying and assessing the level of logistics management in public networks.

The results obtained are of an introductory nature to the new research issues. They enrich the area of public management with the issue of public logistics networks' management.

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LOGISTIKOS PROCESŲ VALDYMO TYRIMO SOCIALINIŲ TINKLŲ KONCEPCIJA

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Santrauka

Socialinių paslaugų efektyvumo didinimo galimybių paieška sukuria logistikos procesų valdymo perspektyvas. Tačiau tyrimai šiuo klausimu atliekami atsitiktinai. Straipsnio tikslas – sukurti logistikos procesų valdymo socialinių tinklų tyrimo koncepciją. Atliekant analizę apibūdintas logistikos procesų valdymas ir socialiniai tinklai. Pagrindinis dėmesys skiriamas socialinių tinklų sudėtingumui ir problemoms, kurios lemia jų specifiškumą. Susipažinti su viešųjų tinklų ypatumais padeda suplanuotas socialinių tinklų santykių žemėlapis ir viešųjų institucijų pogrupių modelis. Šis straipsnis yra konceptualus ir jo rezultatas – nustatyti logistikos procesų valdymo socialiniame tinkle tyrimo kryptys ir tvarką.

Raktiniai žodžiai: logistikos valdymas, logistikos tinklai, tinklo metodas, socialinis valdymas, socialiniai tinklai.

JEL kodai: H11, L14, O38, R58.

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