



INTERMODAL SERVICE - SYSTEM APPROACH

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ABSTRACT. Introduction: Transportation services may be described in systemic categories. Intermodal freight transport is a practical expression of the system approach to transport. Development of the intermodal transport system has brought about the need for the comprehensive grasp of transportation processes. Intermodal transport operators manage the whole transportation service organization process. Hence, a question arises whether the service offered by an intermodal transport operator may be interpreted as a complex system service. Systemness of contemporary products and services consists in that their value for clients is predefined by their place in the whole system of products and/or services as well as by the network of their users. The network language, occurring in this paper, is connected with the development of the notion of network, one of the inspiring ideas in organization and management science of the recent years.

Methods: Literature on the intermodal freight transport issue has been analysed by the present author for the purposes of this paper, with a view to the developing idea of marketing of system products. Within the adopted interpretative paradigm, qualitative / quantitative research was used. Case study is used, among others, to interpret a particular situation, in a way that the subsequent description appears as the research result and may be recognized as valuable contribution to the existent knowledge. The aim of the paper is to highlight, following the research results, the necessity to treat the service offered by intermodal transport operators in system categories. Such systemic interpretation points both to the multitude of components of the service and to the arising opportunity for comprehensive solution of the clients' needs and expectations.

Results: The outcomes reveal that the service offered by an intermodal transport operator may be recognized as the complex systemic intermodal service. They contribute to the knowledge of intermodal transport and serve as the stepping point for the development of the concept of systemic marketing in logistic services.

Conclusions: Proper determination of the systemic essence of the intermodal service constitutes the starting point for the identification of the client's problems as well as for the choice of offered solutions, both in the context of essential and additional values. Due to this reason, the management of an intermodal service creation and delivery has the nature of network management, and the values offered by an intermodal service are conditioned by material elements, without which the provision of the service in accordance with the client's expectations cannot be realized.

Key words: Intermodal freight transport, Intermodal service, Transport system, Network.

INTRODUCTION

It is a feature of the contemporary economy that system products and system services gain more and more share. Openness of economies as well as modern communication and transport techniques eliminate space barriers and enable enterprises to competitively cooperate [Witek, Hajduk 2013]. Both the

network and inter-business management theories have been developed in the organization and management science [Kozminski, Latusek 2014]. Network is a unique form of connections among businesses, based on interdependence, cooperation and trust. The ever increasing role of system products in the network economy determines the development of a new sub-discipline in the science of marketing, namely, system products/services marketing. In

Żabiński's [2009] view, a particular task appears for the researchers of system services of professional nature. The so called intermodal service, created by the intermodal freight transport is understood as a professional service. In the case of services of professional character, they cannot be provided unless there is well-developed material infrastructure available (e.g. railways, roads, terminals, means of transport, IT).

The aim of the paper is to present, on the basis of literature analysis, practical observations, as well as preliminary research of qualitative-quantitative character, the thesis that the service offered by intermodal transport operators has features of a system service which is composed of numerous elements and extensively satisfies clients' expectations.

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THE ESSENCE OF THE INTERMODAL SERVICE SYSTEMNESS

Transportation services are defined in a variety of ways in specialist literature [Rosa 2013, Rucińska 2012]. Transport is a service-providing business activity which consists in the transfer of goods, people and information. The process of a transport service creation is multiphase and multifunctional. The transportation process essential activities are as follows: haulage, performance and organizing-administrative activities. These operations are integrated under the notion of the transport system. The theory of systems serves as the basis within which a system may be perceived as a set of components, interconnected by relations and chains both within the system and with its environment [Piekarczyk, Zimmiewicz, 2010]. In the context of transport such system model is presented in Fig 1. Transport system may be defined as coordinated, from the technical, technological, organizational and

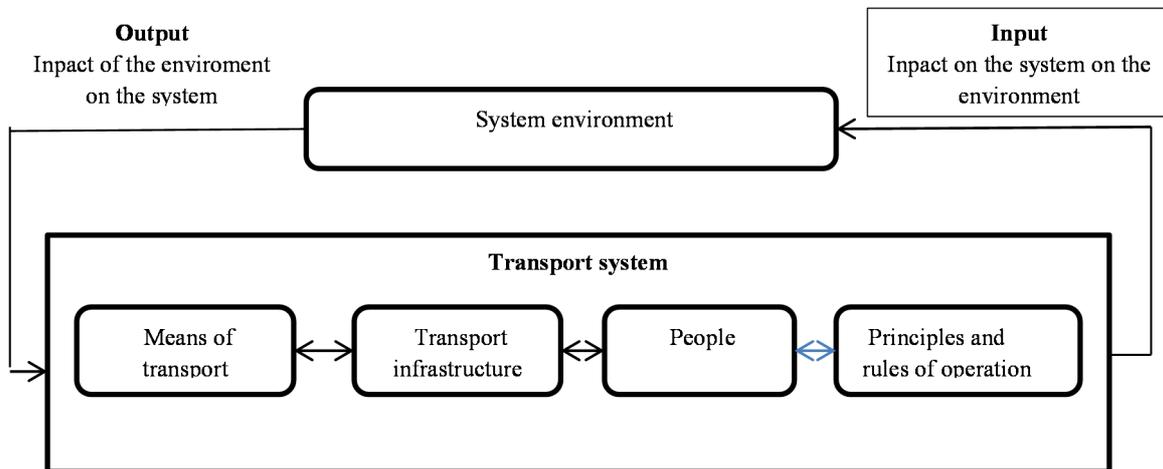
trade perspective, rational succession of activities involving haulage, reloading, storage and administration, which all aim at the transfer of freight in time and space, with particular consideration of a variety of load unit. In terms of logistics, a system may be understood as a chain of deliveries [Armenau, 2006] which comprises the haulage - storage system and, then, constitutes the technological link of storage and reloading spots via transportation routes as well as organizational and financial coordination of ordering processes, customer service, administration processes and all other links contained in the system. In the same logistics terms, a system may also be understood as intentionally organized and combined, within a particular economy, physical flow of goods, accompanied by the flow of finances and information [Jacyna, 2013]. A system is looked at as a whole, according to the principle of holism, with the assumption that its proper functioning is maintained if there is compatibility of aims and motives of all its participants.

Intermodal transportation is the practical side of the system approach to transport. System view of the intermodal transport is presented in fig. 2. Development of intermodal system has led to the necessity for different branches of transport to get closer, for the standardization of load units, infrastructure [Liedke, Murillo, 2012] and the need for comprehensive treatment of transport processes. Systemness has led to internal integration of transport processes which take place at least on three planes [Stokłosa 2011]:

- Technical - technological plane, with the adjustment of line infrastructure and spot infrastructure to ensure the service of standardized intermodal units; and IT infrastructure to monitor and facilitate communication and management processes;
- Organizational plane, with independent intermodal transport operators who offer extensive haulage services with their diverse means of transport as well as a variety of logistic services, e.g., reloading, storage, monitoring, etc. They are intermodal transport integrators (logistic operators) in specific transportation chains;
- Managerial plane, where specialized intermodal operators are hired to do

business within new organization frames that now offer packets of services to resolve a client's problems from the moment of registering freight for transportation to the receipt of the delivery. They may offer,

among others, a single price for the whole haulage route, or they offer a single shipping document, or arrangement of the whole process in the home-home relation, legal counselling, etc.



Source: Mindur, Hajdul, 2011

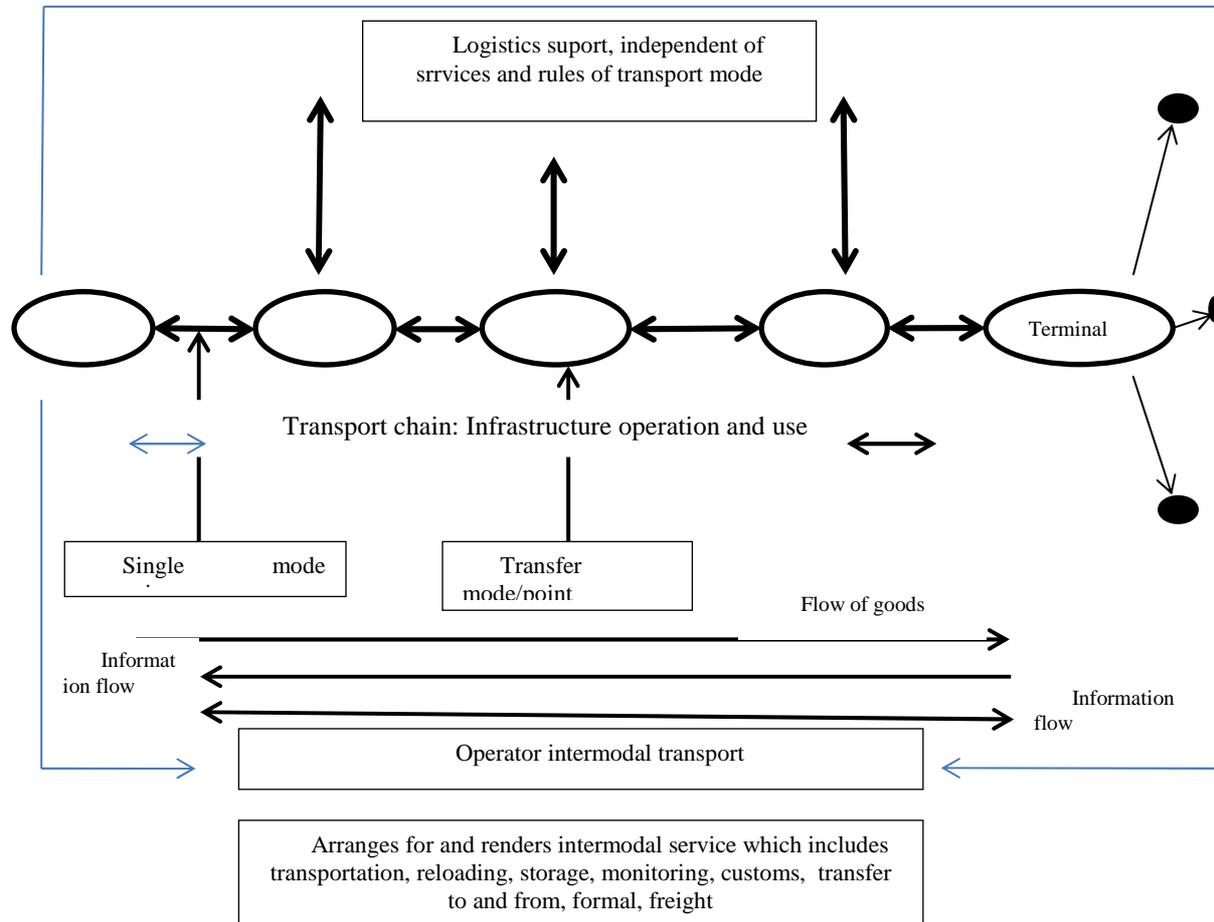
Fig. 1. Transport system and its environment
 Rys. 1. System transportowy i otoczenie

Intermodal transport operators, while rendering an intermodal service, they manage the whole process and particular activities connected with the transfer of freight and shipment of parcels and they integrate different kinds of services provided by different entities [Jarzemskiene, 2007]. So, can a service offered by an intermodal transport operator be treated as a complex system service? Systemness of contemporary services consists in that the perception of their value for client is determined by the fact that they function in a defined and extended system of services and the network of users. A characteristic feature of a system service is its attribute of networking. This means that the components of the final service are delivered to the final service provider by their producers in the course of the service provision. This refers to the suppliers of services which can be realized independently of the system and, at the same time, can be ordered inclusive of other independent services in a packet which is custom-designed by the final service provider. Then comes the time when the system needs the decision as regards the choice of the management model, e.g. operator, integrator,

or conductor model and, cooperation and partnership of all entities engaged in the provision of the service, irrespective of their number. Intermodal transport operator can act in the capacity of the network chief or the system service promotor [Żabiński, 2009]. When one considers Mazurek's [2012] idea of networking triad, then the intermodal transport networking should be referred to the organizational-managerial plane and the way the entities arrange their cooperation. Such interpretation of network engages a lot of businesses driven by either individual or group aims. All members of the network contribute their individual potential to create value [Czakon 2012]. Network management, coordination and integration of exchange are facilitated by both formal and informal tools as well as communication systems. Complexity and networking appear in the intermodal transport. They come as the result of a variety of links that play roles in the technologically combined transport chain. The links are bound by long-term relations that, in the course of the activity, add value to the created service while playing roles both of the supplier and the client for one another [Downar, 2010]. The nature of

contemporary competition does not allow businesses to specialize in all planes of their operations. This lies at the root of the particular type of service, the so called logistic service, which is the outcome of the fast-spreading phenomenon of partner outsourcing [Vitasek, 2011]. Logistic service, in academic

terms, means that a contractor arranges for transportation and storage of goods, together with its full formal and legal support and realizes this transportation in the logistic system to meet the requirements and expectations of the client. [Coyle, Bardi, Langley, 2002].



Source: Author's own. Based on Profir, 2012 and Ovidiu 2012

Fig. 2. System approach to intermodal transport
 Rys. 2. Podejście systemowe do transport intermodalnego

The essence of the logistic service lies in the moulding of it, in the cooperation with the client, shaping it into the required final form and quality as regards goods and services [Gołemska 2009]. Ciesielski [2005] argues that logistic services comprise earnings-oriented forwarding, transportation and storage services, but also, other supplementary services which facilitate the flow of goods within and among the links of the logistic system. According to Rydzkowski [2004], a logistic service, in wider perspective, comprises transport and forwarding activities

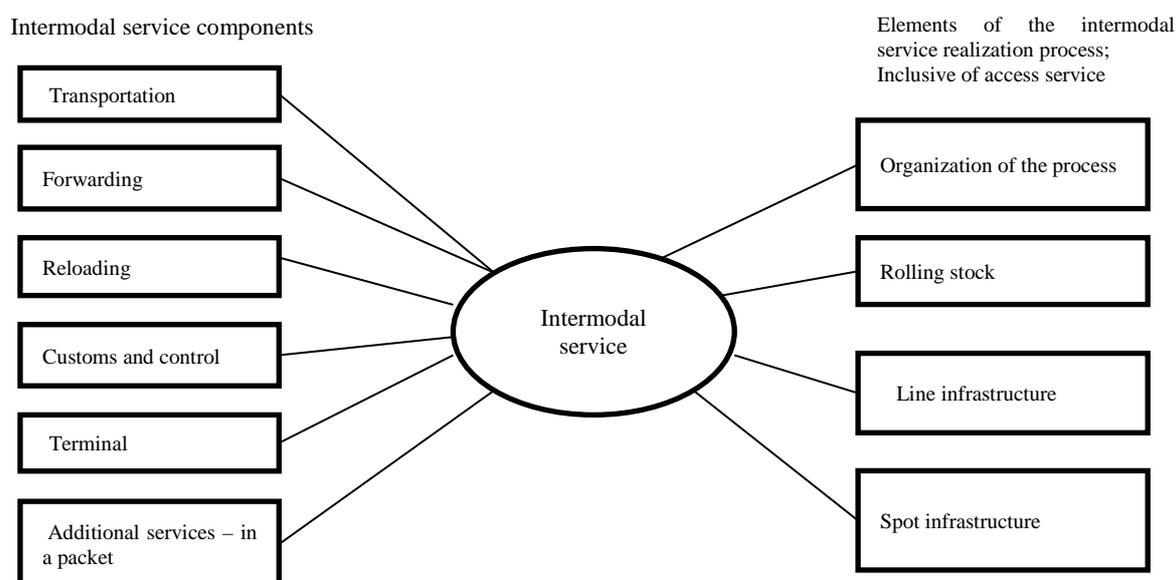
and services (e.g. making arrangements), organizing, documenting, customs and inspection activities and services (e.g. phytosanitary, veterinary), terminal services, storage services (refining included). Additionally, extra support may be added, such as financial, insurance or information services. In Dyczkowska's [2014] model of logistic services provision, transportation businesses offer the core and real haulage to their clients while forwarders offer extended haulage services and logistic operators try to present a comprehensive offer of services with the use

of the potential product. When Kotler's [2005] idea of the system product is considered as the starting point, it can be assumed that the system service is a set of different but related services whose functions complement one another; the sine qua non condition for a system service to arise does not need to be the compression of component services in one service but their compatibility. It must be also noted that in services the phenomenon of encapsulation occurs. This means that certain services get coated with other service processes [Rudawska 2009] so that the services get integrated in the delivery chain and satisfy the clients by offering them the realization of their tasks with the help of the system service. Intermodal transport connected ideas occur both in theory and in practice where it is defined as the transportation of freight in one and the same load unit or a vehicle through the consecutive modes of transport, exclusive of reloading of the cargo itself in the changing modes of transport [Wronka 2008, Mindur 2014]. The essence of the phenomenon is accurately expressed by the statement that intermodal transport means transportation of goods in load units with the use of means coming from at least two modes of transport, following standardized terms arising from the contract for the intermodal transportation,

concluded between a client and the intermodal transport operator [Neider 2012]. Intermodal service, due to its complexity, engages an array of entities whose performance determines the success as well as competitiveness of the intermodal service. From this perspective, intermodal freight transport may be defined as a group of formally independent businesses and hubs [Ishfaq, Sox, 2010] which cooperate in the network system based on business and partnership relations. Additionally, realization of an intermodal service is also affected by the whole process organization, the rolling stock and technical condition and parameters of the spot and line infrastructure [Matczak, 2013]. The essential components of the intermodal service are presented in fig. 3.

INTERMODAL SERVICE IN RESEARCH

For the verification purposes of the adopted assumption, and following Żabiński [2007], research-interpretative paradigm, based on grounded theory [Konecki 2000] was used. It refers to the interpretation of phenomena occurring in the process of creation and provision of an intermodal freight service.



Source: Author's own, following literature study and analysis, with the use of M. Matczak 2013

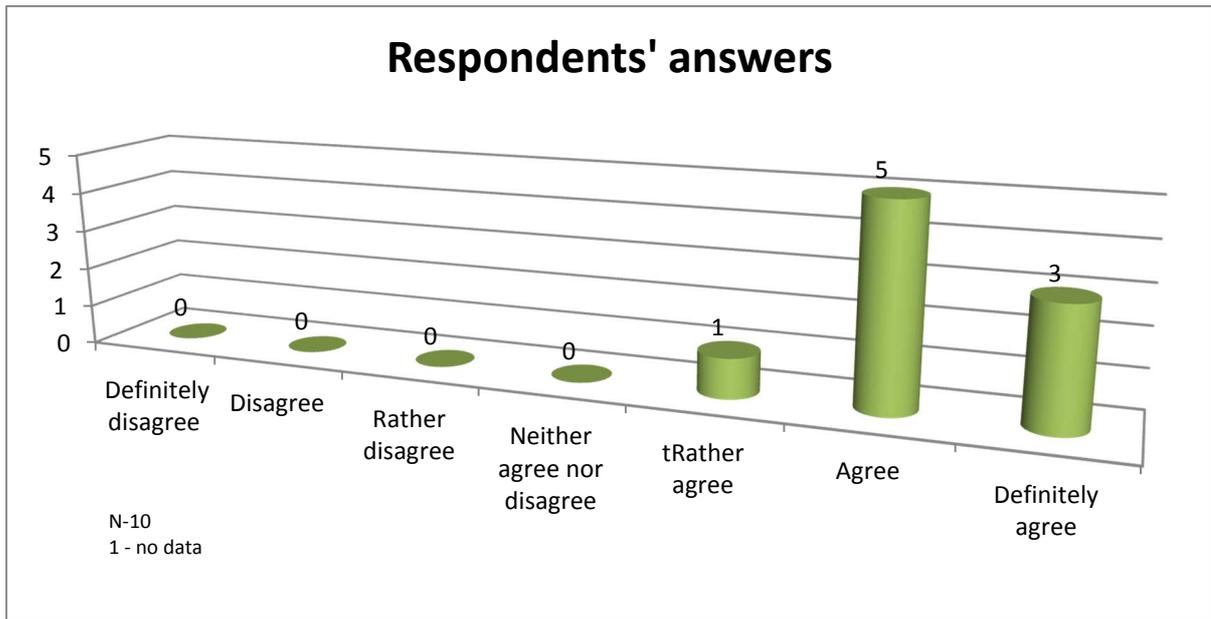
Fig. 3. Essential components of an intermodal service

Rys. 3. Podstawowe elementy składowe i realizacyjne usługi intermodalnej

The aim of the study was to describe and interpret the operations of entities participating in the creation and provision of the intermodal service. Within the proposed interpretative paradigm, the study was conducted with the use of qualitative methods [Latusek 2011]. The adopted study method was case study research [Strumińska-Kutra, Kołodkiewicz, 2012]. This method is applied in research study of marketing management [Żabiński 2007]. Interpretative paradigm assumes that the studied market reality does not objectively exist. Descriptions of phenomena and processes may be the results of such research. Case study is used, among others, to describe the studied situation in the way that the description that arises is treated as the study result and may serve as valuable contribution to the existent knowledge. Basically, case studies proceed in three steps, i.e., exploratory - searching surveys, proper case studies, theory testing with the use of verifying surveys. Following the literature analysis, practical observations and the author's own experience, preliminary theoretical assumptions were made, namely that the intermodal service, offered by the intermodal freight transport operators, may have the features of the system service which is composed of many elements and comprehensively satisfies clients' expectations. Respectively, extensive exploratory surveys were conducted which aimed at the verification of the preliminary theoretical assumptions. The conducted surveys concerned the cases of high importance for the grasping of the subject matter from the point of view of the role and significance on the intermodal services market [Hajdul 2014]; they included both the subjects, so called intermodal transport operators, typical transportation entities, agents who provide services which are the components of the intermodal service, finally, representatives of the links who participate in the chain of intermodal service, e.g., ports or the subjects who promote the idea of their development. 10 extensive exploratory surveys were conducted. In most cases the businesses surveyed operated on the global market and acted as operators, forwarders or terminal owners. Most of them played many roles (carriers, operator) and together with other related businesses organized and provided intermodal services.

Small, medium and large businesses were studied. For conclusions, quantitative study, recommended for this stage, was used, i.e. Likert scale with seven response levels [Żabiński 2007]. Following the rules, the surveys contained questions about interpretation, understanding and explanation of the studied problem of the intermodal service. They regarded 5 major areas, i.e., understanding of the contemporary intermodal transport, innovativeness of the intermodal service, understanding and creation of value by the intermodal service, finally, description of the management system of the intermodal service offered by the intermodal freight transport operators. In the first stage, the respondents characterized the issue of the intermodal service. The respondents recognized that the intermodal service has features which qualify it as a complex system service. In common view of the respondents, the system intermodal service is created in the course of transportation services, forwarding, freight, insurance, reloading, terminals, administration, control (e.g. phytosanitary), customs, repairs (e.g. containers), storage and warehousing, security assurance, monitoring and information, .e.g. tracking. Chart 1 presents the spread of responses to the summing-up structured question. In the respondents' opinion, intermodal service resolves up to a dozen or so problems, depending on the service order, e.g. packaging, delivery time optimization, extra services arrangement, such as customs, forwarding, storage, inspection, etc. It was often emphasized that this problem solving deals with coordination, organizing, management of the whole intermodal transport system.

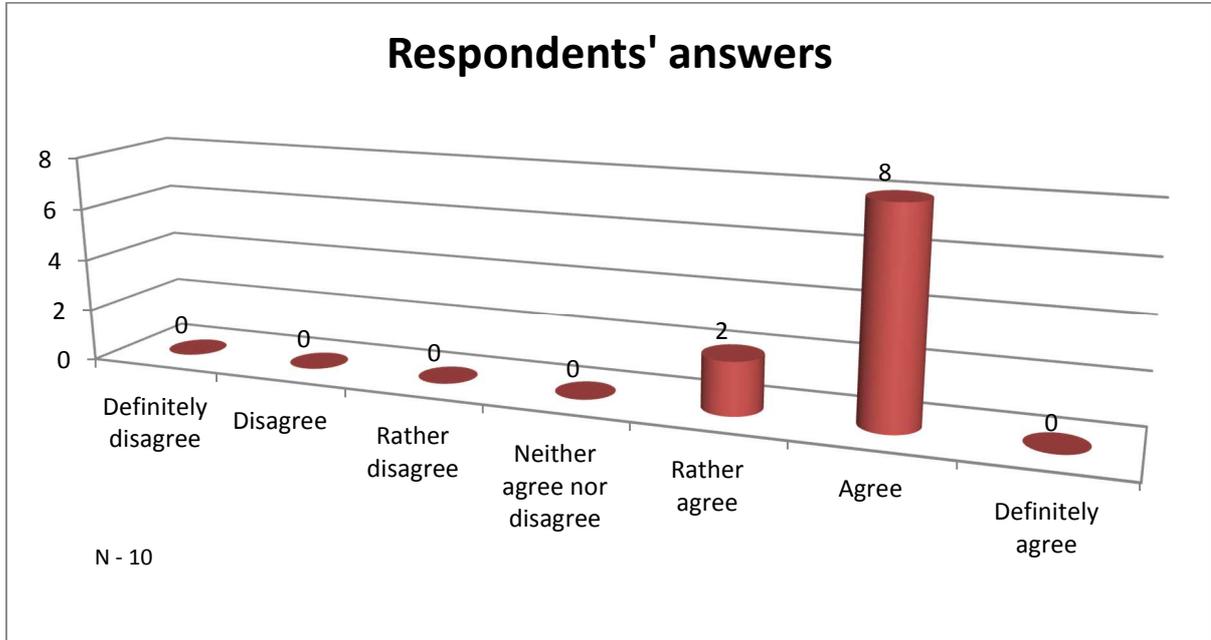
Clients should have their freight transportation problems resolved as provided in the contract. Chart 2 presents the results following the study of this issue.



Source: Author's own

Chart. 1. Respondents' answers, in the seven-level Likert scale, to the contextualized question: Is the service offered by the intermodal transport the complex system intermodal service?

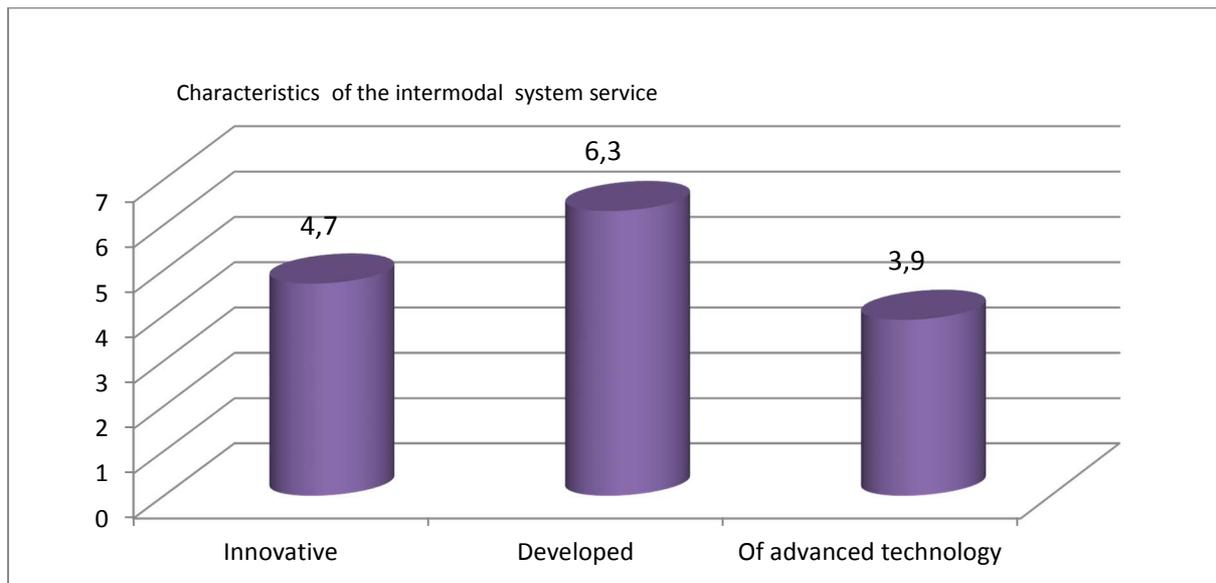
Wykres. 1. Rozkład odpowiedzi według 7 stopniowej skali Likerta podsumowujący w kontekście pytania, Czy usługa oferowana przez transport intermodalny jest złożoną intermodalną usługą systemową?



Source: Author's own

Chart. 2. Respondents' answers, in the seven-level Likert scale, summing up the issue of comprehensive resolution of the client's problems by the intermodal service.

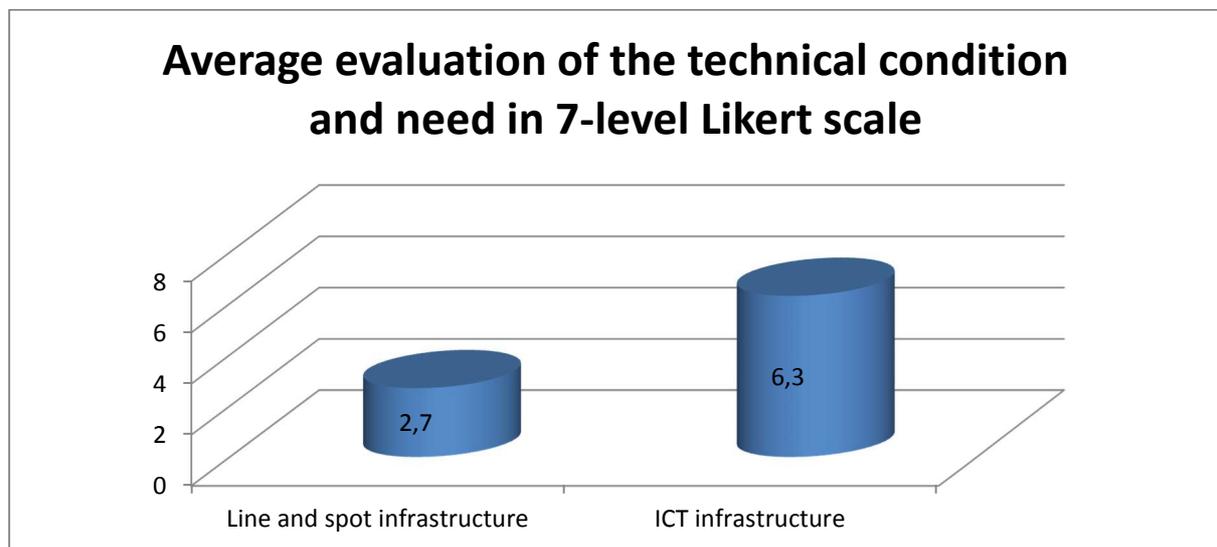
Wykres. 2. Rozkład odpowiedzi według 7 stopniowej skali Likerta podsumowujący problematykę rozwiązywania przez usługę intermodalną kompleksowo problemów klienta.



Source: Author's own

Chart. 3. Average responses, in the seven-level Likert scale, in the context of view on innovativeness, technology and service improvement.

Wykres. 3. Średnie z pytań z 7 stopniowej skali Likerta w kontekście poglądu na zagadnienia innowacyjności, technologii i doskonalenia usługi.



Source: Author's own

Chart. 4. Evaluation of the line and spot infrastructure and the role of ICT infrastructure.

Wykres. 4. Ocena stanu infrastruktury liniowej i punktowej oraz roli infrastruktury teleinformatycznej.

The third area, which is vital to understand system services, namely the area of technological advancement, innovativeness and services improvement, respondents intuitively demonstrated concordance with theoretical assumptions adopted in the

literature [Żabiński 2012] that "complex system services, and, particularly their component elements do not have to be of advanced technology". Intermodal service must be developed and perfected. Chart 3

presents the perception of the issues of innovativeness, improvement and technology.

The set of issues concerning the value for client caused exceptional amount of controversy. In general, respondents saw the value for client as the client's expectations towards the intermodal transport operator's offer and took it in terms of low price or, sometimes, reliability or comprehensiveness of the service. The value for client was also understood as an offer equipped with technical attributes recognized by the client. Respondents divided the value into essential and additional values. Essential values for clients were associated with regularity, stability, being ecological and comfort. Additional values are those which are individually agreed with the client or they have social or environmental dimension. Most often the respondents expressed their belief that the value for client is created by all departments of a business as well as by all businesses engaged in the creation and delivery of the intermodal service. It was also highlighted that the value is worked out in the course of mutual effort and that it arises on the grounds of cooperation and the maintenance of long-lasting positive relations. The opinion arising from the study in the fifth area - related to the view of the management system, its key components, business model and the market operation strategy - shows the picture of client-oriented business and the values for clients. The management of creation and provision of an intermodal service may be interpreted as the management of the network because the intermodal operator must engage a number of subcontractors, each of whom has their own strategy and business model of operations. The operator must establish such network of connections that its management model is coherent with the whole network. The study shows that intermodal transport operators' strategies are multilevel, modifiable and adjustable to the fluctuating market situation. Taken the dynamics of the market changes and the client's expectations, all the system components must operate in tune and undergo continual improvements so that the client obtains the best possible service. Businesses, in their strategies tend to become leaders, they tend to develop their network of contacts and to raise the standard of the offered services.

System service development is subject to material components. Infrastructure poses a serious problem because it does not facilitate the development and competitiveness of the intermodal transport. The respondents negatively evaluated the condition of the line and spot infrastructure and they decisively confirmed the role communication infrastructure. See chart 4.

CONCLUSIONS

Research confirms that intermodal service is perceived in system categories and that the management of the service creation and delivery process is of network management nature. Values offered to clients are subject to material components without which the service for client may not be provided as expected. Research also shows that intermodal services in Poland must be further improved. Success is subject to the assumption that all the elements of the system must, irrespective of their technological advancement, operate in tune and cooperate. Discussions to date and the results of preliminary studies allow to define intermodal service of system character. Intermodal service is a logistically complex system service which, in a comprehensive way, handles tasks posed by its clients and meets their expectations connected with the realization of their enterprise; the service uses standardized packaging in the course of rendering the service through at least two modes of transport, uniformed shipping list throughout the transportation route and is carried out by one service provider who is in charge of the whole organizing process and who accounts to the client irrespective of the number and type of services and businesses engaged in the realization process.

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USŁUGA INTERMODALNA W UJĘCIU SYSTEMOWYM

STRESZCZENIE. Wstęp: Usługi transportowe możemy opisać w kategoriach systemowych. Praktycznym wyrazem systemowego podejścia do transportu są przewozy intermodalne. Powstanie systemu transportu intermodalnego spowodowało potrzebę kompleksowego traktowania procesów transportowych. Operatorzy transportu intermodalnego zarządzają całym procesem organizacji świadczenia usługi. Pojawia się zatem pytanie, czy usługę oferowaną przez operatora transportu intermodalnego można traktować jako złożoną usługę systemową. Systemowość współczesnych produktów i usług polega na tym, że o ich wartości postrzeganej dla klientów decyduje fakt, iż funkcjonują one w określonym, rozszerzonym systemie produktów i/lub usług oraz sieci ich użytkowników. Prezentowany język sieci związany jest z rozwojem w naukach organizacji i zarządzania koncepcją sieci, która staje się inspirującą ideą ostatnich lat.

Metody: Dla wyjaśnienia problematyki zastosowano analizę literaturową zagadnienia transportu intermodalnego w ujęciu rozwijającej się koncepcji marketingu produktów systemowych. W ramach przyjętego paradygmatu interpretatywnego wykorzystano badania jakościowe / ilościowe. Studium przypadku jest używane np. do opisu badanej sytuacji w ten sposób, że sam powstały opis jest rezultatem badań i może być uznany za wartościowy wkład do istniejącej wiedzy. Celem artykułu jest zwrócenie uwagi na podstawie wyników badań na konieczność traktowania usługi oferowanej przez operatorów transportu intermodalnego w kategoriach systemowych. Ujęcie systemowe wskazuje na wielość elementów tworzących usługę i wynikające stąd możliwości kompleksowego rozwiązywania potrzeb i oczekiwań klientów.

Wyniki: Uzyskane wyniki wskazują, iż usługę oferowaną przez operatora transportu intermodalnego można uznać za złożoną systemową usługę intermodalną. Poszerzają one wiedzę o transporcie intermodalnym stanowiąc tym samym przyczynek dla rozwoju koncepcji marketingu systemowego w usługach logistycznych.

Wnioski: Właściwa identyfikacja istoty systemowej usługi intermodalnej stanowi podstawę dla rozpoznania problemów klienta oraz proponowanych mu rozwiązań w kontekście wartości podstawowych i dodatkowych. Z tego powodu zarządzanie tworzeniem i świadczeniem usługi intermodalnej ma charakter zarządzania siecią, a wartości oferowane przez usługę intermodalną są warunkowane elementami materialnymi bez których usługa dla klienta zgodnie z jego oczekiwaniami może zostać niewykonana.

Słowa kluczowe: transport intermodalny, usługa intermodalna, system transportowy, sieć

INTERMODALE TRANSPORTDIENSTLEISTUNGEN IM SYSTEMHAFTEN HERANGEHEN AN DAS PROBLEM

ZUSAMMENFASSUNG. Einleitung: Transportdienstleistungen können in systemhaften Kategorien beschrieben werden. Eine praktische Ausführung des systemhaften Herangehens an den Transport sind intermodale Frachten. Die Entstehung des intermodalen Transportsystems hatte die Notwendigkeit einer komplexen Behandlung von Transportprozessen zur Folge. Intermodale Frachtführer verwalten den ganzen Organisationsprozess bei der Ausführung einer Transport-Dienstleistung. Daher kommt die Frage auf, ob die vom intermodalen Frachtführer angebotene Dienstleistung als gebundene System-Dienstleistung aufgefaßt werden kann. Die Systemhaftigkeit gegenwärtiger Produkte und Dienstleistungen beruht auf der Tatsache, dass über deren Wert für die Kunden der Sachverhalt mit entscheidet, dass sie in einem bestimmten, verbreiteten System von Produkten und/oder Dienstleistungen und Netzwerken deren Anwender in Funktion treten. Die dargestellte Sprache des Netzwerkes ist verbunden mit der Entwicklung des Know-hows und des Managements von Netzwerk-Konzepten, die in den letzten Jahren zur inspirativen Management-Idee geworden sind.

Methoden: Zur Erläuterung der Problematik wurde eine Analyse der Gegenstandsliteratur zum intermodalen Transport im Kontext der sich entwickelnden Marketing-Konzeptes für Systemprodukte in Anspruch genommen. Im Rahmen des angenommenen interpretativen Paradigmas nutzte man qualitative/quantitative Untersuchungen aus. Eine Fallstudie kommt z.B. für die Beschreibung eines zu erforschenden Sachverhaltes auf die Art und Weise zur Anwendung, dass der zustande gekommene Beschreibung selbst als ein Forschungsergebnis gilt und als ein wertvoller Beitrag zum bestehenden Wissen auf diesem Gebiet angesehen werden kann. Das Ziel der Abhandlung ist es, angesichts der Forschungsergebnisse auf die Notwendigkeit der Behandlung der durch die Frachtführer angebotenen Dienstleistung für intermodale Transporte als solche in System-Kategorien hinzuweisen. Das systemhafte Herangehen an die Fragestellungen zeigt eine Vielfalt von den eine Dienstleistung schaffenden Elementen und die daraus resultierenden Möglichkeiten für komplexe Lösungen von Kundenbedürfnissen und -erwartungen auf.

Ergebnisse: Die gewonnenen Resultate weisen darauf hin, dass man die vom intermodalen Frachtführer angebotene Dienstleistung als komplexe, intermodale und systemhafte Transport-Dienstleistung ansehen kann. Sie ergänzen das Wissen über den intermodalen Transport und leisten hiermit einen Beitrag zur Entwicklung des Konzeptes eines System-Marketings innerhalb von Logistik-Dienstleistungen.

Fazit: Eine richtige Ermittlung des Wesens einer intermodalen System-Dienstleistung bildet eine Grundlage für die Erfassung von Kundenproblemen und für die Empfehlung von entsprechenden Lösungen im Kontext der grundlegenden und zusätzlichen Werte. Aus diesem Grund weist das Management bei Erstellung und Leistung von intermodalen Dienstleistungen den Charakter eines Netzwerk-Managements auf, und die aus einer intermodalen Transport-Dienstleistung resultierenden Werte sind durch materielle Elemente bedingt, ohne die eine dem Kunden gerechte Dienstleistung nicht zustande kommen kann.

Codewörter: intermodaler Transport, intermodale Dienstleistung, Transportsystem, Netzwerk

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