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THE IMPACT OF TECHNOLOGICAL DEVELOPMENT ON TRANSPORT ENTERPRISES' MARKETING STRATEGY (LITHUANIAN EXAMPLE)

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Abstract. The article analyses the influence of technological development of transport enterprises on marketing strategies in the light of academic literature which highlights the importance of technological development tools. Technological development of enterprises in the transport sector is necessary in order to adapt to technological, economic, and market changes. The article presents major technological developments which are considered significant according experts. The most important technological development tools which influence marketing strategies of transport enterprises are presented. In order to examine the tools of transport development, a qualitative analysis was performed, and the method of statistical analysis was applied. The research results can be applied in planning marketing strategies of transport enterprises.

Keywords: transport enterprises, information transport systems, marketing strategy, technological development, digitization, internal markets, virtual reality modelling systems, installation of new software.

JEL Classification: M31, M37, O14, R41.

Introduction

Effective marketing strategy tools are becoming a necessity for every business. Businesses face competition every day, so it is important for businesses to determine what marketing strategy tools they will use to attract target customers. Businesses develop long-term marketing strategies to attract as many customers as possible. Marketing is an activity that helps to achieve the company's goals and meet customers' needs. In the current context of a pandemic, transport enterprises need to have their own marketing strategy. The most common traditional marketing tools used in business are television advertising, websites, social networks, events, presentations, sales promotions, business gifts. Today it is important for large international transport enterprises to increase the awareness of their transport services, to expand the number of target customers, and to increase market share. In Lithuania marketing tools of a particular transport company depend on the goal, for example, to increase brand awareness, to introduce new services, and to attract new customers. Instead of investing money, some entrepreneurs in Lithuania invest their time, energy, imagination, information and use guerrilla marketing tools. Transportation is a very specific area and

large marketing budgets do not guarantee increased sales, sometimes more justified marketing tools are those that are closest to the customer. For chosen measures to be effective, it is necessary to determine the target audience, to know what kind of customers a business wants. In order to develop a successful marketing campaign, the person in charge of marketing in the company must answer the question: how the selected marketing tools will help to sell additional quantities of transport services (Chernii, 2020).

The objective of the article is to clarify what current transport development tools affected marketing strategy of transport enterprises.

The remainder of this paper is organized as follows. Section 1.1 provides an overview of the scientific literature about theoretical aspects of transport marketing strategies and transport marketing strategy planning. Section 1.2 presents problematic areas of technological development in transport enterprises. Section 1.3 outlines the selection of the research method and its course – the methodology for assessing the impact of technological development of transport enterprises on marketing strategies and the method of research is proposed. In section 2 the

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result – the model of the marketing strategy of transport enterprises with integrated technological development is presented. The discussion is in section 3.

1. Methods and methodology

1.1. Literature review

Theoretical aspects of transport marketing strategy. Transport can benefit from a strong marketing strategy. Gilmour (1977) stated that transport companies often develop marketing strategies without paying enough attention to the needs of shippers. For Ibraeva and de Sousa (2014) transportation marketing is an opportunity for transportation companies to advertise their products, in addition it also has some positive effects on consumers as it creates a corporate image. Transport marketing strategy is concerned with the development of new technologies. Banister (2008) mentioned that the role of technology is important because it influences transport efficiency by directly ensuring that the best available technology is used for the engine design, alternative fuels, and the use of renewable energy sources. Zhang et al. (2021) stated that due to the current pandemic, various online businesses are spreading rapidly. As a result, more delivery services will replace people shopping in stores, and online work styles will become increasingly popular. However, requirements for deliveries from growing online businesses to deliver on time can increase the number of accidents. According to Rothengatter et al. (2021), transport systems affect the spatial distribution of the population and are linked to all the economic activities that need to be overcome by space. Therefore, in order to analyse the impact of Covid-19 on the transport sector, the economic and social factors of transport activity need to be carefully examined. Lind and Melander (2021) considered that technological developments are rapidly affecting the road freight transport system. According to above mentioned authors in parallel, proposals are made for new types of business models to adapt to the network and complex business features. Falchetta and Noussan (2021) mentioned that it is important to fill the gap with a detailed analysis of the availability of electric car charging stations, focusing on European countries and comparing them with the population and distribution of vehicles in different regions. Kolasińska-Morawska et al. (2019) pointed out that new technologies that have been identified with Economics 4.0 affect almost every dimension of the modern world. The level the competitiveness of the modern economy depends on implementation and dissemination of innovations based on new technologies. Artificial intelligence, Internet of Things, hyperlinks, cloud computing applications and services, Big Data Analytics (BDA), Big-Data-a-Service (BDaaS), automation, and robotics are just a few of the technologies that the authors chose to look at in more detail (Kolasińska-Morawska et al., 2019). Hoppe and Trachsel (2018) stated that technological development, which is a part of emerging industry 4.0 (e.g., the production of

additives), will have a major impact on traditional production processes and will lead to a fundamental transformation of the transport industry in the future. The results of the trend analysis show that many new mobility opportunities arise from innovations that enable the system to become sustainable transport and mobility.

Aghazadeh (2015) stated that marketing strategies play two important roles in maintaining a competitive advantage: (1) promote customer return (according to the market approach) and (2) create exceptional competencies. In today's environment, customer retention is necessary but not sufficient to maintain a competitive advantage and achieve excellent results. The evidence presented in the study by Merlo and Auh (2010) reveals the strategic impact of marketing on Australian manufacturing organizations. Ruyter et al. (2022) mentioned that the key is to successfully change marketing strategy development to future-oriented intelligent systems, which can be a springboard for future research. Marketing researchers are ready to improve sustainable solutions by balancing the interests of key stakeholders. Ishaq and Hussain (2016) considered that a creative marketing strategy is defined as a set of activities designed to promote products/services for a selected or a complete purpose in the markets in a pursuit of business objectives. Karakaya et al. (2011) stated that marketing strategies aim to increase company sales and satisfy customer needs.

Modern technologies and new marketing strategies evolve over time. Al-Surmia et al. (2020), Hassan et al. (2015) mentioned that in order to be successful, enterprises must have a clear business strategy that is supported by other organizational strategies.

Transport marketing strategy planning. In the current global pandemic, every transport company needs to quickly and correctly respond to changes in the external and internal environment and to adapt effectively to consumer needs.

Figure 1 presents the changes in the number of employees and enterprises as well as the revenue from the first quarter of 2019 to the second quarter of 2020. From 2019 the results of the transport sector decreased moderately in the first quarter because carriers carried less cargo, and the turnover of companies shrank (Sumin, 2021).

In the second quarter of 2020, the number of employees in the transport sector decreased by 2.2 per cent, the number of enterprises by 0.5 per cent, and the revenue of the sector by 11 per cent.

Since the beginning of the year – even during the pandemic period – the number of operating companies in Lithuania has increased (564 or 0.6 per cent) and reached 87.7 thousand. By economic sector, the largest number of enterprises in 2021. At the beginning of the year the largest share of companies operated in services (76.0 per cent), a much smaller number of companies operated in industry (10.8 per cent), a similar amount operated in construction (10.7 per cent), and the smallest share of companies operated in agriculture (2.6 per cent). In the services sector the
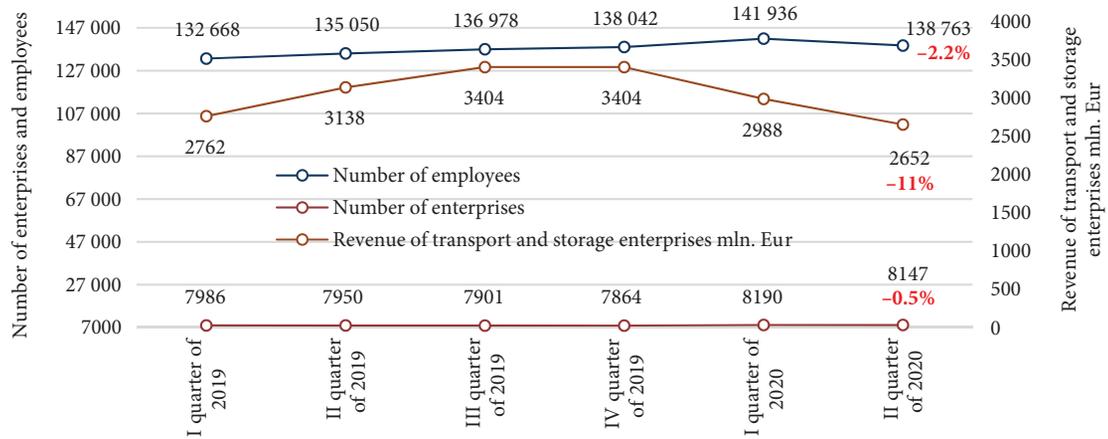
Figure 1. Indicators of revenue, employees, and enterprises in the transport sector (Lithuanian Department of Statistics, 2021)

largest share was in trade (27.7 per cent), then in professional activities, and transport and storage (9.7 per cent) (Lithuanian Department of Statistics, 2021).

Balcı (2021) noted that global competition has been increasing day by day. And for businesses it is very important to gain a competitive advantage. Companies need to create exceptional value to their customers in order to maintain their competitiveness. Ibraeva and de Sousa (2014) mentioned that public transportation marketing gives transportation companies the opportunity to promote their products; in addition, it also has some positive effects on consumers as it creates an image of the company. Ibraeva and de Sousa (2014) stated that when a company is considered as a modern, high-quality service provider, its users and partially associated passengers are more satisfied. Nguyen et al. (2020) analysed the port connection network and proposed several improvement strategies to promote maritime transport in the HCM-BRVT port area. Social network analysis showed that the HCM-BRVT port was connected to 118 ports worldwide using a sophisticated network. Dimić et al. (2016) considered that transport is recognized as an important factor in sustainable development strategy because of its strong link between transport, economic, and social development and especially due to the high environmental impact. At the heart of a sustainable transport strategy are negative/impact control traffic accidents, congestion, land, air and water pollution, noise vehicle, and energy consumption (Dimić et al., 2016). Hong and Nguyen (2020) examined a variety of factors in order to find out which factors have the greatest impact on the marketing strategy of logistics companies in developing countries, in particular in Vietnam. Hong and Nguyen (2020) as well as Toymentseva et al. (2016) evaluated a company's micro, macro, and internal environment parameters, they represent company business profile and overall development strategy based on identification of optimal strategies for logistics, marketing, manufacturing, finance, and human resource management. The overall strategic plan covers all activities of the enterprise and sets out its main objectives. As the strategic
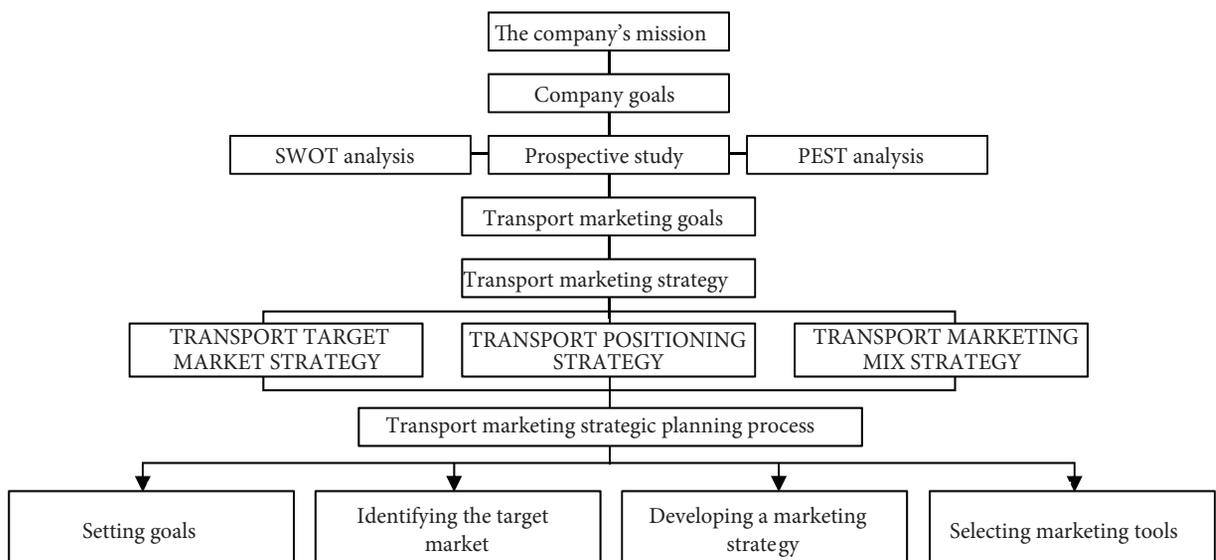
Figure 2. Transport marketing strategy planning (created based on Virvilaitė, 2009)

plan is carried out by different divisions of the company, it is necessary to move from the general goals and general strategy of the company to the strategies of each functional area (finance, marketing, production, etc.).

All this consistency is revealed by a typical transport marketing strategic planning scheme (see Figure 2).

A company that wants to survive in the market and achieve good results should create a consistent system of marketing tools. A marketing plan is an integral part of a company's strategic plan. It shows how and where the products will be sold, what action will be taken in a given market situation. A marketing plan outlines how to enter markets and use marketing programs to help achieve company goals. Marketing planning needs to start by determining the detailed market position of the company. It is crucial to explore not only the strengths and weaknesses of the company but also the micro and macro environment in which the company operates. A strategic plan usually covers a longer period of time. It should take into account such aspects as description of existing market and products sold, overall image created, brand/company positioning, pricing, refinement of competitive advantage, market and SWOT analysis, identification and description of target audience, audit of marketing tools. A tactical action plan (based on the objectives of the strategic plan) is shorter in duration and should cover the following areas: advertising, sales promotion, communication, implementation of loyalty programs, public relations, etc.

McDonald (2006) pointed out that marketing strategy is associated with the following characteristics: definition of a homogeneous market segment, segment specific proposals, the uniqueness of the strategy, force leverage and weakness reduction, creation of internal and external synergies, provision of tactical instructions, alignment with goals, adaptation to market trends, adequate resources, a clear basis for competition.

1.2. Problematic areas of the technological development in transport enterprises

Currently technological development of companies in the transport sector is necessary in order to adapt to technological, economic, and market changes. In 2020–2021 many enterprises went out of business due to the pandemic, and the rest faced the challenge of adapting to the current situation. Therefore, the goal of the marketing strategy of transport enterprises is to determine the appropriate direction of technological development for a particular company, taking into account the nature of the activity, the global economic situation, and other trends that may affect the company's operations in the future. The transport logistics enterprises face stiff competition. Giannopoulos (2004) analysed technologies that have emerged commercially over the past decade and which have made impact on traffic and transport.

According to Vaičiūtė and Bureika (2020), technological development (experimental development or pilot, construction, and technological works) – scientific, technological, acquisition, coordination and formation of business and other knowledge and skills and application of new, improved or enhanced products, processes or service implementation plans, layout (technological) to create diagrams or models. Cavdar and Aydin (2015) believed that the development of technical indicators can clearly define and enable technological development and innovation. Kostrzewski et al. (2021) mentioned that different groups of technologies and systems can be implemented in logistics centers. These groups may include: automatic cargo identification systems, such as RFID, automatic storage and retrieval of warehouse technologies, such as AGV, order picking technologies, such as Voice Picking, IT systems and data transmission systems, such as Electronic Data Interchange (EDI), Warehouse Management System (WMS), Enterprise Resource Planning (ERP), Production Resources Planning (MRP), computer collaboration, and virtual reality modelling systems. Borisova and Pyataeva (2020) pointed out that researchers have identified important factors that affect the development of transport and the logistics system: (1) digitization, (2) changes in the dynamics of internal markets, (3) changes in processes of the installation of new equipment, (4) changes in international trade, (5) change processes due to the installation of new software. At the same time, it is noted that the impact of digitization on the industry is important. A tendency towards the development of technology in transport engineering will lead to process changes due to delivery of new equipment. Gkoumas et al. (2021) argued that STRIA highlights the key areas of transport R&D and distinguished seven priorities for clean, interconnected activities, and competitive mobility: (1) interconnected and automated transport, (2) transport electrification, (3) vehicle design and manufacturing, (4) low emission alternative for transport, (5) network and traffic management systems, (6) intelligent mobility and services, (7) transport infrastructure. Karatsoli and Nathanail et al. (2021), Chung and Koo (2015) mentioned that consumer recognition of the high value of social media has a positive effect on the use of social media to search for travel information, and it increases the ability to cancel a trip on social media information (Milioti et al., 2019). Cortes et al. (2013) mentioned that intelligent transportation systems communicate, calculate and assist in making decisions regarding proper management of traffic vehicles. The integration of electronic data from technologies, such as the Internet exchange, wireless connection, computer developed technologies, and programming, allows to capture and analyse the necessary information for proper transport system management.

1.3. Selection of the research method and its course

Methodology for assessing the impact of technological development on transport enterprises' marketing strategy. To assess the impact of the technological development on transport enterprises' marketing strategy, a multi-criteria approach was chosen. Based on the multi-criteria method,

the expert group n quantifies m objects. Estimates form a matrix of n rows and m columns (Sivilevičius, 2011). Evaluations can be indicator units, unit parts in a ten-point system, percentages. The ranking of expert indicators is suitable for calculating the concordance coefficient. Ranking is a procedure in which the most important indicator is given a rank of *R*, equal to one, the second indicator is given a second rank, and the last indicator is given a rank of m (m is the number of benchmarks). The average of the sum of ranks is calculated (Podvezko, 2005):

$$\sum_{i=1}^{n} R_{ij} = \frac{1}{2} n (m+1), \tag{1}$$

$$W = \frac{12S}{n^2 m (m-1)} = \frac{12S}{n^2 (m^3 - m)}, \tag{2}$$

$$\chi^2 = n(m-1)W = \frac{12S}{nm(m+1)}, \tag{3}$$

$$W_{\min} = \frac{\chi^2_{v,\alpha}}{n(m-1)}. \tag{4}$$

The consistency of the opinions of the expert evaluation indicators is determined by calculating the concordance coefficient of the Kendall ranks. If S (variance) is the real sum of the squares calculated according to Equation (1), then the concordance coefficient (Equation (2)), in the absence of related ranks, is defined by the ratio of the resulting *S* to the corresponding maximum $S_{\max}$. The cut-off value of the concordance coefficient is determined when the expert assessments can be considered harmonized and the significance of the concordance coefficient can be determined using the Pearson criterion χ^2 (Equation (3)). The minimum value of the concordance coefficient $W_{\min}$ is calculated (Equation (4)).

The research process is based on the statement (hypothesis) that a successful implementation of a transport enterprise's marketing strategy depends on the use of technological development tools.

Given that the minimum recommended number of experts for the formation of the expert group is 3 and the optimal size of the expert group is from 8 to 10 experts, 8 experts were included (Tidikis, 2003; Kardelis, 2016).

The study involved 8 experts from different transport enterprises. The experts had 3 to 8 years of experience in managing transport enterprises.

Experts used a multi-criteria ranking method to assess the importance of the criteria (in order of importance: 1 – most important, 8 – least important) for implementing a marketing strategy in a transport company. The criteria are as follows (see Figure 3):

a) encourages the maintenance of the competitive advantage;
b) promotes customer loyalty;
c) encourages exceptional competencies of employees;
d) encourages the development and implementation of a marketing strategy based on future-oriented intelligent systems;
e) marketing budget, allocation of funds for the purchase of technological equipment, and publicity of the improving quality of service;
f) encourages the introduction of automatic cargo identification systems;
g) promotes computer (digital) cooperation, application of virtual reality modelling system to ensure service quality;
h) encourages the development of transport technologies leading to process changes in the delivery of new equipment and product quality assurance.

The data of the analysis and the calculation of the distribution of the rankings from the questionnaires by eight experts were listed in Table 1.

The concordance coefficient W is calculated according to Equation (5) when there are no associated ranks.

Table 1. Ranking of the most important criteria according to the influence of the technological development of the transport enterprises on the implementation of a marketing strategy (compiled by the authors)

Respondent's queue. No.	Factor encryption symbol (m = 8)							
	a	b	c	d	e	f	g	h
$\sum_{i=1}^{n} R_{ij}$	17	44	32	19	35	49	39	53
$\underline{R}_j = \dfrac{\sum_{i-1}^{n} R_{ij}}{n}$	2.125	5.5	4	2.375	4.375	6.125	4.875	6.625
$\sum_{i=1}^{n} R_{ij} - \dfrac{1}{2} n(m+1)$	−19	8	−4	−17	−1	13	3	17
$\left[\sum_{i=1}^{n} R_{ij} - \dfrac{1}{2} n(m+1) \right]^2$	361	64	16	289	1	169	9	289
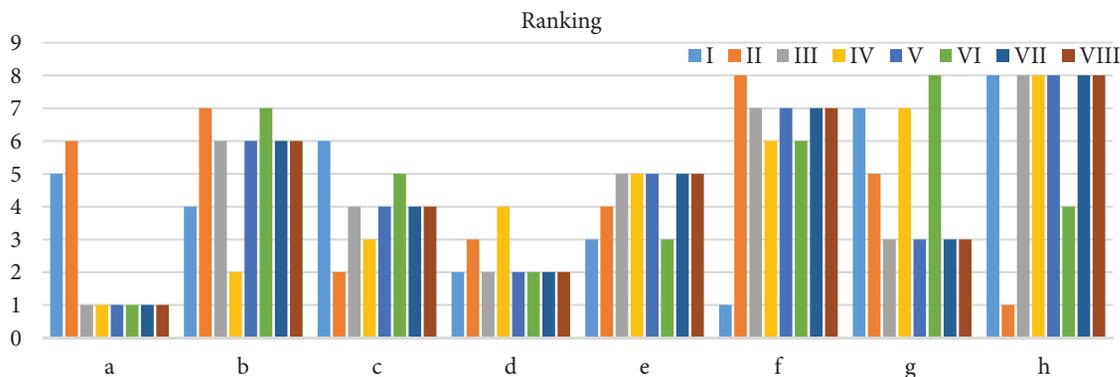
Figure 3. Distribution of expert ranks (compiled by the authors)

$$W = \frac{12S}{n^2(m^3 - m)} = \frac{12 \times 1198}{8^2(8^3 - 8)} = 0.4456 . \qquad (5)$$

The number of important criteria (m) for the influence of technological development of a transport company on the implementation of the marketing strategy is 8, i.e. y. $m > 7$. Then the weight of the concordance coefficient χ^2 is calculated according to Equation (6) and a random quantity is obtained.

$$\chi^2 = n(m-1)W = \frac{12S}{nm(m+1)} = \frac{12 \times 1198}{8 \times 8(8+1)} = 24.958. \qquad (6)$$

χ^2 the estimated value of 24.958 was higher than the critical value (equal to 14.0671), which is why the opinion of the respondents is considered to be consistent, and the average ranks show the general opinion of the experts.

$$W_{min} = \frac{\chi^2_{v,\alpha}}{n(m-1)} = \frac{14.0671}{8(8-1)} = 0.2511 < 0.4456. \qquad (7)$$

The lowest value of the concordance W_{min} coefficient calculated according to Equation (7), where $W_{min} = 0.2511 < 0.4456$, states that the opinions of all 8 respondents on the 8 main criteria of technological development of a transport company which are important for the implementation of marketing strategy are still considered harmonized.

The main indicators of the importance of the technological development of a transport company which are important for the implementation of a marketing strategy are calculated – Q_j. The obtained data are presented in Table 2.

Based on expert assessments and calculations, the list of importance of the main criteria for the impact of technological development of a transport company on the implementation of a marketing strategy should be arranged in the following order and the 5 main ones are presented below:

1. Technological development helps maintain a competitive advantage.
2. Technological development helps to develop and implement a marketing strategy with future-oriented intelligent systems.
3. Technological development promotes the exceptional competencies of employees.
4. Marketing budget, allocation of funds for the purchase of technological equipment and publicity of the improving quality of service.
5. Technological development promotes computer (digital) cooperation, application of virtual reality modelling system to ensure service quality.

Experts had to use a multi-criteria ranking method to assess the importance of the criteria (in order of importance: 1 – most important, 10 – least important) for the transport company's investment in the creation and development of technological infrastructure:

a) digitization;
b) changes in the dynamics of internal markets;
c) changes in the new equipment installation processes;
d) changes in international trade;
e) changes in processes due to new software installed for collaboration;

Table 2. Significance indicators Q_j of the main technological developments of a transport company which are important for the implementation of a marketing strategy (compiled by the authors)

Indicator marker	Factor encryption symbol ($m = 8$)								sum
	a	b	c	d	e	f	g	h	
q_j	0.059028	0.152778	0.111111	0.065972	0.121528	0.170139	0.135417	0.184028	1
d_j	0.940972	0.847222	0.888889	0.934028	0.878472	0.829861	0.864583	0.815972	7
Q_j	0.134425	0.121032	0.126984	0.133433	0.125496	0.118552	0.123512	0.116567	1
Q_j'	0.190972	0.097222	0.138889	0.184028	0.128472	0.079861	0.114583	0.065972	1
Factor layout	1	6	3	2	4	7	5	8	
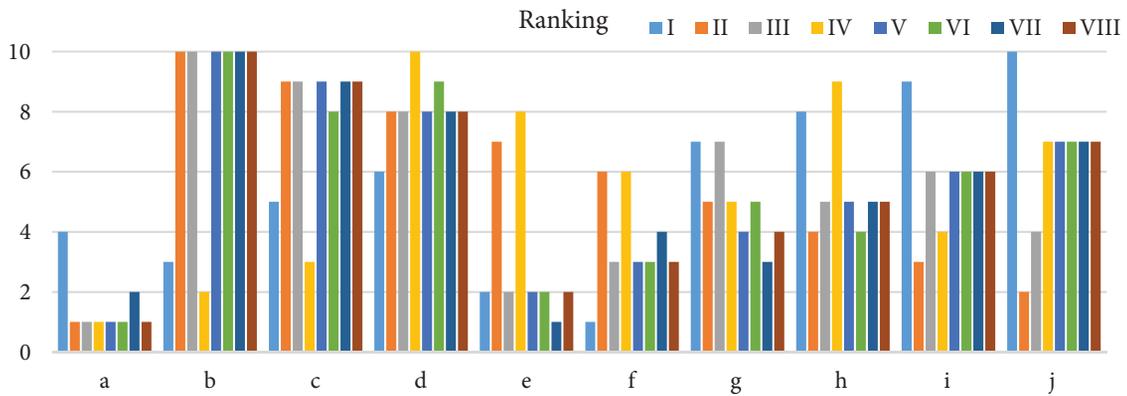
Figure 4. Distribution of expert ranks (compiled by the authors)

f) combined and automated transport; transport electrification;

g) low emission alternative, green transport;

h) information transport systems;

i) implementation of virtual reality modelling systems;

j) changes in the installation of new software.

The distribution of expert ranks are showed in Figure 4.

The data of the distribution of the rankings from the questionnaires were summarized in Table 3.

The concordance coefficient W was calculated according to Equation (8) when there are no associated ranks.

$$W = \frac{12S}{n^2(m^3-m)} = \frac{12 \times 2814}{8^2(10^3-10)} = 0.5329 . \quad (8)$$

The number of major transport companies investing in the creation and development of technological infrastructure (m) is 10, i.e. $m > 7$. Then the weight of the concordance coefficient χ^2 is calculated according to Equation (9) and a random quantity is obtained.

$$\chi^2 = n(m-1)W = \frac{12S}{nm(m+1)} = \frac{12 \times 2814}{8 \times 10(10+1)} = 39.372. \quad (9)$$

χ^2 the estimated value of 38.372 was higher than the critical value (equal to 16.919), which is why the opinion of the respondents is considered to be consistent, and the average ranks show the general opinion of the experts.

$$W_{\min} = \frac{\chi^2_{v,\alpha}}{n(m-1)} = \frac{16.919}{8(10-1)} = 0.2349 < 0.5329. \quad (10)$$

According to Equation (10), the lowest value of the concordance $W_{\min}$ coefficient was calculated, where $W_{\min} = 0.2349 < 0.5329$. The views of all 8 respondents on 10 key criteria for the transport company's investment in the creation and development of technological infrastructure which is important for the management of the transport company's information flows are still considered harmonized.

The importance indicators of the influence of technological development in logistics which are important for the transport company to manage information flows are calculated – Q_j. The obtained data are presented in Table 4.

Based on expert assessments and calculations, the main list of important indicators of the transport company's investment in the creation and development of

Table 3. Ranking table of the main criteria of a transport company's investment in the creation and development of technological infrastructure (compiled by the authors)

Respondent's queue. No.	Factor encryption symbol ($m = 10$)									
	a	b	c	d	e	f	g	h	i	j
$\sum_{i=1}^{n} R_{ij}$	12	65	61	65	26	29	40	45	46	51
$\underline{R}_j = \dfrac{\sum_{i-1}^{n} R_{ij}}{n}$	1.5	8.13	7.63	8.13	3.25	3.63	5	5.63	5.75	6.38
$\sum_{i=1}^{n} R_{ij} - \dfrac{1}{2}n(m+1)$	−32	21	17	21	−18	−15	−4	1	2	7
$\left[\sum_{i=1}^{n} R_{ij} - \dfrac{1}{2}n(m+1)\right]^2$	1024	441	289	441	324	225	16	1	4	49

Table 4. The main indicators of the importance of the creation and development of a transport company's technological infrastructure are Q_j (compiled by the authors)

Indicator marker	Factor encryption symbol ($m = 10$)										
	a	b	c	d	e	f	g	h	i	j	sum
q_j	0.0273	0.1477	0.1386	0.1477	0.0591	0.0659	0.0909	0.1023	0.1045	0.1159	1
d_j	0.9727	0.8523	0.8614	0.8523	0.9409	0.9341	0.9091	0.8977	0.8955	0.8841	9
Q_j	0.1081	0.0947	0.0957	0.0947	0.1045	0.1038	0.1010	0.0997	0.0995	0.0982	1
Q_j'	0.1727	0.0523	0.0614	0.0523	0.1409	0.1341	0.1091	0.0977	0.0955	0.0841	1
Factor layout	1	9	8	10	2	3	4	5	6	7	

technological infrastructure should be presented and arranged in the following order: digitization; changes in processes due to new software installed for collaboration; combined and automated transport, transport electrification; low emission alternative, green transport; implementation of information transport systems.

2. Results

2.1. The model of technological development on transport enterprises marketing strategy

Based on literature analysis, statistical analysis data, and expert assessments, the *model of the marketing strategy of transport enterprises with integrated technological development* was created (see Figure 5).

Based on the analysis of the academic literature as well as research, the model reflects the importance of the set of technological development tools and methods for a marketing strategy of transport companies.

Technological development of companies in the transport sector is necessary in order to adapt to technological,

economic, and market changes that would have a positive impact on ensuring the functioning of the company's internal business processes and synergy with customers.

The model of the marketing strategy of transport companies with integrated technological development consists of two main parts: the creation and development of technological infrastructure and the implementation of the marketing strategy.

The first block includes digitization as a new opportunity to offer customers integrated digital services, new collaboration software for better traffic management; it also encompasses diversification of combined and automated transport, electrification of transport, green transport, and low emission alternative, as well as information transport systems for better optimization of traffic flows.

Given that technological development is important not only for the marketing strategy of transport companies but also for customers to receive all the information about their order in the ways that are now possible, digitization is singled out as the most crucial tool for ensuring integrated service quality.
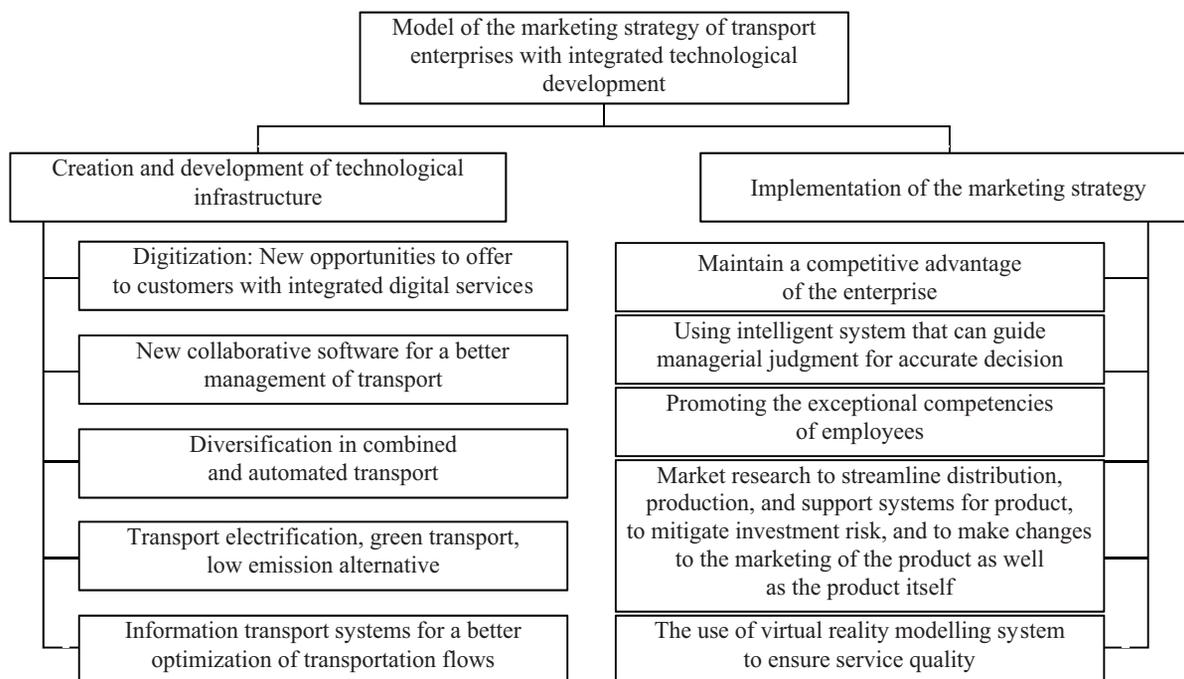
Figure 5. Model of the marketing strategy of transport enterprises with integrated technological development

It is not enough to organize work by ensuring the development of work or by providing the transport company's employees and customers with digital technology; therefore, it is necessary in the process to connect to a unified quality improvement system as many participants as possible. Digitization technologies improve the availability, functionality, and security of services, which affects the quality of the whole service.

In the development of technology, it is also important to manage the flow of information between customers of freight companies, logistics partners at various international terminals, and carriers delivering goods in various countries on land to an international logistics center or to the final recipient.

At the same time the efficiency of this model is integral to the supply subsystem which relies on digital operating system of the contracted transport and its various elements, such as, e-documents, e-accounting, mobile applications for drivers and customers.

The availability of information flow between the functional and the supply subsystems is achieved through the individual channels of each transport participant. By creating service areas for each participant in the process, i.e., customers, employees of partial cargo companies, business partners of logistics terminals, hired carriers, it is possible not only to monitor and manage transportation processes in real time but also to work more transparently and efficiently. Each participant shall pass on the information necessary for the organization of the transport of partial loads to the economic operator who shall distribute the digitization facility in accordance with its purpose and improve the quality of the service during its implementation.

The development of new tasks and decision-making is based on the incoming information flows in the transport company, which affects the productivity and effectiveness of the marketing strategy.

Thanks to the automated data and information collection, the planning of the activities of transport companies can be carried out. In each process it is important to make not only standard decisions that result from proper planning of work but also to promptly make unplanned decisions, to joint implementation of all of them and to control them, all of which affect the quality of the service provided.

Because services cannot be evaluated in advance, transport companies that improve the quality of their services analyse the factors that affect the end result. This analysis is based not only on the level of customer service satisfaction but also on the work done by business partners in transportation processes. It can be said that each participant gets its own benefits: the customer's needs are met, logistics terminal partners and carriers pay faster and optimize documentation and accounting work, transport companies gain competitiveness and various business development opportunities.

In terms of green transport, all transport companies seek financial benefits, but this model aims to reveal how the development of companies' technologies can positively affect the marketing strategy of transport companies. The application of digital technologies can improve service quality and ensure a competitive advantage not only in Lithuania but also worldwide.

The main advantages are that green transport contributes to a sustainable and environmentally friendly service as well as to improving long-term competitiveness.

Thus green transport has a positive impact on attracting new customers and retaining existing ones. Conventional green vehicles are also singled out: the promotion of intermodal transport, the optimization of routes, green carriers and greater involvement of the transport sector.

The diversification of combined and automated transport brings many benefits and contributes to a better quality of life as well as offers an integrated transport solution to improve the performance of the entire transport chain, which also has a positive impact on marketing strategy.

The main advantages are environmental friendliness, friendliness to society, better use of existing capacity, combined flexibility for long journeys or for large quantities, reduced risks and secured goods during transportation.

The use of marketing tools in the activities of transport companies increases the competitive advantage of companies. Advertising services are expensive, so international transport companies, which have tested the effectiveness of marketing tools in other countries, are bolder in the path of traditional marketing.

The market research block presented in the model is important and is designed to simplify the distribution of products and services, production and support systems, to reduce investment risks as well as to change the marketing of the product or service and the product itself.

The development of technology promotes computer (digital) cooperation, the application of a virtual reality modelling system to ensure the quality of services.

Transport companies seek financial benefits, but this model aims to reveal how the development of companies' technologies can positively affect the marketing strategy of transport companies; and application of digital technologies can improve service quality and ensure a competitive advantage not only in Lithuania but worldwide.

The results presented in the model can be applied in planning marketing strategies not only for transport companies, but also for logistics and warehousing companies.

3. Discussion

In today's world the business environment is constantly changing, competition is increasing, and consumers are becoming more demanding and sometimes do not adhere to a single brand. It is difficult for modern businesses to compete without the development of advanced technologies and their own marketing strategy and in the conditions of a pandemic it is difficult for them to compete and strengthen their competitive advantage. The success of transport companies depends on a well-designed marketing strategy, where advanced technologies play an important role. Hong and Nguyen (2020) stated that

the important role of customers and technological capabilities in the effectiveness of a marketing strategy have always been seen in parallel but as mutually supportive factors. As technology advances, companies can communicate more effectively with customers. According to Pelser (2014), advances in technology management go beyond basic research and development (R&D) spending. More and more, corporate strategists make a clearer distinction between technology and technology management. Lind and Melander (2021) stated that technological developments are rapidly affecting the road freight transport system. In parallel, new types of business models that bring them closer to the network and complex business features are proposed. Averina et al. (2021) argued that Industry 4.0 is concerned with the digitization of all enterprise management processes. Shpak et al. (2020) presented the impact of digitization on marketing activities of a company specialising in services, where online sales were promoted through electronic distribution channels, social networks, and mobile programs. Comparative evaluation system of digitization influence parameters to the company's marketing activities were suggested as a confirmation of this impact. Ivanova et al. (2019) stated that specialised technological knowledge plays a key role in ensuring revenue and company profitability. According to aforementioned authors, companies that can manage sufficient investment in R&D and use the results to develop new products, services, and technologies will deliver greater benefits in terms of innovation and technological progress than their competitors. Schroten et al. (2020) noticed that various new technologies (such as smartphones, sensors, block circuit, artificial intelligence) drive innovation in smart mobility. The rising pressure to achieve public goals in the transport sector (e.g., reducing carbon dioxide and congestion, improving road safety) will be another factor in the development of smart mobility. However, there are still many challenges to deploying smart mobility applications in a way that increases the benefits for Europe and at the same time reduces negative effects.

The results obtained by the article authors showed that according to experts, the key indicators of transport technology development for transport company strategy implementation are the following: technologies that maintain a competitive advantage, technologies that help to develop and implement a marketing strategy with future-oriented intelligent systems, technologies that promote exceptional employee competencies, allocation of funds for purchasing technological equipment and publicity for the improvement of quality of services, technologies promoting computer (digital) cooperation, application of a virtual reality modelling system to ensure the quality of services.

Conclusions

1. The theoretical part examines the concept of transport enterprise marketing strategy, the analysis of external and internal environment, the analysis of competitive environment and competitive advantage, a transport company's marketing program.

2. In the scientific literature the development and application of marketing strategies is of a more theoretical nature and it could be used to analyse and evaluate the situation of a particular transport organization. The overall strategic plan covers all activities of a company and sets out its main objectives.

3. The results of the study showed that according to experts, the key indicators of transport technology development for transport company strategy implementation are the following: technologies that maintain a competitive advantage, technologies that help to develop and implement a marketing strategy with future-oriented intelligent systems, technologies that promote exceptional employee competencies, allocation of funds for purchasing technological equipment and publicity for the improvement of quality of services, technologies promoting computer (digital) cooperation, application of a virtual reality modelling system to ensure the quality of services.

4. Based on expert assessments and calculations, the list of a transport company's investment in the creation and development of technological infrastructure should be compiled in the following order of importance: (1) digitization, (2) changes in processes due to new software installed for collaboration, (3) combined and automated transport, electrification of vehicles, (4) low emission alternative, green transport, (5) implementation of information transport systems.

5. Based on literature analysis, statistical analysis data, and expert assessments the model of the marketing strategy of transport enterprises with integrated technological development was presented.

The results presented in the model can be applied in planning marketing strategies for transport companies, also for logistics and warehousing companies on a national level as well as globally.

References

Aghazadeh, H. (2015). Strategic marketing management: Achieving superior business performance through intelligent marketing strategy. *Procedia – Social and Behavioural Science, 207*, 125–134. https://doi.org/10.1016/j.sbspro.2015.10.161

Al-Surmia, A., Cao, G., & Duan, Y. (2020). Industrial marketing management the impact of aligning business, IT, and marketing strategies on firm performance. *Industrial Marketing Management, 84*, 39–49.
https://doi.org/10.1016/j.indmarman.2019.04.002

Averina, T., Barkalov, S., Fedorova, I., & Poryadina, V. (2021). Impact of digital technologies on the company's business model. In *E3S Web of Conferences, 244*, 10002.
https://doi.org/10.1051/e3sconf/202124410002

Balcı, G. (2021). Digitalization in container shipping services: Critical resources for competitive advantage. *Journal of ETA Maritime Science, 9*(1), 3–12.
https://doi.org/10.4274/jems.2021.47364

Banister, D. (2008). The sustainable mobility paradigm. *Transport Policy, 15*(2), 73–80.
https://doi.org/10.1016/j.tranpol.2007.10.005

Borisova, E. V., & Pyataeva, O. A. (2020). Digitalization in the transport industry: Development perspective. *IOP Conference Series: Materials Science and Engineering, 918*, 012184. https://doi.org/10.1088/1757-899X/918/1/012184

Cavdar, S. C., & Aydin, A. D. (2015). An empirical analysis about technological development and innovation indicators. *Procedia – Social and Behavioral Sciences*, *195*, 1486–1495. https://doi.org/10.1016/j.sbspro.2015.06.449

Chernii, V. (2020). Economic assessment of the marketing strategy of municipal transport. *Ekonomichni nauki, Visnik Khmelnitskogo natsionalnogo universitetu, 288*, 221–229. https://doi.org/10.31891/2307-5740-2020-288-6-37

Chung, N., & Koo, C. (2015). The use of social media in travel information search. *Telematics and Informatics, 32*(2), 215–229. https://doi.org/10.1016/j.tele.2014.08.005

Cortes, J. A. Z., Serna, M. D. A., & Gomez, R. A. (2013). Information systems applied to transport improvement. *Dyna, 80*(180), 77–86.

de Ruyter, K., Keeling, D. I., Plangger, K., Montecchi, M., Scott, M. L., & Dahl, D. W. (2022). Reimagining marketing strategy: Driving the debate on grand challenges. *Journal of the Academy of Marketing Science, 50*, 13–21. https://doi.org/10.1007/s11747-021-00806-x

Dimić, S., Pamučar, D., Ljubojević, S., & Đorović, B. (2016). Strategic transport management models – the case study of an oil industry. *Sustainability, 8*(9), 1–27. https://doi.org/10.3390/su8090954

Falchetta, G., & Noussan, M. (2021). Electric vehicle charging network in Europe: An accessibility and deployment trends analysis. *Transportation Research Part D: Transport and Environment, 94*, 102813. https://doi.org/10.1016/j.trd.2021.102813

Giannopoulos, G. (2004). The application of information and communication technologies in transport. *European Journal of Operational Research, 152*(2), 302–320. https://doi.org/10.1016/S0377-2217(03)00026-2

Gilmour, P. (1977). Marketing transport services an evaluation of the marketing strategy for transportation services. *European Journal of Marketing, 11*(6), 383–389. https://doi.org/10.1108/EUM0000000005022

Gkoumas, K., van Balen, M., Tsakalidis, A., & Pekar, F. (2021). Evaluating the development of transport technologies in European research and innovation projects between 2007 and 2020. *Research in Transportation Economics, 92*, 101113. https://doi.org/10.1016/j.retrec.2021.101113

Hassan, S., Nadzim, S., Z., A., & Shiratuddin, S. (2015). Strategic use of social media for small business based on the AIDA model. *Procedia – Social and Behavioral Sciences*, *172*, 262–269. https://doi.org/10.1016/j.sbspro.2015.01.363

Hong, P. V., & Nguyen, T.-T. (2020). Factors affecting marketing strategy of logistics business – case of Vietnam. *The Asian Journal of Shipping and Logistics, 36*(4), 224–234. https://doi.org/10.1016/j.ajsl.2020.03.004

Hoppe, M., & Trachsel, T. (2018, 27–28 September). Emerging trends in transport technologies: The potential for transformation towards sustainable mobility. In S. Žeželj (Ed.), *The Proceedings of International Conference on Traffic and Transport Engineering.* Belgrade, Serbia, ICTTE. INTEND (Intentify Future Transport Research Needs) Project. http://ijtte.com/uploads/news_files/Proceedings 2018 final.pdf

Ibraeva, A., & de Sousa, J. F. (2014). Marketing of public transport and public transport information provision. *Procedia – Social and Behavioral Sciences*, *162*, 121–128. https://doi.org/10.1016/j.sbspro.2014.12.192

Ishaq, M. I., & Hussain, N. M. (2016). Creative marketing strategy and effective execution on performance in Pakistan. *RAE-Revista de Administração de Empresas, 56*(6), 668–679. https://doi.org/10.1590/s0034-759020160608

Ivanova, A. S., Holionko, N. G., Tverdushka, T. B., Olejarz, T., & Yakymchuk, A. Y. (2019). The strategic management in terms of an enterprise's technological development. *Journal of Competitiveness, 11*(4), 40–56. https://doi.org/10.7441/joc.2019.04.03

Karakaya, Ç., Badur, B., & Aytekin, C. (2011). Analyzing the effectiveness of marketing strategies in the presence of word of mouth: Agent-based modeling approach. *Journal of Marketing Research and Case Studies, 2011*, 421059. https://doi.org/10.5171/2011.421059

Karatsoli, M., & Nathanail, E. (2021). Social influence and impact of social media on users' mobility decisions. *Journal of Sustainable Development of Transport and Logistics, 6*(1), 32–48. https://doi.org/10.14254/jsdtl.2021.6-1.3

Kardelis, K. (2016). *Mokslinių tyrimų metodologija ir metodai* [Research methodology and methods]. Mokslo ir enciklopedijų leidybos centras [Science and Encyclopedia Publishing Center].

Kolasińska-Morawska, K., Sułkowski, Ł., & Morawski, P. (2019). New technologies in transport in the face of challenges of economy 4.0. *Scientific Journal of Silesian University of Technology. Series Transport, 102*, 73–83. https://doi.org/10.20858/sjsutst.2019.102.6

Kostrzewski, M., Filina-Dawidowicz, L., & Walusiak, S. (2021). Modern technologies development in logistics centers: The case study of Poland. *Transportation Research Procedia, 55*, 268–275. https://doi.org/10.1016/j.trpro.2021.06.031

Lind, F., & Melander, L. (2021). Networked business models for current and future road freight transport: Taking a truck manufacturer's perspective. *Technology Analysis & Strategic Management*, 1–12. https://doi.org/10.1080/09537325.2021.1970738

Lithuanian Department of Statistics. (2021). *Number of people injured and killed in road accidents.* https://osp.stat.gov.lt/covid-19-statistika/itaka-gyventojams/keliu-eismo-ivykiai

McDonald, M. (2006). Strategic marketing planning: Theory and practice. *The Marketing Review, 6*, 375–418.

Merlo, O., & Auh, S. (2010). Marketing's strategic influence in Australian firms: A review and survey. *Australasian Marketing Journal, 18*(2), 49–56. https://doi.org/10.1016/j.ausmj.2010.01.002

Milioti, C., Katopodis, V., Kepaptsoglou, K., & Tyrinopoulos, Y. (2019). Assessing the influence of social media in tourist mobility of young travelers. In *98th Annual Meeting of the Transportation Research Board.* Washington, D.C.

Nguyen, T. L. H., Park, S. H., & Yeo, G. T. (2020). An analysis of port networks and improvement strategies for port connections in the Ho Chi Minh area. *The Asian Journal of Shipping and Logistics, 36*(4), 223–231. https://doi.org/10.1016/j.ajsl.2020.07.001

Pelser, T. (2014). The influence of technology strategies and their link to company performance. *Mediterranean Journal of Social Sciences, 5*(9), 238–247. https://doi.org/10.5901/mjss.2014.v5n9p238

Podvezko, V. (2005). Agreement of expert estimates. *Technological and Economic Development of Economy, 9*(2), 159–172. https://doi.org/10.3846/13928619.2005.9637688

Rothengatter, W., Zhang, J., Hayashi, J., Nosach, A., Wang, K., & Oum, T. H. (2021). Pandemic waves and the time after

Covid-19 – Consequences for the transport sector. *Transport Policy, 110*(September), 225–237. https://doi.org/10.1016/j.tranpol.2021.06.003

Schroten, A., Van Grinsven, A., Tol, E., Leestemaker, L., Schackmann, P. P., Vonk-Noordegraaf, D., Van Meijeren, J., & Kalisvaart, S. (2020). *Research for TRAN Committee – The impact of emerging technologies on the transport system, Poli.* European Parliament, Policy Department for Structural and Cohesion Policies, Brussels.

Shpak, N., Kuzmin, O., Dvulit, Z., Onysenko, T., & Sroka, W. (2020). Digitalization of the marketing activities of enterprises: Case study. *Information, 11*(2), 109. https://doi.org/10.3390/info11020109

Sivilevičius, H. (2011). Application of expert evaluation method to determine the importance of operating asphalt mixing plant quality criteria and rank correlation. *The Baltic Journal Road and Bridge Engineering, 6*(1), 48–58. https://doi.org/10.3846/bjrbe.2011.07

Tidikis, R. (2003). *Methodology of social sciences research.* Publishing Centre of the Law University of Lithuania. https://repository.mruni.eu/handle/007/15459

Toymentseva, I. A., Karpova, N. P., Toymentseva, A. A., Chichkina, V. D., & Efanov, A. V. (2016). Methods of the development strategy of service companies: Logistical approach. *International Journal of Environmental & Science Education, 11*(14), 6820–6836.

Sumin. (2021, 12 15). *Transporto rinkos statistinių rodiklių apžvalga (2020 m. sausio-birželio mėn.).* https://sumin.lrv.lt/uploads/sumin/documents/files/SM%20int%20svet%20Transporto%20rinkos%20ap%C5%BEvalga.pdf

Vaičiūtė, K., & Bureika, G. (2020). Research of transport company's technological development directions. *Mokslas – Lietuvos ateitis / Science – Future of Lithuania, 12*, 1–6. https://doi.org/10.3846/mla.2020.11790

Virvilaitė, R. (2009). *Marketingo valdymas.* Technologija.

Zhang, J., Hayashi, Y., & Frankc, L. D. (2021). COVID-19 and transport: Findings from a world-wide expert survey. *Transport Policy, 103*(March), 68–85. https://doi.org/10.1016/j.tranpol.2021.01.011