



DIGITALIZATION OF ENTERPRISES IN THE TRANSPORT-FORWARDING-LOGISTICS (TFL) SECTOR IN POLAND

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Abstract

Purpose. Digitalization has contributed to the dynamic development of both the private and professional lives of many people. The form of physical and virtual tools has brought huge benefits but also there have been some negative effects of transferring everyday affairs to virtual space. The aim of the article is to try to identify the structures of digitalization in the Polish TFL sector and to present the advantages, disadvantages, development opportunities and threats arising from the use of modern electronic infrastructure in the activities of TFL enterprises.

Methodology. The study was carried out using the desk research method and in-depth interview. Using the first research technique an outline of the discussion was created and the structure of the vertical division of digitalization was identified. In-depth interviews with dozens of people performing various functions in the TFL sector allowed to increase the thematic scope with empirical data which allowed to characterize the horizontal structure. The results were condensed in the form of a SWOT analysis.

Findings. The research confirmed the possibility of a two-structure approach to the digitalization of the TFL sector enterprises and that digitalization can have both positive and negative impact on the activities of those enterprises.

Słowa kluczowe: digitalization, TFL sector, SWOT analysis

Klasyfikacja JEL: L90, O33, Q55, R49

Introduction

Digitalization is a concept that can be considered as a process (Gajewski, Paprocki, Pieriegud, 2016), strategy (Klimczak, Fryczak, Kaużyński, 2022) or phenomenon (Wziątek-Staśko, 2019). Regardless of the terminology, digitalization is responsible for the interaction between elements of the virtual and real world – both in private and professional life. The main goal, and at the

same time the idea accompanying the dynamic development of digitalization around the world, is to accelerate and facilitate selected operations (Chądzyński i in., 2021). Digitalization consists of both physical and virtual elements, the mutual use of which as an electronic infrastructure can be used to achieve selected results. However, for various reasons, digitalization does not always help to achieve specific results. In addition, there are situations in which the use of modern technologies generates additional problems – they, in turn, contribute to delays in the implementation of a specific task or even a direct increase in costs.

Referring to the transport-forwarding-logistics sector, it should be mentioned that over the last few decades its development around the world has been dynamic. The main factors influencing the currently observed level of evolution of the activities of the TFL sector enterprises include:

- development of international trade,
- technological progress,
- changes in state policy, including standardization of legal regulations,
- consumer changes, including those related to shopping preferences,
- development of infrastructure and suprastructure.

Of course, phenomena such as globalization and its indirect consequence, i.e. the promotion of sustainable development, are also terms that are directly related to the continuous topicality and development of the TFL sector. In addition, changing trends, and in particular those shaping selected megatrends, are also aspects conducive to the development of entities related to the transport-forwarding-logistics sector. From the point of view of the research adopted in the article, one of the most interesting megatrends is the "Mirror World", which refers to the greatest possible transfer of everyday life matters to the virtual world (Łochnicka, Dobosz, Magruk, 2022). However, often unconsciously transferring individual activities to the virtual world, new problems are generated, the subsequent ignoring of which contributes to the accumulation of irregularities.

What is more, moving on to the analysis of the Polish transport-forwarding-logistics sector, it is worth mentioning that about 951 thousand people work in it, and the activity of the TFL sector in 2022 was responsible for about 6% of GDP. The number of employees in the Polish TFL sector has been growing successively since the beginning of the twenty-first century. Analyzing the TFL activities of several selected companies that are the largest entities operating on the Polish market (Poczta Polska SA, InPost sp. z o.o., PKP Cargo SA, Amazon Fulfillment Poland sp. z o.o., Raben Group, DPD Polska sp. z o.o.), based on sales revenues, it is noted that in the last few years companies have recorded sales results of several million zlotys (Fig.1).

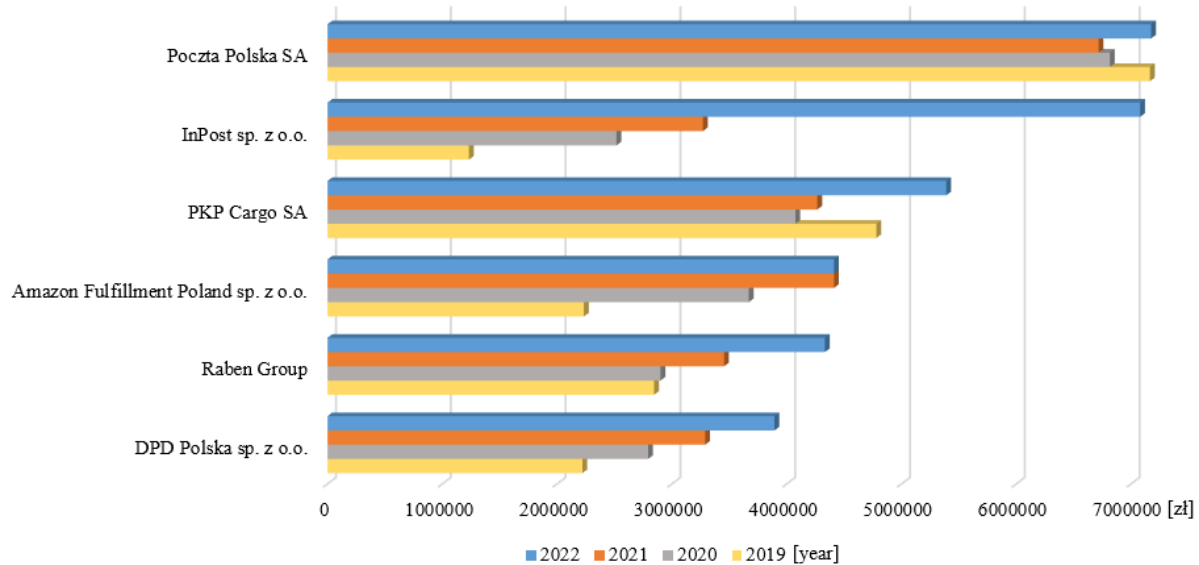


Figure 1: Sales revenues of selected six largest companies in the TFL sector in Poland

Source: own study based on companies' annual reports

Analyzing the sales results of selected six top companies of the Polish TFL sector in 2019-2022, it is noted that the largest revenue in each year was recorded by Poczta Polska SA – in the record year 2022 it was as much as 7174291 zlotys. Interestingly, however, it was not the state-owned enterprise specializing in postal shipments that recorded the largest increase in revenues, because this title belongs to InPost sp. z o.o. The company, which is responsible for the creation of “Paczkomaty”, comparing 2022 and 2021, increased the increase in sales revenues by about 53.8%, while in the same period Poczta Polska SA recorded an increase of 6.38%. In addition, analyzing the data from 2019-2022, it is noted that the majority of enterprises in the Polish transport-forwarding-logistics sector achieved more and more sales results every year. The exception to this rule was the activity of Poczta Polska SA and PKP Cargo SA for 2020 and 2021. Probably one of the main reasons for the decline in sales results of two state-owned enterprises during this period was the coronavirus pandemic and the related increasing restrictions, as a result of which services requiring the physical presence of interested people became a less frequently chosen opportunity to meet customers needs. In turn, technologically advanced enterprises, providing mainly courier services, benefited from the difficult pandemic situation (Szpilko, Bazydło, Bondar, 2021), where most operations (except for physical delivery of the product) could be fully carried out remotely.

At this stage, knowing that the transport-forwarding-logistics sector plays an important role in the economic development of Poland, and that the top companies operating in the industry achieve multi-million results annually, one should consider how digitalization, which is ubiquitous in the provision of transport, forwarding and logistics services, affects the activities of enterprises included in the Polish TFL sector. In addition, it is worth considering whether there are premises that would support the improvement of individual elements and tools of selected technologies, or even relations between entities.

1. Methodology

In order to determine the impact of digitalization on the activities of companies in the transport-forwarding-logistics sector in Poland, a study was conducted using the desk research method

and in-depth interview. The use of two research techniques allowed to present a two-structured approach to the division of digitalization in the TFL sector in Poland.

The first research technique was used to analyze publicly available information, on the basis of which it is possible to present a vertical division. The vertical division structure refers to the level of advancement of the technologies used - physical tools and software - in the implementation of individual tasks of selected enterprises.

The second structure – horizontal – was outlined on the basis of in-depth interviews with several people working in the Polish TFL sector. They were people with diverse experience, working in various positions in small, medium and large enterprises providing transport, forwarding and/or logistics services. The horizontal approach refers to the relationship between entities operating both within one company and between two different entities. The information obtained on the vertical and horizontal division of digitalization in the Polish TFL sector allows us to notice the opposing consequences of using modern solutions in the activities of entities. On the one hand, the positive effects and development opportunities of the impact of digitalization on business operations are recognized. On the other hand, the study presents negative aspects of digitalization limiting the efficiency of entities belonging to the Polish transport-forwarding-logistics sector. The analysis of the obtained results also suggests that certain elements of modern technologies pose a risk of specific irregularities in the operability of the surveyed entities. The results of the study were finally condensed in the form of a SWOT analysis on the impact of digitalization on the activities of Polish enterprises in the TFL sector.

2. Digitalization of the TFL sector enterprises in Poland

Starting from the vertical division of digitalization of enterprises of the Polish transport-forwarding-logistics sector, it should be mentioned that it is diverse due to the level of advancement of modern technologies used in the activities of enterprises. The very diversity of the electronic tools and digital solutions used can be presented in three levels (Fig. 2). The level at which a given company is depends on what elements the entity decides to use. The naming of each level has been adopted for the purpose of the article.

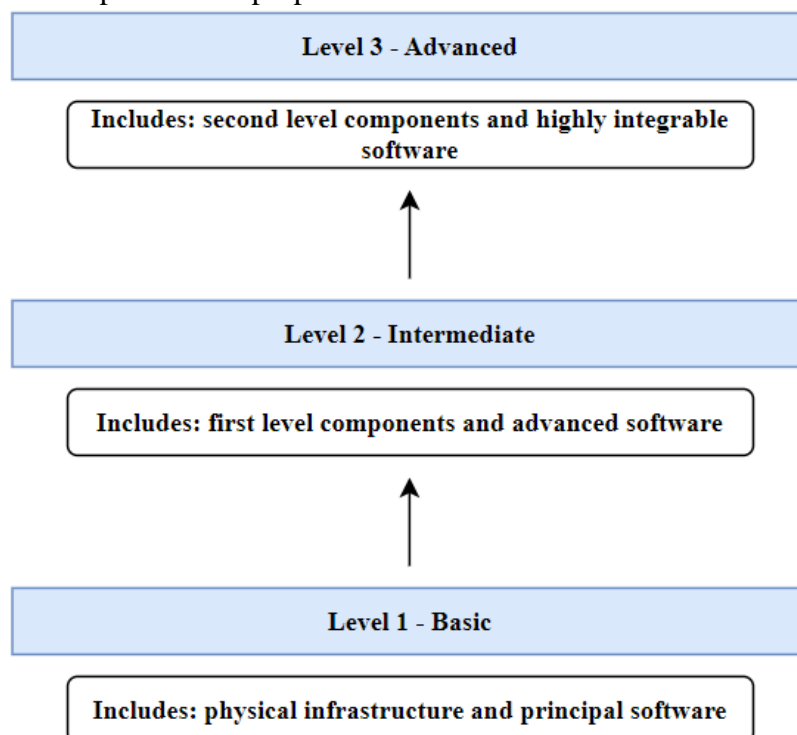


Figure 2: Structure of the vertical division of digitalization in the TFL sector

Source: own study

The first level, defined as basic, speaks of the fundamental use of physical electronic tools, such as computer equipment, telephones or various types of machines. In addition, at this level, it also refers to the use of basic, freely available software, which in the case of the purchase of a physical product is usually already provided free of charge.

The second level – intermediate – applies to enterprises that have decided to purchase specialized software or extend the capabilities of available, free software in the conduct of their business. This solution is most often chosen by companies that in specific areas of activity have a need for equipment specializing in a given field. The demand may concern, for example, access to specific freight exchanges, online maps with detailed emphasis on sensitive elements of road infrastructure or software enabling monitoring of individual stages of the company's operations.

The third level, called advanced, is found among companies in the transport-forwarding-logistics sector, which show a need for high integration of resources available to them – physical and virtual. In this case, selected entities use tools such as ERP, SCM, MRP or WMS software. The ability to multitask elements and tools available in the company is often associated with a significant acceleration and optimization of performed tasks. However, these are also solutions whose purchase involves the allocation of a significant amount of financial resources.

The vertical approach to the digitalization of enterprises in the Polish transport-forwarding-logistics sector differs from the horizontal structure in its main assumptions. The vertical approach focuses on the level of digital advancement of a specific company, while the horizontal approach can be treated, among others, as its development, because it includes the use of individual modern technologies to carry out specific tasks between enterprises. Selected entities may cooperate with each other as components of one enterprise, but it is allowed to analyze the existing relations between at least two separate companies.

Acquiring empirical data on the basis of professional experience of several dozen people working in various positions related to transport, forwarding, logistics and other activities characteristic of the TFL sector, creating a single, graphic representation of the structure of the horizontal division of digitalization of the transport-forwarding-logistics sector is quite a challenge. The existing internal and external relations are very diverse.

Referring in the first place to the internal approach of the company, in response to the question of what affects the creation of existing relations and the efficiency of processes, companies point to differences resulting from the experience and familiarity of a given employee with specific elements of electronic infrastructure. These elements may concern both physical tools and their software, which appear at every level of the vertical division of digitalization in the TFL sector. An important role in the functioning of digitalization within a given organization is also played by the management and management staff, which has an impact on the direction of technological development that the company will take.

In the external approach, enterprises primarily point to differences resulting from the degree of technological advancement of a given entity in the TFL sector and the efficiency and correctness of the selected element of electronic infrastructure. Certain irregularities most often occur in the case of differences in the tools used, unprecedented trust in specific software regarding the data collected and processed, and the training and experience of employees in the use of selected physical and digital tools.

In internal and external terms, market inflows are also noticeable, such as technological changes, customer requirements or the level of competitiveness within the sector. Regardless of whether the existing relations and connections related to the digital activities of the TFL sector

enterprises take place within one entity or between at least two different, in most cases, individual irregularities in the implementation of specific tasks are associated with the occurrence of difficulties, and these in turn may contribute to incurring additional costs by the selected company. Often, the occurrence of any problem in the operability of a company belonging to the transport-forwarding-logistics sector is associated, usually on the basis of a feedback mechanism, with a negative impact on other selected areas of the specific company in which the problem occurred or enterprises undertaking short-, medium- or long-term cooperation with this entity.

Looking at the formation of relations and interactions between entities in the structure of vertical and horizontal division of digitalization of the TFL sector enterprises in Poland, several recurring factors are noticed, which, regardless of the size of a given unit or even its specialization, always affect whether individual operations and processes will take place according to the adopted assumptions.

The factors influencing the efficiency of the use of digitalization in business operations can be grouped by:

- a) internal factors (related to the activities undertaken by the companies):
 - complementarity of the selected software and physical infrastructure,
 - correctness of downloaded, aggregated and processed data,
 - the level of integration of different electronic tools,
 - control of theoretical states to factual state,
 - data security within the organization,
 - adopted organizational culture,
 - management and management staff – approach to innovation, investment and training,
 - experience of users of selected elements of electronic infrastructure,
 - knowledge of laws and regulations,
 - understanding customer needs,
- b) external factors (independent of selected entities):
 - imposed laws and regulations,
 - data security outside the organization,
 - orientation and operation of selected electronic tools,
 - technological progress,
 - competition in the sector,
 - customer requirements.

Each of the mentioned internal and external factors has an impact on the use of digitalization in the activities of companies in the transport-forwarding-logistics sector in Poland. How and to what extent the selected factor will determine changes in the operation of the selected entity depends, among others, on the size of the selected company, its connections and, above all, the services provided and the products sold.

3. The SWOT analysis regarding the impact of digitalization on the activities of the TFL sector enterprises

Presentation of the current situation of digitalization in the activities of enterprises in the Polish transport-forwarding-logistics sector is possible thanks to the preparation of a SWOT analysis (Table 1). The collected theoretical data of the vertical approach of digitalization and empirical data from the horizontal structure of digitalization make it possible to define both the positive aspects of digitalization (strengths and opportunities) and the negative (weaknesses and threats).

Table 1: The SWOT analysis of the impact of digitalization on the activities of the TFL sector enterprises

STRENGTHS	WEAKNESSES
<ul style="list-style-type: none"> – multi-level data integration, – strong market position, – operational flexibility of the company, – acceleration of selected operations, – facilitation of selected operations, – access to advanced digital tools. 	<ul style="list-style-type: none"> – the cost of introducing and using selected technological solutions, – the rate of aging of electronic tools, – sensitivity to laws and regulations, – technological limitations, – lack of uniform, cooperating solutions.
OPPORTUNITIES	THREATS
<ul style="list-style-type: none"> – improving the operational efficiency of the selected company, – development of customer relations, – increase in market position, – employment or training of highly qualified personnel, – increasing the sophistication of the digital tools used. 	<ul style="list-style-type: none"> – the constant need to modernize the electronic infrastructure included in the company in order to maintain competitiveness, – risk of loss of security and privacy of the collected data, – changes in laws and regulations, – dependence of entities' activities on selected technologies.

Source: own study

Observing the list created with the use of the SWOT analysis, several repetitive components are noticed, which, depending on the use, may have a positive or negative impact on the functioning of an enterprise belonging to the Polish TFL sector.

The most frequently repeated aspects include: integration and availability of data, security of stored information, employee qualifications, market positioning and the impact of the external environment (in the form of laws and regulations).

Whether the chosen aspects will have a negative or positive overtone in the company's operations depends on both its internal organizational structures and the external environment entering into various relations with the selected company.

Summary

The currently known face of digitalization significantly affects the surrounding reality, and thus the shaping of individual human operations, including the effective conduct of selected business activities.

It is noted that selected elements of electronic infrastructure – in the form of physical and virtual tools – can significantly determine whether the actions taken will be implemented within the time, quantity and quality assumptions.

Exploring the topic of digitalization of enterprises in the transport-forwarding-logistics sector in Poland, a feasible two-structured division of digitalization is emerging. The vertical division considers the degree of technological advancement of selected entities. The horizontal division focuses attention on both intra-subject relationships as well as between at least two different organizations.

Analyzing the activities of the TFL sector enterprises in Poland, one can see a significant impact of digitalization on the shaping of the activities of these entities. Factors determining the efficiency of the use of digitalization in given organizations can be grouped into internal (depending on the activities of entities) and external (independent of the activities of entities).

The obtained theoretical information on digitalization in the activities of the TFL sector entities in Poland and supplementing them with selected empirical data allow to create a picture of the beneficial consequences of digitalization (strengths and opportunities) as well as unfavorable (weaknesses and threats). Both approaches to the digitalization of the TFL sector can be shown in the presented SWOT analysis.

As part of the SWOT analysis, several repetitive factors are noticed, which at the same time may gain importance for the positive and negative effects of digitalization in the activities of the TFL sector entities. Factors acting on both sides include, among others, integration and availability of data, security of stored information, employee qualifications, market positioning and the impact of the external environment.

The considerations adopted in the article may be the basis for further activities aimed at exploring digitalization, and above all examining the impact of electronic tools on the shaped relations and activities of enterprises in the Polish transport-forwarding-logistics sector.

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