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Supply chain management in the access economy environment

Abstract

The paper focuses on the digital platform being the driving force of development of the access economy impacting on supply chain business model reconfiguration. First, the main accelerators of the sharing and access economies were described and compared with the characteristics of supply chain architecture. Then, different solutions of the platform business model impacting on supply chain reconfiguration are analysed. Next the results of a pilot study are presented to illustrate how supply chain managers understand the role of digital technologies and platforms. The paper is based mainly on a literature review and partially on the results of a pilot study conducted at the end of 2018 among 120 supply chain managers using the CATI methodology. Digital platforms can be used to improve supply chain competitiveness in several ways – starting from access to logistics services using the outsourcing model, through the additional solution of the supply chain business model portfolio widening the range of distribution channels, up to the digital supply chain solution being a platform connecting the whole ecosystem of supply chain stakeholders. The paper has a conceptual character, and the proposed solutions are still at the early stage of implementation in practice. Therefore, the undertaken topic should be a subject of further studies.

Keywords: digital supply chain, platform business model, access economy, digital technologies, supply chain as a platform

The sharing and digital economies have started to be one of the most important trends impacting on companies and the development of their supply chains. Both of them create new conditions for competitive advantages that are influencing the directions of supply chain reconfigurations and their further improvements. One can argue that the sharing economy has been developing for ages and should not be considered to be a new solution. However, the current phenomenon of the diffusion of the sharing economy results from the wide availability of digital technologies – the major determinant in the spread of the digital economy on a global scale – which were not accessible on such a scale even a decade ago.

Therefore, it is important to analyze the circumstances of the development of the sharing economy in terms of identifying new conditions for supply chain competitiveness. At first glance, it is quite easy to indicate several factors that describe both in a similar way – the sharing economy and supply chain. There are, i.e. the need to share information, connection of the demand and the supply sides, and crating network effects. At the same time, there are a number of other characteristics of the sharing economy that might strongly impact supply chains and should not be omitted during the competitive struggle.

Sharing and access economy concepts and the platform business model

The sharing economy has been widely hailed as a major growth sector. This is mainly due to the fact that it has disrupted mature industries, such as hotels and transport, by providing convenient and cost-efficient access to resources without the financial, emotional, or social burdens of ownership (Eckhardt & Bardhi, 2015).

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However, one can argue that sharing has been known for ages as a form of social exchange that takes place among people known to each other, without any profit. According to Giana Eckhardt and Fleura Bardhi (2015), when "sharing" is market-mediated – when a company is an intermediary between consumers who don't know each other – it is no longer sharing at all. Rather, consumers are paying to access someone else's goods or services for a particular period of time. It is an economic exchange, and consumers are after utilitarian, rather than social, value. Therefore, the access economy would be a term that is more precisely defining the phenomena of developing new business models – describing the way that a firm creates and delivers value to its consumers (Teece, 2010) – in today's business environment.

The new business models of the access economy – platforms – are growing based on the diffusion of digital technologies (Nowicka, 2016a). Digital technologies change the economics of doing business at a global level in several ways. The digital platforms are global in scope, and they are driving down the cost of cross-border communications and transactions, connecting demand and supply in any country. Globalization was once reserved for large, multinational corporations, but these platforms reduce the minimum scale needed to go global, enabling small business and entrepreneurs around the world to participate. As a result, new types of competitors can emerge rapidly, increasing pressure on industry incumbents. In many cases, the number of active users of online platforms are comparable or higher than the populations of countries (Kemp, 2020; Manyika et al., 2016). This situation will be even more significant due to the changes in the behavior of customers impacted by the COVID-19 pandemic (Marzantowicz et al., 2020).

Additionally, the platforms can be used for coordination, which refers to the use of digital networks to coordinate economic transactions in an algorithmic way. This means that platforms are digital networks (a 'space' where goods or services can be offered or requested. These online spaces systematically collect, organize and store large amounts of data about the users and transactions) that coordinate transactions in an algorithmic way (matching and coordinating transactions in an automated way. The algorithms provide a governance structure to the platforms, incorporating encoded rules as well as automated monitoring and enforcement mechanisms) (Eurofround, 2018).

Among broadly analysed classification criteria of the platforms, the following can be highlighted (Eurofround, 2018):

1. Platform ownership: privately owned platforms, generally for-profit businesses (Uber, Airbnb), and platforms which are commonly owned by their users (Blockchain). Private platforms generate revenue by charging a fee or percentage of the value of each transaction; but in some cases, they can charge entry fees or generate revenue by displaying ads.
2. Economic nature of transactions: commercial and non-commercial transactions. The category of platforms for non-commercial transactions corresponds most directly with the original idea of the sharing economy, where goods and services are shared (Couchsurfing) or exchanged (Simbi) rather than bought. Even if the transactions are non-commercial, the platforms themselves can be for-profit businesses, generally generating revenue by subscription fees or advertisements (Couchsurfing).
3. Content of transactions: for the exchange of goods (Ebay, Amazon Marketplace) and for the exchange of services (Uber, Airbnb, Taskrabbit). Service platforms can be further differentiated as online vs. local: Commercial service online platforms correspond to the concept of crowd work (Mechanical Turk), whereas commercial platforms providing personal local services are often referred to as the gig economy (Taskrabbit) and types of tasks involved: physical (Taskrabbit), intellectual (Mechanical Turk), social (Bubble).

There are many types of platform business models, including search, communication, social media, matching, content and review, booking aggregator, retail, payment, crowdsourcing and crowdfunding, etc. (Figure 1)

Additionally, platforms can be combined (i.e. a social media platform can integrate communications, contents, retail and payment functions) (Wirtz et al., 2019) or built as a hybrid model. Table 1 presents examples of the main characteristics and earning models of the chosen retail platforms that strongly impact the competitive environment.

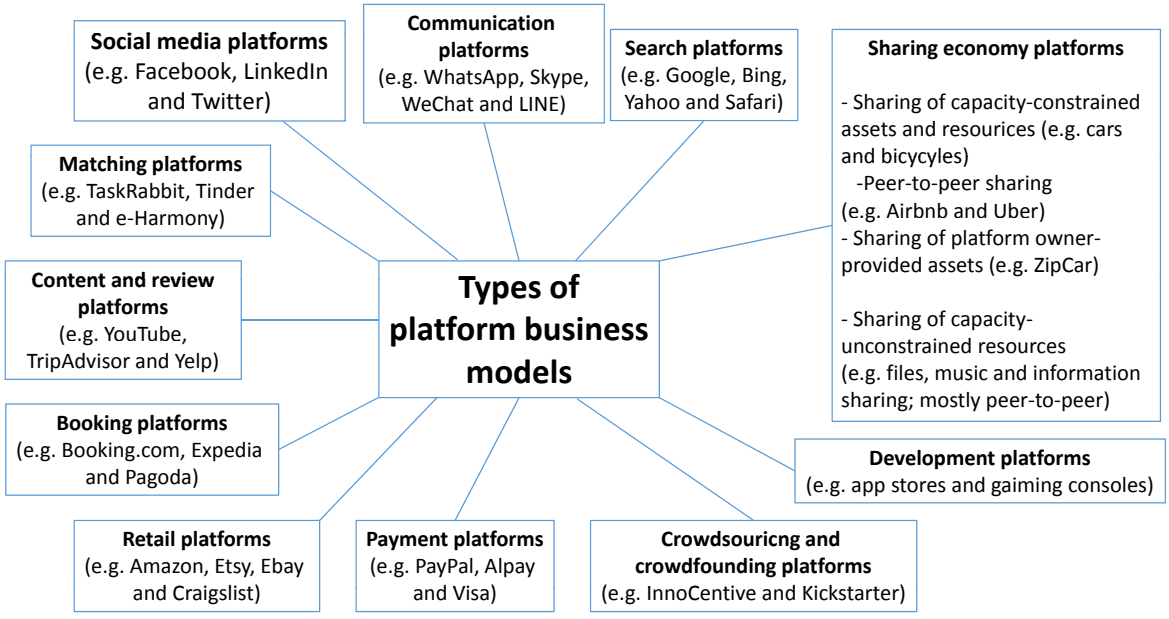
The platform business model changes the meaning of leading organizations, forcing them to re-think their strategies, way of competing, leadership, organizational structures, and approaches to value creation and capture systems. Aiming to become a platform leader entails a vision that extends beyond one's own company and aims to build and sustain an ecosystem of partners, where the platform leader has to be the equivalent of a captain (Evans & Gawer, 2016). Example of stakeholders involved in the platform ecosystem is presented in Figure 2.

Concentrating on the analyses of the platform business model, one can indicate several key aspects that characterize this solution. There are:

- creating network effects,
- connecting demand with supply,
- competing based on economies of scale effects,
- connecting a large group of stakeholders on a global scale.

All of the above effects result from the features of digital technologies and their broad usage by consumers. It can be also observed that those characteristics are comparable to the integrated supply chains architecture.

Figure 1. Types of platform business models



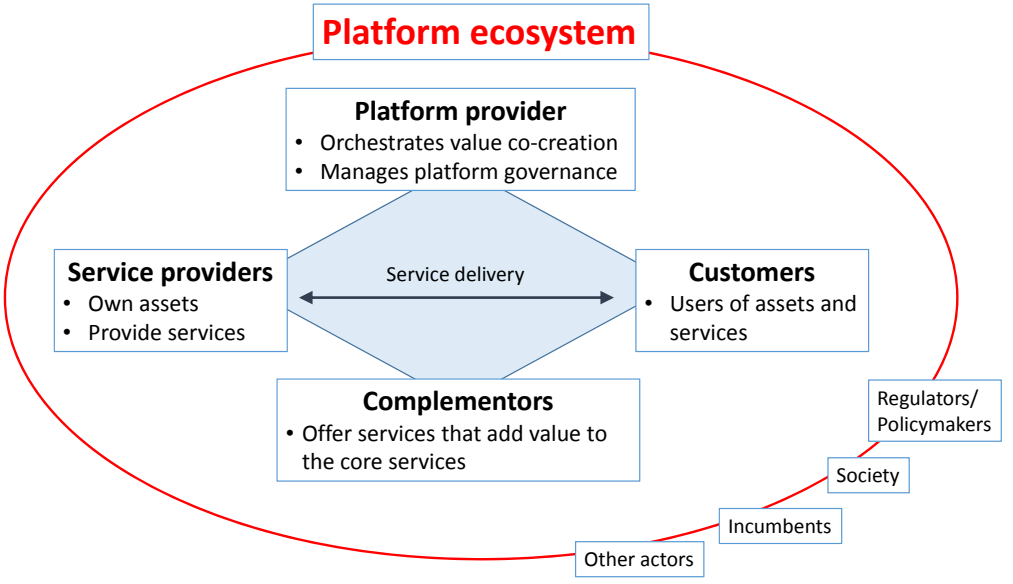
Source: Wirtz et al., 2019.

Table 1. Characteristics and earnings models for Alibaba Group, Amazon.com, eBay and Rakuten Ichiba

	Alibaba Group	Amazon.com	eBay	Rakuten Ichiba
Type of platform(s)	B2B, B2C and C2C platforms	B2C marketplace	C2C and B2C platforms	B2C platform
Market value (Forbes, May 2017)	$264.9 billion	$427 billion	$36.6 billion	$15.2 billion
Year founded	1999	1994	1995	1997
Headquarters	Hangzhou, China	Seattle, USA	San Jose, USA	Tokyo, Japan
Number of employees (2016)	36,450	341,400	36,500	14,134
Gross merchandise value (GMV) (2014/2015)	$476 billion	$225.6 billion	$81.7 billion	$64 billion
Number of commission-based suppliers (2016)	China B2B platforms: 830,000 International B2B Platforms: 136,000 China B2C platforms: 10 million	2 million	25 million	40,000
Number of registered shoppers (2016)	385 million	270 million	167 million	106 million
Average commission	Alibaba.com 0% 1668.com 0% Taobao 0% Tmall 0.3–5% Aliexpress 5%	6–20%	8–15%	8–10%
Other earnings models	Upgraded membership packages Data analytics Digital marketing Sales consultancy Affiliate program Ecosystem services (banking, travel, etc.)	Own sales Digital marketing Ecosystem services (Amazon Prime, Amazon Fresh, etc.) Amazon Web Services products (Kindle, Echo, etc.) Supplier services (distribution, payments, etc.)	Digital marketing	Digital marketing Sales consultancy Ecosystem services (banking, travel, etc.)
Supply chain	Outsourced to affiliated logistics partner Cainiao	394 global logistics facilities (MWPVL 2017), primarily outsourced delivery	Outsourced to third-party providers	Outsourced to third-party providers

Source: Hänninen et al., 2018.

Figure 2. Stakeholders involved in the access economy platform ecosystem



Source: Wirtz et al., 2019.

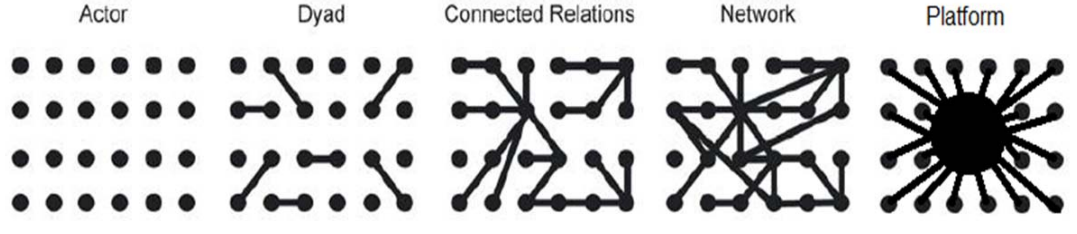
Supply chain and the platform business model

The supply chain is "a network of connected and interdependent organizations mutually and co-operatively working together to control, manage and improve the flow of the materials and information from suppliers to end users" (Aitken, 1998). One can mark an equal sign between this definition and the idea of a platform described in the previous section. However, supply chain management is definitely a more complex and multifaceted problem. First of all, integrated supply chain management covers the cooperation of many independent companies aiming to get the right product in the right way, in the right quantity and the right quality, at the right place, at the right time, and at the right cost (Mangan & Lalwani, 2016). But, the growing complexity of the supply chain, greater volatility in demand, disruptive technological changes, and the shortening lead-times of supply chain processes are making it increasingly difficult (Christopher & Holweg, 2017; Fore et al., 2017). In such conditions, access to information is a key success factor in supply chain management (Chopra & Meindl, 2013). Therefore, to improve competitiveness, the integration process must be developed between partners. The main conditions for supply chain integration are assumptions about partnership, trust, information transparency and the proper sharing of the risk and benefits between its stakeholders.

Except for sharing sensitive information (such as profits and losses), companies that collaborate within the supply chain share different types of logistics resources (i.e. plants, transport and warehouse space in cooperation with logistics service providers), knowledge, or even people (Ocicka & Wieteska, 2017). Since sharing profits and losses can be seen as characteristics of strategic cooperation or partnerships within a supply chain (Nowicka, 2011), the sharing of resources seems to be rather a business-as-usual model for managing the supply chain smoothly. This is a situation where supply chain competitiveness is supported, i.e. by logistics service providers or information technology companies, so, using the outsourcing model (Nowicka, 2016b).

Integration between partners in the supply chain is a process of sharing different types of resources within the network of stakeholders. Figure 3 illustrates the

Figure 3. From the supply chain to the supply platform



Source: Nowicka, 2017.

evolution of complexity in the interconnected network of supply chain relationships, indicating the interplay between interconnectedness and complexity in the shift towards the new supply platform paradigm. Each dot represents a company (supplier, distributor, retailer, etc.), and this is where both stakeholders establish dyadic relationships. Due to technology development, whole supply chains can be 'moved' to cyberspace and developed on an internet platform based on a cloud computing environment. In this case, the platform enables information and money flows to be coordinated, but it can still only rarely be used for the distribution of goods (Nowicka, 2017). This new business model changes the approach from linear flows to one that allows simultaneous access to information by all stakeholders.

Digital supply chain as a platform business model

One of the solutions that might be revised as a new concept of how platforms can be used to improve supply chain competitiveness is the digital supply chain. The digital supply chain can be defined as a new supply chain business model based on the properties of digital technologies, which aims to provide greater value than the current method (a detailed literature review on the term is conducted in: Nowicka, 2019a). The concept of digital supply chains changes the current way of organizing flows – by reconfiguring them – and adds value to them in a diverse way.

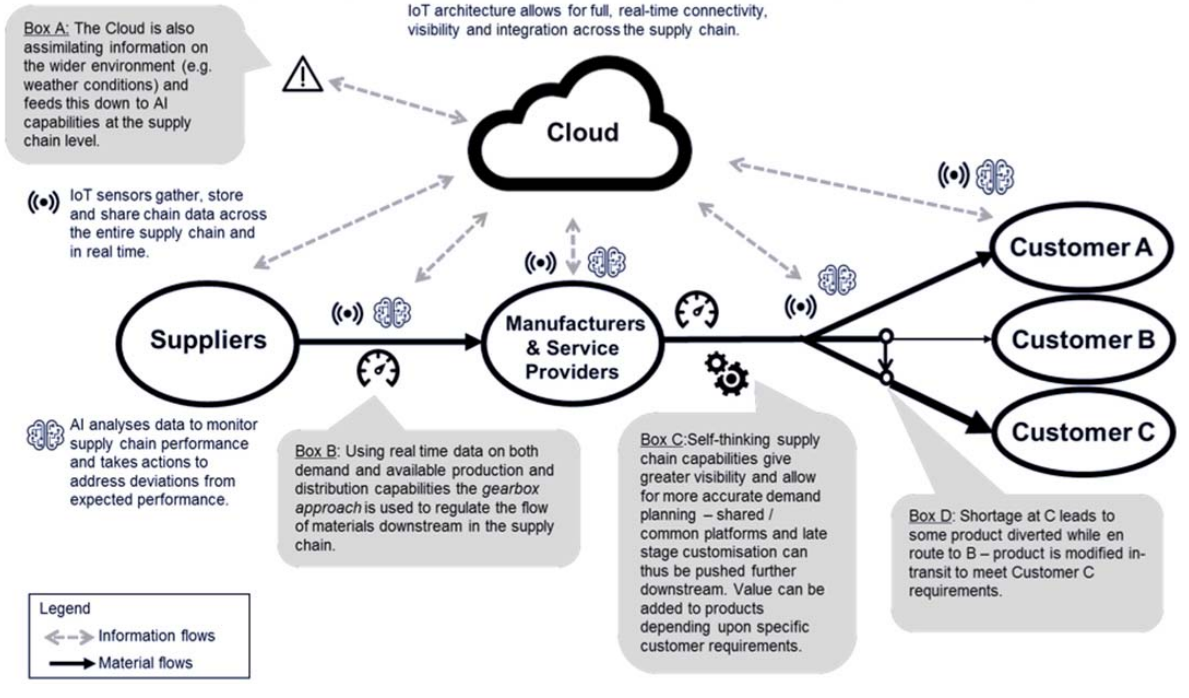
One example of a digital supply chain is the self-thinking supply chain developed by Augustina Calatayud et al. (2019) (Figure 4). This supply chain is based on a digital technologies ecosystem consisting of the Internet of Things (IoT), Artificial Intelligence (AI) and cloud computing (which in most cases is the base for the development of digital platforms) (Nowicka, 2016a). The increased connectivity amongst supply chain partners enabled by IoT, together with AI, allows, i.e. for more accurate demand forecasting, predictive maintenance and continuous optimization (Calatayud et al., 2019). A digital supply chain can be understood as a platform where data and information is crossed and exchanged between all stakeholders.

However, one can observe that such a solution is able to automatically coordinate all of the flows within the supply chain. Hence, nowadays, a digital supply chain based on the platform business model might be used mainly for standardized products or solutions where all of the flows are rather stable. In other cases, where the risks are more difficult to predict or the demand fluctuations are uncertain, a human factor within the supply chain management will be still dominate.

Platform business model as a link in the supply chain

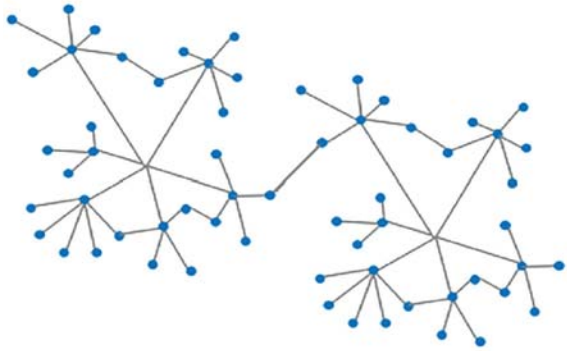
The introduction of the digital supply chain could be a domain of integrated supply chains where stakeholders are willing to share sensitive information. However, it must be underlined that, in practice, most supply chains are not integrated (Nowicka, 2019a). Also, most of the transactions between companies belonging to the same supply chain are not based on

Figure 4. The "self-thinking" supply chain



Source: Calatayud et al., 2019, p. 10.

Figure 5. Platforms as a link in the supply chain network



Source: author's own work.

strategic partnerships. This might mean that companies are more likely to look for and use short-term market opportunities than to build long-term relations leading to deeper integration between their current partners.

At the same time, many companies are developing their supply chains according to the specific needs of their particular product portfolio. Therefore, the digital supply chain based on the platform business model can be dedicated to these assortments. It can also be a new solution replacing that which is currently used. Additionally, managers can use existing platforms such as Amazon and Allegro to distribute their value proposition. All of these concepts are defining platform-based business models as additional business models in the supply chain configuration portfolio helping to differentiate distribution (multichanneling) solutions.

Moreover, the platform business model can be dedicated to help, i.e. sharing logistics resources such as transport and warehouse space, and information on production capacity available in different locations. In most cases, this is the domain of logistics service providers, who serve as virtual logistics hubs for information integration, cross-docking and redirecting flows of goods.

In the above solutions, the platform business model could serve as a link in the supply chain (Figure 5).

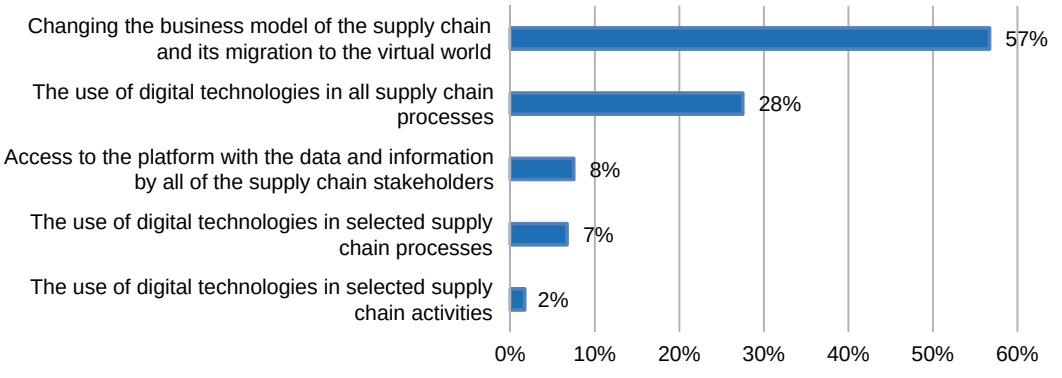
Digital supply chain and platform business model according to supply chain managers – results of pilot study

To identify the role of the access economy environment and the platform business model in supply chain management, it is worth analyzing the results of a pilot study conducted among supply chain managers. The research was undertaken in November and December of 2018 in Poland. Standardized questionnaire interviews (i.e. containing questions with a strictly defined order and unchanging wording, which were closed and had multiple choice answers) and the Computer-Assisted Telephone Interviewing (CATI) methodology were used. The sample was random. Contact was established with 1397 enterprises, and a representative number of 120 full interviews with supply chain and logistics managers were carried out. The response rate of completed questionnaires was 8.59%. The randomization algorithm built into the telephone testing software provided an equal chance for each of the records in the database to be in the sample. The presented results are part of an empirical study aimed at identifying the impact of digital technologies on supply chain transformation (Nowicka, 2019a). The following study results concentrate on the understanding and usage of the digital supply chain and platform business model by supply chain managers in Poland.

According to the research results, 57% of supply chain managers indicated that the digital supply chain is the concept of changing the business model of the supply chain and its migration to the virtual world. The second most frequently marked answer (indicated by 28% of the respondents) was "the use of the digital technologies in all supply chain processes." The third answer (8%) was connected with understanding the digital supply chain as an "access platform for data and information through all links in the supply chain." All of the results are shown in Figure 6.

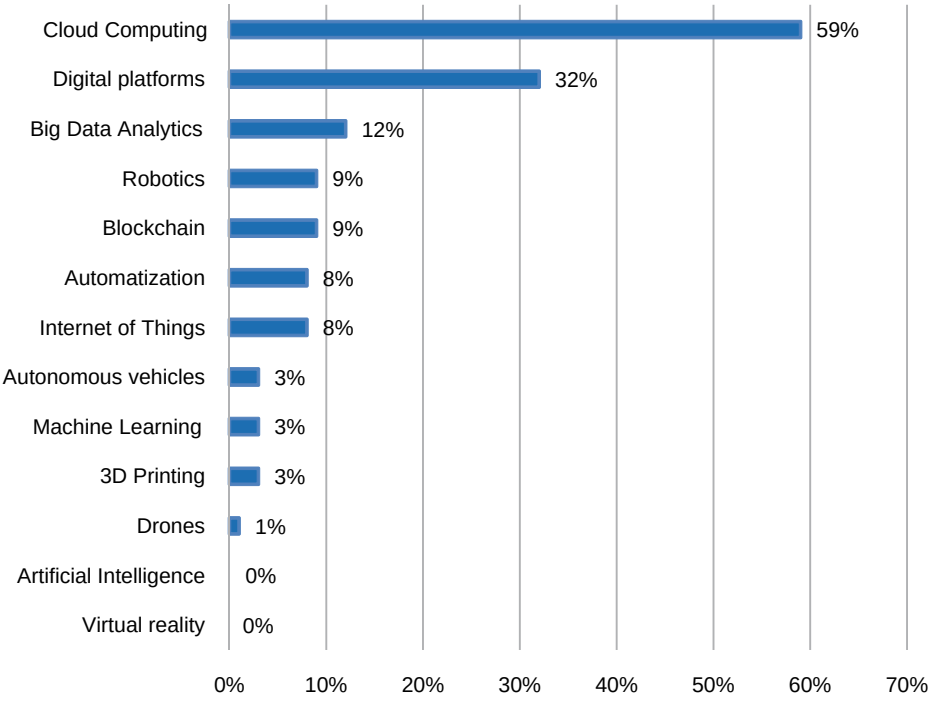
The managers are not identifying the digital platform directly with the digital supply chain. For them, the digital supply chain means the transformation of the current supply chain business model to the digital

Figure 6. Understanding of the digital supply chain by managers



Source: Nowicka, 2019a.

Figure 7. Digital solutions used in supply chain management



Source: Nowicka, 2019a.

one. They do not recognize the digital platform as a ready solution of the digital supply chain that could be delivered by, i.e. logistics service providers.

However, the results shown in Figure 7 underline the role platforms play in supply chain management – it was one of the most frequently chosen answers to the question concerning the usage of technologies or solutions in the supply chain. Digital platforms offering logistics services (i.e. transport or storage) was the second answer (after cloud computing), which was rated as the most frequently used solution in supply chain management. According to 32% of the respondents, digital platforms are the solutions which impact how the flows are managed.

The results shown in Figure 7 underlined the role of digital platforms in supply chain management on a daily basis. This could be understood as using platforms, i.e. for sharing resources between stakeholders. Keeping in mind competition in digital innovations (Nowicka, 2019b) by logistics service providers (Cichosz, 2018), further research on the business models of the digital platforms supporting supply chain competitiveness should be conducted. Especially in terms of distribution channel differentiation by accessing digital platforms.

Conclusions

The aim of the paper was to indicate the most important characteristics of the access economy and describe the ways the platform business model is impacting supply chain reconfiguration.

The access economy has a number of similarities to the characteristics of supply chains. Both of them are based on network effects, both share information and other resources between stakeholders. They connect demand with supply and use economies of scale effects. However, one of the most important differences that might impact supply chain competitiveness are digital technologies. They are still not that popular as a resource of supply chain management or an improvement tool for its competitiveness. At the same time, digital technologies are a base for the development of the access economy and a key element of the platform business model.

The results of the undertaken analysis show that, depending on the level of integration and the type of resources shared within a particular supply chain, digital technologies and digital platforms can impact supply chain reconfiguration in several ways and improve its competitiveness. They can have an influence, i.e. on:

- transformation of the company's business model,
- transformation of the supply chain business model (being a type of digital supply chain),
- developing the portfolio of the supply chain business models (multichannel),
- improving the range of available resources for supply chain management by being a supporting solution for the supply chain business model.

Digital platforms were presented as a base for developing new supply chain business models. This solution might also expand the portfolio of supply chain

business models, and function as an external support for improving existing supply chain management.

Based on a pilot study conducted on 120 supply chain managers at the end of 2018, it can be observed that digital platforms were mainly used as a solution supporting supply chain management in terms of differentiation of sourcing logistics services resources. At the same time, supply chain managers did not connect the concept of the digital supply chain with the platform business model. Based on the potential of the platform business model described based on a literature review, this might mean either that the supply chains are at an early stage of digital transformation with no clear outcome, or the digital platform is just a supporting solution. Due to these conclusions, there is a need for further research on the role of digital platforms in managing competitive supply chains in the access economy environment.

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