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Cloud computing as a factor of the supply chain competitiveness

In the supply chain management, it is difficult to clearly identify the borderline between the scope of the impact of individual enterprises on the level of competitiveness and, consequently, the competitive advantages of the entire system. On the one hand, it is an accumulation of elements that belong to the sphere of factor competitiveness (i.e. resources and methods of managing them in specific conditions of the business environment), and on the other, the ability and possibility to integrate the processes and activities in a holistic approach to the entire supply chain.

Yet, the decisions related to the selection of specific resources and instruments of competition are made at the level of individual companies. Consequently, the selected factors co-determine the resulting competitiveness of the supply chain, especially when it is integrated, that is the partners are involved in the cooperation, have common goals, also in strategic terms.

The key areas of competitiveness of the supply chain are identified in the sphere of costs, time, quality, and flexibility. In this perspective, particular factors (resources and instruments) should be examined against their resulting competitiveness, so the impact on the competitive position of both individual companies and entire supply chains.

Today, a special role in shaping the structure of competitive factors is played by information and telecommunications technologies. Among them, the importance of *cloud computing* should be noted, the properties of which may be a particularly interesting solution for the managers, by improving the listed key areas of the supply chain competitiveness.

The aim of the research was to identify the areas and range of the influence of using cloud computing in the supply chain management. The research was conducted in the context of strategic goals set in managing supply chains, addressing the issue of causes for its use, and in terms of identification of specific instruments under the influence of its application.

The survey was carried out in September 2016, on a sample of 122 companies using *cloud computing* in the supply chain management. The survey was conducted by the INDICATOR company, using the CATI method.

Study of competition conditions of companies

According to M. Romanowska, a competitive strategy can be defined as a way of gaining a selected competitive advantage to achieve a desired competitive position [Romanowska, 2009]. The competitiveness of a company itself can be seen in terms of factor and resulting competitiveness [Lubiński, et al., 1995].

The factor competitiveness is sometimes equated with the concept of competitive advantage, that is the effect of efficient use of a competitive potential, which is always relative (e.g. an offer better than that of the competition). Therefore, these are the assets of the company valued by the market, with which, in the long term, it can maintain or improve the efficiency and ensure a harmonious development.

G. Hamel and C.K. Prahalad search for the sources of competitive advantage mostly in the ability of a company to build the main skills cheaper, faster than their competitors; these skills, in turn create new products [Hamel, Prahalad, 1999]. The sources of competitive advantage are the company resources and the ability to use them. The sources of competitive advantage may include technological, market and organizational innovations, the ability to follow good models used by the market leaders, large capital resources, unique intellectual resources, protection from the state. Taking into account the concept of resources, the source of competitive advantage is a rare strategic resource and a unique ability to use it on the market.

Additionally, M.J. Stankiewicz points to instruments of competition forming a set of methods (measures) of cooperation, deliberately created by the company and used in order to win business parties [Stankiewicz, 2002]. The measures of competition instruments are aimed at a certain area of cooperation with a given group of stakeholders. Most often, it is about suppliers and customers, but also groups with which the relations are particularly important for the company. Naturally, the selection of resources and instruments is made in the context of conditions that prevail in a given area of competition – the sector or its selected part.

A resulting competitiveness specifies the effects of competition of the company, for example by a market share or financial

performance. These effects include the company's competitive position. It is determined against competitors in a sector (or a part thereof), or in a strategic group. Changing a competitive position in a given period allows to evaluate the effectiveness of the competitive strategy.

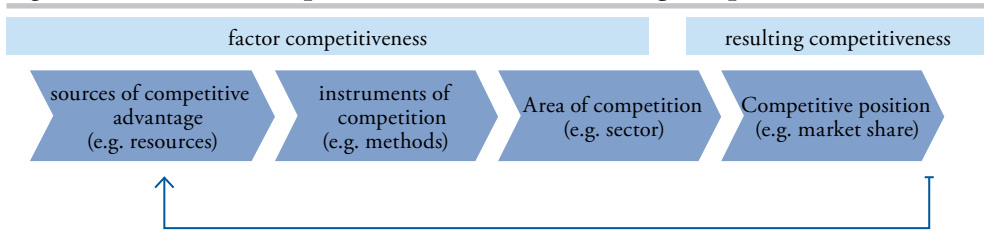
It is worth noting that cause and effect relations occur in the indicated elements. Here, one could also seek for feedback, in which the result of the analysis of the competitive position is a starting point for the evaluation of the existing scope of the used sources of competitive advantage, meaning the factors proving a competitive position. However, this is primarily a process, whose subsequent stages are presented in Figure 1.

The competitive position of a company and its possibility to sustain it depend on a constant revision of the structure of the selected sources of the competitive advantage. Thus, the changes taking place in a more distant and closer economic environment should be analysed systematically, depending on the pace of the changes occurring in particular segments of micro- and macro-environment. As a result, the company has a chance to make optimal choices in terms of structure of resources and instruments of competition – thus, the possibility to make a weaker or stronger impact on the market and competition, deciding on its competitive position and financial performance.

Competitiveness of a company and competitiveness of supply chains

Actions taken by individual companies account for competitiveness of the supply chain. According to M. Christopher, a supply chain is a network of organisations, involved through links with suppliers and customers in various processes and activities, which create value in the form of goods and services provided to consumers. Supply chain management is managing relations (partnership)

Figure 1 Elements of the process of factor and resulting competitiveness



Source: own elaboration.

with suppliers and recipients, as well as customers in order to deliver the highest value to the customer at the lowest cost for the entire chain [Christopher, 2016].

When analysing the factors of competitiveness of a company or a supply chain, first, the areas that may constitute a reference point for the decision on the structure of resources or selection of instruments of competition should be pointed out. Therefore, it is important to determine the expected effect in the selected area of competition. But it is directly related with the strategy adopted by the company and/or the supply chain. In conclusion, the strategy and its objectives dictate certain expected results, achieving of which enables an adequate selection of resources and instruments of competition in a given sector, meaning in terms of certain conditions.

The resulting competitiveness of the supply chain can be analysed in the context of costs, quality, time and flexibility. These four aspects belong to the most often indicated areas around which the activities of managers responsible for this part of operation of enterprises are focused. Specific measures and indicators can be attributed to each of these perspectives [Tarasewicz, 2014].

Due to the importance of dependencies occurring within supply chains, so the need for a holistic analysis, the reference literature often identifies key processes running along the entire supply chains. J. Witkowski indicates, though, significant discrepancies in various sources investigating the aspect of the types of processes integrated within the framework of the

supply chain management. The most frequently cited models of effective supply chain management comprise [Witkowski, 2009]: the Global Supply Chain Forum (GSCF), Supply Chain Operations Reference (SCOR), Suering and Goldbach supply chain management matrix. According to M. Christopher, the key processes in the area of managing logistics and supply chains include: developing new products, developing partnerships with suppliers, order realisation cycle and customer relationship management [Christopher, 2000]. Each of these types of processes involved in the integrated supply chain, although in a different perspective, is focused on improving the efficiency of flows. This is due to the fact that coordination of the flow of goods, money and information creates costs, so their quality determines the competitiveness of the whole system. Regardless of diverse activities within different process classifications, their core is the interdependence and sequence of events that occur in them. Because, consequently, it affects, for example, the level of total costs of the supply chain, thus competitive advantages.

In the competition conditions of today, the factors that stimulate the shape of supply chains can involve innovations, the concept of sustainable development, and the corporate social responsibility or centralising the role of consumer needs. Thus, these are supply chains aiming at the execution of a specific strategy, and their offer presented to their consumers (instruments of competition) is determined by specific values delivered by particular actors of this chain. So, innova-

tive products will be developed mostly by innovation-oriented companies. Where, it is not only about companies located at the level of manufacturers in a given chain, but the most important partners throughout the supply chain of an innovative solution, meaning also the suppliers, sub-contractors and other stakeholders – innovators. Similarly, in the case of implementation of the concept of sustainable development, the leaders of such chains are looking for and selecting partners in terms of specific criteria connected with the values pursued and represented by the suppliers. A key point become ethical, pro-social aspects, as well as actions compatible with respecting natural resources. Customers in such chains usually have also a certain level of awareness as to these values. Moreover, their consumers are increasingly interested not only in the way the product was made, but also in the way it is delivered, so whether the costs incurred by them support the development of the areas that they consider important in their system of values.

There is a need for an analysis of individual actions, which form the resulting competitiveness of the supply chain. Naturally, the resulting competitiveness in a holistic approach to the supply chain is an effect of a set of resources and instruments used by individual companies in that chain, which stimulate (or limit) its growth. The companies cooperating in the supply chains should offer significant values. These values, in turn, are reflected in the ability to select the mentioned resources and instruments to manage them in specific conditions of the economic environment of the company, or more broadly – the supply chain.

The foundation for shaping values, and so – competitive advantages, are resources. Both material and non-material resources may decide on the scope and direction of the development of the organi-

sation. An important factor is the ability to appropriately select them. The choice of the resource selection method coincides with the conditions of the sector in which organisations compete, and instruments fitted both to the features of the market and a given stakeholder, as well as availability of resources sought. Basically, it is not important whether the competing entities are the owners of the resources. What is important is whether they are able to find the possibility of access to the resources that are most appropriate part of the structure of the factors of competition in given circumstances.

Today, one of the most important resources (as well as the tools of competition) is *the Information and Communication Technology (ICT)*. According to GUS (The Polish Central Statistical Office) definition: *The term of information and communication technology (interchangeably called information and telecommunication technologies, teleinformation technology or information technology), refers to a family of technologies processing, gathering and transmitting information in an electronic form. IT technologies is a narrower term, which relates to technologies connected with computers and software, but not related to communication and network technologies. The development of these technologies makes that these two concepts become more and more consistent, at the same time being a driving force of civilisation, social and economic development* [Berezowska, 2010, p.7].

Undoubtedly, ICT transfers a large part of processes both of individual companies as well as entire supply chains into the world of e-business at an increasing pace. The growing digitisation of supply chains directly affects their innovativeness, re-configuring the paths used so far to achieve their results. The way of achieving these results is not so important, but the changes in their level are important. First, though, it is worth to diagnose the extent of the impact of technology on the

areas of the resulting competitiveness of supply chains.

Role of *cloud computing* in competitiveness of supply chains – factor and resulting approach

Cloud computing is a service allowing for access via the Internet to a shared set of resources (e.g. networks, servers, mass storages, software), which are configurable, available “on demand”, can be quickly allocated, and released with a minimal interaction of the service user, allowing for a flexible increase or decrease in resources depending on the current need [Mell, Grance, 2011]. There are three main types of services within cloud computing: Infrastructure as a Service (IaaS) – renting infrastructure to a customer (servers, disk space or a particular storage resource and computing power); Platform as a Service (PaaS) – renting to a customer of a virtual working environment located on servers of the service provider; Software as a Service (SaaS) – renting to a customer of necessary functions of software operating on the server and in the environment in of the service provider [Mell, Grance, 2011]. The main features of the *cloud computing model* include [Nowicka, 2011]:

- Scalability, or the possibility to dynamically allocate and release resources depending on the current demand, without having to maintain own infrastructure, as is the case in the traditional solution, where the entity is the owner of the assets.
- Data processing time is reduced in this model, as it is performed simultaneously on a significant number of servers, often geographically dispersed.
- The level of payment depends on the actually used computing power, bandwidth of the internet connection, and the disk space.
- The service is available via the Internet and standard network devices (computer or other mobile devices).

- The infrastructure is shared – many customers jointly use the physical infrastructure, technological platform or applications, which affects the economies of scale.
- Services are available “on demand” in the units depending on the service – a unit can be a user, amount of transferred data, transaction, or a combination of these values.
- There is a possibility to use the service individually, so that the users can install and configure software on their own.

In the research of “Harvard Business Review”, carried out on a global scale on 1,493 business and technology managers using *cloud computing*, the respondents stressed that its application results in an increase in the pace and possibility of adjusting the business to the changing conditions of the environment, reduces costs and enables development of new ways of business, innovation and cooperation growth. At the same time, they pointed out that the biggest barriers in its implementation are the concerns about the security of data, maintaining business continuity and the issues related to legal circumstances (i.e. compliance) [Harvard Business Review, 2011, p. 3, 5].

When analysing the context of factor competitiveness, it is worth to consider *cloud computing* as a resource and instrument of competition. The resources can be equated with the assets of the entity, its abilities, internal processes, attributes, information and knowledge, which are controlled by the company and with which it can pursue its adopted strategy [Barney, 1991]. In terms of what the organisation has, one could indicate, for example reputation, technological, IT, distribution infrastructure, meaning resources – assets. In turn, in the area of knowledge that is essential to functioning, skills and competencies are distinguished. Skills relate

to specific activities within a single organisation, and competences are a result of having various skills in the scope of many activities and processes [Rokita, 2005]. J. Barney, while dividing resources into capital categories, distinguishes the following categories: financial (having money or other advantages, possibility to obtain financial means from the outside of the organisation, future profits dedicated to activities of the company), physical (material elements of the company's assets, technologies that could be used with the assets held, techniques and computer systems, location of the pursued business activity), human (skills, experience, intellectual potential, personality traits of employees), and organisational (structure, regulatory systems, image/reputation, internal relations, culture, style of management, relations with the environment and stakeholders).

To answer the question whether cloud computing is a resource and to which category of resources it belongs, it is worth to consider its main components. They vary in terms of the previously indicated types of the acquired service. Moreover, depending on the way of implementation of this solution, the resources may be physically located inside or outside the company. The basic elements, at the same time being the basic kind of *cloud computing*, is infrastructure (as a service) and the connection providing access to data. As a further step, each time, though, with the use of indicated resources, specific solutions are delivered, e.g. software. In this context, *cloud computing* is a resource belonging to the category of physical capital.

But the essence of *cloud computing* are its properties, so the potential it provides to a company by creating a foundation for its development in a basically any direction and any scale. Its impact on the business activity is manifold. Since *cloud computing* is a solution belonging to the

service sector, which is connected with buying functionality of IT resources, consequently, there is no need to purchase them in a form of fixed assets. Moreover, in the model of payments, it is accounted for as consumed resources (*pay-as-you-use*). This makes it possible to allocate capital in other, alternative areas with a higher return. The most important, however, is the scope in which it can support the company in terms of its management and execution of business processes.

As a result of its application, the number of unnecessary operations is limited, or errors are eliminated due to the possibility of automation of some or all of business processes in the company, and more broadly – in the processes of the supply chain. Process automation can also mean a reconfiguration of business models of the supply chain and, for example, an elimination of entire groups of intermediate actors, which in the new conditions, do not add value to the system.

Its features reduce the previously existing barriers to access to the solutions, in which the time of company reaction to market changes, or the level of costs, were significant. The possibility to add new partners (stakeholders) to the network of cooperation is a potential to create solutions that meet the problems of offer individualization in terms of the varied systems of values of the customers.

When analysing the possible role of *cloud computing* in the sphere of supporting the development of the instruments of competition, the time of access to information, data processing or the range of resources resulting from its properties should be emphasised. In the cooperation with suppliers, it results in the possibility to immediately share knowledge, shorten the time of research and development work, thus to develop innovation in cooperation, reduce the costs of handling complaints and returns, or reduce the costs connected with the level of resources or

transport, due to access to information on these resources held by the partners on the supply side [Liu, et al. 2016]. It is also a solution that supports the possibility to search for partners globally, whose resources are currently not fully utilized, but may be made available to other entities within the specified time. On the side of cooperation with customers, *cloud computing* gives the possibility to engage customers almost cost-free in the creation of new values offered by the company (e.g. by means of using *crowd sourcing*), supports the development of multichannel operation, giving the customers a chance to choose the way of making (and often realising) orders, consequently increasing their level of loyalty. When it comes to acquiring potential new partners, the application of cloud computing should be analysed in the context of the possibility to respond to contemporary barriers limiting the efficiency of functioning of supply chains (i.e. improving the transparency of operations, improving the accuracy of operations, possibility to adjust the level of resources – including stocks – to the current level of demand, or the necessity to reduce costs) [Nowicka, 2014]. The effects of its application, though, should each time be examined in terms of conditions of the sector and the features of particular partners (supply chains), to which the application of given instruments of competition is planned.

Therefore, *cloud computing* is a resource, as well as an instrument, which in a complex and diverse manner is able to affect the structure of factors shaping the competitiveness of not only a single enterprise, but more broadly – the supply chain. The described aspects constitute a starting point to the analysis of the potential impact on the factor and resulting competitiveness in the supply chain management, in view of the changes in costs, time, quality and flexibility.

Cloud computing in the supply chain management

In the research conducted by the INDICATOR company using the CATI method among 122 enterprises, the respondents evaluated the role of *cloud computing* in the supply chain management. The research was carried out in September 2016. A total of 68 production companies, 38 service companies and 16 production and service companies operating on a global scale took part in the research. Among them, 51% of the respondents are medium-sized companies, 43% large companies, and 6% small companies. The respondents used *cloud computing* mostly in the SaaS (61.5%), IaaS (27%), and PaaS (11.5%) model.

Reduction of costs was indicated by the respondents (78% of the indications) as the most important (priority) objective of the supply chain management; second (of equivalent weight) were – increasing innovation and timeliness of deliveries (with around 7%). At the same time, the increase in innovation proved to be a very important strategic objective to almost 60% of the respondents. In turn, the timeliness of deliveries was indicated as a significant objective by 26% and as an important objective by 20% of the surveyed. The rating of importance of the strategic objectives of the supply chains is presented in Figure 2.

The perspective of strategic objectives can be a reference point to the analysis of reasons for using *cloud computing*. The most important reason for the application of this solution indicated by the respondents is the low cost of access to the latest IT solutions (or limited capacity of their own IT infrastructure) – 71% of the indications. Subsequent main reasons are: the need to increase the level of innovation (47%) and the need to access to advanced technological solutions in the logistics and supply chain management (47%). The reasons indicated as very important when

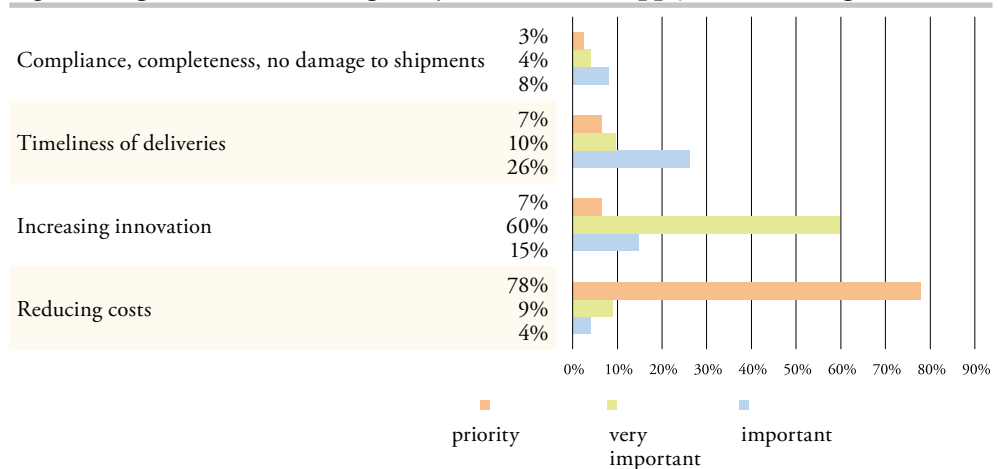
choosing *cloud computing* are: the need to improve transparency and increasing flexibility of operation (79%). It is worth noting that transparency of the supply chain means the ability to react quickly to changes, and to access information on the level of stocks in different locations of the supply chain [Chiang, 2017]. Another major reason was the access to the platform linking data in order to automate the processes in the supply chain (67%) and – *ex aequo* – the need to shorten the time of execution of the processes and the need to change the business model to an e-business model, i.e. using the Internet as a place of business (65% of the indications each). A detailed classification of the significance of the reasons for using cloud computing in the supply chain is presented in Figure 3. A certain relation between the areas indicated as the most important strategic objectives in the supply chain management and the reasons for which the respondents chose to use *cloud computing* can be observed.

Undoubtedly, the main area is the need to reduce costs. However, because it is basically a universal objective and such that permanently accompanies doing business, apart from it, it is worth noting also the remaining aspects highlighted by the respondents. The two further reasons for the application of *cloud comput-*

ing were related to the need to improve the level of innovation – both in the respondent’s company, as well as in the supply chain, in which it cooperated. These responses fulfil the strategic objectives indicated earlier, among which increasing innovation was very important to 60% of the respondents, and at the same time, it was the objective six times more important than the next objective (meaning, the timeliness of deliveries). Therefore, an in-depth study of the correlation between the adopted strategic objectives and the reasons for using *cloud computing* by particular groups of respondents that would refine the dependencies between the variables examined will be essential.

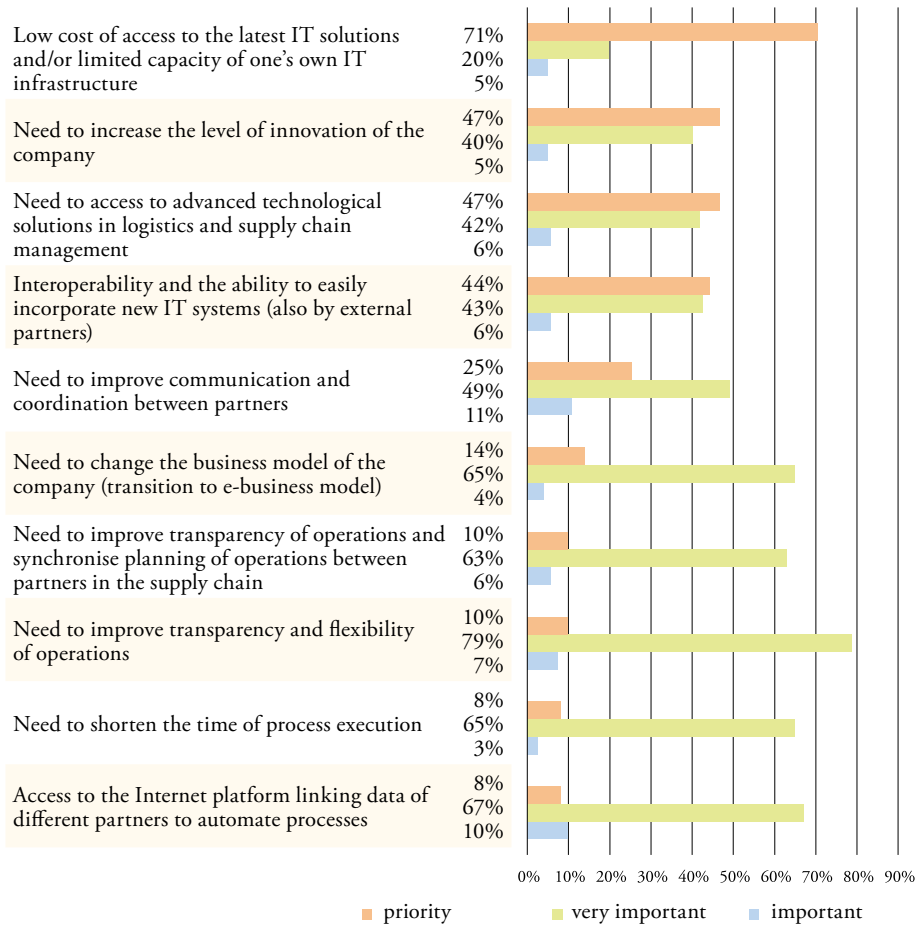
When analysing the essence of cloud computing in terms of factor competitiveness, that is seeing this solution as an asset that stimulates competitive advantages of supply chains, the areas of competition that change most due to the application of *cloud computing* should be distinguished. According to the respondents, this solution has the greatest impact primarily on the possibility to limit the level of stocks kept and to increase their rotation – 82% of the respondents agreed with such statement. Secondly, increasing automation of processes by eliminating some operations (or their performance by IT systems) was indicated. This opinion was expressed by

Figure 2 Significance of strategic objectives in the supply chain management



Source: own elaboration based on the results of the INDICATOR company research.

Figure 3 Reasons for using cloud computing in the supply chain management



Source: own elaboration based on the results of the INDICATOR company research.

almost 79% of the respondents. The third major area of changes resulting from the application of cloud computing was the possibility to communicate with several partners in the supply chain simultaneously in real time (almost 75% of the indications). The ranking of the areas subject to the greatest changes due to the application of *cloud computing* is shown in Figure 4.

The potential and opportunities that the companies obtained using *cloud computing* in the supply chain management, translated into a set of effects accounting for the level of the resulting competitiveness. These effects can be grouped into three areas – changes in terms of costs, time, and quality. As pointed out, these three areas are also the main points of reference in the context of the creation of

indicators to assess the quality of actions undertaken by the companies managing the processes of the supply chain.

In terms of the impact of *cloud computing* on the reduction of costs, the respondents mentioned activities associated with the execution of orders, as those where the greatest changes were observed. Whereby, the differentiation in the level of the reduction of these costs was significant. More than 16% of the respondents found that the costs related to the execution of an order dropped by 10% due to the use of *cloud computing*, 8.2% of the surveyed evaluated this indicator at the level of 15%, whereas according to 9.8% of the respondents the costs declined by 5%. The second major area of change in terms of limiting the costs was handling claims – 22.1% of the surveyed indicated

the decline in costs at the level of 3%, and 18% at the level of 5%. Similar relations of the impact of *cloud computing* on the reduction of costs was recorded in terms of handling returns. In the context of the two basic logistic activities, i.e. transport and storage, the respondents also noted a reduction of costs. Among the companies, where the costs of transport dropped, the largest group of respondents (23.1%) indicated their reduction by 12%. In the case of storage 34% of the respondents who reported decline in costs in this area, estimated it at the level of 10%.

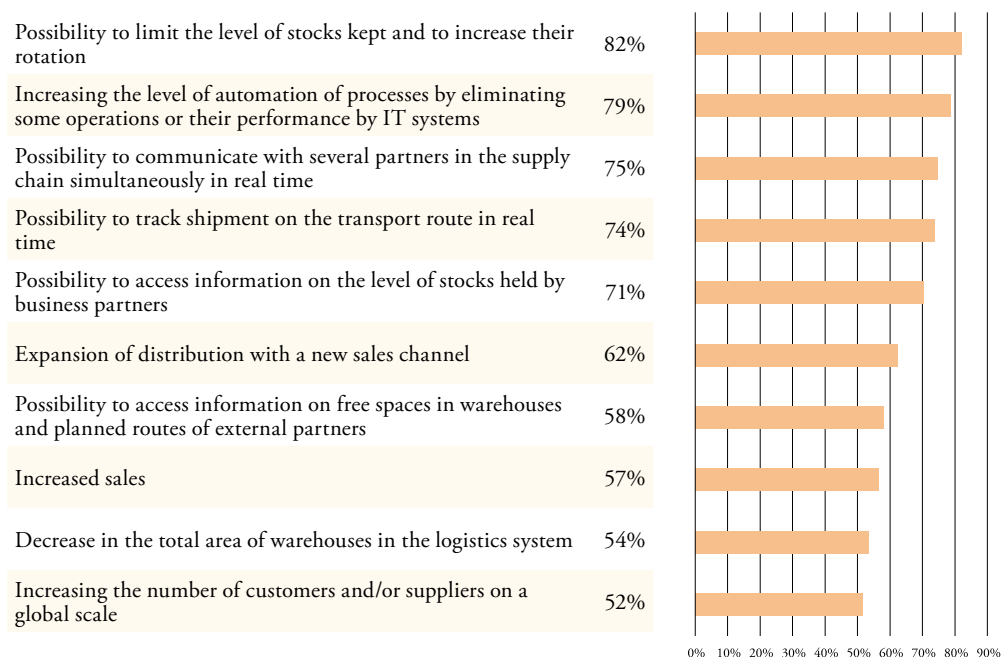
In terms of the impact of cloud computing on the time of execution of operations and processes in the supply chain, the surveyed indicated the following three main areas: time of handling complaints – 78.7% noted changes in this aspect, and 22% of them declared limiting the time by 4 days; time of execution of an order – 77% indicated changes in this scope, 27.7% of which admitted to reducing the time of this process by 2 days; time of payment of liabilities – 75.4% of the surveyed pointed out that the application

of *cloud computing* limited the time in this sphere, whereas 18.5% of them stated that this time was 10 days.

Regarding the role of the examined solution in shaping quality in the supply chain management, the respondents indicated its greatest impact on improving timeliness of deliveries to consumers (48.4% of responses), increasing the level of complete orders delivered to end customers (24.6%) and improving the demand planning accuracy (13.9%).

By analysing the above results of the research in the context of factor and resulting competitiveness identifying the role of *cloud computing* in the supply chain management, it must be stated that the reasons for its choice resonated with strategic objectives adopted in the supply chain management. Their essence today is the need to reduce costs and increase innovation and for exactly these reasons the respondents decided to implement cloud computing in the supply chain processes. This instrument was used by them primarily in the area of limiting the level of stocks and increasing their

Figure 4 Areas of effect of using cloud computing in the supply chain management



Source: own elaboration based on the results of the INDICATOR company research.

rotation, which, consequently, affects the level of the costs of maintaining stocks, shortening the time of the flow of goods and money in the supply chain. The respondents recorded also the possibility to automate selected operations and processes, as well as the possibility of simultaneous communication with supply chain partners. These factors also have a direct impact on reducing costs, shortening the time and improving the quality of cooperation. They constitute also a reference point to create competitive advantages, thus, to improve the resulting competitiveness.

Conclusions

The companies do not operate in the market space completely independently, and the actions undertaken by individual companies affect others, and ultimately define the competitiveness of entire supply chains. The resulting competitiveness in a holistic approach to the supply chain is an effect of a set of resources and instruments used by individual companies in that chain, which stimulate (or limit) its growth. The companies cooperating in supply chains should offer significant values. These values, in turn, are reflected in the ability to select the mentioned resources and instruments to manage them in specific conditions of the economic environment of the company, and the supply chain.

Today, the ICT is indicated among the factors of competitiveness. As it turns out, *cloud computing* is a resource, as well as an instrument, which, in a complex and diverse manner, is able to affect the structure of factors shaping competitiveness of not only a single enterprise, but more broadly – supply chains stimulating their integration and improving the quality of management.

Among the most important conclusions from the study in the context of fac-

tor and resulting competitiveness identifying the role of *cloud computing* in the supply chain management, first, it must be stated that the reasons for choosing cloud computing resonate with strategic goals adopted in the supply chain management. Their essence today is the need to reduce costs and increase innovation and for exactly these reasons the respondents decided to implement cloud computing in the supply chain.

In terms of the impact of *cloud computing* on the reduction of costs, the respondents mentioned activities associated with the execution of orders, handling complaints and returns, as those where the greatest changes were observed. This may apply to a situation of the possibility to change the way of executing these processes into a virtual way, in which operations that do not add value are excluded and the costs of personnel involved is reduced. In the context of the impact of cloud computing on the time of execution of activities and processes, the respondents pointed to three main areas: handling complaints time, order execution time, and liabilities payment time. In this case, a situation in which processes are implemented with the application of the internet platform through which they may be performed in real time may serve as an example. In terms of the role of the examined solution in shaping quality in the supply chain management, the respondents indicated its greatest impact on improving timeliness of deliveries to consumers, increasing the level of complete orders delivered to end customers, and improving the demand planning accuracy. Using cloud computing in these areas enables tracking the execution of individual actions and reacting to them immediately in real time, should adverse events happen. It is worth noting that these instruments are now vital in the competitive struggle in the area of supply chain management.

Undoubtedly, the quality of selection of competitive factors affects the level of results determining the level of the competitive position of the company. Decisions as to the structure of resources and instruments of competition are mostly made at the level of individual entities. It is worth taking a holistic view, taking into account the interdependence between companies and to select factors of competitiveness in this approach as well.

The solution of *cloud computing* fosters the improvement of the resulting competitiveness, both at the level of a company,

as well as supply chains. Apart from the examined specific areas subject to changes due to the features of cloud computing, it can shape entirely new business models of supply chains. This flexibility and growth potential in a global scale of various supply chains, though, should be considered also in the institutional context. This is due to varying regulations governing data protection principles. Therefore, in each case, the implementation of this solution requires also making microeconomic analyses defining the conditions of using the potential of cloud computing in different parts of the world.

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