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VIRTUALIZATION OF WORK IN GLOBAL SUPPLY CHAINS

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ABSTRACT. **Background:** The paper is devoted to the notion and benefits of implementing virtual work in global supply chains. Virtual work must be understood as an intentional activity of a human being, aimed at rendering services (tangible and intangible), by means of ITC tools, performed in a distance from the traditional place of work, in a mobile manner. The empirical research were conducted on the basis of 4 case studies of global leaders of supply chains, which in accordance with M. Fisher's classification, represent two types. The case studies confirmed the positive influence of virtual work both in effective and flexible supply chains. Favourable market and technological conditions and increasing awareness of benefits of virtual work will make it more and more widespread in companies comprising global supply chains.

The aim of the study is to demonstrate the cause and effect relationships between virtual work and competitiveness of efficient and flexible supply chain.

Methods: The paper is based on the available recent scientific-theoretical research and publication. The authors analyzed 4 enterprises in Poland. The enterprises representing a flexible or an effective supply chain, either using or not a virtual work. The study carried out the authors had the form of individual interviews. The authors used case studies to show that virtual work brings notable benefits in an effective and flexible supply chain.

Results: Based on these case studies, the authors demonstrated reasons to implement virtual work in selected enterprises. The reasons to implement virtual work are determinants of possible achieve economies in effective and flexible supply chain

Conclusions: The examined case studies show that virtual work brings different benefits. In the effective supply chain, virtual workers enable to increase effectiveness and financial results for example. In the flexible supply chain the virtual work can be a way to maintain and build long-term relations with suppliers and customers.

Key words: virtual work, supply chain, supply chain management, flexible supply chain, effective supply chain, new methods of work.

INTRODUCTION

Global economic crisis significantly increases the pressure on reduction of cost and risk connected with the functioning of global supply chains. Among many ways to reduce the cost and the uncertainty of demand for the products of supply chain the essential one is the increase of information transparency due to modern ICT solutions. The popularisation of SCM class business apps not only contributes to the increase of the scope of logistic and production outsourcing, but it also creates possibilities of better usage of own resources and the control over them by implementing modern forms of work outside the companies' offices. Virtual work is such a form of work, which must be understood as an intentional human activity leading to rendering services (tangible and intangible), with the use of ICT tools, performed in a distance from the traditional place of work, in a mobile manner. Virtual work spaces is not only sharing knowledge important, having virtual shared workstations that allow real-time communication and exchange of documents is equally important [Marquez 2006]. The most

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competitive companies will be those that do the best job of getting their people to work together and solve problems [Hegar 2012].

Separating virtual work from telecommuting, seems to be legitimate, because of a few features differentiating these innovative forms of work. Both one and the other form are not traditional ways of performing work, based on direct relations of superior-subordinate type. Especially that in practice, telecommuting is associated with work in call centres, telemarketing or customers' service. Fig. 1 shows similarities and differences between telecommuting and virtual work.

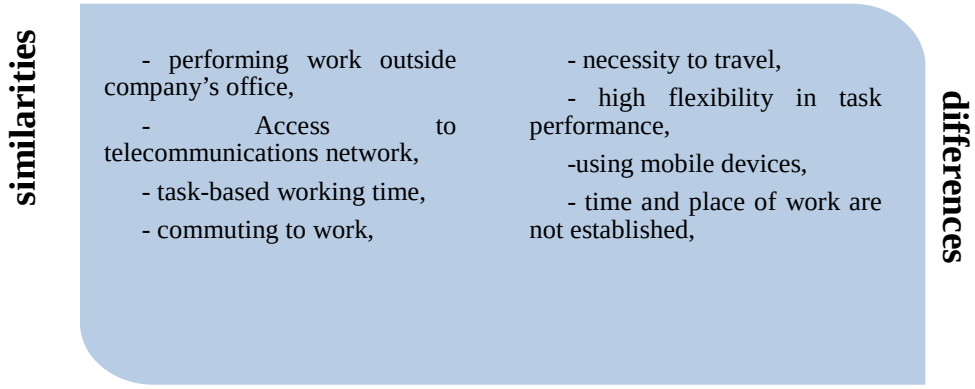

Fig. 1. Similarities and differences between telecommuting and virtual work
Rys. 1. Podobieństwa i różnice między telepracą a wirtualną pracą

The characteristics of virtual work are:

- work out of the office (in the office of a customer, supplier, competitor or a branch of the company)
- high mobility of the workers
- high flexibility (change of places, change of plans, and the order of their realisation)
- the usage of remote devices (a mobile phone, a portable computer, a tablet, etc.)
- the need of internet access and company's data,
- the lack of imposed working hours,
- constant actualization of obtained information.

The performance of work outside the company's office becomes more and more popular; in particular it is visible in countries, which are the leaders of e-business solutions [Waśniowski 2013]. Virtual work is a task-based system of work. The realisation of particular tasks is essential to asses and review the progress of employee's work performed for the employer. Operational goals and tasks require work, and the source of success can be the form of their performance and precious information from mobile workers [Michalski 2011]. A virtual worker, spends most of his time out of the office, hence they have the most profound knowledge of suppliers and competitors.

The concept of corporate social responsibility stresses good interpersonal relations in mutual communication. Performing work out of the company's office demands a great deal of trust on behalf of the employer and a huge freedom of working time organisation and different forms of communication with suppliers and customers. The creators of virtual work are changing circumstances. The development of virtual work is, on one hand, the resultant of market, technological and legal conditions. On the other hand, it results from the needs of an employer and employees.

VIRTUAL WORK STATION IN SUPPLY CHAINS

In the knowledge-based economy, enterprises try to obtain market information as it brings notable benefits. One of a virtual employee's tasks is to obtain, to process and to transfer information on customers, competitors, service providers and other co-operators. In particular it is possible to indicate a certain connection between the obligations of a virtual employee and the location of so called information border point in a supply chain, to which directly get through the information on actual sale and on the behaviour of final customers [Witkowski 2010]. Thanks to virtual workers it is possible to gradually move the information border point from the customers towards suppliers, which results in a significant improvement in the operation and the development of the whole supply chain. Additionally, virtual work increases the effectiveness of synchronization in supply and demand streams in a supply chain, by physically moving the border point down the supply chain, creating favourable conditions to change the principle of flow of product streams from push system (the flow pursuant to plans and forecast), into pull system (the flow pursuant to current information on actual demand). Figure 2 presents the connection between information and physical border point, and the usage of virtual work in the supply chain.

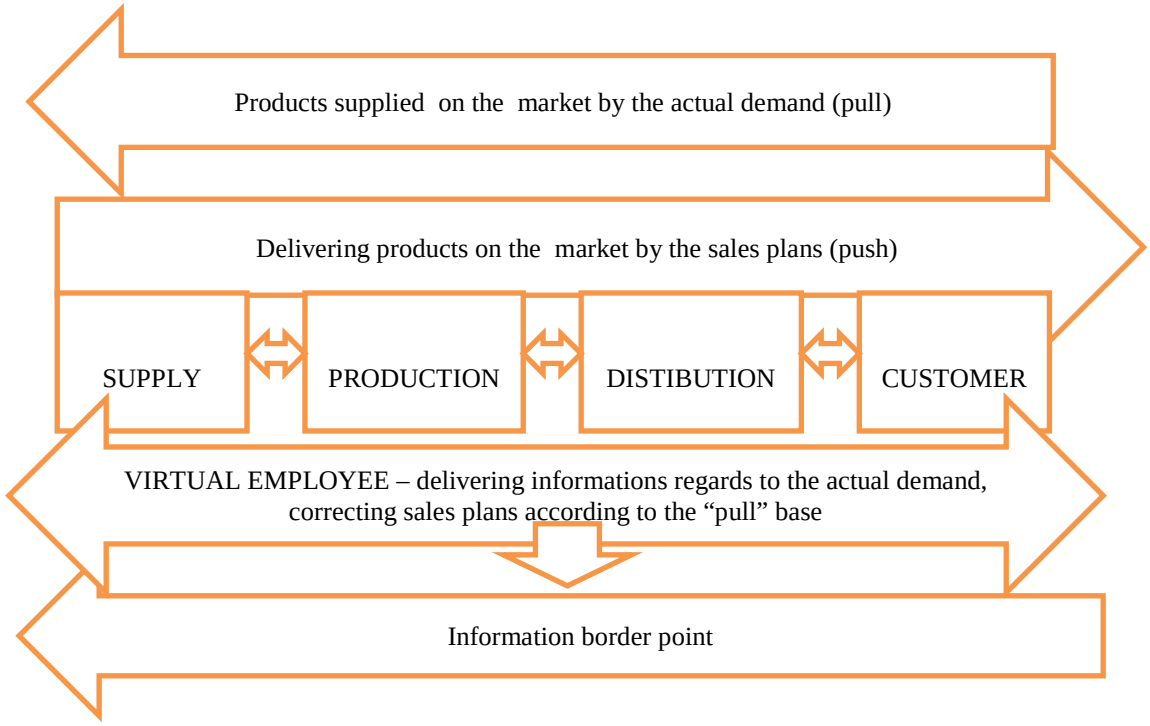

Fig. 2. The conception of virtual work in supply chain
Rys. 2. Koncepcja wirtualnej pracy w łańcuchu dostaw

The key task of a virtual employee is to transfer information on demand as far as possible down the chain. Thus, if all the participants of a supply chain will be systematically informed on the actual demand and its fluctuations, they will be able to react to such information. A virtual worker, who is closer to the customers can better understand and forecast their behaviour, at the same time having a possibility to analyse the transaction data.

The implementation of virtual work requires a deep analysis of its implementation and the character of work. It comes down to indicating the possibilities of replacing

the traditional work station by a virtual performance of tasks. It is beyond doubt, that not all positions enable working out of the office or from home; a limitation might be the time of performing tasks or the necessity of physical presence. However, as a consequence of progressive IT implementation in different areas of economy and society, more and more tasks can be performed in the virtual world by means of mobile ICT tools.

Virtual work refers to performing tasks out of the company's offices, in the field, at the customers' or co-operators' places. It requires using mobile devices to maintain constant contact and access to company's data. In the case of such form of work, employees are goal- and task- oriented, and the time and place of doing the job are less important. Thus, such form of work is not meant for everybody, and requires predispositions and very often the ability to join personal and professional life. Social and psychological basis to do work in such a form is extremely important as it influences the effectiveness of its implementation at certain positions. In order to present the areas of supply chain, where virtual work might be implemented, only possibilities and limitations connected with the transfer of some elements of employee's obligations to virtual space will be taken into account. It must be realised that many processes and activities in a supply chain require physical presence of workers. In table 1 possibilities of virtual work usage in different stages of supply chain flow are presented.

Table 1. Virtual posts in accordance with the stages of supply chain flow
Tabela 1. Wirtualne stanowiska pracy zgodnie z etapami przepływu w łańcuchu dostaw

Virtual position	Possibilities of implementing virtual work	Examples of application
PROCUREMENT		
Procurement specialist	Acquiring new suppliers	Work performed on the move, looking for new suppliers
Supplier service specialist	Common design of goods and implementation of product and organisational innovations	Constant contact with suppliers, quick information flow, new ideas
Investment consultant	Common enterprises and market analysis	Mobile work. Consultation concerning the location of manufacturing plants and warehouses
PRODUCTION		
IT specialist	Service and maintenance.	Maintenance and service by remote access to IT systems.
Project manager	Designing new solution in the production system with applying the knowledge of suppliers	Designing new solutions, in a mobile way, at home, out of the office
Technical consultant	Consultancy and intermediate trade between suppliers, manufacturer and retailer with regard to usage and value in use and utilisation of the product	Organisation of trainings at suppliers and customers, service and consultancy at the customers'' places
On-line customer consultant	On-line consultancy	On-line consultancy
DISTRIBUTION		
Sales consultant	Consultation with regard to the usage of the product and new solutions	Work at the customer's place or on-line
Data base operator	Acquiring and processing market information	Acquiring information on new markets
Mobile customer service consultant	Dealing with complaints and after-sales service	Service at the customer's place or out of the office
RETURNS		
Returns specialist	Seeking possibilities of re-use of waste, waste and returns management	Acquiring information on waste recipients, cooperation with waste recipients

Improvements in a supply chain result among others from an effective and quick information flow and a real-time access to information. It can be obtained by way of integration of IT systems of supply chain participants, which has certain limitations due to the lack of trust between partners, risk and high cost of transactions. A second way of passing current information on market situation is the workers who penetrate the market while doing their job out of the office. Considering the increasing importance

of interpersonal relations and the necessity "to be close" to the customer and co-operator, the access to such information can be much easier and more effective because of virtual employees. Exemplary processes which can be improved with the use of virtual work are (see Table 2):

1. processes connected with customer service,
2. supply and demand planning and forecasting,
3. transport processes.

Table 2. Improvements in selected supply chain processes with the use of virtual work
Tabela 2. Poprawa wybranych procesów łańcucha dostaw dzięki wykorzystaniu wirtualnej pracy

Exemplary supply chain processes	Possible improvements
Customer service processes	Information on terms and conditions of a transaction before its conclusion. Shortened lead time and increase in flexibility and reliability of deliveries during and after transaction.
Demand planning	Quicker and more effective reaction to changes in demand, analysis of changes and its determinant factors.
Sales forecasting	Greater accessibility to first-hand information, reacting to customers' needs and competitors' policy. Better preparation to promotion activities.
Transport	Planning, organizing and monitoring of transport. The choice of carrier and optimisation of routes and times of transit.

Table 3. The reasons for choosing virtual work in a supply chain
Tabela 3. Przesłanki wyboru wirtualnej pracy w łańcuchu dostaw

The reasons for choosing virtual work in a supply chain	Explanation
Savings	Savings with regard to the equipment of work stations, necessary social facilities and office space.
Acquiring information straight from the horse's mouth	Acquiring information directly from customers and co-operators.
Development of global networks	The necessity of constant relocation of employees on international supply and demand markets
Development of information technology	Possibility of performing work without being physically present at work
Fluctuations in the intensity of work	Possibility of adjusting intensity of performed tasks to the needs of an employee and an employer

Virtual work can be applied wherever there is a necessity to obtain information, contact with customers and suppliers, and the physical presence of an employee is not required at the company's office. Virtual workers can comprise a factor bonding together the management of customer relations with the management of supplier relations. A high level of mobility of virtual employees, a constant access and acquiring information from both ends indicate that virtual work in present market conditions might be an effective and future form of improving the supply chain operation. A few reasons for choosing virtual work in a supply chain are presented in table 3.

As a consequence of changes happening in economy, such as the development of information society as well as dynamization of new branches and businesses in economy, concentrated on the flow of information, the number of professions possible to perform in different forms of telecommuting (such as virtual work) and independently of location will increase [Harnik 2008]. The new form of rendering work, whose main objective is the increase of effectiveness and efficiency of supply chain operation, originates from new market needs and a new role of an employee. Both factors are strictly connected together. The development of the concept of supply chain management created new personal needs, posing new challenges to managers. The necessity to meet the customers' needs and to face competition redefined a number of issues in the current operation of a supply chain. Nowadays the management of an enterprise and a supply chain is characterised by flexibility, so the employees of different management levels need to adopt the same approach. Table 4 presents tasks and the way

of its realisation at selected virtual positions in a supply chain.

Table 4. Selected positions in a supply chain realised in the form of virtual work
Tabela 4. Wybrane funkcje w łańcuchu dostaw realizowane w postaci pracy wirtualnej

Position/function	Tasks to be performed	Implementation of virtual work
Purchasing manager	Acquiring knowledge of procurement market. Managing supplier relations.	Work out of the office, seeking new suppliers, facilitating the cooperation with current suppliers, maintaining long-term relations with suppliers. Establishing the strategy of cooperation.
Customer service manager	Prepares the standards of customer service, provides meeting the needs of a customer and supports company's operation	Acquires information directly from customers or from the sales network
Logistic services trader	Seeking and on-line sale of transport and warehousing services and other specialised services to third parties	Seeking potential customers to sale transport services (i.e. transport exchange), location of warehouses and warehouse equipment adjusted to customers' needs
Procurement manager	Identifies sources of supply globally, selects suppliers, arranges contracts and manages existing suppliers	Seeks new sources of supply globally, facilitates current cooperation through joint undertakings and maintains present contacts connected with the flow of goods and information
Supplier development manager	Monitors the efficiency of suppliers, indentifies entities which need to increase their efficiency and helps to excel the processes performed by a supplier	Coordinates the cooperation with suppliers, analyses the efficiency, timeliness of deliveries and payments in real time. Initiates and supports undertakings realised together with suppliers.
Supply chain manager	Analyses existing procedures and examines possibilities of making the processes in a supply chain more efficient, analyses the flow of capital in order to meet the requirement of final customers	Coordinates the processes realised in a supply chain, obtains the knowledge directly from the market and in accordance with the needs directs the improvements of realised processes

It must be realised, that the described tasks realised in a supply chain by virtual managers, mainly rely on the flow of information. Care and diligence, while using modern IT tools, decides on the effectiveness of their work. This is about using and on line access to company's business apps such as CRM, MRP, ERP, SCM and other functional modules connected with monitoring and informing superiors systematically on the extend of achievement of goals. They realize that although this in not their strength, developing the true supply chain manager in not something that can simply be outsourced only to human resources [Fawcett, Ellram, Ogdan 2007], because people are the most valuable asset.

BENEFITS AND THREATS OF VIRTUAL WORK IN A SUPPLY CHAIN

Virtual work, which is based on information, constitutes one of the ways of obtaining goals of a supply chain. Each participant of a supply chain expects the biggest possible benefits, which require greater trust, exchange of information and partnership [Nalebuff, Driffield et al., Ciesielski 2013]. The question is how can one achieve it while using human resources, skills and competences of employees and build permanent relations, to find and keep customers? Which benefits of virtual work implementation can be obtained by particular links of a supply chain? Due to the shorter life cycles of products, the pressure of dynamic adjust and adapt the supply chain is increasing [Gattorna 2010].

Thanks to virtual employees the exchange of information between particular links of a supply chain becomes quicker and more effective and comprises a significant element of improvement of its operation [Report HBR 2006]. Information has a big influence on each aspect of a supply chain and affects its control, whereas appropriate information may improve its operation and reacting [Chopra, Meindl 2010]. The premise to implement virtual work is acquiring and processing information, flexibility and swiftness of operation, performing work there, where it is needed at that moment. Thus, it can be stated that the usage of virtual work in a supply chain brings a lot of benefits (see Table 5).

Table 5. Selected benefits of implementing virtual work in a supply chain
Tabela 5. Wybrane korzyści wdrożenia wirtualnej pracy w łańcuchu dostaw

Benefits of implementing virtual work in a supply chain
Better usage of employees' potential and optimal adjustment of staff to the needs
Lowering the cost of administration, benefits, recruitment, trainings, etc.
Better control of effectiveness of workers, assessment of results
Possibility of hiring for seasonal jobs or specialised projects, tasks
Possibility of work in a few places at the same time (there are no spatial and timing limitations)
Joint inter-organisational planning of sale and operation
Possibility to design, conduct research for several links simultaneously
Elimination of wasting time, travel expenses, which contributes to environment protection
Higher productivity, does not interfere with the work of the whole department or the whole organisation
Lower cost of properties, office spaces and energy bills

Table 6. Selected benefit of implementation of virtual work for an employer and an employee
Tabela 6. Wybrane korzyści wdrożenia wirtualnej pracy dla pracodawcy i pracownika

SELECTED BENEFIT OF IMPLEMENTATION OF VIRTUAL WORK	
Employee	**Employer**
- an increase in efficiency of work (result-mindedness, goal achievement) - possibility of hiring disabled people and employees on a child care leave - lowering the cost of commuting - more effective time management (savings) - an increased possibility of employing people from small communities - adjusting work to one's own biological pace of life	- reducing cost of company's operation (office space, the number of paper documents) - increase in efficiency of work (nobody is late, nor stuck in a traffic jam on the way to work, reducing the periods of incapacity to work due to illnesses) - greater possibilities of acquiring workers with high qualifications - employees may demonstrate a greater willingness and readiness for work (they do not waste time and strength while commuting) - possibility to adjust the number of employees to actual needs (infrastructure savings) - possibility to employ people from small communities, where the average salary is lower

There are many benefits resulting implementation of virtual work, and the reduction of time and cost in a single enterprise, finally translates into the benefits of the whole supply chain. The set of benefit resulting from the implementation of virtual work can be divided into ones connected with an employee and ones connected with an employer. It is worth noticing, that chosen benefits, and even most of them, are strictly connected with the concept of management though goals, where the result is a significant motivation factor, not time and method or tool necessary to achieve them. Table 6 contains a set of such benefits.

The implementation of such form of work is not free from flaws, which include for example lack of control and personal contact with an employee, or also the necessity to create a new type of job contracts and compliance with occupational safety and health regulations. However, it seems that there are more such benefits. It is also important to realise, that virtual work is not the only solution in every circumstances. It depends on the type of business, performed activities and personal characteristics of workers who do such job. In enterprises and supply chains in order to obtain benefits aiming at the increase of competitiveness one needs to consider present and future condition of the environment and own abilities to take advantage of the chances created by the circumstances and counteract threats.

VIRTUAL WORK IN FLEXIBLE AND EFFECTIVE SUPPLY CHAINS - THE RESULTS OF EMPIRICAL RESEARCH

To perform empirical research 4 enterprises were chosen representing a flexible or an effective supply chain, either using or not a virtual work stations, which is illustrated in Figure 3.

The representatives of supply chains were chosen to the research since the whole supply chain is not an organisation with an established legal structure which could employ workers. The implementation of virtual work in selected links of a supply chain in cooperation with other enterprises operating together is less risky and economically justified. Such dependence is similar to joint integrated IT systems within a supply chain, which with regard to the whole supply chain also does not exist.

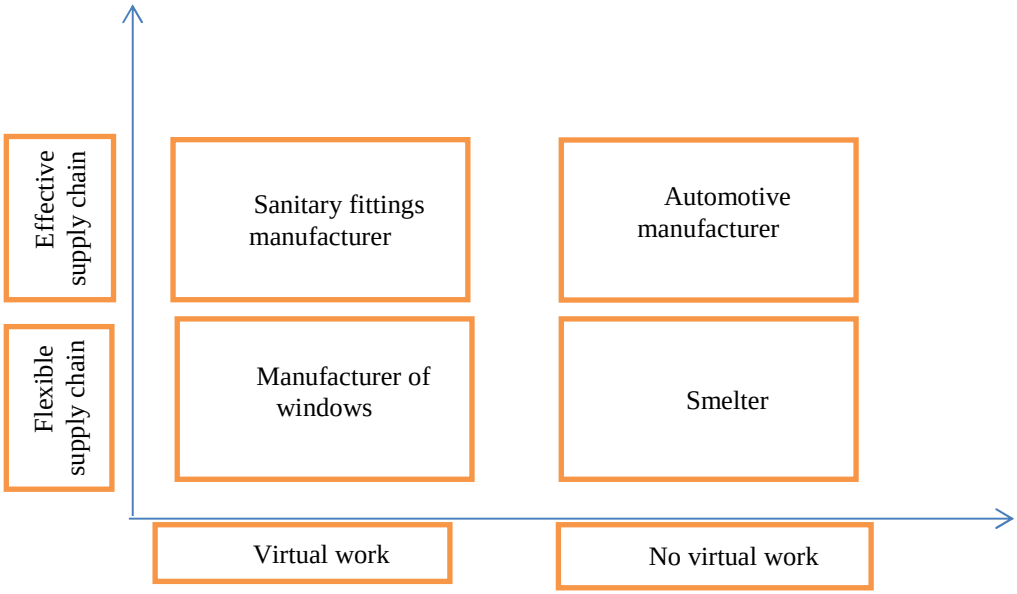

Fig. 3. A matrix of choice of supply chain to quality test with the use of case studies method
Rys. 3. Macierz wyboru łańcucha dostaw do testowania metodą studiowania przypadków

An attempt at considering the role of a human being in modern organisations, and in particular the adjustment to actual market conditions, the way of performing work, results from the need to realise the importance of the role of a human being plays in economics, with his knowledge, skills and competences. It seems reasonable then, to pose a question: firstly, how a human being along with all his attributes, which he uses at work, affects the competitiveness of enterprises and supply chains, in which he participates? And secondly, if virtual work becomes some compromise between the needs of an employer and an employee, which contributes to their economic success? More and more often, both relevant literature and practitioners stress that traditional methods of competition based on factors such as profitability and quality of product are giving way to new ones, which result from human attitudes, skills and competences of employees.

Within conducted case studies it was proved, that selected enterprises as leaders of global supply chains either successfully make use of virtual work or are interested in implementing such form of work soon. One also has to note, that depending on the orientation of a supply chain, slightly different areas were indicated, which could be improved and increase competitiveness of a supply chain. Table 7 presents an overview of key areas with regard to increase of competitiveness through implementation of virtual work for different supply chains.

Table 7. An overview of key areas with regard to increase of competitiveness through implementation of virtual work, indicated by the representatives of studied supply chains
Tabela 7. Przegląd najważniejszych obszarach zwiększenia konkurencyjności poprzez wdrożenie wirtualnej pracy, wskazane przez przedstawicieli badanych łańcuchów dostaw

Flexible supply chain	**Effective supply chain**
- improved customer service	- quicker information flow
- adjustment to current market needs	- real-time information on demand
- improvement of the information flow	- better planning of procurement, manufacturing and sale
- current knowledge on changes in demand	- crating partner relations in a supply chain
	- better operational factors

Possibilities of increase in competiveness indicated by links in a supply chain, which do not take advantage of virtual work
- flexibility in performing duties by employees
- adjusting to the needs of an employee and the employer
- better quality of customer service

In the case of an effective supply chain, which uses virtual work, it can be stated that orientation on realisation of a triad of objectives: a supply chain, a customer and an employee, has become a permanent element to the culture of its management and supports the integration of enterprises cooperating within such a chain. In the first stage of implementation of virtual work, in an enterprise and in a supply chain, the flow of information is facilitated, long-term relations with customers are built and in consequence, due to saving resulting from better planning of demand, reducing the amount of stock and improvement of timeliness of deliveries, the economic results of the whole company as well as other cooperating links improve. Due to dynamic changes in the surroundings, high efficiency does not guarantee success, which makes the examined manufacturer of sanitary fittings improve flexibility.

However, in the case of the examined manufacturer of windows, which is a representative of a flexible supply chain, virtual work is a way to maintain and build long-term relations with suppliers and customers, which translates into many benefits, also economic ones. An integrated IT system of the whole supply chain, which the company is a leader of, is still a vision of the future. In the case of a window manufacturer, virtual workers are integrators of the manufacturing plant, suppliers and customers. It helps to facilitate the information flows, to build long-term relations with suppliers and customers, which are oriented on a constant improvement of customer service, both with regard to timeliness of deliveries, flexibility or cost connected with maintaining stock. Sharing information with suppliers and customers brings a number of benefits, but in the case of tested company does not create any problems in the flow of information, which could endanger its market position. Thanks to virtual workers, information on actual demand reaches the supplier. Then, the supply chain links are able to react appropriately to these changes. It reduces the creation of excessive stock in the early stages of a supply chain, which is a reaction on information about insignificant changes in demand.

CONCLUSIONS

The examined case studies clearly show that virtual work brings notable benefits, both to the employers and to their employees. In the case of supply chains oriented on the reduction of costs, virtual workers enable not only to increase effectiveness and financial results, but also facilitate the increase of flexibility of its operation. However, for flexible supply chains virtual work comprises a way to improve the swiftness of reaction to customers' expectations without paying additional cost for storing and transport. The awareness of these benefits will make virtual positions more popular, even in the case of global supply chains, which have used only traditional forms of employment and performing work to date.

The aim of the case studies is to demonstrate the cause and effect relationships between virtual work and competitiveness efficient and flexible supply chain.

The aim of the study was to demonstrate the cause and effect relationships between virtual work and competitiveness of efficient and flexible supply chain. The research in the form of case studies confirmed positive relationship between the use of virtual work and the competitiveness of the supply chain. Authors have plans to continue research in a different research group and with the use of quantitive methods and testing in selected industries.

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WIRTUALIZACJA PRACY W GLOBANYCH ŁAŃCUCHACH DOSTAW

STRESZCZENIE. **Wstęp:** Artykuł poświęcony jest pojęciu oraz korzyściom z wdrożenia wirtualnej pracy w globalnych łańcuchach dostaw. Wirtualną pracę należy rozumieć jako celowe działanie człowieka, której celem jest świadczenie usług (materialnych i niematerialnych), za pomocą narzędzi teleinformatycznych, wykonywanych zdalnie od tradycyjnego miejsca pracy, w sposób mobilny. Badania empiryczne zostały przygotowane na podstawie 4 studiów przypadku globalnych liderów łańcuchów dostaw, które zgodnie z klasyfikacją M. Fishera reprezentują dwa ich typy. Studia przypadków potwierdziły pozytywny wpływ wirtualnej pracy zarówno w efektywnych i elastycznych łańcuchach dostaw. Korzystne warunki rynkowe i technologiczne oraz zwiększenie świadomości korzyści płynących z wirtualnej pracy będzie wpływało na powszechniejsze jej stosowanie w firmach tworzących globalne łańcuchy dostaw.
Metody: Praca została przygotowana w oparciu o dostępne badania zarówno teoretyczne jak i praktyczne. Autorzy przeanalizowali 4 przedsiębiorstwa w Polsce. Przedsiębiorstwa reprezentują elastyczny i efektywny łańcuch dostaw, wykorzystujące lub nie, wirtualną pracę. Badanie przeprowadzone przez autorów miały formę wywiadów indywidualnych. Autorzy wykorzystali studia przypadków w celu pokazania, że wirtualna praca przynosi wymierne korzyści w efektywnym i elastycznym łańcuch dostaw.
Rezultaty: Na podstawie studiów przypadków, autorzy wykazali przesłanki wdrożenia wirtualnej pracy w wybranych przedsiębiorstwach. Przesłanki wdrożenia wirtualnej pracy są wyznacznikami możliwości uzyskania korzyści w efektywnym i elastycznym łańcuch dostaw.
Wnioski: Badane studia przypadków pokazują, że wirtualna praca przynosi odmienne korzyści. W efektywnym łańcuchu dostaw, pracownicy wirtualni dla przykładu umożliwiają zwiększenie skuteczności jego działania i wyniki finansowe. W elastycznym łańcuchu dostaw praca wirtualna może być sposobem na utrzymywanie i budowanie długoterminowych relacji z dostawcami i klientami.

Słowa kluczowe: logistyka, wirtualna praca, łańcuch dostaw, zarządzanie łańcuchem dostaw, elastyczny łańcuch dostaw, efektywny łańcuch dostaw, nowe metody pracy.

VIRTUALISIERUNG DER ARBEIT IN GLOBALEN LIEFERKETTEN

ZUSAMMENFASSUNG. **Einleitung:** Der Artikel ist dem Wesen und den Vorteilen, die der Einführung von virtueller Arbeit in globalen Lieferketten zugrunde liegen, gewidmet. Die virtuelle Arbeit ist zu verstehen als gezielte menschliche Handlung, die es zum Zweck hat, die mithilfe von teleinformatischen Tools, auf mobile Art und Weise in Form von Fernarbeit geleisteten (materiellen und nichtmateriellen) Dienste zu vollbringen. Die betreffenden empirischen Forschungen wurden aufgrund von 4, bei globalen, führenden Betreibern von Lieferketten vorgenommenen Fallstudien, die nach der Klassifikation M. Fishers zwei deren Typen vertreten, durchgeführt. Die Fallstudien belegten den positiven Einfluss der virtuellen Arbeit auf ihre Effizienz, und dies sowohl innerhalb der effektiven als auch der flexiblen Lieferketten. Günstige, technologische und Marktverhältnisse sowie das wachsende Bewusstsein der sich von der virtuellen Arbeit ergebenden Vorteile wird die immer breitere Inanspruchnahme deren in den die globalen Lieferketten bildenden Firmen positiv beeinflussen.
Methoden: Die vorliegende Arbeit wurde aufgrund der greifbaren, sowohl theoretischen als auch praktischen, wissenschaftlichen Erkundungen ausgearbeitet. Die Autoren haben vier in Polen befindlichen Unternehmen analysiert. Die Unternehmen betreiben die flexible und die effektive Lieferkette, wobei sie dabei die virtuelle (oder keine virtuelle) Arbeit in Anspruch nehmen. Die von den Autoren vorgenommenen Forschungen hatten die Form individueller Interviews. Die Autoren benutzten die Fallstudien, um zu zeigen, dass die virtuelle Arbeit messbare Nutzen in der effektiven und flexiblen Lieferkette mit sich bringen kann.
Ergebnisse: Aufgrund der betreffenden Fallstudien zeigten die Autoren die Voraussetzungen für die Einführung der virtuellen Arbeit in ausgewählten Unternehmen auf. Die Voraussetzungen für die Einführung der virtuellen Arbeit machen Maßstäbe für die Gewinnung von Nutzen in der effektiven und flexiblen Lieferkette aus.

Fazit: Die in Angriff genommenen Fallstudien bestätigen den Sachverhalt, dass die virtuelle Arbeit auch für unterschiedliche Nutzen sorgen kann. In einer effektiven Lieferkette können beispielweise die virtuellen Mitarbeiter deren Effizienz und Finanzergebnisse erhöhen, in der effektiven dagegen kann die virtuelle Arbeit zum Aufbau und Aufrechterhalten von langzeitigen Relationen mit Lieferanten und Kunden beitragen.

Codewörter: Logistik, virtuelle Arbeit, Lieferkette, Management von Lieferkette, flexible Lieferkette, effektive Lieferkette, neue Arbeitsmethoden.

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