

REACTION TO RISK IN LOGISTICS COOPERATION – RESULTS OF EMPIRICAL RESEARCH

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Abstract: The risk of cooperation with service provider is associated primarily with non-performance of outsourced tasks or with performance not in line with the expectations of principal. Significant factors that affect the risk of cooperation with service provider result from the attitude of parties to cooperation, and also from the external conditions of this cooperation. Undistorted cooperation with logistics service provider, as well as undisturbed flow of goods play a special role in the delivery of goods to recipients. The objective of this article is to present the results of empirical research on reaction to the risk of cooperation with logistics service providers. It is part of the results of a wider research on management of the risk of cooperation with logistics service providers. The research is based on the assumption that attitudes of cooperating parties play a key role in dealing with risk.

1 Introduction

The risk of cooperation with service provider is associated primarily with non-performance of outsourced tasks or with performance not in line with the expectations of principal. The effects of risk may be related to disruptions in relationships with suppliers and recipients cooperating with the client of service provider (described in this article also as principal) and consequently may also result in the increase of logistics costs of principal [1]. Significant factors that affect the risk of cooperation with service provider concern insufficient experience in contract preparation, limited access to information, tendency of parties to opportunism, high specificity of assets used in cooperation, as well as external changes in conditions related to legal regulations, policy and economy [2,3]. The problem of risk management in logistics cooperation including the issue of reaction to risk factors concerning relationships between parties is widely discussed in literature. It is considered particularly in the context of cooperation with logistics service providers [4-7], as well as in the area of cooperation in supply chains [8-11]. Phenomena related to the natural environment also affect the activity of both principal and service provider [12,13].

Undistorted cooperation with logistics service provider, as well as undisturbed flow of goods play a special role in the delivery of goods to recipients. Among the main factors related to logistics, influencing the competitiveness of suppliers of such goods, efficiency management, organization of flows, capital investments (in infrastructure and equipment), focus on searching and implementing innovations, and the ability to forecast demand are distinguished [14]. Cooperation with suppliers is often associated with long-term contracts, based on joint

improvement of the parties' activities. The assumption of a long period of cooperation is related to the ability of cooperating parties to adapt to changing conditions in the environment [12,13].

The objective of this article is to present the results of empirical research on reaction to the risk of cooperation with logistics service providers. It is part of the results of a wider research on management of the risk of cooperation with logistics service providers. The research is based on the assumption that attitudes of cooperating parties play a key role in dealing with risk. (*The publication was financed from the resources allocated to the Management Faculty of Cracow University of Economics under the grant for the maintenance of the research potential*).

2 Methodology

The article presents the results of research carried out in enterprises cooperating with logistics service providers. In the research, suppliers of goods for customers, logistics operators, as well as freight forwarders were included. The data presented was collected using a questionnaire addressed to representatives of enterprises operating in Poland, responsible for ordering and further monitoring of the service. The activities of the surveyed enterprises included production, trade, comprehensive logistics service and forwarding. Most of them have at least several years of experience in cooperation with suppliers of specialized service in the area of logistics. The obtained data was analyzed using the assumptions of the FMEA method. The research was of a pilot nature.

In general, risk factors affecting cooperation with providers of logistics service can be divided in two groups. The first group includes factors representing the performance of logistics service: errors, damages and

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delays in deliveries [15]. The results discussed in this article concern the second group of factors, related mainly to the attitude of employees representing principal and provider of logistics service. The occurrence of these factors may be related to changes in parties' approach to cooperation as a result of new, unforeseen changes in the environment of cooperation. They can be considered as factors influencing further problems in the area of logistics performance. The identification of factors related to parties' attitude to cooperation is based on the typology of transactional, operational and strategic risk factors presented in literature [16,17]. The typology of risk factors prepared for research is also based on opinions of employees responsible for cooperation with logistics service providers in enterprises.

In this article, the point of view of principal is considered. It includes factors related to general terms of cooperation with service provider, as well as factors caused by logistics service provider. However, it should be noted that factors shaping the terms of cooperation are usually the result of joint decisions of principal and service provider. Depending on the relationship between these parties, the influence of each party on shaping the terms of cooperation may differ significantly.

Presented assumptions of risk factors taken into consideration in the research, as well as threats influenced by these risk factors and potential consequences for cooperation are presented (Table 1).

Table 1 Risk of cooperation with logistics service provider, threats and consequences for client [16,17]

Risk factors	Potential threats	Potential consequences for cooperation
Tendency of provider to take advantage of opportunities for his own interest, affecting the disruption of deliveries to principal and his recipients.	Differences between provider's offer and his real ability to perform the assigned tasks, excessive dependence of client on the service provider, conflicts between partners destroying cooperation.	Complaints from principal, his suppliers and recipients regarding cargo safety, way of transport in supply and distribution, possibility of reducing the scope of cooperation or loss of principal's recipients.
Opportunistic limitation /obstruction of principal's access to information held by service provider regarding the performance of the outsourced service.	Differences between offer of logistics company and its real ability to provide service, limiting the knowledge of principal, his suppliers and recipients about the quality of order fulfilment by service provider.	Low quality of service, complaints from principal, his suppliers and recipients concerning cargo safety, way of transport in supply and distribution, possible loss of recipients by principal.
Dependence on the provider of logistics service related to costly commitment of principal to infrastructure adaptation to the terms of cooperation (this applies for example to adaptation of loading and unloading points to the methods of goods flow used by provider).	Long period of time for coordination of activities and solving problems in cooperation with provider, reduced influence of principal on the adjustment of the service provider to changes in the principal's logistics needs.	Difficulties in planning activities by principal, possibility of losing the ability to make independent decisions on further activity of principal, possibility of market loss by principal.
Insufficient commitment of logistics service provider to improvement of cooperation with principal.	Failure to notice disturbances and errors in principal's business, too slow development or lack of development of principal's activity.	Delays in adapting to new requirements of suppliers and recipients of principal, difficulties in planning of activities, weakening market position of principal.
Insufficient experience of principal in cooperation with logistics service provider.	Difficulties in understanding mutual expectations of parties to the contract, difficulties in determining the expected effects of cooperation.	Too long negotiations of the terms of cooperation, possibility of losing the ability to make independent decisions on further activity of principal, insufficient quality of service provided.
Lack of assignment of responsibility for updating information about logistics service market and new offers of providers addressed to employees /organizational units of principal.	Lack of knowledge about current state of offers, excessive costs of obtaining the expected quality of service (if there are units on the market that offer similar quality at a lower price).	Long period of time to acquire new service provider after termination of cooperation with the existing one, difficulties in providing the expected level of logistics service.
Differences in risk perception and assessment between principal and provider of logistics service.	Problems in communication of risk between partners, misunderstanding of mutual expectations by parties to the contract.	Disruptions in the implementation of the terms of cooperation, conflicts with service provider related to disruptions.

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As one of the most important results of the research conducted, the significance of the impact of each risk factor on cooperation between principal and service provider was estimated. It should be added that factors with previously estimated insignificant impact on cooperation, without requirements to take any actions in response, may also gain more importance in further period of cooperation. Therefore, the occurrence and strength of the impact of individual risk factors should be monitored on an ongoing basis. Although the reaction in response to the increase in their impact mainly consists in limiting the effects of occurrence, the lack of any reaction may result in significant additional costs.

The next step of the research was to determine important actions taken in response to the risk of cooperation with logistics service provider. These actions can be treated as a response to identified risk factors (Table 1). Taking into account these risk factors, the principal may independently take specific actions affecting the behavior of service provider or may also undertake activities jointly with service provider. Activities in response to risk may be of a different nature. Using the typology of risk management methods proposed for the concept of risk management in project management, the following general types of risk response can be distinguished [18,19]:

- acceptance of risk and its potential effects as they are – this approach is characteristic for factors with estimated low impact (taking action to reduce the impact of risk factor would be associated with the need to incur higher expenses than the costs associated with the results of this risk factor),
- reduction or complete elimination of the probability of occurrence of risk factor and its consequences – it concerns situations where it is possible to influence the source of risk so that the risk factor does not arise or despite the lack of influence on the risk source it is possible to limit the likelihood of occurrence of a threatening factor,
- transfer of consequences of the risk factor influence on principal’s activities – by insurance, guarantees or the division of outlays on the implementation of activities between cooperating units, appropriate for the risks which can be insured; it is important to compare the costs of insurance and of the risk effects,
- reducing consequences of impact (determining the activities that will be implemented if the risk factor occurs, related to the development of the so-called contingency plans) – such actions do not affect the probability of risk occurrence, but reduce its potential effects by minimizing the time necessary to respond to a specific event.

It should be added that due to the subject of the conducted research, the first type of response to risk (accept risk and take no actions in response) was not included in further part of the discussion.

According to the characterized types of response to risk, different types of activities representing different types of risk responses were included in the questionnaire. A typology of actions was developed based on the approaches presented in literature [12,13,20-24]. It also included consultations with logistics managers of the surveyed enterprises to determine adequate activities, taking into account the specificity of the logistics service market and logistics itself in achieving and maintaining a competitive advantage.

3 Results of research

The results of the first part of research concerning the significance of risk factors, as well as the results of further part of the study related to identification of the importance of particular actions in reaction to each risk factor were reported in other separate publications. In this article, the relevance of individual actions appropriate for response to each risk factor is presented.

Table 2 The importance of types of reaction to risk factors in logistics cooperation

Position	Type of action taken in response to the risk
1.	Renegotiation resulting in changes of cooperation terms with existing service providers.
2.	Extending the scope of control of tasks performed by service providers.
3.	Complementary training of employees of principal cooperating with provider.
4.	Extending the scope of tasks of employees representing principal in cooperation.
5.	Changes in internal procedures concerning logistics activity of principal.
6.	Starting cooperation with a new service provider.
7.	Termination of cooperation with existing service provider.
8.	Involving additional staff from other organizational units of principal in cooperation.
9.	Transfer of selected responsibilities of logistics employees to other organizational units of principal.
10.	Learning from an experienced service provider.

Based on information concerning the frequency of use of individual types of actions in response to each risk factor included in the study, a summary of risk-response activities was made in order from the most to the least used actions. It is presented in prepared ranking of individual types of actions in Table 2. The higher position (lower number) in the table means that the considered action is more often used.

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Based on the types of actions listed in Table 2 it can be stated that the most commonly used response to risk in cooperation with logistic service providers is renegotiation resulting in changes of cooperation terms with existing service providers. This type of action has been identified in the research as suitable primarily in conditions of the appearance of such risk factors as:

- difference in risk perception and assessment between principal and provider of logistics service,
- insufficient experience of principal in cooperation with logistics service provider,
- dependence on the provider of logistics service related to costly commitment of principal to infrastructure adaptation to the terms of cooperation,
- opportunistic limitation/obstruction of principal's access to information held by service provider regarding the performance of the outsourced service,
- tendency of provider to take advantage of opportunities for his own interest, affecting the disruption of deliveries to principal and his recipients.

Renegotiation and changes in cooperation terms with existing service providers represent the types of attitudes to risk such as risk transfer or reduction of risk results. Renegotiation resulting in transfer of risk is associated with the need to change the scope of each party's commitment to cooperation and the resulting need to increase the level of benefits for partner who bears more risk. This approach is related to preparation for future risk factors. Negotiation of existing terms of cooperation may also be aimed at eliminating current problems occurring in day-to-day cooperation. In this situation, the considered action is implemented to reduce the results of risk factors that have already occurred.

Another type of action in response to the risk of cooperation with service provider included in the study is extending the scope of control of tasks performed by service providers. This action is considered appropriate in response to the following risk factors:

- difference in risk perception and assessment between principal and provider of logistics service,
- insufficient commitment of logistics service provider to improvement of cooperation with principal,
- opportunistic limitation/obstruction of principal's access to information held by service provider regarding the performance of outsourced service,
- insufficient experience of principal in cooperation with logistics service provider.

According to the results of the conducted research, the type of action mentioned above is applied less frequently in response to such risk factors as tendency of provider to take advantage of opportunities for his own interest, affecting the disruption of deliveries to principal and his recipients, as well as dependence on the provider of logistics service related to costly commitment of principal

to infrastructure adaptation to the terms of cooperation. This type of action usually represents an attitude based on efforts to reduce the effects of risk occurrence. It means, therefore, striving to reduce mistakes made by service provider, resulting in disruptions in principal's activity and dissatisfaction of his recipients and suppliers. Extended control of provider's performance is usually a reaction to already occurring risk factors. However, under certain conditions, it may be treated as a way to reduce the probability of occurrence of cooperation risk in the future, when the principal considers provider's experience to be insufficient.

Another kind of action used in response to the risk of cooperation with provider of logistics service is complementary training of employees of principal cooperating with provider. This applies particularly in reaction to such risk factors as:

- difference in risk perception and assessment between principal and provider of logistics service,
- lack of assignment of responsibility for updating information about logistics service market and about new offers of providers addressed to employees/organizational units of principal,
- insufficient experience of principal in cooperation with logistics service provider.

The considered type of action is less frequently undertaken in response to other risk factors such as dependence on logistics service providers associated with the costly involvement of principal in infrastructure adaptation to the needs of cooperation and opportunistic limitation/obstruction of principal's access to information held by service provider regarding the performance of the outsourced service. This type of action is also occasionally used as a reaction to such risk factors as insufficient commitment of logistics service provider to improvement of cooperation with principal or the tendency of provider to take advantage of opportunities for his own interest, affecting the disruption of deliveries to principal and his recipients. Emphasizing the complementary nature of training of employees involved in cooperation with service provider it can be concluded that it represents the type of response to risk defined as a reduction of risk results.

The action regarding the extension of tasks of client's employees in cooperation with service provider is a solution implemented much less frequently than other actions presented so far. This applies to taking over by these employees some broader tasks related to preparation and coordination to ensure greater integration of cooperation. This is usually a reaction to such risk factors as:

- difference in risk perception and assessment between principal and provider of logistics service,
- lack of assignment of responsibility for updating information about logistics service market and about

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new offers of providers addressed to employees/organizational units of principal,

- dependence on the provider of logistics service related to costly commitment of principal to infrastructure adaptation to the terms of cooperation.

The action presented here plays a minor role in the case of reaction to such factors as insufficient commitment of logistics service provider to improvement of cooperation with principal, opportunistic limitation/obstruction of principal's access to information held by service provider regarding the performance of the outsourced service, insufficient experience of principal in cooperation with logistics service provider, tendency of provider to take advantage of opportunities for his own interest affecting the disruption of deliveries to principal and his recipients. The considered action represents the type of reaction to risk reducing the results of risk occurrence. It can also serve as a tool to reduce the probability of occurrence of risk factors in future cooperation.

According to the results of the conducted research it can be concluded that extending the scope of tasks of the client's employees cooperating with service provider, as well as changes in procedures of principal's internal logistics activity are of similar importance in response to the risk of cooperation with logistics unit. Extending the scope of tasks performed by principal's logistics employees may be related to the need to implement adjustments to existing procedures and to the need to develop new procedures. Changes in procedures of principal's internal logistics activity play a special role in responding to such risk factors as:

- dependence on the provider of logistics service related to costly commitment of principal to infrastructure adaptation to the terms of cooperation,
- insufficient experience of principal in cooperation with logistics service provider.

The considered type of action is less frequently used as a reaction to the lack of assignment of responsibility for updating information about logistics service market or in the case of new offers of providers addressed to employees/organizational units of principal. Occasionally it is also a reaction to the tendency of provider to take advantage of opportunities for his own interest, affecting the disruption of deliveries to principal and his recipients. This action is the least likely reaction to such risk factors as a difference in risk perception and assessment between principal and provider of logistics service, insufficient involvement of the logistics service provider in improvement of cooperation with principal and opportunistic limitation/obstruction of principal's access to information held by service provider regarding the performance of the outsourced service.

The previously presented types of actions reflect mostly the reactions to risk related to transfer of risk and reducing the consequences of risk factors. Changes, and in

particular improvement of internal procedures of principal's logistics activity, reflect focus on reducing the probability of occurrence or even complete elimination of risk factors and their consequences. Although errors in procedures can be revealed through errors and misunderstandings in actions, an improvement of these procedures makes it possible to eliminate sources of risk.

The results of the conducted research also indicate types of actions used less frequently in reaction to the risk of cooperation. The example is cooperation with a new service provider. It is implemented especially as a reaction to such risk factors as:

- insufficient commitment of logistics service provider to improvement of cooperation with principal,
- opportunistic limitation/obstruction of principal's access to information held by service provider regarding the performance of the outsourced service,
- tendency of provider to take advantage of opportunities for his own interest, affecting the disruption of deliveries to principal and his recipients.

The considered solution is also occasionally used as a reaction to difference in risk perception and assessment between principal and provider of logistics service and as a reaction to dependence on the provider of logistics service related to costly commitment of principal to infrastructure adaptation to the terms of cooperation. Starting cooperation with new service provider represents the orientations based on risk transfer and on reduction of the results of risk occurrence. New service provider may also take over the responsibility for cooperation of principal with his existing suppliers and recipients of goods. Cooperation with new service provider can also be a way to discipline existing service providers.

The aforementioned solution consisting in undertaking cooperation with new service provider may be the consequence of another type of action concerning termination of cooperation with existing service provider. The greater usefulness of the previously presented type of action indicated in the research means that it is more widely used than the termination of cooperation with existing service provider. The termination of cooperation is characteristic as a reaction to such risk factors as:

- insufficient commitment of logistics service provider to improvement of cooperation with principal,
- dependence on the provider of logistics service related to costly commitment of principal to infrastructure adaptation to the terms of cooperation,
- tendency of provider to take advantage of opportunities for his own interest, affecting the disruption of deliveries to principal and his recipients.

The presented solution in response to the risk of cooperation is also used, but less frequently, as a result of difference in risk perception and assessment between principal and provider of logistics service, in the case of

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dependence on provider of logistics service related to costly commitment of principal to infrastructure adaptation to the terms of cooperation, as well as in the case of opportunistic limitation/obstruction of principal's access to information held by service provider regarding the performance of the outsourced service. The action consisting in termination of cooperation with existing service provider most often represents an attempt to reduce the results of the risk factor occurrence.

According to the results of the conducted research, among the least used solutions in response to risk in logistics cooperation is the involvement of employees of other organizational units of principal's company in relationship with service provider. This solution was indicated as significant in conditions of the provider's tendency to take advantage of opportunities for his own interest, affecting the disruption of deliveries to principal and his recipients. On the other hand, such a response is rarely taken into account in the case of a difference in risk perception and assessment between principal and provider of logistics service, insufficient commitment of logistics service provider to improvement of cooperation with principal, in the cases of dependence on the provider of logistics service related to costly commitment of principal to infrastructure adaptation to the terms of cooperation and opportunistic limitation/obstruction of principal's access to information held by service provider regarding the performance of the outsourced service. Little interest in the application of such a solution results in particular from its specificity and focus on increasing the level of integration of the activities of principal and provider of logistics service. Such an integration may be a manifestation of approach concerning reduction or even complete elimination of the occurrence of risk factor.

The type of action which is occasionally implemented is the transfer of some responsibility from logistics employees to employees of other organizational units of principal's enterprise. It has been used as a reaction to such risk factors as lack of assignment of responsibility for updating information about logistics service market and about new offers of providers addressed to employees/organizational units of principal, and also as a reaction to insufficient experience of principal in cooperation with logistics service provider. The considered type of action may represent the orientation towards reduction or elimination of the probability of the occurrence of risk factors. More often, however, it is a reaction to already occurring problems, associated with improper allocation of aforementioned competences and errors when establishing and conducting cooperation resulting from principal's lack of experience in cooperation with provider of logistics service.

According to the results of the conducted research, the type of action that is rarely used but seems to be currently up-to-date, especially in terms of focusing on organizational learning, is the response to risk defined as learning from an experienced service provider. Such a

response is taken into account in the circumstances of insufficient principal's experience in cooperation with a logistics service provider. It may reflect the orientation towards reduction of the results of the risk factor occurrence. However, this action can also be treated as being undertaken in order to reduce the probability of risk occurrence or to completely eliminate the source of risk.

4 Discussion and conclusion

The significance of response to risk of cooperation involving renegotiating the terms of cooperation with existing logistics service providers may result from considerable experience and knowledge of respondents of problems and disruptions in cooperation related to changes of service providers. Due to the importance of logistics in achieving and maintaining competitive advantage, these problems can significantly affect the satisfaction of suppliers and recipients of goods from principal. The focus on continuation of cooperation, even in conditions of mistakes made by service provider, also confirms the frequency of extending the scope of control of tasks performed by service providers.

According to the results of the conducted research, the improvement of cooperation with logistics service provider is also related to the development of principal's employees and extending the scope of tasks of employees involved in relationship with logistics service provider. This approach reflects the importance of human resources in ensuring lasting and undistorted cooperation. It may be accompanied by improvement in the organization of cooperation, which is reflected in changes in the internal procedures of principal's logistics activity.

The fact that termination of cooperation with existing service provider, sometimes followed by the start of cooperation with a new provider, is used much less frequently than other aforementioned types of actions may indicate significant maturity of participants of the research and their experience in cooperation with providers of logistics service. Independently it should be added that starting cooperation with a new service provider, while maintaining relations with existing providers may result from the decision to increase the scope of cooperation.

Focus on concentration of responsibility for cooperation with service providers among employees of principal's logistics activity may be reflected in little interest in involvement of additional staff from other organizational units of principal in this cooperation, as well as little importance of transfer of selected responsibilities of logistics employees to other organizational units of principal's company.

Research results presented in the article, regarding the application of considered types of actions in response to identified risk factors may be useful for practice of cooperation with logistic service providers. These results reflect opinions of respondents regarding the effectiveness of each type of action. However, results obtained in the research have some limitations. Further research may refer

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to attempts to determine suitability of identified types of actions in response to risk, depending on the scope of logistics activities performed by service provider, expected period of cooperation with this provider, as well as market conditions in the environment of cooperation between principal and service provider.

References

- [1] BAHLI, B., RIVARD, S.: The Information Technology Information Risk: A Transaction Cost and Agency Theory-based Perspective, *Journal of Information Technology*, Vol. 18, No. 8, pp. 211-221, 2013. doi:10.1080/0268396032000130214
- [2] JURIK, T.: Classification of service logistics in terms of branches, *Acta Logistica*, Vol. 4, No. 1, pp. 1-4, 2017. doi:10.22306/al.v4i1.78
- [3] MASTERS, J.K., MILES, G., D'SOUZA, D., ORR, J.P.: Risk propensity, trust, and transaction costs in relational contracting, *Journal of Business Strategies*, Vol. 21, No.1, pp. 47-67, 2004. AN: 13572820
- [4] FABIANOVÁ, J., RIDZOŇOVÁ, Z.: Risk analysis of the logistics outsourcing, *The International Journal of Transport & Logistics*, Vol. 15, No. 35, pp. 1-6, 2015.
- [5] GOVINDAN, K., CHAUDHURI, A.: Interrelationships of risks faced by third party logistics service providers: A DEMATEL based approach, *Transportation Research Part E*, Vol. 90, pp. 177-195, 2016. doi:10.1016/j.tre.2015.11.010
- [6] TSAI, M-CH., LAI, K., LLOYD, A. E., LIN H.-J.: The dark side of logistics outsourcing – Unraveling the potential risks leading to failed relationships, *Transportation Research Part E*, Vol. 48, pp. 178-189, 2012. doi:http://dx.doi.org/10.1016/j.tre.2011.07.003
- [7] VEERAKKODY, V., IRANI, Z.: A Value and Risk Analysis of Offshore Outsourcing Business Models: an Exploratory Study, *International Journal of Production Research*, Vol. 48, No. 2, pp. 613-634, 2010. doi:10.1080/00207540903175160
- [8] DURACH, C. F., MACHUCA, J. A. D.: A matter of perspective – the role of interpersonal relationships in supply chain risk management, *International Journal of Operations & Production Management*, Vol. 38, No. 10, pp. 1866-1887, 2018. doi:10.1108/IJOPM-03-2017-0157
- [9] HALLIKASA, J., KARVONEN, I., PULKKINEN, U., VIROLAINEN, V.-M., TUOMINEN, M.: Risk management processes in supplier networks, *International Journal of Production Economics*, Vol. 90, No. 1, pp. 47-58, 2004. doi:10.1016/j.ijpe.2004.02.007
- [10] HARLAND, C., BRENCHLEY, R., WALKER, H.: Risk in supply networks, *Journal of Purchasing and Supply Management*, Vol. 9, No. 2, pp. 51-62, 2003. doi:10.1016/S1478-4092(03)00004-9
- [11] LAVASTRE, O., GUNASEKARAN, A., SPALANZANI, A.: Effect of firm characteristics, supplier relationships and techniques used on Supply Chain Risk Management (SCRM): an empirical investigation on French industrial firms, *International Journal of Production Research*, Vol. 52, No. 11, pp. 3381-3403, 2014. doi:10.1080/00207543.2013.878057
- [12] GAY, CH. L., ESSINGER, J.: *Outsourcing strategiczny. Koncepcja, modele i wdrażanie*, Oficyna Ekonomiczna, Kraków, 2002. (Original in Polish)
- [13] WATERS, D.: *Supply chain management. An introduction to logistics*, 2nd ed., Palgrave Macmillan, New York, 2009.
- [14] WALKER, W. T.: *Supply Chain Architecture: A Blueprint for Networking the Flow of Material, Information and Cash*, CRC Press LLC, London, New York, Washington, D.C., 2005.
- [15] RATAJCZAK-MROZEK, M., NOWACKI, F.: Kształtowanie ryzyka w krajowych i międzynarodowych łańcuchach dostaw, *Gospodarka Materiałowa i Logistyka*, No. 7, pp. 2-7, 2016. (Original in Polish)
- [16] MAŁKUS, T., WAWAK, S.: Information security in logistics cooperation, *Acta Logistica*, Vol. 2, No. 1, pp. 9-14, 2015. doi:10.22306/al.v2i1.32
- [17] TYRAŃSKA, M., MAŁKUS, T.: Metodyka zarządzania ryzykiem współpracy z operatorem logistycznym, *Zeszyty Naukowe Uniwersytetu Ekonomicznego w Krakowie*, No. 11, pp. 109-127, 2016. (Original in Polish)
- [18] PAWLAK, M.: *Zarządzanie projektami*, Wydawnictwo Naukowe PWN, Warszawa, 2006. (Original in Polish)
- [19] WYSOCKI, R. K.: *Efektywne zarządzanie projektami. Tradycyjne, zwinne, ekstremalne*, 6th ed., Wydawnictwo Helion, Gliwice, 2013. (Original in Polish)
- [20] BROWN, D., WILSON, S.: *The Black Book of Outsourcing. How to Manage the Changes, Challenges and Opportunities*, John Wiley & Sons Inc., Hoboken, New Jersey, 2005.
- [21] CORBETT, M.: *The Outsourcing Revolution. Why it Makes Sense and How to Do it Right*, Dearborn Trade Publishing, A Kaplan Professional Company, 2004.
- [22] HALVEY, J. K., MURPHY MELBY, B.: *Business Process Outsourcing. Processes, Strategies and Contracts*, John Wiley & Sons, New York, Chichester, Brisbane, Weinheim, Toronto, Singapore, 2000.
- [23] POWER, M.J., DESOUZA, K.C., BONFAZI, C.: *Outsourcing. Podręcznik sprawdzonych praktyk*, MT Biznes Sp. z o.o., Warszawa, 2010. (Original in Polish)
- [24] WATERS, D.: *Supply chain risk management. Vulnerability and resilience in logistics*, 2nd ed., Kogan Page Ltd, London, Philadelphia, New Delhi, 2011.

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Review process

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