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IMPACT OF SUSTAINABLE LOGISTICS ON BULGARIAN 3PL-COMPANIES AND THEIR COMPETITIVENESS[15]

Ivanka S. Korbankoleva, PhD
University of National and World Economy Sofia
Contact: ikoleva@unwe.bg

ABSTRACT

This paper presents part of the results from a research project conducted between 2014-2016 by the Department of Logistics at the University of National and World Economy with the aim to estimate the level of development of the logistics sector in Bulgaria. One of the project's main research interests is exploring the sustainability of logistics services. More specifically, this paper examines the relationship between the level of implementation of sustainable logistics practices (SLPs) and the achieved outcomes of logistics service providers (LSPs) forming the logistics sector in Bulgaria. Analysis of the questionnaire data gathered from 136 companies shows that 85% of the respondents have to a satisfactory degree implemented SLPs, having focused their efforts to a greater extent on internal improvements aiming to enhance environmental protection. They identify a positive economic impact due to the implementation of eco-friendly logistics practices (ELPs). Logistics organizations, classified as third-party logistics (3PL) companies, value most the positive effects the implemented SLPs have on the company outcomes. The indicators they rate most highly refer to the improvement of the quality of services and processes, increase of sales and market share, improvement of corporate image, which are all significant in terms of the competitiveness of LSPs.

Keywords: sustainable logistics, sustainable logistics practices, eco-efficiency, eco-friendly logistics practices, logistics service providers

[15] Original scientific article

THE IMPACT OF SUSTAINABLE LOGISTICS ON BULGARIAN 3PL-COMPANIES AND THEIR COMPETITIVENESS

The current state of logistics development, characterized by the expansion of the scope of coordinated management of material and material-related flows streaming across the supply chain, and by increasing customer requirements for sustainable logistics services, the implementation of SLPs is considered as one of the main strategic directions to gain competitive advantage for an organization. Companies in the logistics sector face new challenges as they play the role of the connecting link among the main participants in the supply chain, and their activity exerts a substantial influence on environmental protection, frugal use of natural resources, and achievement of other social and economic effects.

Analysis of the scientific research in the field of sustainable logistics conducted by the author (Korbankoleva, 2015, pp. 151-163) in relation to a project development on the subject matter of contemporary trends in the development of the logistics sector in Bulgaria, proved that organizations, influenced by internal and external factors, are increasingly focusing efforts on incorporating the principles and practices of sustainable logistics.

Numerous studies also prove the relationship between the level of implementation of SLPs and an organization's competitiveness. Established research interests in the issues of sustainable logistics, as well as the significance of LSPs in terms of achieving a Sustainable Supply Chain Management, determine the implementation of SLPs as one of the major aspects under which the development of the logistics sector in Bulgaria is to be examined in the above-mentioned project. This is the first study related to the logistics sector in Bulgaria which places an emphasis on various aspects of sustainable logistics.

Based on an analysis of the indicators collected from the database devised under the project, the purpose of the current paper is to evaluate and draw conclusions about the level of implementation of logistics practices oriented towards environmental protection, and their impact on the results achieved by the LSPs under investigation.

LITERATURE REVIEW

Application of the principles of sustainable logistics involves achieving a balance between the economic, environmental and social perspectives while executing logistics activities within a certain organization or across a supply chain. In the last two decades, scientific interest is focused on the impact of managerial decisions in various areas of logistics on the

environment. As early as 1995, Wu and Dunn, investigating the main activities constituting the logistics cycle, outline logistics' capabilities to help protect the environment.

According to Mckinnon (2012, p.4) "making logistics "sustainable" in longer term will involve" not only cutting carbon emissions, but also further initiatives "…to cut the other environmental costs of logistics by a significant margin". Minimising the environmental impact of logistics is linked to practices aimed at protecting air, water, and soil from pollution and requires additional investment, which could be an inhibitor for the implementation of ELPs for some companies. At the same time however, logistics practices that prioritise sustainable consumption of natural resources often lead to a reduction of logistics costs incurred by the company and subsequently, an increase in their financial outcomes as well as their competitiveness. The benefits of implementing ELPs are largely related to the economic dimension of sustainable logistics, as demonstrated by a number of studies (Rossi, Colicchia, Cozzolino, and Christopher, 2013; Testa and Iraldo, 2010; Bai, Sarkis, Wei, and Koh, 2012 etc.). The interconnection between the environmental and economic dimensions of sustainable logistics is designated in the scientific literature by the term "eco-efficiency". This paper focuses on investigating the eco-efficiency of LSPs in Bulgaria.

The relationship between the implementation of ELPs and a company's competitiveness strategy has been investigated by a number of authors. According to Vachon and Klassen (2007) favorable opportunities for implementation of ELPs are offerred by competitive strategies, aimed at innovation, efficiency, and positive image. Additionally, some authors examine the level of their impact on the competitive advantage of the company (López-Gamero et al., 2010; Testa and Iraldo, 2010, etc.) in relation to different external and internal factors. Investigating studies, differring in methodology and scope, on the factors for implementing ELPs, Mckinnon (2002, p.17) observes that they highlight among them corporate image, competitive differentiation, cost saving and compliance with government regulation as the most. These factors are congruent with the aforementioned competitive strategies, which leads to the suggestion that in implementing ELPs, companies choose those that contribute to the realization of their competitive advantage.

Very few studies discuss environmental issues in the logistics sector that reveal the impact of environmental commitment of LSPs on their performance. Among them are these of Lieb and Lieb (2010) and Rossi et al. (2013). The former is concerned with big logistics companies, classified as third-party logistics (3PL) companies. According to the annual study of the

companies within the logistics sector undertaken by Langley and Allen (2002, p.31), 3PL companies offer two or more logistic services in combination. These companies as well as 4PL companies, which offer complete solutions for supply chain management, are referred to as logistics companies in the current study. The findings of examining the GEOs of 40 3PL companies in North America, Europe, and the Asia□Pacific show "substantial commitments to environmental sustainability goals during the past several years and … quite positive impacts on those companies" (Lieb and Lieb, 2010, p.524). Their efforts toward achieving environmental sustainability goals in cooperation with their customers and other organisations "…have resulted in significant cost savings for the companies" (Lieb and Lieb, 2010, p. 532).

Rossi et al. (2013)'s study is based on in-depth interviews within six companies with facilities based in Europe and operating in global supply chains. Research findings show that LSPs are inclined towards implementing innovative eco-efficiency initiatives (practices), but there is a range of inhibitors that prevent major change programmes (Rossi et al., 2013, p.583). Companies do not measure the impact of implementing these practices via concrete methods and indicators, but evaluate it mostly as a change in the costs as well as benefits, which are difficult to measure as well. The authors emphasise that in terms of utilising eco-efficiency initiatives by LSPs as a source of competitive advantage there is a significant potential, which could be explored through developing new skills and integration with customers.

The discussed recent studies in the logistics field show that LSPs identify a positive economic impact due to the implementation of ELPs despite the lack of instruments for its evaluation. The organisations in the sector take targeted actions to achieve their sustainability goals, often following formalised environmental policy. However, they are not yet capable to develop an eco-friendlly strategy and include it in their corporate strategies.

METHODOLOGY OF THE RESEARCH

The scope of the study conducted within the parameters of the specified project extends over LSPs in Bulgaria, offering transportation, warehouse, packaging, handling and other services contributing to the movement of material flows from the sources of supply (mainly manufacturing and commercial companies) to final destination – customers such as organizations of various branches of economy (construction, manufacturing, energy etc.), organizations operating in the services sector (tourism, health, defence etc.), as well as individual end users. Organizations

supplying logistics equipment, software, consultation and training, and organizations supporting the processes of products' physical movement across the supply chain are also included within this scope.

The subject of this study incorporates three main areas of investigation of modern aspects in the development of Bulgarian logistics sector. These are related to the customer service level provided by LSPs, implementation of modern information and communication systems and technologies, and application of SLPs. The third area of the subject matter herein is to be presented in this paper while reflecting on the level of application of ELPs and their impact on the performance of different type of LSPs.

As a result of careful scrutinizing of theoretical concepts and studies in the area of sustainable logistics certain indicators were devised against which the three dimensions of sustainable logistics - environmental, economic and social - are measured. The environmental dimension comprises ELPs which are split into two basic groups – external and internal. Internal practices incorporate decisions to implement ecological improvements within the specific organization and are directed towards the following fields of activities: transportation and distribution, warehousing and green construction, consumption and recycling, packaging, management. The application of external practices results from the customer pressure or the cooperation of a LSP with customers, as well as with other organizations in the logistics industry.

The economic dimension incorporates indicators reflecting the results achieved by LSPs following the implementation of SLPs. Such indicators refer to costs, effectiveness, quality of offered services, sales, market share, profit, and other market performance and benefits with a long-term effect on the organization's competitiveness.

The social dimension includes indicators related to the employees' health and safety protection, on the one hand, and to the organization's commitment to community relations through support for social projects, providing employment to people with disabilities, members of minority groups, long term unemployed, etc. This perspective of sustainable logistics is not subject of investigation in this paper but will be evaluated in the research project.

Based on the indicators developed across the three dimensions of sustainable logistics a set of eighteen questions was devised which is incorporated in the general questionnaire used for data collection in the research project. The questions feature varied scales requiring a choice between two response alternatives (dichotomous scales), a choice of a true response among multiple variables (nominal scale); an evaluation based on a

five point scale through the expression of a certain level of agreement, application, availability, achievement, numeric or text data. The questionnaire was approbated by two leading organizations operating in the Bulgarian logistics sector and improvements were made by adding or deleting certain scales based on recommendations of participating organizations. Such changes were made for the purpose of achieving completeness and to avoid repetitiveness.

To gather information from respondents the questionnaire was distributed by e-mail, and a web-based version was, also, utilised. Additionally, face-to-face interviews were conducted in order to address a larger number of organizations. The total number of companies contacted amounts to approximately 200, of which 136 participated in completing the questionnaire.

EVALUATION OF THE LEVEL OF IMPLEMENTATION OF ELPS BY LSPS IN BULGARIA

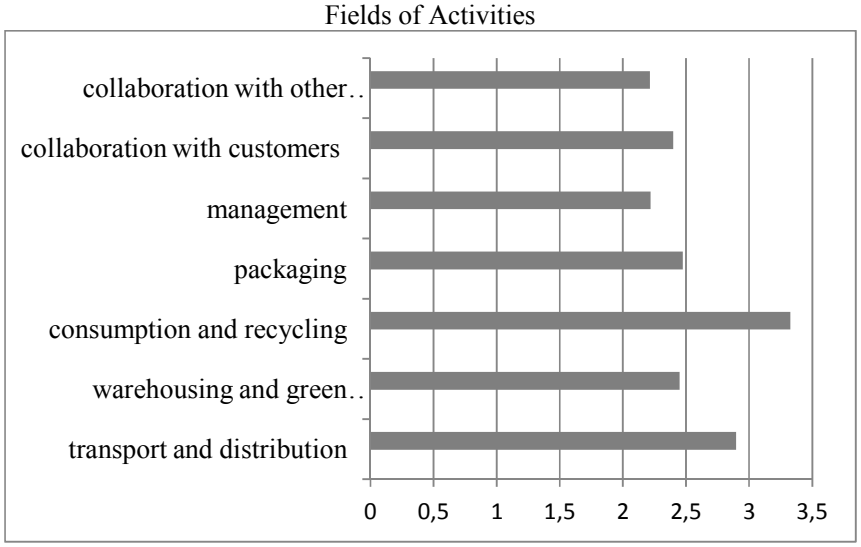
The empiric research shows that 86% of organizations completing the questionnaire are Bulgarian private entities, which comes to prove that research results are representative of the development of logistics service providers in Bulgaria. Additionally 63% of respondents are micro and small companies based on number of employees, the medium and large companies have an almost equal share of participation – 18% and 19% respectively. By type of activity respondents identify themselves as logistics companies and organizations offering transport, forwarding, transport and forwarding, courier, trade, warehousing, information, customs and other services. The largest percentage is held by logistics companies (30%). These are followed by transport service providers and transport and forwarding service providers at 20,6 % each, while in both groups 4 to 6 organizations have specified that they offer an additional type of a logistics service. Organizations offering forwarding services represent 10%, which is also the percentage rate of courier organizations.

This research paper will give an estimate of the results achieved in the field of sustainable logistics by the three types of organizations featuring the highest percentage of participation – logistics organizations, transport service providers and transport and forwarding service providers. The research shows that 85% of respondents have adopted differing number and type of eco-friendly logistics practices.

The analysis of the extent to which ELPs are implemented by the respondents is based on a self estimate on a total of 39 practices internally

oriented and 7 practices focused on customer collaboration and other LSPs collaboration. Average estimates by fields of activities shown in Fig.1 lead to the conclusion that efforts of the organizations are focused to a greater extent on internal improvements aiming to enhance environmental protection, and more specifically such improvements are adopted in the fields of "consumption and recycling" and "transport and distribution". With respect to consumption and recycling, adopted practices include reduction of packaging and other material waste, and their re-use. Preferences for such practices could by explained the accompanying economic effect which find expression in reduction of packaging costs, and reverse logistics costs.

Figure 1: Average Estimates of the Degree of Implementation of ELPs by Fields of Activities



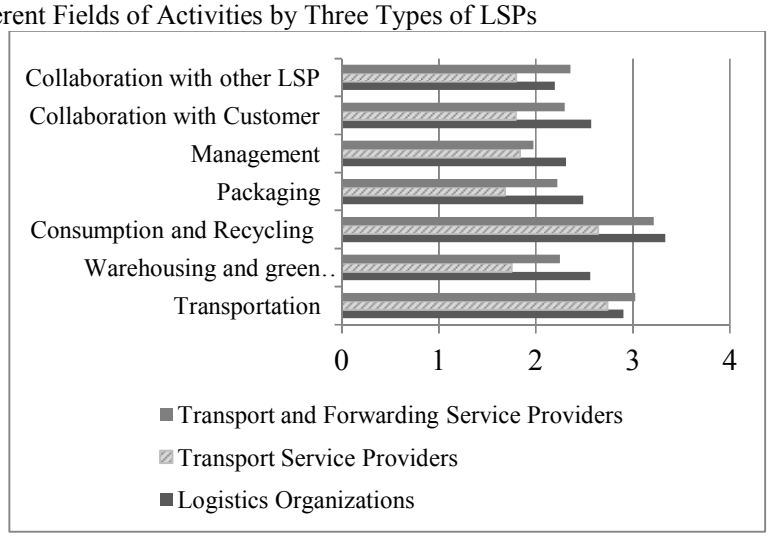
The next important area of implementation of the ELPs is transportation and distribution. An above average estimate for the field is scored by practices related to utilization of route optimization systems, freight consolidation and full load pickup, decrease in vehicle driving speed affecting fuel economy and emissions levels, avoidance of rush hours and busy traffic, use of newer low emission vehicles. The implementation of the following practices remains insignificant: use of alternative vehicles, alternative fuel types, and re-design of logistics systems to improve environmental performance. Integration of such practices requires investment of funds. For micro and small organizations comprising the

majority of responders, the practices aforementioned are not likely to be priority investment areas.

ELPs are implemented to a lesser extent in the fields of packaging, warehousing and green construction, management. Still there are practices in these fields presented with scores above the average for the respective field. Such practices are linked with reusable packaging, effective utilisation of warehouse capacity and land resources, as well as developing official company policies for sustainable development.

In terms of ELPs focused on cooperation with customers and other LSPs, the level of implementation of these practices is relatively low, which could result from the difficulty of reaching agreements for cooperation on environmental protection activities between two or more organisations in the supply chain. The result of the data analysis shows that the organisations under investigation cooperate more closely with their own customers, which could be based on their long-standing business relationships and the resulting high level of trust between them, as well as on pressure on behalf of the customers to implement SLPs.

Figure 2: Average Estimates of the Degree of Implementation of ELPs in Different Fields of Activities by Three Types of LSPs



These results are logical considering the activities and the range of services offered by the two types of organisations. Compared with the other two, organisations that offer transport services exclusively show a lower level of implementation of ELPs in all fields of activities.

The previously described fields which see the LSPs perform a more active role in environmental protection, are also confirmed as preferable by the analysis of the level of implantation of ELPs by three basic types of organisations – logistics firms, transport service providers, and transport and forwarding service providers. Furthermore, as seen from results presented in Fig. 2, logistics organisations are the leaders in terms of consumption and recycling, whereas transport and forwarding service providers are the leaders in the field of transport and distribution.

In terms of cooperation with customers and other LSPs, the average estimates for all organizations under investigation are confirmed by the average estimates of transport and forwarding service providers and logistics organizations. The latter are more active in cooperation with customers, as their average score is higher than the common average on this indicator. In contrast, transport and forwarding service providers show a higher level of implementation of logistics practices for cooperation with other LSPs, aimed at environmental protection. This result could be connected to the traditional, for these organisations, long-lasting partnerships with other transport service providers or forwarding agents in order to guarantee successful deliveries to/from transnational destinations.

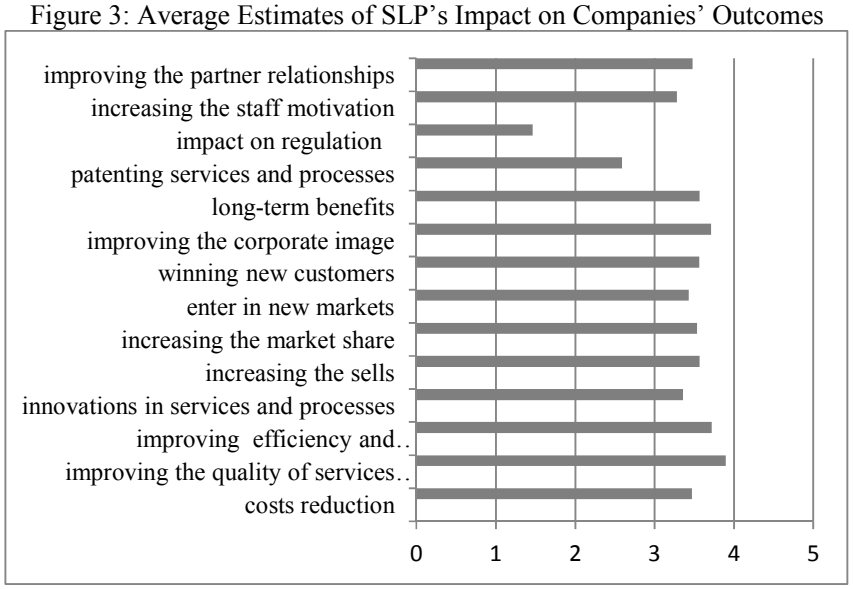
Analysis of the data regarding the level of implementation of ELPs by the organisations under investigation, allows us to conclude that LSPs in Bulgaria have focused their efforts on reducing the negative effects of their activities on the environment to a satisfactory degree, as in the fields of consumption and recycling, and transport and distribution. Furthermore, it can be confirmed that the increase of the type of services the organisations in question offer leads to a higher level of implementation of ELPs. Their results will be evaluated in the following section.

EVALUATION OF THE RESULTS OF THE IMPLEMENTATION OF SLPS BY LSPS IN BULGARIA

The results of the implementation of SLPs by the companies under research are based on 14 indicators, which are both quantitatively-measured (for example costs, revenues, productivity, etc) and qualitatively-measured (for examples improving corporate image, increasing staff motivation, enhancing cooperation with partners, etc). The analysis of the data shows that achieving these results has significantly contributed to the implementation of SLPs by LPSs. The average estimates of most of the indicators, shown in Fig. 3, vary between 3.5 and 4 and are higher than the average estimates for the degree of implementation of ELPs by fields of activities. These results reflect the organisations' realisation of the benefits

of the implementation of SLPs, whilst also indicating the presence of certain barriers for their introduction, which would be examined in the future outputs of the current research project. The highest ranked contribution of SLPs is linked to improving the quality of the services and processes on offer, improvement of corporate image, as well as to increasing effectiveness and productivity. These indicators contribute to the realisation of competitive strategies for organisations oriented towards innovation, effectiveness, quality, and image.

Figure 3: Average Estimates of SLP's Impact on Companies' Outcomes

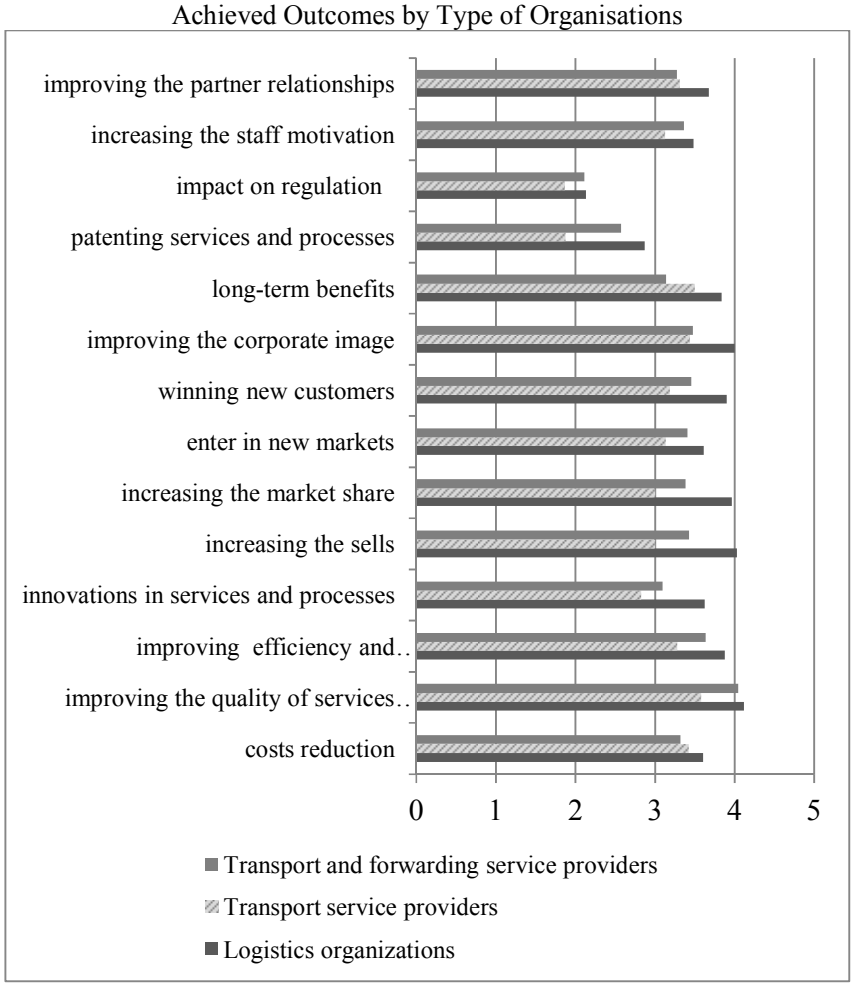


Comparing the average estimates for the level of impact of the SLPs' implementation on the 14 indicators by type of organisations (Fig. 4) demonstrates that logistic organisations value most the positive effects the implemented by them SLPs have on company outcomes. Their estimates on 12 indicators fall within the same range as the common average estimates for all LPSs under investigation. Additionally, the indicators with the highest average estimate (around 4) refer to the improvement of the quality of services and processes, increase of sales and market share, improvement of corporate image, which are all significant in terms of the competitiveness of LSPs. Opportunities for influencing regulatory institutions, are evaluated as minor. The average estimate for this indicator of transport organizations and transport and forwarding service providers are also noticeably lower than estimates for the rest. Reasons for this could be found in the lower level of

implementation of SLPs in the field of management, as well as to internal or external inhibitors.

The avarage estimates of transport and forwarding service providers are higher than those of transport service providers on most indicators, except for the long-term benefits as a result of implementing SLPs.

Figure 4: Average Estimates of the Impact of Implementing SLPs on the Achieved Outcomes by Type of Organisations



The analysis shows that the arrangement of the three types of organisations is identical, both in terms of the impact of implementing SLPs

on the achieved outcomes and in relation to the level of their implementation. This supports the conclusion that the LSPs' aim to increase the variety of services offered in combination as a service package leads to better results, which then contributes towards the improvements of LSPs' competitiveness.

CONCLUSIONS AND FUTURE STUDY

The results of the study presented in this paper suggest that the implementation of SLPs in LSPs in Bulgaria is not on a high level, but that organizations realise the benefits of the efforts towards offering sustainable logistics services. These efforts have been focused to a greater extent on internal ELPs than on external cooperation aimed at enhancing environmental protection. To clarify the reasons behind this finding we will carry out further investigations in our research project to examine the driving factors and inhibitors for the implementation of SLPs.

The leading position of the logistics organizations in terms of implementing SLPs in almost all fields of activities supports the conclusion that the development of the LSPs from a 2PL to a 3PL company enhances their commitment to environmental sustainability because of increased customer requirements for sustainable logistics services.

The investigated organizations' efforts directed towards improving their environmental sustainability impact their outcomes positively, which supports the eco-efficiency view. As expected, the implementation of the SLPs has a higher impact on the outcomes of the 3PL companies. Their best results connected to the improvement of the quality of services and processes, increase of sales and market share, and improvement of corporate image could create competitive advantages for them and contribute to the strategic differentiation of the organizations. The suggestion regarding the relationship between the positive impact of SLPs and the competitive strategy of LSPs needs to be examined further in a future study.

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