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INNOVATIVE SOLUTIONS IN THE FIELD OF LOGISTICS

Abstract:

The paper discusses the problem of innovation and innovativeness in the field of logistics. Changeability and dynamics of the market bring about that, for modern enterprises, an increasingly noticeable need arises to replace the solutions of the evolutionary nature, applied so far (such as verification, evolution and constant adjustment) with innovative solutions of the revolutionary nature. Therefore, in logistics, there appeared the necessity to not only react quickly at the proper place and time but to search for and implement modern, innovative solutions and concepts. The need for innovation exists both in the field of the whole logistics systems and individual management areas such as: warehousing, distribution and transport etc. The main objective of the paper is to present logistics as the field where innovation plays a very important role by depicting the theoretical aspects of the selected views of the representatives of the world of science with reference to this thematic area and reviewing the results of rankings of modern and innovative solutions in the field of logistics. There have been characterized the concepts of innovation and innovativeness and there has been indicated their essence in the business activity. Subsequently, this problem has been referred to the area of modern logistics as the field being the source of new potentials and providing enterprises with an increase in the effectiveness of functioning. There have also been given the examples of innovative solutions, the most important ones from the perspective of the selected theoreticians of the subject and the practitioners of the logistics activity according to the ranking results. As a result of the analysis of the listed summaries there has been determined the specificity of the innovative solutions applied in the field of logistics.

Keywords:

logistics, innovativeness, innovation, logistics innovativeness, innovative product

JEL Classification: O31

Introduction

Modern enterprises are to operate in the environment which is difficult to predict, extremely variable and really dynamic. The above mentioned variability and dynamics of the market causes that, in case of enterprises, there is an increasingly noticeable need to replace the solutions of the evolutionary nature, applied so far, (such as verification, evolution and constant adjustment), with innovative solutions, which are revolutionary in nature. Therefore, in logistics, there has appeared the need not necessarily to react instantly, at the appropriate place and time but to search for and implement modern, innovative solutions and concepts.

At a time when the crisis is being discussed, innovation is a particularly important source of development for the logistics sector. The growing interest in innovation is associated with the rapid development of logistics, among others, caused by: the depletion of the possibilities of reducing production costs, an increase in transport costs and inventory service, an increasing variety of products and services, continuous changes in the structure of trade in goods, development of technology and IT tools, as well as globalization (Tervonen and Haapasalo, 2015).

The dynamics of the present economic, technological and social changes forces enterprises to search for solutions in all areas of their activity, also including, or maybe above all, in logistics. The basic objective of the paper is to show logistics as the field in which innovation plays a very important role, by presenting the theoretical aspects of the selected views of the representatives of the world of science referring to this thematic area and the review of the rankings of modern and innovative solutions in the field of logistics.

The essence of innovation and innovativeness

Since ancient times, innovation has been regarded as a kind of driving force of the social progress. However, in the contemporary environment, which is highly turbulent, innovativeness amounts to something more than only active looking for the ways to maintain a business activity (Ślusarczyk and Szajt, 2013). It is difficult to clearly define the concept of innovation. In literature, there are lot of different definitions used to clarify this term.

Drucker (2006) refers to innovation as: “a specific tool which provides resources with new opportunities to create wealth”, considering it not only a new technological solution but, above all, a modern management concept, which constitutes the key element of the process of building entrepreneurial economy. Griffin (2012) regards innovation as the guided effort of the organization for the benefit of the development of new products or services or new applications for the already existing products or services.

Knight (1967) defines innovation as the introduction of the change which is new for the specific organization and the environment of its operation. This amounts to deliberate changes which aim at the implementation of innovation or new value or quality which is applied in a business activity (Gattorna, 2006). Referring to the discussed issues slightly more broadly, it can be concluded that innovation is the whole management

process, including varied activities, which result in creating, developing and introducing new values in products or new connections between applicable funds and resources, constituting newness for the unit creating or implementing it (Kelley and Littman, 2006). The above definition is the starting point for the discussion held in the following part of the paper.

Innovativeness, the most frequently, is defined as the capability for the implementation of new or improved products (goods or services), new or improved processes, new organizational or marketing methods onto the market (Bessant and Tidd, 2007) or the capability and motivation to search for innovative solutions (Brdulak, 2010). According to Schumpeter (2004), innovation is: manufacturing new products, applying modern production methods, finding new markets, reaching new sources of new materials, introducing new organizations. Basically, innovativeness is the capability of the enterprise to implement innovation. The innovative process, in turn, is regarded as a set of ventures as a result of which new products, patterns, technologies and services come into being (Oke, Burke and Myers, 2007).

The innovative enterprise is the one which introduces new solutions concerning products, marketing or organization into practice (Boer and During, 2001). It is also the entity which, on account of its openness to changes, can search for and implement new concepts, and more and more recent ideas, inventions as well as scientific and technological solutions (Grabowska, Otola and Mesjasz-Lech, 2014). This allows for the development of a strong market position and maintenance of this position in the future (Nowicka-Skowron and Pachura, 2010). Being innovative is based on thinking: firstly – in an innovative way, secondly – in a conceptual and systemic way and, thirdly – in a non-conventional way.

Innovation and innovativeness in logistics

Logistics is changing day by day, becoming the source of new potentials which provide greater efficiency to enterprises. It is the field in the framework of which we very often deal with the implementation of different kinds of innovation and new ideas.

Searching for new solutions in logistics is the self-sustaining mechanism. The contemporary logistics uses both technical, technological and organizational innovation. These solutions include, almost all, the areas of the conducted logistics activity and among them: means of transport and handling equipment (particularly, drive technologies, ergonomics of vehicles, new control and automation systems, increasing security of means of internal and external transport), organization and control of the flow of materials, development of systems supporting the implementation of logistics and transport processes and development of business principles specifying the framework of the competition and collaboration in logistics (Grabara, 2013). This also amounts to: better use of the possessed resources, development of the principles of cooperation, organization of the flow of information, improvements in communication (e.g. Voice-Picking, Pick-to-Light systems, the RFID technology, portable terminals PDA, which support the work of drivers, etc.). The innovation in logistics can be implemented with so called new

measures in the form of: technologies, knowledge and network cooperation (Koźlak, 2009).

Logistics innovation is the improvement, new value, from the point of view of the client, which amounts to the market value and is the basis for the development of logistics services and building the operation strategy on the market (Borkowski and Ingaldi, 2014). One of the most significant signs of innovativeness and modernity in logistics is, after all, not the technology itself, but the way of thinking and planning work and management of the course of the logistics processes. Among the most important issues in logistics, from the point of view of innovativeness, there are: investments in planning, recognizing and adjusting to individual requirements and needs of clients, accurate and systematic monitoring and continuous and active improvement in the level of the performed services. The application of the innovative planning tools, in combination with the appropriately adopted strategy, allows for effective creating and using the enterprise potential and savings of 10-15% (Buchwald, 2012).

The improvement in logistics processes itself is not enough nowadays. Innovative solutions in logistics also refer to (Bujak, 2011):

- constant development of the team dealing with organization and adaptation of innovation, by stimulating modern sharp thinking and caring about work and involvement in the implementation of the assigned tasks,
- constant protection and control of the quality of the conducted activities,
- transparency of the conducted activity combined with honesty to clients,
- solutions involving continuous concentration on work, task forces, the implemented practices and shared values,
- activities aimed at finding more recent and better ways to implement individual logistics tasks,
- satisfaction with work, respect from clients and opportunities for further development.

The common feature of the above solutions is high degree of creativeness, integration and technological complexity.

The essence of innovativeness in logistics is effective for better adjustment to changes taking place in the micro- and macro-environment of the enterprise and, therefore, better adjustment to the conditions on the specific market and achieving the capability to react quickly to the needs of this market (Clausen, Hompel and Meier, 2014). Innovativeness in the logistics sector is oriented, most of all, towards an increase in the effectiveness of processes, reducing costs and minimizing negative impact on the natural environment (Wallenburg, 2009). According to the research of 2007, conducted by ELA and Arthur D. Little company, the objectives of innovation in logistics are: reducing the costs of processes, modularization/standardization of logistics services, creating new services satisfying the requirements of clients, meeting

basic requirements of the market (Little, 2007).

Innovativeness in the area of logistics may emerge, among others, by: building the sustainable supply chain, undertaking activities oriented towards the coordination of the flow of streams of goods and information within the whole supply chain and concentrating on the creation of appropriate relationships between the participants of the supply chain (Blaik, 2010). The activities conducted in the framework of the logistics innovativeness focus on the development of changes which result in the fact that enterprises become more advanced and more competitive (Brendzel-Skowera, 2013). They, the most frequently, include: the latest IT technologies, the improvement and increase in the effectiveness of processes, using new distribution channels, affecting the level of involvement of employees or using the services applied so far in other areas (Grawe, Chen and Daugherty, 2009). Innovativeness in logistics is the need of the times we are to live in and run the business activity. It should be inscribed in the market needs, in this case, both in the requirements of the logistics sector and other branches of economy.

The examples of innovative solutions in the field of logistics

There is the need for innovation both in the field of the whole logistics systems and individual areas of management, such as: warehousing, distribution, transport etc. Below, there are presented the selected views of the representatives of the world of science concerning innovation in logistics and the review of the ranking results in this thematic area.

1. According to Koźlak (2009), the most frequently considered technological innovation in the field of logistics, among others, includes:

- technologies of data identification and acquisition (RFID – Radio Frequency Identification, OCR - Optical Character Recognition, ADC, EPC – Electronic Product Code, vision systems, voice identification, fingerprint scanning),

- warehousing technologies (automatic sorting systems, complementation computer-aided systems, WMS – Warehouse Management System),

- information technologies (EDI – Electronic Data Interchange, Internet, logistics information system, enterprise information portals, VOIP, EOS – Electronic Ordering System, POS – Point of Sale),

- transport technologies (GIS – Geographic Information System, GPS – Global Positioning System i.e. satellite navigation system).

2. Among the breakthrough innovation in logistics, Pohl (2007) lists: the container, which is unbeatable in the organization of material flows and RFID – radio frequency identification, which is irreplaceable in modern supply chains.

3. Szymczak (2009), in turn, indicates such innovation as: the concept of the integrated supply chain, the RFID technology, the standard EPC number, ICT, virtual logistics operators. The author also mentions the organizational solutions recognized as innovation, such as VMI – vendor manager inventory by the supplier or the

postponement strategy.

4. According to the listing by the publisher and editor in chief of the American *Supply Chain Digest,* Gilmore (2010), the greatest innovation in logistics amounts to: Toyota Production System (TPS), P&G – continuous replenishment of goods, the container for carrying goods on ships, EOQ – Economic Order Quantity, Ford assembly line, universal product code, FedEX tracking system, the process of distribution planning, Central System of Transport Control 3M and Taylorism.

5. The ranking prepared and published by the Polish daily “Rzeczpospolita” for the last 10 years known as “The List 2000" includes two main summaries: “Good Company Prize Winners” and “The Ranking of Innovative Companies".

Recently, the invariably leading position in the ranking has been occupied by the company specializing in the design and implementation of IT systems, ComArch S.A. from Cracow (Poland), being the leader for 4 years and also at the forefront before. The companies from the sector of transport-shipping-logistics (TSL) are rather unfortunate, in years 2011 - 2013 the sector was represented by the company Siódemka S.A. from Warsaw (Poland). Little share of contract logistics is noticeable not only with respect to far positions occupied by TSL companies but also much lower level of expenses indicated for the funding of research and development - these expenses were found a few to several times smaller than those of the leaders of the subsequent editions of the ranking.

The image of the relatively poor assessment of the direct relevance of innovation in the companies of the TSL sector is completed by the results of the analysis “Logistics Operator of the Year”, prepared by Data Group Consulting. Namely, it shows that the clients of logistics companies (logistics operators) appreciate their partners, most of all, not for innovation, which was indicated by slightly more than a half of the respondents. For example, in 2009, it was 58% of the indications whereas in 2013 the criterion of innovativeness fell to 53% in the indications of the respondents. These results clearly indicate that this is correctness and flexibility of supplies and the executive potential that the logistics operator may gain trust and recognition of the clients with. These features, in both discussed editions of the report “Logistics Operator of the Year” are mentioned in the forefront. This means that the appreciated logistics operator is the one that is reliable, trusted and has the potential to provide different services and demonstrates willingness to provide perfectly selected services (packages of services).

It is not difficult to notice, though, that each of these features of the customer logistics service would not be possible to offer without innovation. It definitely affects the quality of the provided services and, at the same time, the clients’ satisfaction. Innovation may not be directly noticeable to them. The results in the form of the executive potential of TSL are more important.

6. To motivate the entrepreneurs from the sector of transport and logistics to creative thinking in the field of modernization of products and processes, there has been held a competition known as "The Innovative Product for Logistics and Transport " for a few years (Kostecka, 2013). Every year about 50 entrepreneurs report their ideas for

innovativeness, while presenting the developed improvements in different areas of the activity of the logistics operator. The competition committee consists of the experts from the TSL sector. The aim of the competition “The Innovative Product for Logistics and Transport” is to emerge and award the best innovative solutions in the TSL sector, which have been implemented in this sector in the last two years or which will be implemented soon.

While making an assessment, the chapter of the competition is driven by the technological innovativeness of the product, benefits for clients and market innovativeness. Additional points could be awarded for references, opinions or patents. Eventually, after summing up the points, the products selected by the chapter within the last three years are indicated below.

- In 2013 “The Innovative Product for Logistics and Transport” was Zenit Pro Diesel, i.e. the system enabling LPG gas combustion in diesel engines in cargo trucks and passenger cars.

The distinctions were awarded to:

1. EQ System for Asprova software, allowing for the optimization of production processes,
2. STILL Poland for STILL iGO Easy system, allowing for the optimization of work in the warehouse,
3. TimoCom Soft- und Hardware GmbH for the calculation and tracking software - TCeMap, allowing for the optimization of routes,
4. Law Firm Viggen for LEXtrans24 system for legal service of transport companies,
5. European Leasing Fund for the service ”Free Leasing”, i.e. the service allowing lessees to make the lease repayment at their discretion.

- In 2012 four equivalent awards were given for:

1. Mobile On-board Computer - Navto OnLine, one of the few communicators on the Polish market, which reduces costs and improves the communication between a dispatcher and a driver and the fleet drivers themselves,

2. The refrigerating unit PULSOR using the E-Driver technology, consisting in the application of the inverter and hermetic variable speed compressor, providing 100 per cent of efficiency at low engine speeds,

3. INTEX, i.e. compact electric truck for transporting and rolling reels, electric lift truck with additional function of rolling loads and rolling them along the ramp, designed for reels of different width,

4. The installation DEGAmix –Dual Fuell System as an innovative solution, consisting in powering the vehicles with diesel engines simultaneously with two types of fuels: diesel oil and LPG. DIEGAmix power system allows for reduction in operating costs by 10-15%.

- In 2011 there were awarded three equivalent awards for:

1. Folded transport box C3SB and double transporter for the vehicle of the company DHL Global Forwarding, improving the loading and unloading processes. It is the breakthrough in the sector since it significantly reduces transport costs. Due to the folded sides of the transport boxes it is possible to carry them even one on another, by means of which the number of courses of the truck carrying the load decreases,

2. The Mobileye system of the Mobileye Yision Technologies company, dedicated to the drivers of truck tractors and not only. By means of the satellite connection, the system automatically detects the objects on the route of the driver, and it includes the intelligent module to warn in case of driving too fast or the possibility of the collision,

3. The system of automatic loading and unloading of cargo trucks (ATLS) of the Ancra Systems company is an example of loading and unloading engineering providing fully automated process significantly increasing the efficiency and safety at work. The advanced technology is adjusted to the loading and unloading needs (different sizes of trailers/semi-trailers, weights and types of goods etc.). This system consists of two overlapping systems: one must be installed on the truck and the other one on the loading platform.

Conclusions

The exemplary innovative solutions in the field of logistics, indicated above, prove that logistics is the sector in which innovativeness aims at an increase in the effectiveness of processes, reducing costs and minimizing negative impact on the natural environment. The innovativeness not determining measurable benefits – not only the financial ones but also the ones in the field of ecology, efficiency of processes or an increase in safety at work – will become clearly unnecessary expense for business entities. At the same time, innovation symbolizes the change in paradigms, breaks with commonly accepted stereotypes, simultaneously, bringing about the strengthening of competitiveness of the entities implementing innovation (Nogalski, Szpitter, Karpacz and Wójcik-Karpacz, 2011).

The conducted analysis of the views on the innovation in logistics and the review of the selected rankings, presented above, allow for the following conclusions:

1. The specificity of the logistics activity locates the companies of this sector in far positions in the rankings of innovativeness, based on the criteria of expenses on research and development (R+D), the number of people employed in R+D departments and the number of the reported patents and licenses. This kind of qualifications will always be appreciated by the firms whose basic activity is strictly connected with creating and selling innovative products directly in the sectors with high demands of clients in this field and short life cycles of products (e.g. Comarch S.A.). This kind of companies will always maintain the strong base in the field of research and development, they will also invest in innovativeness and regularly occupy the leading positions in the ranking mentioned above.

2. Clients expect logistics companies to be, most of all, reliable to maintain the potential to provide different services and ready to provide individually selected services (packages of services). The fact if the client notices innovation in the logistics operator service counts much less. The key expectations of clients could not be met, though, without constant implementation of innovation and continuous improvement in the process of order and supply service.
3. The innovation implemented in the TSL sector mainly concern the logistics processes and their infrastructural support. It concentrates on the transport processes and warehousing operations (including the picking ones) of loading and unloading and also on their informative (IT) conditions. This directly amounts to the quality of customer service and profitability of the activity of TSL companies. Therefore, innovation is worth implementing, although it does not have to be noticeable for clients.
4. The approach to innovation management in the TSL sector is not significantly different from the ones in other sectors, in which the emphasis is placed on the efficiency of business processes (including management, operational and support processes). It is also important to rationally specify the key areas of innovation, define the expected effects of implementation and management of the process of their creation and implementation, taking into account adequate threats.

The problem presented in the paper constitutes a very important issue since it is not possible not to agree with the statement that innovativeness is the condition of the development of logistics, its adjustment to the requirements of the twenty first century, it is the way towards competitiveness and the condition of the development of the company, the region and the entire economy (Wagner and Sutter, 2012). In the environment where the area of the economic life is constantly changing, all kinds of innovation are important factors of an increase in competiveness of companies.

In the race for survival and domination, the enterprises that are ready to implement innovation have the greatest opportunities. Moreover, it is assumed that organizations will be able to survive as long as they are able to implement innovation. In the conditions of the increasing competition, enterprises must care about constant progress in the field of innovation. Nowadays, innovativeness is one of the most important factors influencing the competitiveness of enterprises. More and more companies are convinced of the profitability of innovation, however, still a significant part of enterprises underestimate its significance, while building their competitive strategy not on innovation but on the price, quality and the level of customer service (Romanowska and Gierszewska, 2009). In spite of numerous advantages of innovation in logistics, enterprises still approach it with caution.

The research conducted by the Polish Confederation of Private Employers Lewiatan (Kondej, 2015) indicates that the investments of innovative companies in innovation which is productive, process or organizational in nature, developed at the time of crisis, brought about the improvement in their competitiveness on the market and an increase in the quality of products and services, which allowed these companies to create better

and more competitive offer of products and services for clients. More than 80% of the surveyed companies confirmed that this type of innovation positively influenced their present situation (Anam, 2015). As it was indicated in the report Research International of 2009, at the time of the economic difficulties, clients, due to reflections concerning their own needs and consumer habits, become increasingly aware of their needs. Searching for the best ways to satisfy them, they not only do not avoid risk connected with the purchase of new products but they also open to new solutions (new products and services and, simultaneously, innovative activities of enterprises). Referring to the above, it can be concluded that the more companies will be able to meet and understand the needs of the purchasers the greatest opportunities they will have to efficiently implement innovation, which will allow them to achieve success on the market, even at the time of unfavorable changes within the economic reality (Kenneth, 2010).

The fact is that the level of innovativeness in Poland is created below the average in the European Union. However, the EU also falls behind in the area of innovativeness compared to e.g. the United States. The EU leaders are Germany, Denmark, Switzerland and Finland. These countries are compared by the European Commission to the Asian tigers. Unfortunately, Poland belongs to the group of countries below the EU average. These data result from the report by the European Commission concerning the area of innovativeness, including the analysis of the previous innovation system and the one considering the basic issues referring to the entities responsible for creating the policy, implementing the suggested solutions and also the results of individual 25 factors depicting the innovative capabilities of the country i.e. so called European Innovation Scoreboard.

Summing up the previous considerations and taking into account the economic tendencies on the market, it can be concluded that, actually, each of the areas of the business activity associated with logistics is the source of great opportunities for the implementation of innovative ideas and solutions. On this basis, it can also be assumed that innovation in the logistics sector, over time, will play an increasingly important role in the activity of enterprises, becoming the foundation for their competitiveness.

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