

## LOGISTICS IMPROVEMENT POSSIBILITIES IN ENTREPRENEURSHIP

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**Abstract.** Nowadays, the harmonised and rational performance of logistics in a competitive environment is essential for entrepreneurship to reduce costs and accordingly gain advantages on the market. Besides, it is necessary to achieve a maximum level of service for customers – to make deliveries within the specified time and at high quality. The research aim is to examine logistics management for freight deliveries by DSG Karjeri LLC and to identify possibilities to improve its logistics operations. Three logistics management scenarios for freight deliveries were designed to achieve the aim. The scenarios envisage that the company outsources transport services, rents vehicles or purchases vehicles. The research found that the purchase of lorries used for freight deliveries would result in savings within a range EUR 4000-25000 a year as well as the company would provide timely and quality freight deliveries.

**Key words:** logistics, scenarios, logistics management.

**JEL code:** L91, R40.

### Introduction

Nowadays, under a market economy, the role of logistics increases and problems related to it emerge as well. It is necessary, on the one hand, to achieve a maximum level of service for customers (to make deliveries within the specified time and at high quality), while, on the other hand, to minimise service-related costs. Timely deliveries and precision factors are particularly essential for companies whose basic activity relates to the transport of products (Patlins P., 2011). The problem is urgent due to the role an efficient transport system plays in entrepreneurship as well as the fact that the market economy raises standards for timely deliveries and cost reductions in transport. Furthermore, in a competitive environment companies have to seek to achieve cost reductions and hence advantages on the market; that is why harmonised and rational operation assists in achieving not only advantages in terms of cost but also in the flexible functioning of the entire logistics system (Ozolins D. and Kruzs K., 2005).

Any company has to plan its economic activities and a great deal of its activities relates particularly to logistics processes. A number of scientists have focused on logistics; thus, this term is analysed from different perspectives. From the scientific perspective, logistics is a science focusing on the management of the flow of material valuables and the related flow of

information in certain micro- and macroeconomic systems to achieve the objective set (Praude V. & Belcikovs J., 2003). However, from the management perspective, logistics involves the planning, management and control of economic activities. It provides the purposeful maintenance of material valuables and their delivery from the production site to consumers as well as other related activities regarding their flow and the related flow of information, aiming to raise performance efficiency and meet consumer needs (Krumina A., 2005). According to findings in scientific literature, effective logistics management allows customers of a company to be served at high quality by timely delivering their products as well as efficiently exploiting the company's resources and minimising their maintenance costs even in cases of change in customer demand (Patlins P., 2011). The research sets the following **hypothesis**: effective logistics management is a basis for company cost reductions. The research object is company DSG Karjeri LLC, which deals with dolomite quarrying and the production of crushed stone; the company's daily operation is associated with logistics management.

The research **aim** is to examine logistics management for freight deliveries by DSG Karjeri LLC and to identify possibilities to improve its logistics operations. To achieve the aim, the following specific research **tasks** were set:

1) to describe the theoretical aspects of logistics;

2) to analyse the logistics management of DSG Karjeri LLC for freight deliveries and to identify possibilities to improve its logistics operations.

The following **research methods** were employed: the monographic and descriptive methods were applied to describe the role of logistics nowadays as well as to examine the logistics management process in DSG Karjeri LLC; the scenario method was used to identify the most economically efficient way of transport of freight for DSG Karjeri LLC: contracting an outsourcing provider (purchase of outsourcing services), renting vehicles or purchasing vehicles. The scenario method is appropriate in cases where a company has to prepare for some risks and opportunities in the future, given the effects of various factors on different scenarios (Zurek M. B. and Henrichs T., 2007). This method is useful in the present research to choose the most economically efficient logistics management solution based on each scenario's advantages and disadvantages.

The research used unpublished and informative materials of DSG Karjeri LLC as well as scientific literature on the theoretical aspects of logistics.

### **Development and role of logistics in entrepreneurship**

Logistics has a long history, and its practical application originated in Ancient Greece (776 BC - 323 AD) when the term logistics referred to supplies for the army and displacement (Radzele-Sulce A., 2011). However, the scientific literature refers to J.Crowell as the first author who defined logistics and its key principles in his 1901 report on the flow of goods, costs and efficiency (Stock J. and Douglas L., 2000). The modern scientific literature provides a number of definitions of the term logistics, which involve a narrow or a broad

range of issues researched. Most often, logistics is understood and described as deliveries of goods to customers; yet, logistics is also necessary to produce the goods to be delivered. Logistics is also defined as a science focusing on the management of the flow of material valuables and the related flow of information in certain micro- and macroeconomic systems to achieve the objective set (Praude V. & Belcikovs J., 2003). However, D. J. Bowersox and D. J. Closs (1996) believe that the object of logistics may be defined as flows of materials that are in place both within a company and among companies, intermediaries and financial institutions. A. Radzele-Sulce (2011), summarising a number of definitions given by scientists, points that logistics involves efficient uses of resources, flows of material valuables and information, a process of planning consumption sites, sales and control aimed at meeting customer needs and increasing an company's profit. As noted by I. Slavinska (2007), most companies associate the term logistics only with the most obvious part of it – the provision of transport services.

Efficient logistics plays a significant role in entrepreneurship, as it reduces the total cost of transport and logistics services by up to 30%, managing the operation of a company's units as rationally and coordinately as possible (Urbahs A. and Cerkovnuks A., 2003). Logistics is also important in serving clients and buyers (Sergeyev V.I., 2005). It is important for buyers that the seller is continuously searching for the best solutions in communication, deliveries of materials and the process on the whole (Bowersox D. J. and Closs D. J., 1996; Heskett J. L. et al., 1990). All this may be provided through effective logistics in an company. An analysis of findings on the role of logistics by a number of authors allows concluding that logistics is important not only in reducing costs and serving customers but also in time planning – both for production and for

deliveries of goods. Globalisation created a need to perform deliveries as fast as possible, thus, not freezing assets during the delivery process (Sprancmanis N., 2011). As pointed by I. Slavinska (2007), in globalised economies companies can successfully develop and compete particularly through effective logistics management. To identify the possibilities to improve logistics management, the present research analysed company DSG Karjeri LLC, focusing particularly on the management of transport services in the company.

### **Characteristics of the logistics process in DSG Karjeri LLC**

DSG Karjeri LLC was founded on 2 June 2005; its key activity involves dolomite quarrying and the production of crushed stone but it also sells other mineral materials, as the company buys sand, gravel and clay from other quarrying companies. DSG Karjeri LLC has opened four dolomite fields – at Iecava, Saikava, Birzi and Ape –; yet, it plans to open 11 more dolomite fields until 2020 in the entire territory of Latvia, thereby increasing its sales by 5 % until 2020.

An essential role in selling the dolomite produced and the materials bought is played by effective logistics management in DSG Karjeri LLC, as most of its customers prefer the materials they have bought to be delivered to their construction object. Also, the company uses logistics services for its own needs – for the transport of materials quarried, machinery, employees and materials bought.

The head of the Production Department and sales employees are involved in managing the logistics process in DSG Karjeri LLC. The head of the Production Department arranges the relocation of machinery and mobile teams among quarries, planning the necessary production intensity at every quarry and for every period. Sales employees work on delivering the company's products to customers; they also plan product purchases for customers, i.e. the loading

of products at other quarries and their delivery to the customer's object at a specified time.

Since DSG Karjeri LLC does not have its own vehicles to deliver its products, it contracts other companies that provide transport services. This means that the most reliable provider of transport services has to be selected for every delivery site, which is ready to do it for the price agreed with the customer. In addition, a sales employee has to correctly calculate the distance from a quarry, from which products are delivered, to the customer's site, so that when agreeing on the price with the customer, there are no doubts the company is able to sell the material and contract a provider of transport services for the revenue earned. During the active season, mistakes are often made in calculations of prices for customers; consequently, if an incorrect calculation are performed, customers have to often pay for transport. However, no price change is allowed for deliveries of products in large quantities – the lowest price set by the company is often the reason why customers decide to buy the products particularly from DSG Karjeri LLC.

In 2015, DSG Karjeri LLC cooperated with 15 providers of transport services, and the cooperation with most of them continues in 2016. Important criteria in the choice of a transport company are the price for kilometrage set by the company, the distance from the company's site to the production site of DSG Karjeri LLC, the reliability of the company based on previous cooperation with it and the company's accuracy and timelines in making an invoice for the service it provides.

On the whole, logistics management is effective in DSG Karjeri LLC; yet, the company has to examine its possibilities to improve its logistics processes (transport) in order to reduce its costs.

## **Logistics improvement possibilities in DSG**

### **Karjeri LLC**

Transport in business may be performed in three ways: contracting an outsourcing provider (purchase of outsourcing services), renting vehicles or purchasing vehicles. Three scenarios were analysed to identify the most optimum one for the situation of DSG Karjeri LLC.

**Scenario A: purchase of outsourcing services.** At present, DSG Karjeri LLC outsources transport services; yet, contracting an outsourcing provider involves several advantages and disadvantages.

Transport companies are not sufficiently flexible in time; in the result, the company may lose revenue, as any customer can find another seller that can also deliver the product. An opposite situation is also likely, i.e. idling. Idling is possible if a contracted transport company waits for the freight to be loaded or for unloading it at the site. In 2014, the company's expenses due to idling totalled EUR 300.00.

One of the greatest disadvantages of outsourcing transport services is the motivation of employees to do a good job, i.e. to deliver the freight to the customer's site and collect all signatures of the construction manager on transport waybills. DSG Karjeri LLC has experienced situations where a customer did not accept the delivery of the freight just because he/she had not put a signature on the transport waybill. In such cases problems emerge with providers of transport services – if the customer refuses to accept the freight, DSG Karjeri LLC reserves its right not to accept a transport invoice if the transport company has not done its job properly. One can conclude that there are problems with employee motivation, which cannot be controlled by the buyer of transport services.

A significant disadvantage regarding buying transport services relates to the time factor. Delivering the product from distant quarries, the provider of transport services is not always

located close to the site, which does not make deliveries as fast as possible. However, if the company has its own vehicles, it can timely plan trips, making kilometrage more rational. In addition, the company pays for transport services during idling – the time the transport company spent to load or unload the freight at the site.

One of the largest advantages relates to maintenance and repair costs for vehicles. In case the company chooses to buy transport services, it is responsible for annual vehicle roadworthiness tests and has to pay road taxes. If some transport company refuses to do a trip because its vehicle has to be repaired, the buyer of transport services can contact another transport company and deliver its products in any case. Also, the use of funds of another company is also an important advantage. The company, buying transport services, uses the funds of the other company to fulfil its obligations to clients. Any provider of transport services invests its funds at the moment when providing the services and receives its funds earned in a month or even later. An advantage is also the control of employees if buying transport services, i.e. hours worked, rest periods and kilometrage do not have to be controlled.

**Scenario B: renting vehicles.** The research analyses annual maintenance costs for a lorry if the lorry is rented. A provider of transport services whose fleet consists of four leased used lorries SCANIA R420 (a tractor-trailer) is analysed as the research object. The lorries have trailers for transporting loose bulk freight. The company transports the mentioned kind of freight and is one of the most frequently contracted partners by DSG Karjeri LLC.

An examination of the financial performance of the company allows finding that the greatest per unit cost concerning the maintenance of rented lorries relates to rental costs, namely, EUR 24900.25 a year (Table 1).

Table 1

**Maintenance costs for a lorry SCANIA R420 a year, EUR**

Indicators	Costs	
	EUR	Proportion, %
<b>Wages</b>	5000.00	7.47
<b>Fuel</b>	24036.50	35.92
<b>Repairs</b>	7714.25	11.53
<b>Road Traffic Safety Directorate roadworthiness tests</b>	510.75	0.76
<b>Rental costs</b>	24900.25	37.21
<b>Tyres</b>	4763.00	7.11
<b>Total cost</b>	66924.75	100

*Source: authors' calculations*

In case of need, a renter covers such costs as overhauls and insurance. No overhauls have been performed for the SCANIA lorries during the last three years. In contrast, the cost of daily repairs is covered by the lessee. In 2014, the repair cost per lorry totalled EUR 7714.25, which accounted for 11.53% of the total cost per lorry a year. The total maintenance cost per lorry amounted to EUR 66924.75 in 2014.

The authors calculated an approximate kilometrage, given the average diesel fuel price (value added tax excluded) per litre in 2014 and the fuel cost per lorry purchased and used in freight deliveries by the following formula:

$$D_1 * P = L \quad (1)$$

where

$D_1$  – fuel cost per lorry used in freight deliveries (value added tax excluded) (EUR);

$P$  – diesel fuel cost (value added tax excluded) (EUR/l);

$L$  – amount of fuel used in freight deliveries (l).

The amount of diesel fuel consumed is calculated by dividing the cost of fuel by the average diesel fuel price in 2014, which was 0.90 EUR/litre; it totalled 26707.22 litres. It means that a lorry consumed about 26707.22 litres of diesel fuel for freight deliveries. Further, the authors calculate kilometrage for 2014 by the formula:

$$D_a / P_a = R \quad (2)$$

where

$D_a$  – average fuel consumption (l/km);

$P_a$  – average price set by providers of transport services (EUR);

$R$  – kilometrage (km).

It is assumed that the average fuel consumption per lorry is 35 l per 100 km. One can find that about EUR 66924.75 were required to provide transport services and maintain a lorry that travelled 76306.34 km in 2014. Accordingly, if the kilometrage of the lorry is greater, the cost of maintenance and repairs also rises. It has to be noted that this cost includes a rental cost of EUR 24900.25, which would not be paid if the lorry were owned by the company.

In 2014, the lowest price per kilometre asked by transport providers contracted by DSG Karjeri LLC was EUR 0.93, while the highest price reached EUR 1.20. In a situation where DSG Karjeri LLC has to maintain a lorry whose total cost is EUR 66927.75 a year and kilometrage is 76306.34 km, it is not efficient to outsource transport services. If it sets its own price at EUR 0.93 per kilometre, the cost of transport at a kilometrage of 76306.34 km is EUR 70964.90.

Table 2 provides a comparison of data to identify the gains from kilometrage if the company has to pay for kilometrage at a rate of 0.93 EUR/km and at a rate of 1.20 EUR/km. In the comparison, the rate of EUR 0.93 per

kilometre is selected as the lowest price of transport providers contracted by DSG Karjeri LLC and the rate of EUR 1.20 per kilometre represents the highest price DSG Karjeri LLC has paid if outsourcing transport services. It is assumed that the annual cost of a rented lorry at a kilometrage of 76306.34 km totals EUR 66925.

The calculations show that the higher the average price per kilometre set by a transport provider, the more efficient it is for the company to rent itself a lorry for freight deliveries (Table 2).

Table 2

**Comparison of situations if renting a vehicle or if outsourcing transport services  
(at a rate of 0.93 EUR/km or 1.20 EUR/km)**

Situation	Kilometrage, km (76306.34)	Savings if renting a vehicle (EUR)
Price for kilometrage if buying transport services at a rate of 0.93 EUR/km	70965 EUR	4040
Price for kilometrage if buying transport services at a rate of 1.20 EUR/km	91568 EUR	24643
Maintenance costs if renting a vehicle	66925 EUR	-

*Source: authors' calculations*

According to Table 2, the purchase of a lorry results in savings: the higher the average market rate paid for kilometrage, the greater savings. If the average rate set by transport providers equals EUR 0.93 per kilometre, a saving reaches about EUR 4000. At an average market rate of EUR 1.20 per kilometre, a saving is considerably greater – approximately EUR 24000 a year.

**Scenario 3: purchasing vehicles.** The third scenario examines the purchase of a lorry SCANIA R420. Own vehicles can bring extra direct revenues for the company by providing additional transport services to other companies (as not only own products are delivered). The company plans to buy a SCANIA R420 (a lorry of the same version that was rented by the company and whose characteristics were employed in the calculations). Such lorries were often present in the fleets of transport companies contracted by DSG Karjeri LLC. The second most popular brand was VOLVO; such lorries were less

frequently operated than SCANIA lorries. A market study revealed that the average price of a lorry was EUR 21150 (value added tax excluded). Table 3 presents calculation results for a situation if the company has purchased a SCANIA R420 at the mentioned average market price of EUR 21150.

For financial needs, the depreciation rate for a lorry is set at 20 %. A monthly cost of fuel was calculated based on the annual kilometrage of 76306.34 km and the monthly kilometrage of 6358 km, given the fuel consumption per lorry was 35 litres per 100 kilometres and the average diesel fuel price was EUR 0.95 per litre. Repairs, Road Traffic Safety Directorate services and tyre repairs were calculated based on the real annual total cost (data provided by a company having four lorries based on a rental contract). According to the calculations, the monthly cost per lorry equals EUR 3993.79, which makes up an annual cost of EUR 47925.48.

**Maintenance and related costs for a lorry SCANIA R420 a month, EUR**

<b>Indicator</b>	<b>Cost, EUR</b>
<b>Lorry depreciation</b>	352.50
<b>Fuel</b>	2114.04
<b>Wages</b>	444.92
<b>Repairs</b>	642.83
<b>Road Traffic Safety Directorate services</b>	42.58
<b>Tyres</b>	396.92
<b>Total cost</b>	3993.79
<b>Total cost (depreciation excluded)</b>	3641.29

**Source: authors' calculations**

According to Table 1 showing that the total cost per lorry amounts to EUR 66924.75 a year, the purchase of a SCANIA R420 could result in a saving for the company at approximately EUR 18000 a year. The company, of course, can reduce its profit, becoming, for example, an attractive employer for lorry drivers through raising wages from the minimum wage up to a decent wage. In addition, the company could afford to pay bonuses to its employees for kilometrage to motivate the employees and to raise the quality of their work.

The company has to provide its new vehicles with devices that help identify precise arrival times for loading freight at a quarry as well as send information to clients about freight deliveries to the site at a specified time. The vehicles owned by the company could help maximally use lorry operating hours as well as provide timely freight deliveries.

The examination of logistics processes in the company reveals that it is useful for DSG Karjeri LLC to purchase vehicles for efficient logistics management, which allows it to reduce costs.

**Conclusions, proposals, recommendations**

1) Logistics plays an essential role in entrepreneurship, it allows reducing total costs, contributes to clients' satisfaction with the quality of services provided and promotes rational time planning in production and

freight deliveries, thereby raising any companies' competitiveness.

2) DGS Karjeri LLC was analysed to examine possibilities to improve logistics management; its key activity involves dolomite quarrying and the production of crushed stone. DGS Karjeri LLC owns no vehicles for freight deliveries; thus, it contracts companies providing transport services, which leads to a number of disadvantages – the quality of work done by employees of the companies is low and there is no flexibility in time. It incurs extra costs and losses to the company.

3) To identify the possibilities to improve logistics in DGS Karjeri LLC, three scenarios were designed: purchasing outsourcing services, renting vehicles or purchasing vehicles. The research revealed that purchasing vehicles for freight deliveries could save funds ranging from EUR 4000 to 25000 a year (based on the average transport provider price for kilometrage) as well as the company would provide timely and quality freight deliveries.

4) A member of the executive board of DGS Karjeri LLC has to buy lorries for freight deliveries in order to raise profits, better serve clients and provide flexible delivery times. The lorries have to be equipped with special devices helping identify the locations of the lorries as well as plan deliveries within a

specified time, thereby efficiently exploiting the lorries and their driver working hours.

5) The transport dispatcher of DSG Karjeri LLC has to ensure that the purchased lorries

are operated to meet the needs of DSG Karjeri LLC and to provide transport services to other companies, thus, earning extra revenues.

## Bibliography

1. Bowersox, D. J., Closs, D. J. (1996). *Logistical Management*. London: The McGraw-Hill Companies. p. 645.
2. Heskett, J. L., Sasser, W. E., Hart, C. W. L. (1990). *Service Breakthroughs: Changing the Rules of the Game*. New York: The Free Press. p. 389.
3. Krumina, A. (1997). *Logistics Strategic Planning as an Element of the System of a Company's Strategic Planning*. In: Scientific papers University of Latvia, Economics IV, Volume 689. pp. 161-175.
4. Stock, J., Douglas, L. (2000). *Strategic Logistics Management*. New York: The Free Press. p. 312.
5. Ozolins, D., Kruzs, K. (2005). *Perspectives of Transport Logistics Development in Latvia*. In: Scientific papers University of Latvia, Economics IV, Volume 689, pp. 239-251.
6. Patlins, P. (2011). *Road Transportation Planning Optimization within Logistic System*. Summary of the Doctoral thesis. Riga: RTU Izdevnieciba. p. 37.
7. Praude, V., Belcikovs, J. (2003). *Logistics (in Latvian)*. Riga: Vaidelote. p. 277.
8. Radzele-Sulce, A. (2011). *Economic Benefits of Logistics Application in the Agriculture Sector*. Summary of the Doctoral thesis. Jelgava. p. 72.
9. Slavinska, I. (2007). *The Role of Logistics in Improving Performance of Local Governments*. Proceedings of the Latvia University of Agriculture, Volume 19, Issue 314, Jelgava. pp. 62-75.
10. Sprancmanis, N. (2011). *Basics of Business Logistics (in Latvian)*. Riga: Burtene. p. 219.
11. Urbahs, A., Cerkovnuks, A. (2003). *Intermodal Container Transport (in Latvian)*. Riga: RTU izdevnieciba. p. 496.
12. Zurek, M. B., Henrichs, T. (2007). *Linking Scenarios across Geographical Scales in International Environment Assessments*. Technological Forecasting and Social Change, Volume 74, No. 8, pp. 1282-1295.
13. Sergeev, V.I. (2005). *Corporate Logistics: 300 Answers to Questions of Professionals (in Russian)*. Moscow: Infra-M, p. 976.