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1 HOW TO DEVELOP A BUSINESS MODEL? PRE-FORMING STAGE. GENERAL INFORMATION

How to develop a business model which could be adapted to your situation? At first, all aspects, which could possibly be helpful in organizing logistic activities, making them more environmentally-friendly, lowering emissions and creating economic benefit for businesses and customers alike, must be assessed. But even more important is to agree what is considered as a logistic activity and what is the principle of its operation.

According to various authors, it can be stated that logistics is not only a goal in itself, and **logistic business cannot be assessed without other businesses it is associated with.** The other businesses are:

- production, for which logistics provides raw materials and distribution of products,
- sales and provision of services, for which logistics provides products and means necessary for provision of services.

Schematically, **the place and role of logistics in the business processes can be seen in fig. 1.** The figure shows that transport flows are appearing only when it serves a purpose to provide, to transport or to ensure mobility. The size of these flows is directly linked to volumes of consumption, i.e. the higher the consumption or provision of services, for which raw materials are required, the bigger the logistic flows are formed, and they will require more investment and suitable equipment and infrastructure, and in turn will often have a corresponding environmental impact.

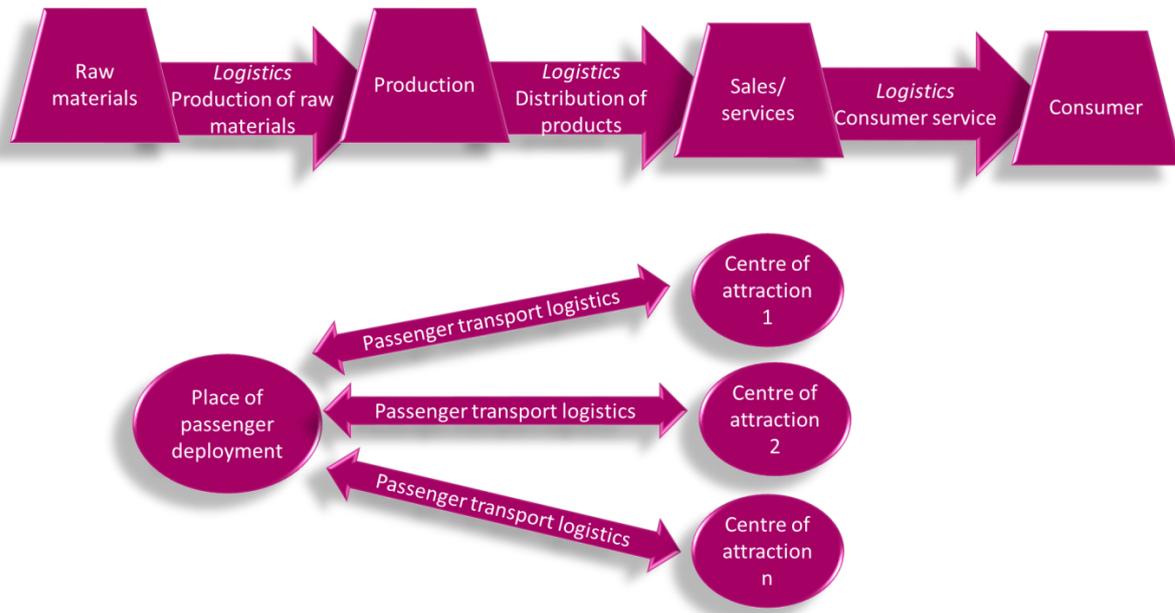


Fig. 1. Logistic diagrams of cargo and passenger transportation

A very important aspect when analysing logistic business models is the dependence of logistic activity from other businesses and economic activities. The general economic potential of the region, on-going cargo and passenger transit flows, as well as the tendencies and perspectives of social-economic development must be taken into account when assessing the organization of the logistic system and creation of business models. This assumes a definition saying that **Green logistics business models are influenced by the all on-going global and local processes**, and are dependent on other business activities, such as production, sales, and provision of services, agriculture and the sociocultural needs of the residents within the region and the possibilities for meeting such needs.

Also the **terms “logistic business model” and “Green logistics business model” should be separated**. This difference is fundamental since the “Logistic business model” unlike the “Green logistics business model” includes additional dimensions associated with all dimensions of sustainability. These dimensions will require additional investments and the possible problem with the return of such investment; possible restrictions can occur, i.e. giving up usage of conventional powerful vehicles or equipment.

When guiding through the process of green logistics business model development, insights from the project “Low Carbon Logistics” were used, i.e. the deliverables: *“Good Practice Book. Reduction of Fossil CO₂ Emissions and Other Types of Pollutants from the*

Transport Sector in the Baltic Sea Region – Theory and Practical Possibilities; and the following **assumptions** were taken into account (*see more in Appendix*):

1. **Business models** are understood as models of business behaviour for specific stakeholder groups by taking local preconditions into account. For example, in “Low Carbon Logistics” the two chosen stakeholder groups are private businesses and municipal organisations. **Business behaviour** is understood as the behaviour of stakeholders i.e. their interests and internal conflicts of interests, as well as possible strategic solutions, business organization schemes, guidelines and requirements for optimizing logistic activity management. Business models encompass possible solutions for reducing the GHG emissions, including CO₂, other hazardous substances, optimizing activity and helping solve cost-benefit problems by assessing social benefits and the economic effect created.
2. The general dimensions of business models include the assumption that the main elements of the logistics system – supply, production, consumption – are elaborated in terms of city logistics or urban areas. The **concept of city logistics or urban territories** includes the existing transport infrastructure – roads, existing public and private logistics centres, warehouses, distribution sites, places of consumption and traffic flows. Business models are oriented towards:
 - *means for optimizing the management of transport, passenger and cargo flows;*
 - *analysing urban or highly populated territories and centres of attraction;*
 - *creating, designing or restructuring systems by focusing on reducing CO₂ emissions and increasing efficiency;*
 - *technical/technological solutions for reducing emissions, creation of the conditions for increasing the efficiency of activity and dealing with cost optimisation issues;*
 - *management concept analysis – who is responsible for proper implementation of a business model in chosen regions;*
 - *social-economic consequences of the business model adaption.*
3. When analysing the possibilities of creating business models, an assessment of the business model operator’s choice is also possible. Decisions are made on the possible **“actors” of the business model** – institutions participating in the distribution system

– municipal enterprises and private companies providing socially-sensitive services – post, parcel services, companies delivering goods. Routes optimized according to relevant criteria – shortest route, faster delivery, time windows – for delivering cargo to customers and environmentally-friendly vehicles used – electric cars, cargo bikes, hybrid gears.

In all these cases an analysis is made on how all of these measures could affect ecological indicators, reduce emissions, increase activity efficiency and provide economic benefit.

2 WHAT A BUSSINESS MODEL SHOULD INCLUDE - ELEMENTS AND STRUCTURE

In this section specific elements of a Business model and their interrelationships are identified. Recommendations on how to manage the business model creation process are presented as well. Though, attention must be paid to the fact, that recommendations must not be considered as categorical, peremptory ones. When **creating an actual model in an actual municipality, the following aspects must be taken into account** and the model must be adapted in accordance with them:

- identification of **local groups** of the interested ones;
- definition of **strategic goals** of the business model, corresponding to the local specifics;
- selection of **technical- technological decisions**, best for the local conditions;
- creation of **business model management system**, corresponding to the local conditions.

The process of designing the framework of business models must be consistently focused on the results of the situation analysis. Therefore the Business models draft and the recommendations, presented in this section must be considered as guidelines for appropriate design, negotiations, and harmonization. Specifying the model will depend on the local conditions, circumstances and additional consultations.

2.1 The process of business model framework development

The process of creating the business model framework and its adaptations to particular situations is presented in **fig. 2**.

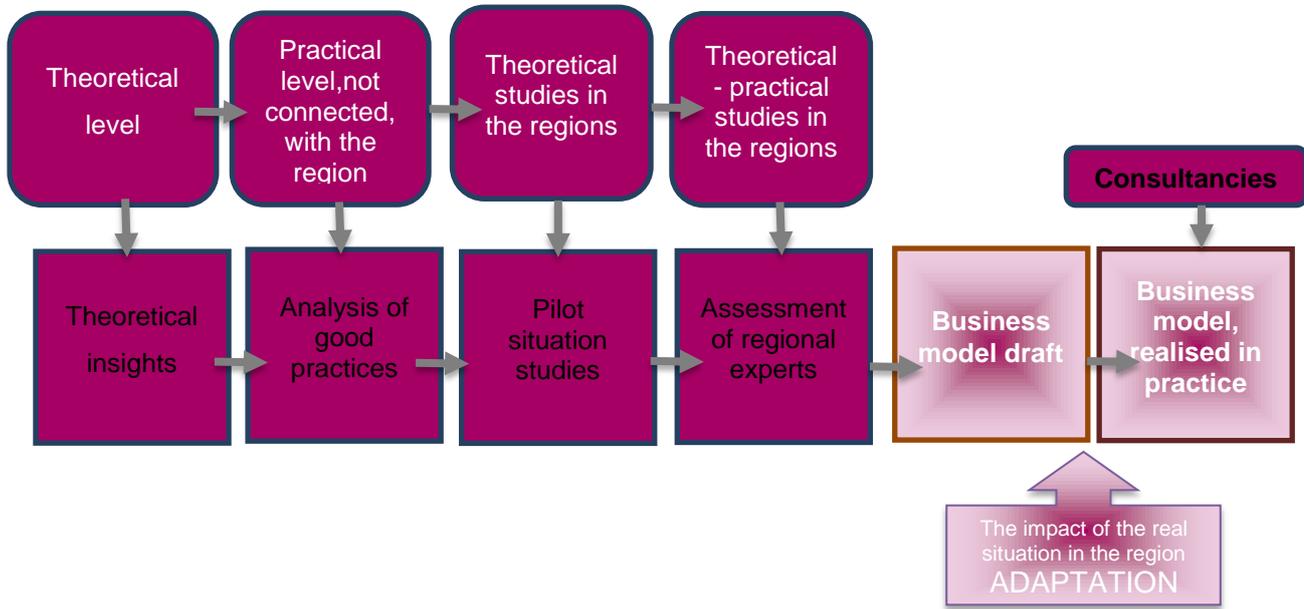


Figure 2. Scheme of the process of Business model creation and adaptation

There are different **definitions of business models**, but mostly they are identified as specific regularity of conduct and dependence on the selected or given circumstances and strategic attitudes. In other words - the Business model is a functional entirety of selected, identified and grouped elements, which, according to strategic tendencies defines the regularity of the conduct of these elements. Usually, **a business model should include the following elements:**

1. **User** – the inhabitant of region's municipality, business company, social institution, providing services, or any other institution, to which goods, raw materials and other components, necessary for everyday activities are delivered
2. **Actors** – subjects, acting in business model, which provide transport and logistics services, for example, municipality, its institutions or business companies.
3. **Strategic goals** – circumstances, which define model activities, make an impact on the selection of appropriate technical – technological measures. This also can include economical decisions, accepted on municipality or state level.
4. **Implementation of business model** – ways, methods, and measures, applicable seeking to implement a business model in the region

5. **Development of business model** – consistent expansion of business model, choosing key points, connected with one, distinguished as main and/or selected logistic activity in the region, for example delivering of shipment/parcels.
6. **Effect on juridical-political environment** – a necessity to accept political decisions, allowing to influence more the development and implementation of the business model.
7. **Level of business social responsibility**– the readiness of business institutions and enterprises to implement more „green“ logistic activity, not seeking the only effect of cost minimizing through the usage of toxic or unfavorable to environment measures or materials.
8. **The tasks of the business model** – activities to be performed by choosing specific technical - technological measures and solving maintenance and system management issues
9. **Change of infrastructure** – the adaptation of the existing infrastructure to the usage of electrical transport means.
10. **The operator of the business model** – the manager of the selected business model, responsible for the organization of activity, for its coordination and control.

2.2 Elements of the business model

Taking into account the elements of the business model, listed above and assessing the statements of Project experts, it is possible to specify the situations of certain pilot regions and identify the Business models, relevant for them. Therefore, the elements of the model are filled in with existing information. The elements are divided into two groups – into „white“ and „grey“ zones. The „white“ zone means that the elements of the model are clearly identified by the experts, and the „grey“ zone means, that elements can be discussed, that the targeting of their application is not clearly expressed or these elements are not relevant to all Project regions. The classification of Regional Business model elements are presented in **fig.3.**

No.	Element	Zone	Expression	Notes, practical aspects
1.	User	White	<i>Municipality inhabitants, business companies, municipality institutions.</i>	<i>Clear element</i>
2.	Actors	White	<i>Municipality, business institutions</i>	<i>Clear element. It must be decided, who is responsible in the municipality for the application and control of the business model, also to identify actual companies, which would be included into model activity.</i>
3.	Strategic goals	White	<ul style="list-style-type: none"> - <i>Transport emission and air quality;</i> - <i>Optimization of load flows.</i> - <i>Reduction of noise effect.</i> 	<i>In selecting the appropriate practical activities the following goals must be followed. Practical measures are described in Business model tasks.</i>
4.	Implementation of business model	Grey	<i>Implementation of model – start of realization.</i>	<i>Implementation of Business models should not be associated with „revolutionary“ changes in the municipality. There must be an initial stakeholders agreement.</i>
5.	Development of Business model	Grey	<i>Model accretion, expanding it for new activities</i>	<i>It should be started with „pilot activity“, which would become as an example for the possible actors</i>
6.	Effect on juridical – political environment	White	<i>Regulation of juridical, political and economic activities</i>	<i>Politicians of the municipality must be ready to analyze the juridical regulation issues according to the level of their competence, which would let the growth of the Business model</i>
7.	Business model tasks	White	<ul style="list-style-type: none"> - <i>To eliminate and reduce transport flows;</i> - <i>To increase load capacity of means of transport</i> - <i>To use ecological and clean means of transport;</i> - <i>To conduct joint purchases, use a consolidation service.</i> 	<i>The expressions of the practical solutions of the provided tasks can be connected with the appropriate logistic activities – modal shift, that means usage of other means of transport, which have bigger level of load capacity (where it is possible); changed management of logistics supply chain, increased load capacity and level of usage of means of transport, reduced the empty run; the issue of effectiveness of fuel renewal; CO2 reduction using alternative kinds of fuel</i>
8.	Change of infrastructure	White	- <i>Establishment or organization of</i>	<i>Very clearly expressed element and precise forms of its expression –</i>

No.	Element	Zone	Expression	Notes, practical aspects
			<i>consolidation centers DEPO; - Development of infrastructure, designed for the usage of electro- mobiles</i>	<i>DEPO, and electromobiles. DEPO can be established as a new enterprise but this function can be delegated to the selected business company as well. Development of the infrastructure of electromobiles should be the basis of activity, organized according to municipalities and PPP principle.</i>
9.	Operator of the business model	Grey	<i>The department of municipality or selected business institution</i>	<i>Operator of the model must be responsible for the organization of activity, involvement of new actors, control, and strategy of model development</i>

Figure 3. Regional Business model draft elements, their expression and classification

2.2.1 Business Model Canvas

When forming the business model draft, the so called **concept of Business Model Canvas** (Turblog, 2011) can be used. Business Model Canvas is an adequately and effective method, which enables an objective assessment of the situation and selection of appropriate measures and methods for the application of the business model in practice. Many elements of Business Model Canvas have already been described in **fig.3**.

<p>Key partners</p> <p>Who are the organization's key partners and suppliers?</p> <p>Which key resources are we acquiring from partners?</p> <p>Which key activities do partners perform?</p>	<p>Key activities</p> <p>What key activities do our value propositions, distribution channels, customer relationships and revenue streams require?</p>	<p>Value proposition</p> <p>What value does the organization deliver to the customer?</p> <p>Which one of our customer's problems are we helping to solve?</p> <p>Which customer needs are we satisfying?</p>	<p>Customer relationships</p> <p>What type of relationship is established between the organization and the customer?</p> <p>What type of relationship does each of the Customer Segments expect?</p>	<p>Customer segments</p> <p>For whom is the organization creating value?</p> <p>Who are the most important customers?</p>
	<p>Key Resources</p> <p>What key resources do our value propositions, distribution channels, customer relationships and revenue streams require?</p>	<p>Externalities</p> <p>Which environmental and societal impacts does the business model cause?</p>	<p>Channels</p> <p>How do the customer segments want to be reached?</p> <p>How does the organization reach the customer now? How are the channels integrated?</p>	
<p>Cost structure</p> <p>What are the costs associated with the business model?</p> <p>Which key resources and key activities are most expensive?</p>		<p>Revenue streams</p> <p>For what value are the customers willing to pay?</p> <p>For what do they currently pay? How are they paying?</p> <p>How would they prefer to pay?</p>		

Figure 4. Business Model Canvas for City Logistics (Turblog, 2011)

There are some other elements left, which should be discussed and evaluated separately (**fig. 4**):

- Key partners** - municipalities and business companies, but it is very important to evaluate the additional issues: Who are the organization's key partners and suppliers? Which key resources are we acquiring from partners? Which key activities do the partners perform?

Bringing these issues closer to the real situation in pilot regions, the attention must be paid to the fact, that it is very important to decide on *the initial partners group* whether to leave the open access to the new partners. Second – the possibilities of

resource accumulation: it is important to evaluate the possibilities to use not only the partners' operation and the added value they create but appropriately purchase and use the resources, necessary for the activity, which other partners do not own.

- **Key activities** - What key activities do our value propositions, distribution channels, customer relationships and revenue streams require?
- **Value proposition** – this is a very important element, related to business „ecological consciousness“ and readiness to choose such forms of operation, which would allow combining the means of cost reduction and increase of effectiveness of the activity. What value does the organization provide to customer? Which our customer problems are we trying to solve? Which customer needs are we aiming to meet? Answering these questions it must be noted, that in addition to meeting the everyday consumer needs, further added value is created as well – the care is taken about consumer health and their life quality and favorable conditions for saving efficiency and prolonging lifespan are created. At the same time to increase the value of land and immovable property of the inhabitants, thus making conditions for their material welfare
- **Customer relationships** - Issues, which are relevant to the partners and to the consumers - B2B and B2C systems as well: What kind of relationships are established between the organization and the client? What type of relationship does each customer segment expect? In this case, it is important to emphasize the issues of the economic and ecological efficiency of the activity and the added values, which are being developed.
- **Customer segments** - What are the values of the organization designed for? What are the most important customers?

According to the existing situation in project regions, consumer segments can be divided into two groups– local inhabitants and incoming tourists. This is an important aspect, which can be appropriately used by local politicians, seeking to show their care of local inhabitants – by creating favorable and safe life conditions for them, attracting tourists and offering them a safe, clean and healthy environment as an additional recreational element. It is noticed, that this aspect can operate as an additional element of profit- benefit analysis, forming bigger revenue from tourism activity.

- **Key Resources** - What key resources do our value propositions, distribution channels, customer relationships and revenue streams require? Identifying of the resources is

closely connected with the resource synergy law, that means with the resource optimization and the possibility of the usage of partner resources.

- **Externalities** - Which environmental and societal impacts does the business model cause? The essential effect must be connected with the aim to eliminate, to reduce transport flows and to increase load capacity of transport means and to use ecological and clean transport means and carry out joint purchases, use a consolidation service - all of which will reduce emissions, improve air quality, reduce the negative impact of noise.
- **Channels** - forming practical steps of business model it is necessary to create tight relationships with customer, using for this aim the selected mass media and marketing means. What type of relationship is established between the organization and the customer? What type of relationship does each of the Customer Segments expect? In order to use this element properly, it is necessary to provide resources for marketing and social advertising services - to inform consumers in a proper and clear way about how the new product and product distribution system will operate, what benefits for the user and the public it will provide, how joint action will help to create new added value.
- **Cost structure** - What are costs, related to Business model? What main resources and activities are most expensive?
- **Revenue streams** - forming adapted real business models in places, it is necessary to answer these questions: For what value are the customers willing to pay? For what do they currently pay? How are they paying? How would they prefer to pay?

2.2.2 Practical business model tasks

The recommendations, below summarized as a checklist, can be used by municipalities and business companies in the project regions.

In very broad terms, **opportunities to reduce CO2 emissions from transport operations** can be divided into:

- **Modal shift** opportunities, shifting transport operations to “greener” modes of transport, i.e. those which emit the least CO2 per ton-kilometre.

- **Supply chain management** related opportunities, such as product swaps, peak level balance, route and transport optimization or logistics network optimization efforts.
- Measures which increase **vehicle utilization** i.e. minimize empty running and maximize the fill rate of vehicles (payload optimization).
- Measures which increase the **fuel efficiency** of vehicles or reduce the carbon intensity of fuels, or change to renewable fuel.

Elaboration of measures above:

1. **Change of transport modes** – if the ways to use intermodal transport solutions were found, it would bring tangible benefits to regions. Unfortunately, this measure is more often used in long distance freight transportation. Road transport is changed by intermodal sea/road transport, where cargo is carried by sea ro-ro ferries or container ships. It is recommended to use Ro-Ro or Lo-Lo type or ships. On land most often is used railway transport to carry the cargo to the land terminal, where the cargo is transshipped to road transport. If there is a railway connection, it is suggested that the first and the last mile could be done by railway, not on road. As it was mentioned above, it is rather difficult to achieve this in short distance distribution, but analogically city trams can be used as measure of cargo „last mile“ carriage. The benefits: electrically driven transport vehicle, no direct emission, big load capacity. Problems: possible noise and traffic jams.
2. **Logistics supply chain management.** These measures are more complex, because usually require the agreement of manufacturers and supply to deliver the same products to customers, who are located nearby. It can help to avoid long distance or doubled traffic. However, while speaking about cases when manufacturers and suppliers, who are closest to the consumer and precisely to them the orders for supply, are placed, the competition rules and non-discriminatory purchase criteria should be considered. It is also meaningful to investigate the deployment of goods, necessary for the consumer in the stores of the wholesalers and choose the closest suppliers.
3. **Modifying the cycle of ordering.** Very often, an inappropriate formula of order placement and billing timing cycle is used. For example, many companies calculate the orders for the fixed time interval – per month, per week, etc. It is sensible if the product qualities allow this, i.e. to place orders only when the maximum quantity of

order can be loaded into the used transport vehicle,. If it is necessary to supply products more often, the methods of product consolidation should be used – cooperation of several customers and forming of joint orders. In this way, the load capacity of transport vehicle is increased, the direct „empty run“ is avoided. It lets to recalculate quantity of emission to the unit of the load, and it is always smaller than in the case of incomplete loading of the transport vehicle

4. **Maximize direct deliveries.** Most orders are executed through intermediates, who form joint shipments and guarantee individual distribution to the users. But it is sensible to organize bigger shipments, bypassing the services of distributors and outer stores, delivering directly from the factory to customers. This allows a reduction of administration, increase of fill rate and to reduce reloading etc., which increases emission.
5. **Proper routing.** Very often, when delivering joint shipments and organizing their distribution, appropriate route optimizing systems are not used. The general concept of optimal route includes an annular route, independent of delivery time gaps, with maximum loading in the beginning of the route and with minimal at empty run at the end of the route. Consultants can select route optimizing IT means, It requires assessment of local business conditions, number of senders, carriers, and consumers and this action is carried out during the adaptation stage.
6. **Increasing vehicle utilization and minimizing of the empty runs.** It makes sense to use both route optimization tools and the horizontal cooperation of logistics service providers, aiming to increase use repossessing opportunities – logistics service providers, delivering the goods to the customer, have an agreement to overtake the repossessed or cargo flows to their own disposal. If the conditions and cargo transporting norms allow, the carriers of „direct“ supplies can perform the services of taking out the used packages, waste (if it is allowed) not sold goods, in this way increasing the utilization of the transport vehicle and avoiding an empty run.
7. **Increasing of fill rate of transport means.** This measure is understood as the result of before mentioned measures– shipment joining, consolidation, decrease of transport intensity, and other measures. But this measure can be understood directly as well – to load as many cargos as possible.

8. **Fuel saving.** There are three measures of fuel saving – 1) appropriate design of vehicles, including aerodynamic qualities; 2) regular technical maintenance of vehicles; 3) eco-driving. It is difficult to change design aspects, but this issue is relevant when newer or older transport vehicles are selected for performing of logistics services. It is always necessary to predict how and in what way maintenance of vehicles will be carried out, who will be responsible for it, whether it will be given sufficient financial and time resources. One of the operational aspects is properly selected material, controlled and regulated tire pressure, regulated fuel supply and engine operation systems. All of these measures are directly related to fuel costs and although they form a specific cost category, their benefits can be much bigger than costs.

Eco driving is a new trend that needs to be considered when choosing a transport company. The attitudes of eco-driving are rather simple: avoidance of quick acceleration, avoidance of extra braking, smooth running at constant speed, avoidance of routes with steep slopes, avoidance of traffic jams in the city, etc. It is clear that this is the result of the training of staff- drivers and programmes of constant training, but the systems of observation of transport vehicles are created and rather widely used in the market, which allows to identify at real time the state of transport vehicle, its speed, acceleration, real-time detection of vehicle position, speed, deceleration-braking and other parameters controlling the performance of drivers - tire pressure, cargo temperature regime, fuel disposals and other relevant indicators. This recommendation is relevant to municipalities – in purchasing the service the fact of presence of such systems can be included into competition's conditions for commercial enterprises as means of control of drivers' work.

9. **Direct elimination of CO₂ emission.** As it was mentioned above, when aiming to directly to eliminate CO₂ and other emissions, it is necessary to reduce fossil fuels. Electrical vehicles are used for this purpose. Their technological solutions are widely described in in the publication of *Good practices and recommendations*, but it must not be forgotten that the usage of e-vehicles is directly related to the presence of infrastructure. As the project study shows – the development of infrastructure is one of the tasks of the project partner municipalities.

3 HOW TO ASSESS THE FINANCIAL RETURNS OF BUSINESS MODEL?

Assessing the financial aspects of business models and possible cost-benefit issues, it should be noted that these activities are limited by the basic provision and accurate profit-loss and profit-benefit assessment is possible only when working with an adapted and specific local business-specific model. In this adaptable and tailor-made business model, the individual results of the actual business models are calculated; they are aggregated as indicators of the economic activity of the system, and the municipality is included in this process with its financial - social indicators. In principle, self-government participation in a business model can be associated with grants, compensations and attraction of funds through participation in the EU-funded projects and programs. The possibility of attracting additional funding is very real, as the issues of Green Logistics are funded in tenders for environmental, urban, transport and logistics project financing programs.

It is also important to note that the approach that Green Logistics activities in a business operation are either loss-making or requiring more investment may be found in individual regions. It is argued that investing in Green Logistics products does not generate more profits and increases operating costs. And if it is invested, it is perceived as a fear of potential pollution penalties or other repressive measures imposed on business and self-government in violation of relevant laws or regulations. If logistics activities are carried out on EURO6 standard tractor units, then the initial investments will be higher than the attempt to still use the EURO3 standard, since the vehicles of this standard are old and cheap. One can immediately point out that these speculations are misleading, since calculating cost and benefit indicators always find opportunities to measure the added value of the benefits. Increased investments in green vehicles or investments in infrastructure changes can be compared to lower operating costs, higher efficiency, and savings.

Investments in Green Logistics can also be seen as the basis for the development of the relevant social welfare meaning a safer and healthier living environment. The negative impact of the logistics and transport system on the environment, as proved by this project's research, is focused **on emissions and noise pollution**. CO₂ emissions in the case of local pollution are always associated with the fact of hazardous substances, such as nitrogen oxides, heavy metals, particulate matter, CO, sulfur dioxides and O₃ emissions. The above mentioned substances have a direct impact on the human respiratory system, the skin, and can cause

respiratory system, cardiovascular and oncological illnesses. In this case it is possible to avoid these diseases by reducing the amount of emissions.

3.1 Cost-benefit analysis

Returning to the aspects of theoretical business model cost-benefit analysis, it is worth mentioning the papers of Izabela Kotowska, Stanisław Iwan, Kinga Kijewska, Mariusz Jedlinski and others. Those scientists state that the starting point in the model (see **fig.5**) is to highlight the three key stakeholder groups i.e., residents (M), business (B) and the city authorities (WM) (it must be mentioned that environmental groups may join as a party, as a result of the relevant provisions).

Urban freight transport (UFT), is a result of business activity, performed by business entities, including shippers (sellers), transport contractors (transport companies and/or own transport of sellers) and consumers (trade and services). A transport service is to create a utility of time and place for the customer (resident), by providing the appropriate delivering for the recipient of the goods (trade and services).

Expenditure/cost (N/K) relationships apply to the performance of transport (protecting transport potential in the form of rolling stock - transport superstructure) as well as expenditure/operating costs (direct and indirect). The specificity of road transport requires to provide adequate nodal and linear infrastructure by the responsible body i.e. City Authorities.

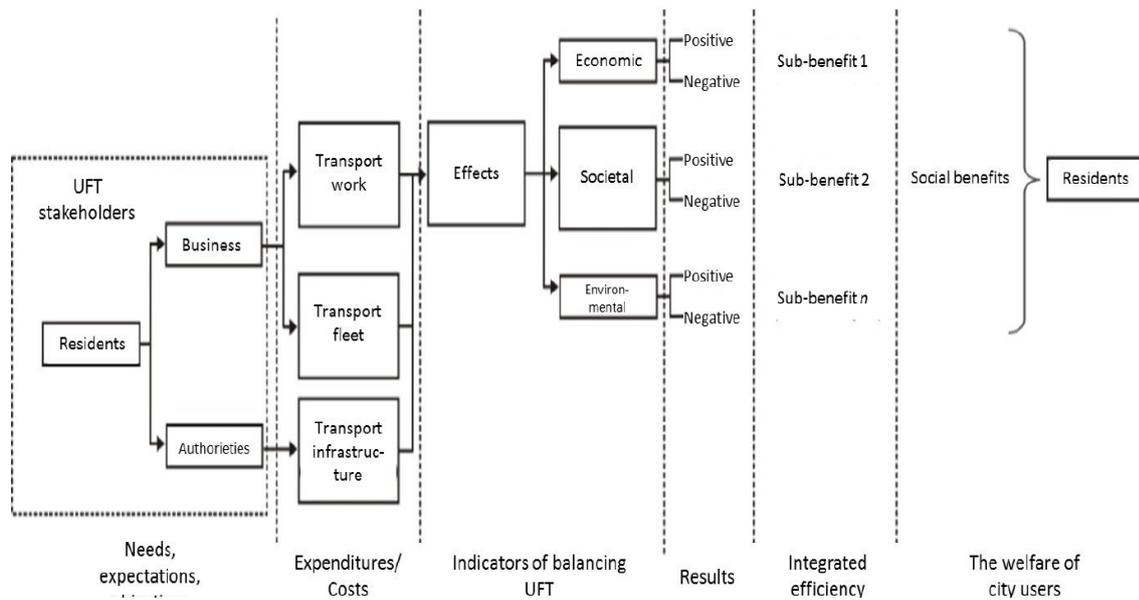


Figure 5. Model of component structure aggregation of expenditures/costs (N / K) and effects (social benefits (KS))

According to Kotowska, I. et al., determination of external costs requires a very detailed identification of the number of vehicles based on entering the area, type, capacity and Euro norm. These data can be collected through primary research (e.g., the analysis of the number of vehicles entering and leaving the area, taking into account the type, capacity, and Euro norms, surveys). The secondary data, collected by the Department of Communications or Statistical Offices (e.g., the type and structure of vehicles registered in the region) can be used if it is impossible to conduct primary study.

Another important factor, necessary to determine the external costs of transport is to estimate the average transport distance. It can be determined by identifying the representative routes giving rise to estimate the average transport distance in the study area.

However, the effect, created by the transport and logistics system can have three impact points, such as:

- Economical;
- Social;
- Environmental (nature conservation).

Transport and logistics in all these areas can create added value, but at the same time it can cause damage. Often this damage is understandable globally and is limited by the relevant

legislation in applying fiscal policies (emission allowances, fines). Possible **aspects of damage** include:

- Air pollution costs (fines and damage to the health of the population, treatment, incapacity);
- Costs of damage, caused by global climate change, related to CO₂ and other greenhouse gas emissions;
- Costs of transport and accidents (loss of human life, disability, temporary incapacity for work, as well as loss or repair of vehicles);
- Overload costs (costs of cargo consolidation and deconsolidation);
- Noise damage costs (fines, limitations, investments, incapacity for work and treatment).

An assessment and a profit-and-loss calculation of the investment in business models can be shown graphically (see **fig. 6**).

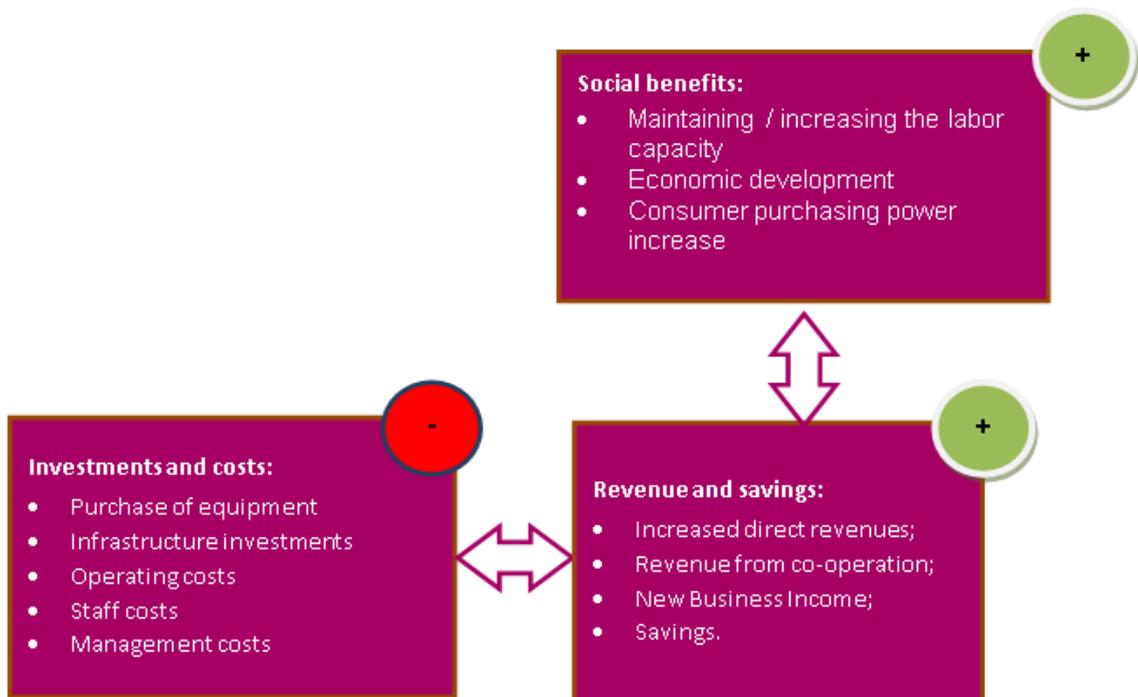


Figure 6. Calculation of investment payback in the Business model

Calculating the return on investment made, it makes sense to use the **method of cost savings**. This methodology is very simple, as all costs, incurred in the Adapted Business Model, are calculated first. These costs in the Model become the size of the total investment.

The extent of the investment may remain constant, but it can increase assessing the costs of operating an adapted business model. The savings are calculated separately, and the social benefit of the model's operation is assessed also (reduced morbidity, increased income from other businesses). Further, the comparison of the dynamics of investment and saving funds according to the time criterion curves is provided, and their intersection indicates the payback point in time.

The final point when calculating the values of investment, profit and benefit means that it is necessary to follow the systematic approach and to assess not only the benefits of one company, but also the added value, created by the business model as a system, additional revenue or overall savings.

3.2 Cost-benefit analysis of Business model solutions

Let's analyze the selected business model solutions from the positions of economic-social analysis. Summarized analysis is presented in **fig. 7**.

Logistic solution	Short description	Need for investments	Potential cost groups	Possible profits, savings, benefits
Changing types of transport	The change of the type of transport is understood as the maximum use of the bulk mode for the carriage of goods, including the distance of the "last mile", in the case the infrastructure allows.	High, if there is no such infrastructure	Investment into infrastructure (development or adaptation); Investments in vehicles; Management costs.	Transporting large amounts of freight, the cost of transporting one unit of freight has been reduced to a lower cost, as well as a lower share of CO ₂ emissions per freight unit
Logistics Supply Chain Management	Commodity swap. Manufacturers and suppliers agree to deliver the same products to one or other customers located in an area adjacent to the respective production sites in order to avoid long-distance traffic.	Minimal	Most of the expenditure is related to management costs	In all cases, the distance and time of shipment is shortened. Less fuel and other operating costs with less distance, increasing customer satisfaction and attaching to the existing system – loyalty, providing fast delivery time. Lower emissions and damage.

Logistic solution	Short description	Need for investments	Potential cost groups	Possible profits, savings, benefits
Changing the order cycle	Orders will only be submitted assuring the maximum order quantity, fitting into the used vehicle.	Minimal	Management costs	Rarer shipment means lower operating costs, reduced, minimized and recalculated CO2 emission per unit load and less negative environmental impact. Reduced overall noise exposure.
Maximally increase direct deliveries	Larger shipments are organized, bypassing services of distributors and outsourcing, directly from the factory to customers.	Minimal	Minimized direct management costs.	There is no need to create or develop distribution terminals or other Urban Logistics infrastructure, allowing saving investment, as well significant reduce of management costs.
Proper routing	Delivering of goods and freight on an optimized route while transporting them at a distance of the "Last mile".	Acquisition and upgrade of IT systems and their maintenance.	Management costs, maintenance and service of IT systems.	Cargoes and goods are delivered at maximum carrying capacity at the beginning of the route and the minimum empty run at the end of the route. This means that there is no direct loss in the empty run. The vehicle is at maximum carrying capacity, and this reduces the cost of transporting a unit of cargo. There are no unnecessary long distance and return journeys within the route - minimized operating costs.
Increasing vehicle use and minimizing empty mileage	Horizontal co-operation in order to increase the possibility of repossessing opportunities	Minimal	Costs for management and coordination.	The maximum carrying capacity is guaranteed and the "empty run" is eliminated, the most important is to create additional revenues from the return service.

Logistic solution	Short description	Need for investments	Potential cost groups	Possible profits, savings, benefits
Increase of transport capacity	Combining of consignments, reduction of freight intensity, change of stock management, etc. Also, increase of the direct transport capacity	The investment need is low, if direct carrying capacity is increased by transporting a larger amount of freight by one vehicle. It grows up, if a new urban logistics distribution system is being developed. These investments can be minimized by using outsourcing capabilities.	Management costs. Investments to the development of cities own logistics and distribution system. Only minimized management costs if the outsourcing principle is applied.	The maximum carrying capacity of vehicles is associated with reduced operating costs, minimized emissions and reduced environmental impact.
Fuel saving	Vehicle design, regular vehicle maintenance, eco-driving	Vehicle fleet renewal, possession of the vehicle maintenance service. IT, controlling transport system.	The new vehicles of the highest EURO standard, management and training costs. Support and upgrade of IT systems.	Fuel savings makes it possible to raise the corresponding funds, which redeem investments in the acquisition of a fuel saving complex.
Direct elimination of CO2 emissions	Electric vehicles; Biofuels	Investing in the creation of infrastructure suitable for use of electric vehicles, acquisition of electric cars.	Primary investment and infrastructure maintenance, upgrading costs.	Removing CO2 emissions eliminates all negative consequences of hazardous substances, improves air quality, thus enabling the quality of life of the population and labor force capacity. Another important aspect is saving money, as electric vehicles maintenance in many cases is cheaper than using fossil fuel.

Figure 7. Solutions in Business models and their analytics from a profit-benefit perspective

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5 APPENDIX. EXPERT GROUP SURVEY ON BUSINESS MODEL DEVELOPMENT FOR PILOT REGIONS.

5.1 Methodology of the research

The material and results achieved during the first stages of the project LOW CARBON LOGISTICS are used for the creation of business models. It should be noted that the geographic environment of business model creation is associated with the regions participating in the project:

- Bad Doberan, Germany (Associated partner),
- Neringa, Lithuania (Project partner),
- Olofström, Sweden (Project partner),
- Rietavas, Lithuania (Project partner),
- Stargard, Poland (Associated partner).

When performing pilot analysis and summarizing the information it has already been agreed to summarize the provided information of the regions, it is possible to claim that the essential problem in the project's regions lies in the need to optimize transportation to reduce emissions, noise, transport systems and infrastructure. The majority of logistical problems are linked to increased levels of noise and air pollution, as the initial research conducted in municipalities suggest. As it was mentioned in the theory overview, air pollution is ascribed to local pollution group and has a direct impact on human health. Therefore, the aim to reduce air pollution and improve quality of life in regions has a complex impact, i.e. removed or minimized local pollution substances result in improved quality of life, protected human health, decreased incidents of chronic diseases; real estate value is growing under qualitative environment conditions.

According to the conclusions made the general provisions for creating possible business models are formed and expert studies are carried out, during which these provisions are specified and expert information on the problems indicated below is generated.

1. In order to determine the strategic aims and objectives of future business models, and also to properly select technical/technological means and management solutions, actualizing and refinement of Green logistics problems and challenges in

a corresponding region should be done by presenting a list of possible problematic areas:

- the transport emissions and air quality problem;
 - noise;
 - the need for optimizing the transport system and infrastructure;
 - the need for optimizing cargo transportation flows;
 - the need for optimizing centres of attraction;
 - high accident rate;
 - the well-being and morbidity of residents associated with the effect of emissions and noise;
 - Insecure living environment.
2. Determining and assessing of the business model creation, implementation and development process is important for forming business models. The experts were provided with a statement *that when forming new business models for application and behaviour of Green logistics the provision that the implementation and realisation of a model must be uncomplicated as possible and not cause additional overpowering problems, is followed.* This statement is associated with the provisions that the structure of the model, and its implementation, is a rather complicated process, because of:
- changing well-established values in business and society;
 - requiring new „actors“, operators, means;
 - forming the need for new behaviour;
 - requiring investment;
 - stakeholders may face possible new interests and conflicts;
 - unclear operation of the profit-loss principle in the changed environment;
 - no clear benefit for the social environment and effect of indirect return on investment;
 - inertia and traditions of thinking and acting;
 - possible resistance from stakeholders.
3. The logical continuation of the second question is the specification of the business model development and expansion mechanism. If the experts understood the

indicated problem correctly, the assessment of these statements should be close. The experts were provided with a statement that *a business model can and should be expanded – its development and expansion must be consistent. First starting from realistic, possible actions, which are and can be controlled and formed by a relevant institution, later moving to actions, which would involve business structures and free market operators and create conditions for self-regulation of the model.*

This statement seeks to reveal several formation and practical implementation problems of a business model – firstly, the development of a business model must be associated with controlled actions performed by the operators of the model. The list of these actions is not exhaustive, but mostly they are associated with relevant decisions for starting the process of forming and practically applying the model, for example – construction or initiating construction of public logistic centres by the means of public tenders, forming consortiums, development of the PPP principle, etc. The list of initial actions may include specification of certain rules, requirements or means used, the aim of which is create a *self-regulating system*, i.e. a system able to operate without every-day/routine intervention by the operator in the process.

4. Experts were requested to assess the statement that *the development of a business model may require additional charges linked to the formation and alterations in a political-legal environment.* This statement is associated with a dual provision: firstly – who must be the operators of the model, secondly – how to involve or not involve local municipal governments in this process in order to adopt relevant legislations or local decisions, which encourage or hinder the development of the Green logistics model in the region. The answers of the experts should also demonstrate another provision and a possible development stage – full business independence or the suitability of the existing legal basis for developing Green logistics.
5. Experts were asked and requested to assess *how the principles of the free market and the competitiveness of business can be maintained by applying Green logistics business models.* It should be noted that this statement is slightly provoking because it was formed on the provision that at free market and competitive

conditions businesses may tend to seek maximum profit by minimizing costs, and in some cases costs can be minimized at the expense of environmental protection – cheap, but polluting fuel, noisy, high-emission vehicles, fast reaction to fluctuating demand in the market in transportation small cargo, etc. Therefore determining the extent of such threats is aimed for, if such a threat exists. It should also be noted that the answer to this question is also associated with business environment and the level of social responsibility the business has, which cannot be set as a constant factor and must be assessed in every individual case by taking the impact of changing environment into account.

6. Starting from point 6 it was aimed to determine and assess the possible technical/technological parameters and solutions which a business model could generate. These parameters and solutions would manifest through the actualization and rating of the objectives of relevant business models. Therefore the experts were asked to provide an assessment of every objective of the Green logistics business models, presenting these objectives as a basis:

- to eliminate, reduce transport flows;
- to increase the load level of vehicles;
- to optimize routes;
- to use environmentally-friendly and clean vehicles;
- to reorganize the locations of the centres of attraction and the existing transport infrastructure;
- to reorganize the routes and/or times for delivering goods to places of consumption;
- to coordinate the working hours of institutions in order to prevent daily formation of transport flows;
- to carry out general procurements, use consolidation services for goods and cargo.

7. When creating business models it is necessary to determine the operator of a model – an institution, which shall be responsible for organizing activity, coordination and management work, which could properly coordinate on-going processes with the strategic objectives of the business model. Therefore indicating who can be the operator for this business model – a relevant municipal department,

a hired independent operator, etc. – when carrying out analysis and expert surveys is aimed for. Such wording of the analysis of the matter is associated with two essential opportunities and management philosophies – direct participation of the municipality in the management process or delegating the management function to a selected institution – an independent legal entity, which may be commercial or institutional, but with the ability to take over the *management content* of the business models. The term *Management content* has a very broad concept involving every-day coordination, management, formation and analysis actions aimed to achieve strategic aims and implement tactical actions. Management content and the management of it require resources – time, human resources, as well as material/financial resources (salaries), necessary communication and organization means. There is a provision that management content can be, by means of outsourcing, transferred to other institutions, or carried out in municipal institutions by taking up the additional activity load.

8. Theoretically, a business model is composed of various components. There is a sufficient amount of scientific and methodological material on this matter. This work is based on the publications of Stanisław Iwan, Hans Quaka, Susanne Balma, Bineke Posthumus and other scientists. According to *Hans Quaka, et. al.*, Osterwalder's business model canvas initially contains nine building blocks showing different elements that together lead to a value proposition. The business model canvas examines the "customer" in three blocks, i.e. customer relationships, customer segments and the channels. The business model basically shows who the customer of a certain product or service is (customer segments), how these customers are reached (channels) and the type of relationship the company has with the customers. Together these three blocks result in a revenue stream for the company. Next, the model shows the elements that are necessary to actually make a product or create a service. The model shows which partners are used, what activities are undertaken and which resources are used to make a product or create a service. These blocks eventually show the costs of making a product or service. The value proposition is centrally located in the business model canvas, between the operations and the customer. This block shows how the operations undertaken result in value for the customer. Also shows a tenth block, which is normally not

included in Osterwalder's business model canvas, i.e. the externalities (or: the value proposition to society). In TURBLOG the additional block is added to the model to capture the externalities of city logistics. The structure of the Business Model Canvas helps to analyse which aspects change when the CITYLOG solution is implemented, as well as to show how these changes result in a better value proposition for the customer (which might increase revenue streams), in a better value proposition for society, or maybe leads to changes in costs, or a combination of these effects. It should be noted that business models are usually presented to specific companies, which become the users of these models, but the concept of the models must be extended by the aspects of social benefit and impact when analysing the social aspect of business models. The model canvas shall be analysed by forming the possible elements of the model. The "actors" of the business models – institutions participating in the activity of the business model – municipal enterprises and private companies providing socially-sensitive services – post, parcel services, companies delivering goods, etc. – must be identified during the first stage.

9. One of the ways for practical realisation of a possible business model is establishing and using the so-called "depots" – logistics centres and terminals where goods and other cargo for the customers of a specific region are consolidated. Depots also ensure that environmentally-friendly vehicles are loaded to their full capacity. Most often depot activity would be organized according to the principle of PPP (public private partnership). For this purpose, ascertaining overall capabilities is important, as well as determining who would be the representative of the public sector in the activity of such a depot and if such depots could be managed only by businesses, when forming the business model.
10. One of the main components of the Green logistics business models is the technical and technological means with the lowest pollution and level of environmental impact used. One of these is the electric vehicles described in good practices – electric cars, trucks, vans and medium load vehicles. Although in the context of current technology electric vehicles are problematic, because they are highly dependent on current infrastructure – electric charging points, means of fast charging and other means necessary for proper operation. Therefore the

development level of the infrastructure for electric cars in a region must be identified when forming business models:

The aim of the expert analysis is to get relevant data from the regions participating in the project by assessing the specifics, expectations and how to ensure the relevance and viability of the business level formed to actual circumstances.

As earlier analysed in the General Provisions for Forming Business Models, an expert analysis was carried out for determining the business model philosophy, concept and elements, based on the results of which the concept of business models applicable to a specific region and all participants of the project can be formed.

The research methodology was made of 11 questions with possible answers and statements, the assessment of which was made on a 10-point scale, where 0 means a non-answer, 1 – very bad or very insignificant, 5 – in all cases means a neutral opinion with no dominant positive or negative, 10 – very good, very positive or very significant assessment.

5 experts representing the main project regions located in **Germany, Sweden, Poland and Lithuania** participated in the analysis. In order to maintain objectivity the coding of experts was not associated with the region represented, but, in turn, they reflect the essential provisions, concepts and situation assessments, which are specific to their region, they were also asked to assess the situation at global scale. The experts were coded with letters A, B, C, D and E, which can be seen in tables. There were experts, who did not provide their assessment for certain reasons, the non-answers can be seen in the graphic material and can be assess by making respective conclusions. In this case the certainty terms should be used by determining the credibility or weight of answers, or the “strength” of the experts’ opinions. Because the number of respondents in low, although sufficient for expert analysis, all expert assessments are presented as-is, without additional statistical processing, only by presenting the arrhythmic average, this makes rating of the answers easier. Attention should be drawn to the variance of answers and assessment, this variance shows that the experts did not agree on all questions, this represents different competencies and situation in separate regions. The variance in answers is analysed and assessed.

5.2 Results of the research

As already mentioned, respective problems of Green logistics in the regions were refined and actualized before determining the strategic aims and objectives of business models. As shown in analysis results, also correlating with pilot analysis performed at the end of 2016, **the transport emissions and air quality problem remain the essential problems and challenges of Green logistics in the regions – fig.8.** The experts were united on this question and answers were only 10 and 9 points, average – 9.8, the variance of answers is very small. The second most important problem is **the need for optimizing cargo flows**, but in this case, despite of an 8.6 average, which is the second place on the rating scale, the dominating expert assessment scores were around 8 points. The experts' assessments were dramatically different when it came to determining the importance of the **noise** problem: the variance of answers is high in this case – 9, 10, 7, 5, 10, which can be assessed in various ways, because it can be stated that there are regions which managed to deal with this problem or the effect of noise is not that significant. Although the average rating of the noise problem is 8.2 and it can be included into the list of challenges tackled by business models. Two other problems – **the need for optimizing the transport system and infrastructure** and **the well-being and morbidity of residents associated with the effect of emissions and noise** – scored an average of 7.4 points, this is logical because these two problems are secondary ones associated with problem of emissions and air quality, as well as the problem of optimizing cargo flows and this suggests that optimization of transport and cargo flows is directly associated with possible changes of infrastructure, and the well-being and morbidity of residents is associated with emissions, air quality and noise.

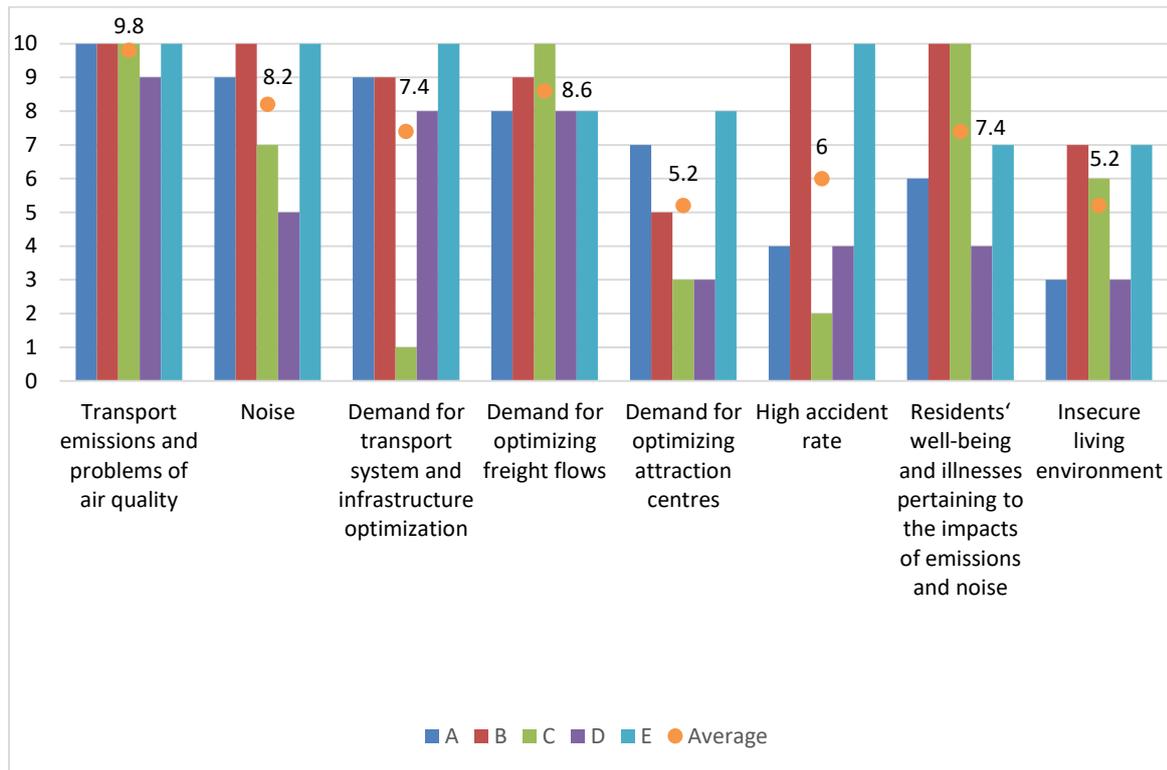


Figure 8. Green logistics problems in the regions

Other three problems – **the need for optimizing centres of attraction, high accident rate and insecure living environment** received the lowest points and according to the experts these problems are not significantly associated with Green logistics business models. Therefore it would make sense to rate the problems and challenges of regions according to analysis results and to indicate possible business-model elements to help solve these problems in the future. The rating is presented in **fig. 9**.

It should be noted that experts were not unanimous when analysing the provisions for creating business models associated with the statement that **the implementation and realisation of a model must be uncomplicated as possible** and not cause additional overpowering problems, see **fig. 10**. Firstly, a wide range of assessment results is noticed – 3, 10, 7, 5, 10, the average rating is 7, but the level of variance is also very significant. In this case it can be stated that although a positive assessment is dominant, a conclusion should be drawn that the matter of implementing business models is complicated and may cause significant problems for creating and applying them. This may be especially relevant in regions with insufficient resources or management experience and a strictly-regulated

situation formed, changing which would be complicated at an economic, social or even local political aspect.

Problem	Assessment criterion (average)
The transport emissions and air quality problem;	9.8
The need for optimizing cargo transportation flows;	8.6
Noise;	8.2
The need for optimizing the transport system and infrastructure;	7.4
The well-being and morbidity of residents associated with the effect of emissions and noise;	7.4
High accident rate;	6
The need for optimizing centres of attraction;	5.2
Insecure living environment.	5.2

Figure 9. Rating of Green logistics problems

When analysing the experts' assessment of statement "***A business model can and should be expanded – its development and expansion must be consistent. First starting from realistic, possible actions, which are and can be controlled and formed by a relevant institution, later moving to actions, which would involve business structures and free market operators and create conditions for self-regulation of the model.***", it can be stated that the experts were united and the average rating is 7.4; this indicates that the assessment of this statement and provision is more positive, and this methodology should be followed when forming actual business models in regions.

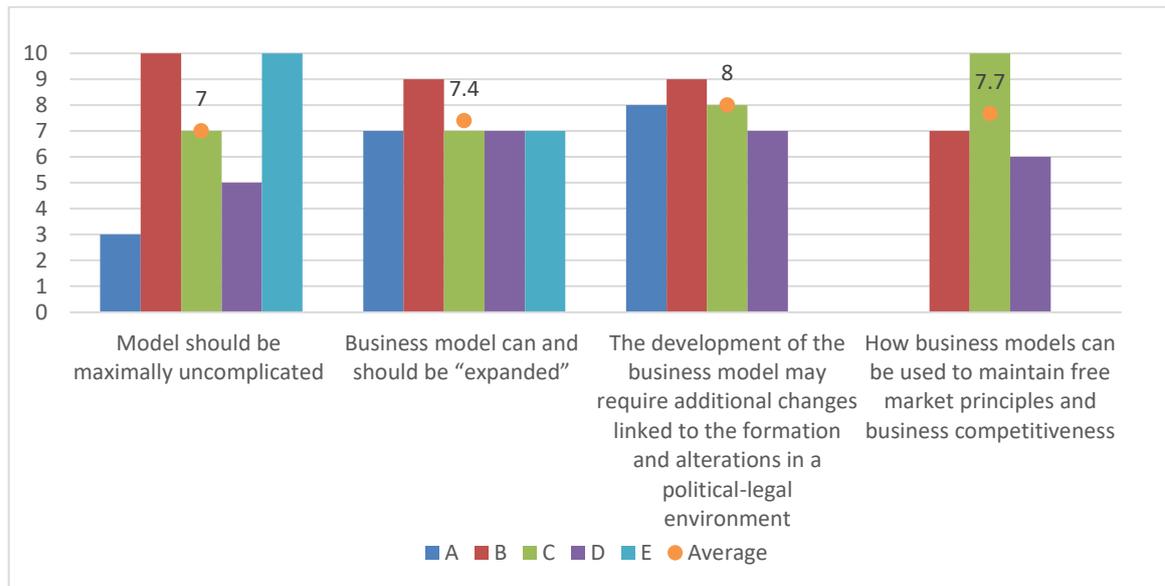


Figure 10. Results of the expert assessment of the statements

When deciding on **the impact of local political environment** for forming business models the experts assessed the statement that *“the development of a business model may require additional charges linked to the formation and alterations in a political-legal environment.”* In this case it is clear that the experts are united – an average of 8, and the level of variance is low – this indicates that the involvement of local government and municipalities in the processes is necessary and a need for changing the legal environment and making decisions of political nature may arise. Therefore it is concluded that one of the main elements of the business models should be associated with municipal institutions and their activity.

As expected, the most controversially assessed and discussed statement was **how Green logistics business models can be used to maintain free market principles and business competitiveness** – the variance of ratings is quite high and two experts did not provide answers to this question. Therefore, it should be admitted that the so-called aspect of “social responsibility of business” remains open for discussion. Although it was also noticed that it is still possible to coordinate the interests of businesses, associated with cost reduction and profit increase, with the environmental protection solutions and reducing environmental impact by developing Green logistics activities. Various environment-friendly technical-technological solutions should be used, which still create conditions for tackling business-related challenges – e.g., using energy-conserving means, which would enable the reduction of costs and provide a higher profit or the possibility to apply a more flexible price policy.

The possible conflict between business interests and environmental matters also depends on business culture, experience and social environment in different project regions. It is likely, although cannot be stated directly, that the general business models in Eastern European countries are prone to low-cost (but more polluting) activities, but by the means of European integration this tendency is disappearing and becomes less relevant. The general European transport and logistics policy forms sufficiently clear and customer-attractive environmental protection standards, which become relevant in all member states.

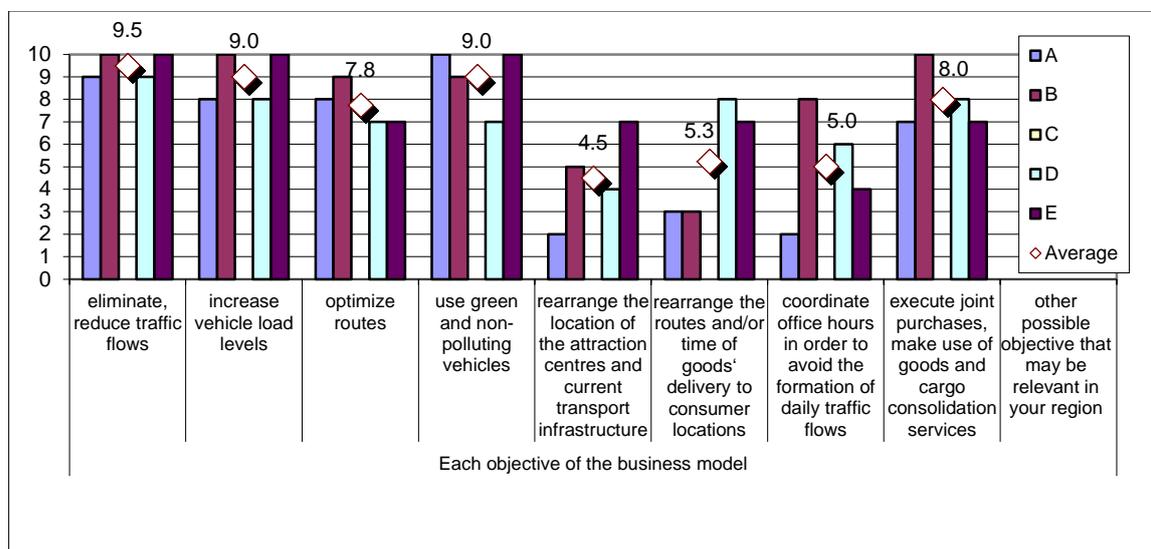


Figure 11. Essential objectives of business models

When deciding on the essential objectives of Green logistics business models the experts were united on three main objectives – **to reduce or eliminate transport flows** (average rating – 9.5), **to increase the load level of vehicles** (9), **to use green and clean vehicles** (9). The following can also be attributed to high-rated objectives: **to carry out general procurements, use consolidation services for goods and cargo** (8). It can be established that these essential three-four business model objectives must be developed when forming the model itself, as well as choosing its elements. In all cases the experts remain consistent with their choices and this proves the reliability of the analysis, for example, the aim for reducing emissions and improving air quality will be achieved by reducing transport flows. The objective of increasing the load level of vehicles, which is associated with the possibilities to establish consolidation centres, can also be attributed to flow reduction, see **fig.11**.

The general rating of business model objectives is presented in **fig.12**.

Objective	Rating (average)
To eliminate, reduce transport flows	9.5
To increase the load level of vehicles	9.0
To use environmentally-friendly and clean vehicles	9.0
To carry out general procurements, use consolidation services for goods and cargo	8.0
To optimize routes	7.8
To reorganize the routes and/or times for delivering goods to places of consumption	5.3
To coordinate the working hours of institutions in order to prevent daily formation of transport flows	5.0
To reorganize the locations of the centres of attraction and the existing transport infrastructure	4.5

Figure 12. Rating of business model objectives

The analysis could not identify the possible choice of a business mode **operator** and this matter remains open for practical realisation of the model. The answers provided are not statistically sufficient and reliable to form a clear, concise point of view. It can be assumed that the experts understand the problems of managing a business model in their own way. As mentioned earlier the management of business models can be understood in two ways – as **the personal choice of separate logistics or transport companies to carry out some activity** or as **the management of an integral system, organized and operating according to the principle of PPP**, where private companies and municipal institutions would participate and agree on who must assume the function of the operator – i.e. agree who would perform every-day management activities of the coordination system-business model and create and form long-term strategies. **Long-term strategies** are an important component of business models because investments, the durability, developmental management of the system and determining the possible reflections, general effectiveness and long-term benefit assessment depend on them.

To sum up the problems of an **operator of a model**, it can be stated with a low level of certainty that the best choice would be a municipal department or an implementing business entity.

The experimental indication and assessment of **the participants and “actors” of business models** was clearer. In summary, it can be established that most experts answered that the main “actors” of business models should be private companies and the municipalities with their separate companies and branches. Detailed information of the actors is presented in **fig. 13**.

A	B	C	D	E
Parcel services, IT services, municipal enterprises	Parcel services, IT services, municipal enterprises	Private companies and municipality	All stakeholders	N/A

Figure 13. Actors of the Green logistics business models according to the experts.

Most theoretical business models and good practice recommendations presented indicated the very important role of **consolidating shipments** and the need to use especially adapted consolidation and de-consolidation terminals or other elements of the logistics structure, for the description of which the terms DEPOT is used. Depots usually are an element of *city logistics* used to achieve full load of vehicles, thus minimizing the number of trips and the emissions of hazardous substances. It should be noted that the emission of a fully-loaded truck is higher than that of a partially-loaded truck, but in the context of Green logistics the recalculated emission is important, i.e. the total emission of hazardous substances is calculated for a weight unit cargo and thus the emission effectiveness is determined. I.e. if 1 kg cargo equals to an emission of 1 kg CO₂, this means that 1 kilogram of CO₂ is used for 1 kilogram of cargo. But if 100 kg of cargo is transported and the emission is increased to, let’s say, 10 kg CO₂, then the recalculated CO₂ amount for 1 kg of cargo is only 0.1 kg. This way not only the achieved effect of Green logistics organisation and minimizing effect on the environment is shown, but the economic effect as well because the cost of transporting cargo is reduced.

The experts favoured the possibility to establish such depots. Expert assessment is presented in **fig. 14**.

<i>Are there “logistics depots” (i.e. logistics centres and terminals where goods and other freight designed for the region’s customers would be consolidated) available in your region? Additionally, depots ensure that green vehicles are in full load. Usually, the activities of depots are organized according to the principle of PPP (public private partnership).</i>					
Expert	A	B	C	D	E
Possible / Impossible	N/A	Possible	Possible	Possible	N/A
Who would be the representative of the “public sector” in the activities of this depot?	N/A	Municipality	N/A	District administration	N/A
Could these depots operate under control of business institutions only?	N/A	Yes, but participation of the municipality is preferable.	Depends on owner of the terminal (DEPOT)	Yes	N/A

Figure 14. Analysis of logistics depot possibilities

As already mentioned in the analytical part of business models – modern business models include technical-technological solutions, usually associated with the use of “green” vehicles. As shown by this analysis, the experts gave a high rating (9) to the model objective to use environmentally-friendly and clean vehicles. Electric vehicles are considered to be the most suitable for achieving the objectives of Green logistics. Although, as mentioned earlier, it is important to determine if the infrastructure (charging stations and quick-charging equipment), available in the regions is properly adapted for the use of such vehicles. Analysis results are presented in **fig. 15**.

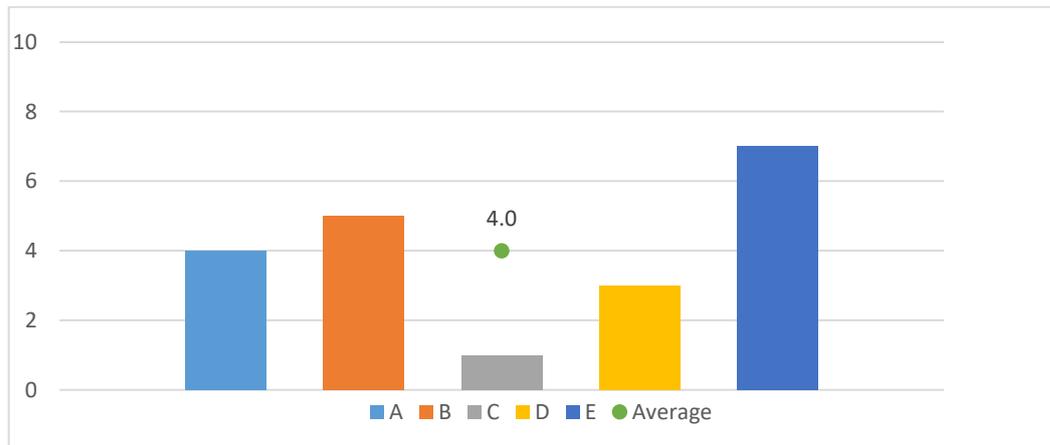


Figure 15. The degree of development of your region’s infrastructure aimed at using electric vehicles

Unfortunately, as shown by the results of the expert analysis, the dominating infrastructure-assessment criteria are not high. Two extreme assessments should be distinguished – 8 and 1. Assessments provided by other experts are around the average of 4, i.e. lower than the neutral and moving towards negative assessment. This means that the element for developing infrastructure suitable for using electric vehicles must be planned when forming business models. In other words, to emphasize wide use of electric vehicles in project regions without changing the infrastructure would be inappropriate and non-viable.