

# Creating Trade Plans of Strategy Development with Foresight Methodology

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Because structural innovation projects are burdened with high risk, there is a need for prior planning for rational investment decisions making, which can ensure the sustainable development of the industry. Finding the most probable development vision is one of the reasons why more and more successful and appreciable are studies connected with prediction of the future (known as: future studies), among which a method of foresight is also classified. The paper presents the problems associated with strategic planning based on foresight methodology, applied to searching for rational visions and scenarios for the development of transport systems.

**Keywords:** forecasting, sustainable development, transport technologies, foresight.

## 1. INTRODUCTION

Development planning is one of the key tasks that were assigned to local government law at city or province level. The plan develops a strategy for recording the region's communities to make aware choices, oriented to solve the main problems and the maintenance of the area on a path of sustainable development and improving its competitiveness. As the main tool of development policy pursued by governments, development strategy sets out the extent of activities undertaken by the regional authorities, as well as a benchmark for initiatives and documents of a planning, spatial and programmatic, undertaken at regional, and local levels as well as by the industry.

*Strategy* - refers to the plan indication of how the organization (industrial, social) is to achieve selected targets (position). This can also be described as the observance of positive patterns of organization's behavior from the past [1].

A logistics strategy can be regarded as a set of guidelines, and well-established causative factors of attitudes that help to coordinate the objectives, plans and policies, and become stronger as a result of conscious and subconscious behavioral expression of a dimension inside and outside the

organization by the partners forming the plan of development of certain industries, such as transport [2].

The term *sustainable development* was defined in 1987 (in a report of World Commission on Environment and Development "*Our Common Future..*") as development that meets the needs of the present without compromising the ability of future generations to meet their own needs [8]. Once a development of sustainable principles was agreed and adopted in the Declaration of the Earth Summit in Rio de Janeiro in June 1992, together with the accompanying comprehensive set of recommendations known as *Agenda 21*. *Sustainable* development has three dimensions: environmental, economic and social development, and is associated with the economy of energy and transport (Fig. 1). Energetic powers the economy of macroeconomic growth, but it is also a source of negative environmental impacts [3]. It also provides the basis for meeting a variety of human needs. "*Sustainable development of transport*" is defined as "development, the needs of today, which does not limit transport capacity of future generations to meet their mobility needs" [8].

*Foresight* is the process of creating a methodology for thinking about the future, in which both scientists, engineers, and representatives from industry and public administration employees are involved in setting the strategic direction of technology development and research, in order to yield the greatest economic and social benefits in the economy [4]. Participants of the foresight project shall determine the priority directions of research, jointly creating a vision of future developments. In addition to the objectives of the acute (building development scenarios) foresight is also important for meeting the demand for know-how: the scientific, business and culture.

- structural *prediction* of long-term: social, economic and technological progress and needs,
- interactive research methods, analysis and research, including a wide range of stakeholders that are characteristic for foresight (as opposed to many traditional research on the future, which are rather reserved for experts),
- interactive approach involves the creation of new social networks. The emphasis put on the role of networking differs depending on the type of foresight,
- formal products of foresight go beyond the presentation of scenarios and preparation of overall development plans,
- common vision of development can not be utopian, since clear recognition of the implications and an explanation for "today's decision and future actions" must be made.

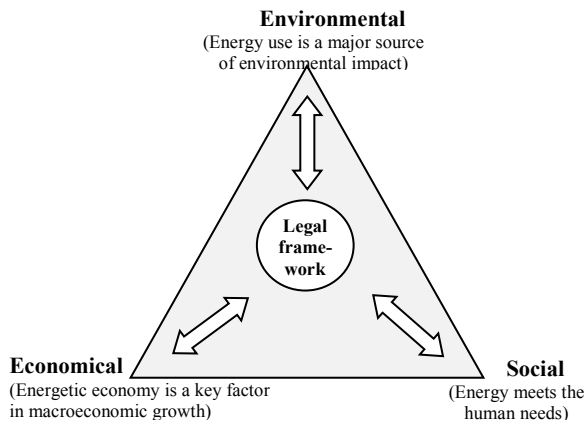


Fig. 1. Sustainable development and energy economy  
Source: [3]

For individual industries or organizations provided clarification takes the form of interest in the field of *technology foresight*. It is a process involved in the systematic (scientific) look at the long-term future: art, science, economy and society, aiming to identify areas of strategic research and emerging generic technologies that have the potential to bring the highest economic and social benefits in a specific term [6]. The aim of *technology foresight* is to identify key emerging technologies that have the potential to produce the highest economic and social benefits. Key technology is considered to have the highest potential technologies to influence the competitiveness of a company, region or country and the quality of life of society.

These definitions are often modified with the definitions of foresight putting bigger emphasis on building the system and the benefits of the forecasting process. Foresight programs include five key elements [6]:

It should be noted that foresight does not replace forecasting and future studies of the strategic planning. It rather focuses on creating a desirable vision for the future by the current proposals for action. Foresight type programs allow and are therefore helpful in developing plans for sustainable development of the sectors (regions). From the perspective of sustainable development in the region they play a very important role in the following aspects: the level of society, energy, ecology, technology, environmental protection, economic growth and infrastructure. In turn, the development of all these elements is affected by an efficient local transport system. Transportation, indeed has been, is and will remain one of the most decisive sectors of economy according to the efficiency of the functioning of all socio-economic areas of the country [3].

Regional transport technology foresight is a process involved in the scientific view of the long-term future development of transport systems, designed to identify areas of strategic research, social needs and emerging transport technologies that are adequate for the region.

The methodology followed for the transport - technology foresight type projects - is analogous to the classical methodology of foresight (Fig. 2). The transport specificity of the region (e.g. the Upper Silesian Agglomeration, as a large industrial region with a significant population of people), requires the analysis of the development including

transportation systems conditions: social, economic, environmental and politico-legal, so called: SEEP. The final list of factors for each panel can be reached through, often used in such cases, heuristic methods (such as expert brainstorming, Delphi method).

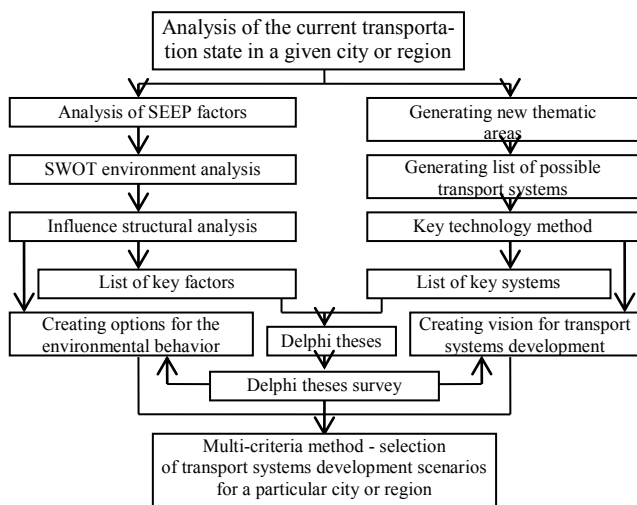


Fig. 2. Block diagram of the transport systems development scenarios creation for a particular city or region

Source: own elaboration basing on [4]

The procedure followed for the analysis of the SEEP is presented in Fig. 3. From the results of individual studies and literature studies of regional and international workshops, the list of factors is determined by individual groups of structural SEEP. The final list of factors can occur, for instance through the so-called targeted discussion, or through brainstorming in the classic version or the use of notice board etc.

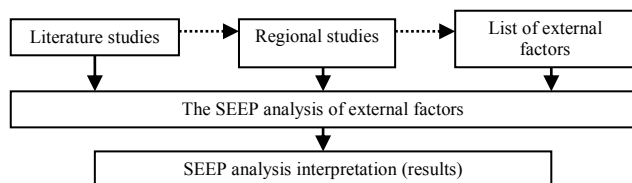


Fig. 3. The steps in the SEEP analysis of external factors. Source: own elaboration basing on [4]

Selection of the most important external factors for the development of transport systems in the region should also be based on SWOT analysis, which will be indicated by the key strengths and weaknesses, and the opportunities and threats affecting the functioning and development of key transport systems in cities. The SWOT analysis

should be based on this group of external factors, which were obtained as a result of the implementation of the preceding SEEP analysis.

The indicators developed basing on SEEP factors, and then thesis on the directions of development of sustainable transport in Silesia to be verified, will take into account [4]:

- time factor (time limit for completion of the thesis),
- the importance of the issue (the impact of implementation of the thesis on the development of sustainable transport).

Due to the influence structural analysis it is possible to select (by creating of the factors matrix) list of key factors (critical), having the greatest impact on the development of key technologies. Development on the basis of variants of the behavior of the environment is possible through the assessment of increase, decrease or no impact on any external factor previously nominated.

After obtaining the Delphi thesis questionnaires results and also basing on and compiled a list of key systems, it is possible to formulate a vision of development of transport systems in terms of technology.

Each of the vision should have a different set of transport systems, according to the matrix, in which each row has properly selected systems placed, and visions of the columns (Table 1). For every vision of reality is determined the system to be implemented or the application of relevant keywords. Developed vision should then be properly named and described according to their characterizing critical systems.

Table 1 Vision matrix

Critical systems list	Vision 1	Vision 2	Vision ...	Vision n
System 1	X	X		X
System 2	X			X
System ...			X	X
System n		X		X

In the foresight studies formulated visions of development of transport systems should then be confronted with the alternative variants of the future behavior of the key factors, which condition the development of the transport industry in the

agglomeration. After a thorough analysis of the results of the Delphi questionnaires, it is important to identify opportunities to fulfill the vision of key systems development with the assumed variants behavior of the key factors. In this way, it is possible to create scenarios of transport technologies for a given city or region.

Evaluation of results of foresight requires an understanding that is also one of the factors influencing public policy or strategy for the development of particular industries or organizations (companies, cities).

Due to the territorial scope of interest, foresight programs can be divided into [4]:

- regional,
- trans-national
- national - created by national or international organizations.

In most cases, regional and national foresight, the main objective is to identify the most promising issues in the development of science, technology and education in a given area and strictly selected industry. Regional Foresight is a systematic process of gathering knowledge about the future in a shorter or longer period of time, decision-making and encouraging future economic activities on a specific (and well-defined) geographical area and industry, e.g. transport. Configuration of the methods used in this kind of foresight studies depends on region and specific of undertaken actions. Consequently, there are many different types of regional foresight (e.g. foresight focused on the problems of increasing innovation, development of transport systems, etc.). The regional foresight fulfills a need for ways of responding to strategic issues in a way that is geographically limited or socially complete.

The result of foresight projects are sustainable transport scenarios (Road Maps) and transport technologies cluster. These are the list of actions that should occur after the identification of regional transportation problems and possible solutions for the whole duration of the foresight process. Development scenarios (action plans) should not be "wish lists", and should not only specify the endpoints and ultimate objectives. It should indicate the action and the relevant institutions (persons) to monitor project progress, and evaluate indicators of the degree of success

achieved (so-called "verifiable objectives") that in the next step of action should be included in a document called the *Feasibility Study*.

## 2. STRATEGY DEVELOPMENT PLANS CREATION BASED ON FORESIGHT METHODOLOGY

Strategic development plan relates to transport policy making process, which is one of the key documents for a given city or region. The purpose of this plan is to define the conditions, rules and instruments, and so the basic components of the transport policy of the territorial area to which it relates. Preparation of a strategic development plan extends the already existing basis for the development of informational programming process of the city transport system. The plan must be analyzed on the existing town or region transport policy and its transport system. Indicate when it is appropriate for current and future conditions and the conditions of transport policy making process of the city or region. An important issue of such plan is the problem of the city's transport policy context in relation to regional, nationwide and European level.

Treating transport policy as a tool in the programming of current and prospective development of the transport system of the city or region, the plan should discuss the principles shaping the development of the transport system in this area, referring to all the major functional subsystems and modality (modal split, public transport, freight transport systems, road -street and rail infrastructure, parking, traffic calmed areas and pedestrian and bicycle road network).

When analyzing real (implemented), town or region transport policy and preparing the assumptions of active transport, the policy should be based on distinguishing between the classical system of transport policy in the following problems (areas of formulating targets) [6]:

- external availability,
- internal availability,
- development of the logistics potential of the city or region,
- limitation of negative effects of transport development.

However, it is impossible to make a strategic development plan a narrow topic only for public

transportation, without impoverishing its results - public transport is part of the transport system of the city or region, the displacement of residents takes also place through individual transport and on foot.

Strategic development plan for transport in the region should include:

- analysis of the overall transportation state,
- development vision for the term specified in the foresight,
- regional strategic balance based on a SWOT analysis,
- priorities, strategic objectives, action lines and undertakings,
- framework for the implementation and financing plan,
- monitoring and evaluation plan.

Strategic development plan should be consistent with the general assumptions of the Polish State Transport Policy for 2006-2025 [9]. One of the most urgent tasks in implementing the country's sustainable development policy is to closing the gap with Western European countries in terms of the degree of civilization and living standards. However, this requires the creation of strong structural foundations of economic growth, including an efficient transport system. Plan of strategic development of the transport system should enable the public (residents and people outside the town or region) realization of the right to mobility [8]. At the same time it should minimize the negative externalities of transport - it is necessary not only to develop but also to impact of transport on the modalities of the right of mobility. While creating a plan to achieve the right conditions for mobility, also the use of different transport subsystems should be considered.

A more flexible approach appropriate, rejecting the conventional thinking of stating the objective of passenger cars, diesel locomotive or, more broadly, in opposition or clearly negative light relative to public transport, or carbon-free ways of movements (eg, bicycles). Road transport has become part of people's lives, part of the urban area that is a key tool for realizing the right of mobility - while increasing congestion and other externalities not only that limits mobility, that also declines in the efficiency of the transport system, competitiveness of cities and the deterioration of the life quality.

Forecasts of future direction of the city transport systems should be implemented in the system of:

- area of the city as a whole,
- area of the city divided into separate sub-
- develop the area in a regional context.

Public transport in the strategic development plans for transportation systems of large towns and cities must play a key role - hence the need to take measures to enhance its competitiveness and efficiency in meeting the transportation needs. Creating a public transport strategy must take into account many factors - in particular the importance of technological development for the future of transportation, the need to reduce emissions and demographic changes [3]. Reducing energy intensity, in conditions of deficit of goods, is one of the key objectives for resource management. In this context, the establishment of the sustainable development of transport technology results from the conviction that, the technical development of means of transport will have a dominant influence on improving the quality of transport services and transportation needs of society in the future (Fig. 4).

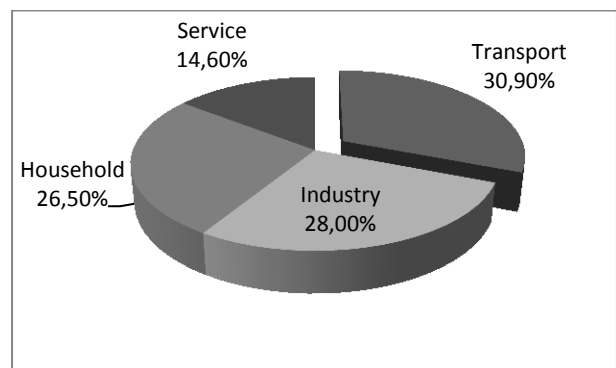


Fig. 4. Energy consumption by sectors of the economy in the EU-27 countries in 2005. Source: [3]

City with a developed functional and spatial structure, which play a key role in the region and with a large potential for growth (resulting from social characteristics, location, and quickly improving the availability of transport) should be an example of innovative, effective and sustainable urban transport development plan.

Great importance for the proper functioning of the transport is the part of the plan relating to the zoning, including the location of point and linear infrastructure facilities, which may cause most of

the activities connected with passenger transport should be the result of long-term vision of the mobility of people, meeting the needs of transport, sustainable and effective development of the transport system [5]. Implementation of the plan of public transport development policy requires many actions of a structural nature, it is a long process, and therefore should be properly targeted. The complexity of the transport development strategy also results from the fact that transport is a network industry composed of many components (infrastructure, vehicles, operators, regulation, adopted economic and organizational solutions), which are the responsibility of the administration of different levels. The elements of the transport system are financed from various sources and according to different rules, and are covered by, often different, regulations. Many regulations are created by mode of transport, or the range of services, such as the principle of entitlement to concessionary travel as specified by statute, some are different for urban public transport, and the other for rail services, although services are provided in the same area. The result is that the cities have an impact only on selected elements of the passenger transport system, which in turn limits the ability to effectively and efficiently support work. All components of the transport development plan in a given region should be confronted with the current law (ownership of land for infrastructure investments) and financial capacity (or indication of potential sources of funding), which are contained in the so-called *Feasibility study*.

### 3. STRUCTURE AND SCOPE OF THE *FEASIBILITY STUDY*

The feasibility study is a study on how to implement a specific investment project with a strategic development plan, implemented on the principles of public procurement tender, which should mainly contain [10]:

1. conclusions from the analysis of strategic development plan for the region,
2. characteristics of the project,
3. evaluation of regional development strategies in the field of transport infrastructure,
4. analysis of the socio-economic environment,
5. conditions of realization of the expansion,

6. description and analysis of problems,
7. technical analysis,
8. identification of feasible alternatives,
9. costs of the investment task and how it is financed,
10. assess the impact of investment on the environment,
11. legal analysis of the feasibility of investment,
12. timetable for implementation of investment,
13. analysis of the potential risks of the project.

*Conclusions from the analysis of the region's strategic development plan* should include a summary of the total project investment, along with the presentation of the most important issues: organizational, technical, legal, environmental, financial and economic conditions.

The *characteristics of the project* should present concisely and clearly the subject and scope of the project, which should show what actions will be implemented under this project.

*Evaluation of development strategies in the field of transport infrastructure* should justify that the project follows directly and is complementary to the objectives of the European Union's transport policy, as well as the positioning the project in the development strategies and programs of the region.

*Analysis of socio-economic environment* should include basic socio-economic data of the region, describe the condition of the existing spatial management of grounds covered by the project, the characteristics of existing transportation systems and the analysis of residents communication needs at current and in the future, after completion of the project.

Under *realization conditions* of the development plan needs to be submitted which are current and future determinants of the investment from these points of view: spatial plan, development plans, public transport system. It should also provide legal conditions (current and future) and the financial capacity of the Project.

*Description and analysis of the problems* is the identification, analysis and relationship between problems that affect the project beneficiaries. Identified problems should arise from the analysis of realization conditions.

The *technical analysis* should describe the condition of existing public transport infrastructure, traffic safety problems, to provide existing and potential solutions to achieve the objectives of the project and pre-selection of variants in technical terms.

*Identification of feasible alternatives* is a presentation of alternative realization variants of intended investment. The main objective of this activity is to provide the possibility to choose the best available options for the investment.

*Assess the impact of investment on the environment* is characteristic of the environmental impact and proposals for the best possible environment variant for solution of the reasons for his choice. This section should describe the potential impact of investment on the environment and present the results of public consultation in this regard.

The *analysis of legal feasibility* of the investment should describe the legal issues related to the project (eg, ownership of land, buildings where the project will be implemented), and describe the legal process leading to the start of the investment.

*Timetable for implementation* of the project is to provide time deadlines: the preparatory work, documentation and approvals, completion of the tendering process and project implementation.

The *analysis shows the potential risks* of the project for reliable data and experience in statistical evaluation of previous projects, qualitative risk analysis related to the project.

The scope and requirements detailed feasibility study will be presented by the Contracting Authority project (this is usually a local government unit) in the form of a public offering and are included in the *Terms of Reference*.

#### 4. SUMMARY

On the basis of the article analysis of the applicability of the foresight methodology in the industry strategic development plans creation, following conclusions can be formulated:

- studies based on the methodology of foresight enables rational development of plans for

development of transport in a certain region or city,

- strategic development plan for transport policy-making process, which is one of the key documents for a given city or region should take into account the sustainable development strategy,
- all components of the transport development plan in a given region should be confronted with the current law and financial capacity of the beneficiary, which are included in the *Feasibility study*,
- during strategic planning of transportation systems (infrastructure transport networks) at the regional level we should also be aware of weaknesses and threats connected foresight methodologies, which include primarily a uncertainty associated with very long planning horizon, ability of making decisions based on abstract concepts or avoiding risky decisions.

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