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LOGISTIC PROJECT – DEFINITION, TYPOLOGY AND RISK

1. Introduction

In an attempt to clarify the term “logistics project” it is necessary to begin with the definition of “project” itself. According to management literature “project” is an ambiguous word. In its broadest meaning, a project is a single endeavor (task) that should be planned and implemented within specific time and budget frames. However, in economic literature a project is comprehended as an investment, through which development goals are materialized. Due to its innovativeness, and resulting problems with predicting its time and costs, project’s main feature is high level of uncertainty (risk), which diminishes as further steps of the project are implemented.

2. Logistics project as a special type of project

Conducted analysis of literature allows the authors to introduce two groups of definitions of term “project”: one representing management and second economic angle. Concerning management, “project” is a commonly used expression in publications considering all the classical functions of a company: marketing, R&D, operations, HRM, logistics, etc. Moreover, there is a group of management publications devoted to a project, its planning and management only. In case of economics literature, the term “project” could be mainly found in publications regarding development economics and in particular its integral part: cost–benefit analysis. Accordingly, considering the economics point of view, development project is a commonplace collocation.

Below are listed exemplary definitions of a project quoted from management literature:

- temporary endeavor undertaken to deliver unique product or service¹;

¹ Project Management Institute, 2001, s. 156, [za:] J.R. Meredith, S.J. Mantel, Jr. *Project Management. A Managerial Approach*, 5th ed., Wiley 2003, p. 8.

- series of tasks that will culminate in the creation or completion of some new initiative, product or activity by a specific end date. In contrast to operations, projects are not routine or ongoing. Moreover, they are implemented to achieve a strategic goal of an organization²;
- endeavor leading to the achievement of a goal, necessitating resource utilization, harnessed with time, cost and quality frames. Besides projects are usually unique³.

Based on the above definitions, a project should be comprehended as a constellation of three interconnected and interdependent parameters:

- 1) goal/ initiatives that is to be achieved,
- 2) resources/costs devoted for a goal accomplishment,
- 3) time during which a goal is to be realized.

Considering development economics literature the following definitions of project could be provided:

- involves a commitment of resources now to obtain extra resources in the future⁴;
- scheme or a part of scheme, for investing resources which can reasonably be analysed and evaluated as an independent unit⁵.
- Undertaking that has following features⁶:
 - defined set of objectives ;
 - involves the investment of scarce resources for the future;
 - can be planned, financed and implemented as a unit with defined:
 - start and end,
 - beneficiaries,
 - geographical and organizational boundaries.

The diagram of development project is provided below.

While analysing development projects, the scope of project influence is of fundamental importance. Generally, two groups of project exist: first, affecting an investor and other involved parties, second, influencing involved actors as well as third parties, i.e. people or institutions that are not directly involved. Project's influence on third parties is called externality (side effects). In case of the first group of projects, financial analysis is a sufficient technique to choose or reject the project. However, in case of project with significant external effects economic analysis is indispensable to make a decision on project implementation⁷.

² T.S. Stover, *Microsoft Office Project 2003*, Inside-out, MicrosoftPress 2003, s. 38.

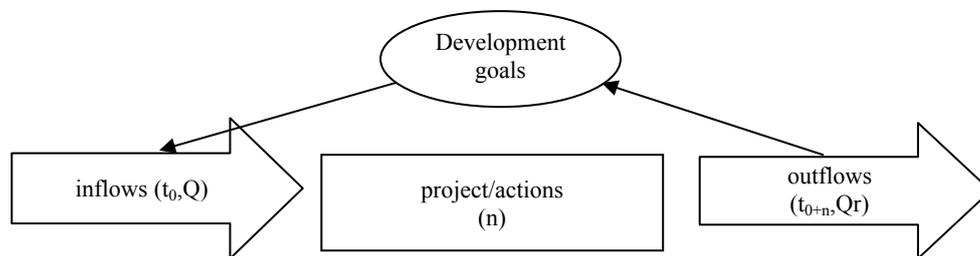
³ H. Kerzner, *Advanced Project Management. Edycja polska*, Helion, Gliwice 2005, s. 17.

⁴ S. Curry, J. Wiess, *Project Analysis in Developing Countries*, The Macmillan Press LTD, Londyn 1994, s. 8.

⁵ I.M.D. Little, J.A. Mirrlees, *Project Appraisal and Planning for developing countries*, HEB, Londyn 1982, p. 3.

⁶ D. Potts, *Project Planning and Analysis for Development*, Reinner, London 2002, p. 12, European Commission *Project Cycle Management Guide*, Brussels 2004, <http://europa.eu.int/comm/europeaid>, p. 8.

⁷ See for example L. Kurowski, *Ocena projektów gospodarczych*, Wydawnictwo AE, Wrocław 2004.



t_0 – project inception, t_{0+n} – project completion, n – project duration, Q – resources, r – premium for postponing a current consumption ($r > 0$)

Fig. 1. Development project

Source: authors' own description.

To sum up, two described above points of view are based on mutual assumptions. Both presume that a project is a certain configuration of resources, which within defined time frame are to be utilized in the way that guarantees certain goal accomplishments. However, from the managerial point of view a project is reduced to the achievement of goals of a single company (optionally group of companies). From economic angle, goals have broader meaning and pertains not only to business entities but also to broader focus groups, regions or even national economy as a whole.

Regardless taken point of view, projects relate to various areas of institutions, regions or countries. From this perspective, there are diverse types of projects: R&D, production, marketing, financial, social, infrastructural, ecological, logistical and others.

Concerning logistics, projects apply to the location of supply chain nodes, transport, warehousing, development or modernization of linear elements of logistics infrastructure, inventory management, customer service. What is more, the above endeavors could be undertaken in micro-, mezo- and macroeconomic scale.

Hence, logistic projects are defined here as:

Unique, time and budget constrained undertakings (tasks) which implementation is aimed at the improvement of efficiency and effectiveness of material and accompanying information flows within companies, supply chains and in certain geographical areas.

It should be stressed again that a logistic project could influence directly involved entities only or spread over third parties (i.e. project's environment).

3. Universal categorization of logistic projects

Among numerous typology criteria of a logistic project, the most important are: time and significance of project's results, functional area of project implementation, type of actions and their results, budget, financing sources, spatial scope,

entities involved, scope of effects. The list of the above criteria, along with a resulting logistic project type is presented in the table below.

Table 1. Types of logistic projects

Criteria	Type of project	Examples
Time and significance of project results	Strategic Tactical Operational	Centralization of distribution network Norms of inventory control ascertaining Route optimization
Functional area of project implementation	Localization Transportation Warehousing Inventory management Customer service	Location of warehouse Transport mode selection Warehouse construction Inventory model selection Customer service strategy formulation
Type of actions and their results	Trainings Consulting and implementation Investment (including infrastructure)	IT in logistics training Audit and improvement of logistics system Internal transportation system modernization
Number of participants	Implemented by single company Implemented by two or more cooperating companies	Kanban implementation VMI implementation
Spatial scope	Local Regional National International	Local public transportation system improvement Regional distribution centre construction Logistics service e-market launch La Manche tunnel construction
Scope of effects	Projects influencing stakeholders Project influencing third parties (other players in sector, region or even country)	Kanban implementation International logistics centre construction
Financing sources	Private; Mixed Public	ERP system implementation Logistics centre construction and operation (PPP model) Town bypass construction
budget	Microprojects Vast expense	Business logistic training Logistics centre construction

Source: the authors own description.

In practice while classifying a logistic project one should use more than one criterion at the same time. It is particularly important when the scale of the project is ascertained. Here, at least three factors should be utilized:

- number of project team members;
- work consumption measured by cumulated real work time;
- expenses⁸.

⁸ Based on listed criteria it is possible to categorize projects as very small, small, medium, large, very large. The rules of projects classification are presented in M. Pawlak, *Zarządzanie projektami*, PWE, Warszawa 2006, p. 20.

Multi-criteria logistic projects typology is also useful while dividing them into strategic and operational. In case of former ones long duration time and results which are important and difficult to alter are essential determinants. However, it should be highlighted that described above results of strategic projects are not only caused by investment projects that aim at the modernization or the development of logistics infrastructure. In the table below the examples of supply chain strategic and operational projects are presented.

Table 2. Examples of strategic and operational supply chain projects

Supply chain node \ Project	Manufacturer	Wholesaler/retailer	3th PL	Waste storing and utilization entity
Strategic	New factory location	ECR implementation	Comprehensive package of logistics services	New landfill location
Operational	Kanban implementation	Inventory control training	Route optimization	Waste sorting system ascertaining

Source: the authors own description.

Spatial scope along with scope of effects are also noticeable. Small logistic projects (e.g. trainings) limited to a single entity are easy to identify, plan and implement. Larger projects spreading over various entities cause more problems as it comes to identification and assessment. Here important is the ability to calculate the effectiveness of a project as a whole and then to investigate the distribution of costs and benefits among project partners. Nonetheless, the most sophisticated is planning of logistics projects that significantly influence their environment, i.e. entities, that do not implement a project, but are affected by it. The mentioned influence can be limited to mezzo-economic scale (e.g. the reconfiguration of supply chain of global sector leader might cause visible effects on logistical system of the leaders partners) or even spread over the national economy as a whole (e.g. motorway construction shortens travel time of private entities, influences functioning of logistics service providers or even increases the transit role of a country).

4. Logistic project based on A.J. Shenhar typology

Based on his research A.J. Shenhar provided two interesting dimensional project typologies consisting of project management scope (understood as a project management complexity) versus technological uncertainty⁹. Considering the first dimension three levels of project complexity are as follows:

⁹ A.J. Shenhar, *Developing a Project Typology, w Project Management: From Genesis to Content to Classification*, <http://www.maxwideman.co/papers/genesis/typology.htm>, 04.01.2008.

Level 1 – Assembly: represents a project consisting of a collection of components and modules combined into a single unit.

Level 2 – System: represents a project consisting of a complex collection of interactive elements and subsystems within a single unit, jointly performing a wide range of independent functions, adapting to changing circumstances;

Level 3 – Array: represents a programme, rather than a single project, where a programme is taken to mean a series of related projects designed to accomplish broad goals and to which the individual projects contribute.

Regarding technological uncertainty, Shenhar introduced continuum of projects: A,B,C and D. Class A projects depend upon existing well established technologies, available to all industry players, while class D projects require high class technologies, i.e. emerging, not entirely existing technological solutions, unknown to other players (fig. 2).

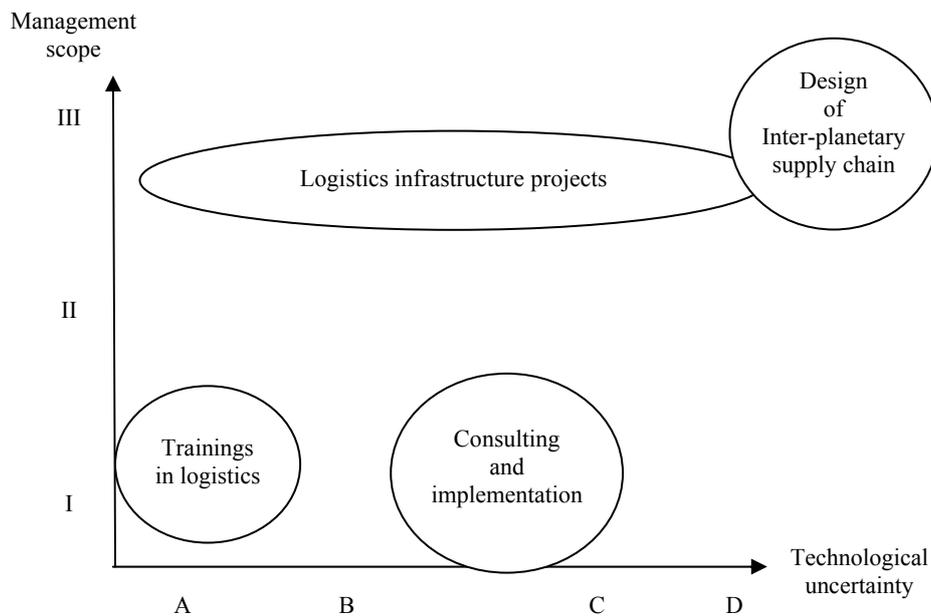


Fig. 2. Logistics projects according to technological uncertainty and management scope

Source: the authors own description based on A.J. Shenhar, *Developing a Project Typology*, [w:] *Project Management: From Genesis to Content to Classification*, <http://www.maxwideman.co/papers/genesis/typology.htm>, 04.01.2008

According to the authors a lot of undertaken logistic projects depend upon available technologies, albeit management scope (complexity) varies from the simplest undertakings (trainings) to the most sophisticated endeavors (programmes of public logistic infrastructure development). IT technologies implementation projects, embracing various independent supply chain nodes should be regarded as

advanced technologies (group C). Logistic projects that use highly advanced technologies are rather unusual, however, some examples could be found, i.e. NASA initiative to design interplanetary supply chain, indispensable to put the man on the moon, Mars and other more distant parts of the solar system¹⁰.

Most of the presented above logistic projects dimensions are universal, thus could be utilized while considering not necessarily logistics projects. Regardless obviousness of provided above criteria, they seem to be pragmatic, hence they might help in a proper logistic project management i.e. project assessment, planning, coordination, control and evaluation.

5. Project risk

Logistic projects, as many other projects, involve risk (uncertainty) stemming from the occurrence of unexpected events or conditions, and their effects. However, it should be underlined here that unexpected event/condition might have negative or positive effects on a project¹¹. Accordingly, risk management is not only limited to dealing with project threats but also opportunities. Obviously there is a general tendency to associate project risk with threats only, which to some extent is a reasonable assumption, especially considering the fact that project objectives are usually challenging, and the probability of downside events is higher than a chance of opportunity occurrence. Regardless of project risk/uncertainty perception, the probability of unexpected events (negative or positive) increases as the complexity and time horizon of the project rise.

Table 3 presents types of project uncertainty¹² with a special reference to logistic undertakings.

The matter of a great importance while considering logistic projects is risk allocation between project parties. Especially real or postulated supply chain partnership as well as public-private partnership in case of logistics infrastructure project, necessitates careful assessment and deployment of project risk already at the planning stage of the project. An achievement of partnership synergic effects necessitates allocating risk to the partner that can best handle it.¹³ Obviously, in case of “soft” logistic projects planned and implemented within a single company, the need of risk transfer is importantly reduced, and depends upon organizational structure type as well as the professional competence of employees. As mentioned above, the issue of risk deployment is much more complex in case of supply chain mana-

¹⁰ E.L. Gralla, S. Shull, O. de Weck, G. Lee, R. Shishko, *A Modeling Framework for Interplanetary Supply Chains*, A/AA Space 2006, San Jose, CA, 19-21 Sep 2006.

¹¹ PMBOK 2000, *A Guide to the Project Management Body of Knowledge*, Project Management Institute, Newton Square Pennsylvania 2001, p. 120.

¹² M. Ramgopal, *Cost Engineering*, Vol. 45, No. 12, December 2003, p. 22-23.

¹³ S. Coyle, *Applied Transport Economics, Policy, Management and Decision Making*, Kogan Page, London – Sterling 2005, p. 334.

Table 3. Typical risk types in logistic projects

Uncertainty type	Description	Logistics
Uncertainty about project objectives and priorities	Coherence between project objective and strategic goals of organization or supply chain	Logistics or supply chain embraces usually a chosen process or system element. Project objective set to improve functioning of that process or area may neglect the development or the competitive goals of company, e.g. the implementation of lean approach (killing costs) in case of supply chain for which flexibility and rapidness (agility) is a competitive goal.
Uncertainty about project effects	Project deliverable and the process of producing it	Different logistic processes are interconnected, and changing just one of them causes negative or positive effects to the others (known as trade-offs); while designing logistic process improvement project, possible impacts on other processes have to be carefully investigated in order to ascertain if global positive effects of a project would exceed its total direct and indirect costs. Public logistic infrastructure development projects influence various stakeholders (often third parties that are not directly involved in the project); investigating possible project external effects (external deliverables, e.g. environmental) and valuing them is a tricky but very important issue.
Uncertainty about project parameters	Lack of knowledge (at planning stage) concerning the main project parameters: costs, schedule, quality	Especially important in case of logistic infrastructure project (especially planned, implemented and operated under PPP scheme); e.g. inability to prepare and execute project schedule might result in severe increase in project costs; the conservative calculation of investment costs (without contingency) might lead to the postponement of project implementation or even project cancellation.
Uncertainty about the basis of estimates	Inability to objectively establish project input data	Due to bullwhip effect project team might not be able to deliver correct data considering demand characteristics.
Uncertainty about fundamental relationships	Multiplicity of involved people and/or organizations and the resulting network of relationships between above parties	Especially important in case of supply chain management project (internal or external chain). Within such projects people from various business units or different organizations are expected to work together on achieving the common project objectives; having different backgrounds, supervisors, often different goals these people are prone to get involved into conflicts. On the other hand, merging various project participants might produce unexpected, innovative solutions while implementing a project.

Source: the authors own description based on M. Ramgopal, op. cit., p. 22-23.

gement and logistics infrastructure projects. The problem of cost and benefits valuation and distribution under assumed risk goes even beyond parties directly involved in a project. Such a situation is particularly common in case of transport and warehousing infrastructure development/modernization projects, which usually positively or negatively impact the quality of life of local society or might change the rules of a particular sector functioning.

Another issue that needs a special attention is an assessment and allocation of risk of logistic infrastructure development projects undertaken within PPP model. Usually a private partner is better positioned to managed the risk. It produces some possibilities to transfer risk connected with¹⁴:

- construction costs overrunning,
- losses through completion delay,
- quality standards of facilities failing to meet performance targets,
- poor design that hinders effective delivery of services,
- problems through facilities failing to keep up with new technology,
- losses through capacity proving too large or too small for needs,
- costs of adaptation for alternative use,
- escalating maintenance and repair costs,
- failure to meet facilities management costs targets,
- income generation schemes failing to meet net income targets.

The identification and analysis of a logistic project potential risks allows to evaluate the impact of a risk on project main parameters which are presented below.

Table 4. Evaluating impact of a risk on the logistics project parameters

Parameters \ Project type	Trainings	Consulting and implementation	Investment
Goals and deliverables	Low, medium	Medium	Medium
Costs	Low	Medium, high	High
Schedule	Low	Medium, high	High
Quality	Low, medium	Medium, high	High

Source: authors own description.

The identification and the evaluation of logistic project risk is just the first step in a project risk management. Based on it a project team has to ascertain risk mitigation plans, and then control and monitor project risk.

Literature

- Coyle S., *Applied Transport Economics, Policy, Management and Decision Making*, Kogan Page, London – Sterling 2005.
- Curry S., Wiess J., *Project Analysis in Developing Countries*, The Macmillan Press LTD, London 1994.
- Gralla E.L., Shull S., O. de Weck, Lee G., Shishko R., *A Modeling Framework for Interplanetary Supply Chains*, A/AA Space 2006, San Jose, CA, 19-21 Sep 2006, 10.10.2007.
- Kerzner H., *Advanced Project Management. Edycja polska*, Helion, Gliwice 2005.

¹⁴ Ibidem, p. 334.

- Little I.M.D., Mirrlees J.A., *Project Appraisal and Planning for Developing Countries*, HEB, London 1982.
- Kurowski L., *Ocena projektów gospodarczych*, Wydawnictwo AE, Wrocław 2004.
- Meredith J.R., Mantel S.J., Jr., *Project Management. A Managerial Approach, 5th ed.*, Wiley 2003.
- Pawlak M., *Zarządzanie projektami*, PWE, Warszawa 2006.
- PMBOK 2000, *A Guide to the Project Management Body of Knowledge*, Project Management Institute, Newton Square Pennsylvania 2001.
- Potts D., *Project Planning and Analysis for Development*, Reinner, London 2002.
- Project Cycle Management Guide*, European Commission, Brussels 2004,
http://ec.europa.eu/europeaid/multimedia/publications/documents/tools/europeaid_adm_pcm_guidelines_2004_en.pdf, p.8, 01.02.2008.
- Ramgopal M., *Cost Engineering*, Vol. 45, No. 12, December 2003.
- Shenhar A.J., *Developing a Project Typology*, w *Project Management: From Genesis to Content to Classification*, <http://www.maxwideman.co/papers/genesis/typology.htm>, 04.01.2008.
- Stover T.S., *Microsoft Office Project 2003*. Inside-out, MicrosoftPress 2003.

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Streszczenie

Na podstawie studiów literaturowych z zakresu analizy ekonomicznej oraz zarządzania projektami zdefiniowano pojęcie projektów logistycznych. Autorzy artykułu przez projekty logistyczne rozumieją jednorazowe, ograniczone czasowo i budżetowo przedsięwzięcia (zadania), których realizacja służy poprawie sprawności i efektywności przepływu produktów oraz towarzyszących im informacji w przedsiębiorstwach, łańcuchach dostaw lub układach przestrzennych. Dokonano również wstępnej klasyfikacji projektów logistycznych, która może być przydatna przy doborze metod zarządzania nimi. Z perspektywy aplikacyjnej ważna jest także identyfikacja typów i natężenia.