

# Evaluating Efficiency in Capital Allocation

Ava Morales, Ethan Russell

Harvard University, Boston, USA

**Abstract**—Construction and reconstruction of settlements and individual municipalities, environmental management and the creation, deployment of the forces of production and building transport and technical equipment requires a large expenditure of material and human resources. That is why the economic aspects of the majority decision in these planes built in the foreground and are often decisive. Thereby but more serious is that the economic aspects of the settlement, the creation and function remain in their whole, unprocessed, and cannot speak of a set of individual techniques and methods traditional indicators and experiments with new approaches. This is true both at the level of the national economy, and in their own urban designs. Still a few remain identified specific economic shaping patterns of settlement and the less it is possible to speak of their control. Also practical assessing economics of specific solutions are often used non-apt indicators in addition to economics usually identifies with the lowest acquisition cost or high-intensity land use with little regard for functional efficiency and little studied much higher operating and maintenance costs".

**Keywords**—Investment, municipal engineering, value for money.

## I. SUSTAINABLE DEVELOPMENT OF SEAT AND INFRASTRUCTURE

THE construction and reconstruction of settlements and individual municipalities, environmental management and the creation, deployment of the forces of production and building transport and technical equipment requires a large expenditure of material and human resources. That is why the economic aspects of the majority decision in these planes built in the foreground and are often decisive. Thereby but more serious is that the economic aspects of the settlement, the creation and function remain in their whole, unprocessed, and cannot speak of a set of individual techniques and methods traditional indicators and experiments with new approaches. This is true both at the level of the national economy, and in their own urban designs. Still a few remain identified specific economic shaping patterns of settlement and the less it is possible to speak of their control. Also practical assessing economics of specific solutions are often used non-apt indicators in addition to economics usually identifies with the lowest acquisition cost or high-intensity land use with little regard for functional efficiency and little studied much higher operating and maintenance costs" [1].

The economic principle of "value of money" represents a qualitatively different view of the preparation, realization and exploitation of a particular investment project than in the Czech Republic usual. From an investment perspective emphasizes the careful consideration of all aspects of the project lifecycle, not just the initial costs or benefits, but the

sum of all costs and benefits over the standard required life.

Sustainable residential development is economically primarily qualitative development. Involves the use of the seat, while watching the economic prosperity, but ultimately also leads to weakening of future generations, i.e. to degrade the seat in the physical or economic sense. Crucial role in the sustainable development of settlements have a particular investment in infrastructure.

Infrastructure is a set of conditions which ensure the functioning of the economy. Infrastructure is de-fined as "social overhead capital" and includes the necessary investments in the sector contingent upon economic development [2]. In the most general sense is a set of interconnected structural elements, which can then keep the entire structure together. It follows that the different emphasis on infrastructure development can influence the dynamics of the economy, both in local, regional and supra-regional and even international scale.

According to scientific publications and definitions of professionals in economic societies, public investment is defined as public expenditure (expenditure from public budget), which increases public physical capital [6] and the "productive life" will interfere with the future in length up to several decades [7]. The goal of public investment and not just to accumulate profits, as is often the case in private investment, but to ensure the development of infrastructure to ensure the function of the territory and meet the needs of its population.

A long, productive life can also have public expenditure on education and health care not only toward individuals, but the whole society. In this case, however, the result of expenditure is less visible (tangible). Although the government considers spending on education and health care as ordinary expenses, it is basically public investments [7]. The issue of public spending in education also addresses Anderson et al., That these expenditures for public investment does not, but mentions that are generally regarded as an investment) [6].

According to the above definitions can be regarded as public investments that serve to meet public needs and the implementation of the public interest. The Czech Republic is not legally defined "public interest" is usually identified with the "general interest" / "general interest" - used in the European Union in respect of services of general interest (services of general interest). The notion of public service includes both market and non-market services which the public authorities classify as being of general interest and subject to specific public service obligations.

Services of general interest can be divided into:

- Services of general economic nature, i.e. Non-market services provided and funded from public funds: health,

social services, public administration and defense, security, education services in the field of culture and others.

- Services of general economic interest, which can be delivered by the market: Services in the transport sector (including public transport, rail), energy, waste management, telecommunications and postal services, water management and more.

Distribution is only general boundaries of individual services are not sharply determined; each service must be assessed specifically. According to the statements of the European Court are among the services of general economic interest included activities in the cultural, social, educational and public health is an objective economic profit.

The basis for the current definition of the investment priorities of the EU's investment policy is based on the Europe 2020 Strategy Investments are also subject RIS three strategies (from the English "Research and Innovation Strategies for Smart specialisations", abbreviated as S3), which is designed as ex-ante conditionality for approving the operational programs to boost investment in research, development, innovation and information technology from the European Regional Development Fund (ERDF) for the programming period 2014 - 2020. Member States must develop a strategy that will not be processed from the upper level, but will be based on the needs All stakeholders in specific countries and regions and focusing on the most promising areas of specialization, or on specific deficiencies hindering innovation in this area.

At the level of the Czech Republic, at the end of 2013, national strategies RIS 3, including 14 regional strategies in the form of so-called regional annexes prepared for the CR regions. Guarantee of fulfillment of this obligation, the Czech Ministry of Education, Youth and Sports, which compiled so-called RIS 3 Coordination council made up of experts representing the institutions that play a key role in shaping economics policy on competitiveness, regional development, and research, development, innovation and information technologies. In individual regions activity were controlled by regional coordinators so-called S3 regional managers. In each region was determined by the Regional Coordination Platform Strategy 3 RIS brings together all the key actors in all areas of research and development.

Smart Cities ("smart city") - the concept of the cities that make best use of modern, integrated technology, services and infrastructures in energy, transport and ICT technologies to respond to the social and economic needs of society. In the literature Smart Cities concept frequently divided into six basic characteristics (smart economy, smart people, smart governance, smart mobility, smart and smart living environment). The city is defined as "Smart" when its investments in human / social capital, technical infrastructure (classic - Transportation, modern - ICT) effectively support sustainable economic development, high quality of life sustainable management of natural resources, especially through participation and the involvement of citizens in public policy.

The concept of smart cities is a Europe-wide perspective and dynamically developing the theme. The European Commission intends in 2014 and 2015 to invest approximately Smart Cities

200 millions of Euros from the budget of its research and innovation agenda for the planning period in 2020.

There will also be opportunities to draw subsidies from the European Structural Funds and investment. The system should be intelligent cities to participate in the European Innovation Partnership (EIP). Partnership brings together representatives from cities, businesses, community representatives and those entities providing a forum in which they can identify, develop and deploy innovative solutions to improve the condition of cities and Municipalities

## II. ECONOMICS OF INFRASTRUCTURE PROJECTS

General relationships in construction of municipal infrastructure primarily pursue economic goal. Right - whether laws, regulations, decrees, private con-tracts, etc. - are just a means to express the goals of economic development. Legal relations have to "serve" economic goals, not vice versa. This economic goal is not to be seen beyond the usual understanding of the term "economic"; should include the positive difference between the whole society benefits and costs of a project (environmental, social, safety, etc.), i.e. not only the positive difference between the initial income and expenditure captured from an accounting perspective. From this broader perspective, it is interpreted that concept and in international practice, particularly in the context of project tools used CostBenefit Analysis ("CBA").

As part of the investment project, which is always expressed by three basic elements - activities, time and money - it therefore is to set and actual implementation of solutions in the most economically advantageous. Enforcement of economic objectives, which should serve relationship, here should be ensured at all stages of the project cycle roads (Fig. 1) [5].

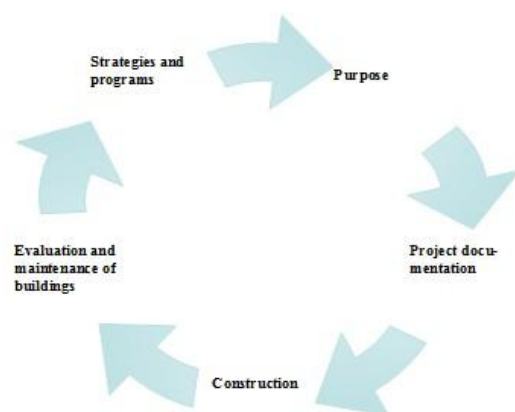


Fig. 1 Project cycle of investment

In the context of public investment is therefore necessary to ask the following basic questions and solve them within the economy of the investment project:

- Why the public sector invests?
- Who invests in the public sector?
- How and to what the public sector invests?
- How is the investment in favor of the public sector realized?

- What is the subject of public sector investment used / operated?

### III. THE PRINCIPLE OF "VALUE FOR MONEY"

The basic term that in good international practice occurs in relation to the economy, public investment is "value for money". Value for money can be de-fined as "the optimum combination of whole-life cost and quality of the investment that meets the reasonable needs of users." In terms of dealing with taxpayers concept of "Value for Money" by National Audit Office, we can define as a utility (U) obtained of each investment or the amount of money spent on each. Principle Value for Money is based not only on the minimum price (economy) but also at maximum efficiency and effectiveness purchase. "Result investment - building object in itself forms two basic dimensions: E - financial and economic dimension and U - dimension of utility [3]:

$$f(E,U) \quad (1)$$

Like any commodity, can be applied to building object a business view and only maximize economic yields and monitor independently evolving user effects (2) or maximize user interests and monitor an independently evolving economic effects (3):

$$\max g(E) \rightarrow h(U) \quad (2)$$

$$\max h(U) \rightarrow f(E) \quad (3)$$

Value for money is not only based on the mini-mum cost (economy) but also to maximize the efficiency and effectiveness (Principles 3E). 3E principles are expressed in EU law, particularly in the budgetary provisions, namely Article 27 EC Regulation 1605/2002 as the principles of sound financial management:

- *Economy* = means a use of public funds to ensure the set of tasks with the least expenditure of these funds, while maintaining adequate quality of the tasks;
- *Effectiveness* = means a use of public funds to ensure an optimum level of achievement of the objectives in carrying out certain tasks. Effectiveness is understood the degree of achievement of the objectives and the relationship between intended and actual impacts of the activity;
- *Efficiency* = means using public means which will give the greatest possible extent, quality and benefits of tasks performed in comparison with the amount of resources spent on their performance.

### IV. THE IMPORTANCE OF INVESTING IN MUNICIPAL INFRASTRUCTURE

During the decision-making process of investment in municipal infrastructure is crucial to take into account several crucial aspects [4]:

- The important aspect is the size of the area (or importance) and type of area (or specifically residence) in which investments of municipal infrastructure should be located to,

- Also significant is the time horizon for investments to be prepared
- But always in terms of a set of realistic alternative solutions / investment.

Each investment should be initially evaluated and subsequently may be finally decided. In case of municipal infrastructure is always some kind of comprehensive system (the system of collective urbanized area, including subsystems conceived proportion to his needs). The investment into the system of collective urbanized area and implementation of such an investment is always a need to look at as a step forward "when there is no way back." The evaluation of the current situation is usually defined specific problems in the area, whether it is a problem in the individual sections of the technical infrastructure or problems coordinating the nature of the utility networks [8]. Here again it is necessary to use appropriate alternative solutions (including assessment) - the solution must respect the developmental trends in the area. Of course it is necessary to analyze the wider relations and links in area, including an analysis of public space.

In the case of investment in municipal infrastructure analogy cannot miss investment proposal to other "sectors" in the area. In the case of deficiencies, it is necessary to make an additional investment (recovery of public space - street, area, Regeneration of apartment houses, construction of new areas for recreation and others).

In connection with the importance of investment in municipal infrastructure is necessary to highlight the importance of planning activities, which defines the development of the municipal infrastructure and the development itself (town). Already during the creation of task planning documentation is necessary to respond to the municipal infrastructure to carry out research and analysis of the current state of municipal infrastructure in the area.

### V. CONCLUSION

Sustainable development within settlements should be measured in its specific forms, i.e. The evaluation of longterm economic sustainability, which in monetary terms compared:

- Existing urban solutions with any proposed changes (including statements loss of territory resulting from the proposed solution or an existing use using the positive and negative externalities);
- Short - term costs and benefits for the investor, induced income and expenses in the long term (both in terms of operation and in terms of the evaluation.

Due to the fact that once again the dominant role in the development and building of settlements takes the public sector, it is necessary to include not only the comparison of income and expenditures, and the short-term and longer-term impacts, but also follow the principles of 3E.

If the creation of the final set of indicators of the economic pillars of sustainable development is successful and concise, it will be used as a supporting argument for the selection of such spatial solutions that are economically sustainable, longeconomically efficient with minimal negative externalities in economic terms.

## REFERENCES

- [1] Hrůza, J. (1977). Slovník soudobého urbanismu. Praha: Odeon.
- [2] Rektoušek, J. and Hlaváč, J. (2012). Ekonomika a řízení odvětví technické infrastruktury. Praha: Ekopress.
- [3] Beran, V., Dlask, P., Schneiderová Heralová, R., Tománková, J. (2011). Management udržitelného rozvoje území 3. Praha: Česká technika – nakladatelství ČVUT.
- [4] Vanier, D. J., & Danylo, N. H. (1998). Municipal infrastructure investment planning: asset management. In Innovations in Urban Infrastructure Seminar of the APWA International Public Works Congress. (Accessed 14 Jul. 2014).
- [5] Anderson E., Renzio, P., Levy, S. (2006). The Role of Public Investment in Poverty Reduction: Theories, Evidence and Methods. London: Overseas Development Institute. ISBN 0 85003 796 4.
- [6] Centennial Group. (2009). Public investment: Vital for Growth and Renewal, but should it be Countercyclical Instrument? New York and Geneva: United Nations.
- [7] Goodman, A.S., Hastak M. (2006). Infrastructure Planning Handbook: Planning, Engineering, and Economics. McGraw Hill ISBN: 978-0-07147494-8.