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Abstract

The aim of the article is to examine infrastructure classification and assess private financing alternatives for major groups of physical infrastructure under ownership of state owned enterprises in Latvia. Tasks of the research include examining types infrastructure with a focus on physical infrastructure, explaining importance of physical infrastructure to economy of a country and society, studying physical infrastructure financing challenges and problems, conducting a research on a state owned enterprises in Latvia, which own physical infrastructure, conducting expert interviews to reveal key challenges of private financing alternatives for funding of infrastructure of state owned enterprises in Latvia as well as drawing corresponding conclusion.

Methods used are structured expert interviews, analytic hierarchy process, monographic method, document analysis, case study method, and literature review. The empirical research covers ten state-owned enterprises of Latvia, which own physical infrastructure. The major groups of infrastructure covered by the research are transportation, communication and power. Following key private financing alternatives are considered- commercial bank loans, bond issues as well as public-private partnerships. Seven experts were interviewed to reveal key infrastructure financing challenges faced by state owned enterprises. Out of seven experts, one expert represents the power industry, two experts operate in the area of communications and four are financing experts covering all infrastructure areas. At the final stage of the research, preferred alternatives for major groups of physical infrastructure under ownership of state owned enterprises in Latvia derived from expert assessments are presented and corresponding conclusions drawn.

Only one company out of ten subject to research is financed not only by bank loans, but also issued bonds to attract funding. None of infrastructure objects belonging to these companies is financed via public-private partnership.

The outcome of the article is an expert interview based hierarchy of suitable financing alternatives for studied types of infrastructure under ownership of state owned enterprises of Latvia.

KEYWORDS: infrastructure financing, state owned enterprises, corporate governance, public-private partnership, Latvia



Introduction

Modern society demands adequate quality of life, which inevitably translates into high requirements for infrastructure. Even though infrastructure can be very broadly defined, typically most demanded are electricity, communications and transportation, which represent physical infrastructure. In terms of social infrastructure, potable water as well sanitation prevail while health along with education facilities conclude the list. Additionally, conventional economic theories suggest that infrastructure facilitates economic, social, agricultural and regional development as well as contributes to income redistribution and poverty reduction.

Some researchers noted that investment is critically important to infrastructure development (Agrawal, *et al.*, 2011; Grimsey and Lewis, 2004). Infrastructure projects are in a need of substantial financing for its key stages, which include planning, designing, constructing, operating as well as further maintenance. Infrastructure funding deficit is a common challenge for academic and business discussions (Erol and Ozuturk, 2011; Majumder, 2010). Till late nineties of the last century, public sector was the main contributor to develop nearly all infrastructure sectors. Because of shortage of public funding, infrastructure has been in a dire condition in many developing countries.

In general, infrastructure investment can be considered to be pro-cyclical rather than evenly spread around economic cycles (Välilä, *et al.* 2005). It means that when gross domestic product is at higher levels, so go public infrastructure investments. Nonetheless, one can find instances when government investments were made in a counter-cyclical manner. During severe economic conditions, as already witnessed at the time of the great depression in thirties of the last century, the public sector heavily increased its spending on various infrastructure objects (Margairaz 2009; European Investment Bank Papers, 2010).

Cyclicality of total investments measured as a share of gross domestic product in the recent decade can be largely explained by private finance fluctuations, which were caused by business cycles. On the contrary, public infrastructure investments also measured as a share of gross domestic product was found to be rather stable within the European Union at an aggregate level and even increased to some extent in 2008 and 2009 (European Investment Bank Papers, 2010).

Private sector players in late nineties of the last century started to enter the infrastructure marketplace with considerable funding opportunities and strong operating skills that helped minimise risks related to infrastructure projects (Agrawal, *et al.*, 2011; Grimsey and Lewis, 2004). Private infrastructure investments evolve from various sources. One of those, public-private partnerships, is gaining popularity in the world (Majumder, 2010). Quite similar findings are presented by European Investment Bank (European Investment Bank Papers, 2010), stating institutional and private investors have become very active investments into public infrastructure in recent years.

Recently, many infrastructure linked financing products have been established by the financial industry in response to demand for the new asset class, which would offer a number of different investment characteristics. Nonetheless, many private investors are still reluctant to make investments in infrastructure because of high risk, low returns and extra-long payback periods.

Investors reconsider the whole spectrum of available debt investments since many still prefer stable yields provided by infrastructure investments compared to high growth of capital. According to credit agencies, infrastructure projects typically expose investors to very low default rates (Chambers 2007). Taking a long-term perspective, the appropriate risk-return profile of infrastructure as an asset class is not yet clear. Till now, history offers very limited guidance while a relevant finance theory was not designed yet (European Investment Bank Papers, 2010).

Infrastructure

Grimsey and Lewis (Grimsey and Lewis, 2004) believe that identifying infrastructure is easier than describing it. So far the term infrastructure included different things in it. “*The definition that makes the most sense from an economics standpoint consists of large capital intensive natural monopolies such as highways, other transport facilities, water and sewer lines, and communications*” (Gramlich, 1994). However, it has to be noted that the definition cover called economic infrastructure. In particular, these are physical structure objects, which are used to produce goods and provide services demanded by many industries (Chan, *et. al.*, 2009).

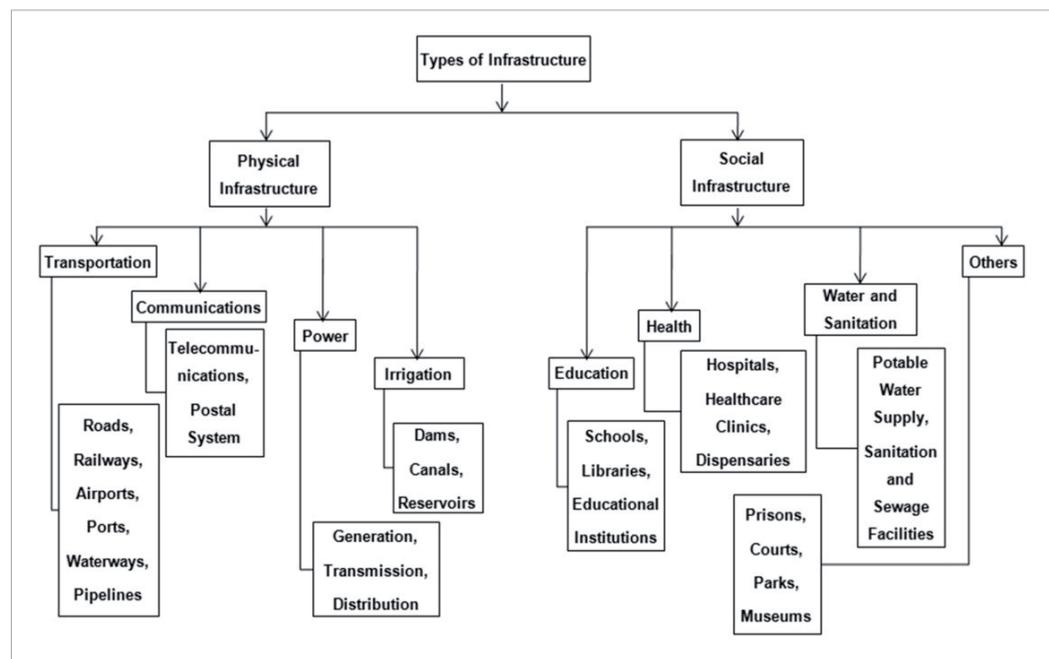
A broader definition of infrastructure should also include so-called social infrastructure. Typically, such infrastructure is needed in education, health and other sectors of economy, which are serving society at broad. Important to mention that social infrastructure is involved in provision of services which, in contrast to output by physical infrastructure, are used indirectly by many industries. However, investments in both economic and social infrastructure are considered to be suboptimal in case of no public funding available. Therefore, infrastructure is typically classified into two main groups provided key differences in its use:

- _ physical or sometimes also referred to as economic infrastructure
- _ social infrastructure.

A detailed chart of various types of infrastructure with a further breakdown is provided in the Figure 1.

Figure 1

Types of infrastructure
(Kumari, Sharma, 2017)



Physical or so called economic infrastructure is responsible for subsectors, which are directly linked to production and economic activities (Ghoshand, 1998; Majumder, 2010; Singh, *et. al.*, 2007). Social infrastructure covers subsectors, which are responsible for facilitating development and quality of life of the society (Ghoshand, 1998; Grimsey and Lewis, 2002; Majumder, 2009). The physical infrastructure directly assists production functions and contributes to economic development.

Summing up, broad infrastructure includes roads and bridges, tunnels and railways, harbours and airports, tramways and subways, irrigation networks and dams as well as canals, water

pipelines and water purification, potable water supply as such, powerlines and power plants as well power distribution grids, oil and gas pipelines, sanitation and sewage facilities, health and housing services, communications (including telecommunications) networks (Prud'homme, 2005; Sinha, *et. al.*, 2012).

Economic or physical infrastructure is estimated to account for about 75% of total infrastructure investment in the European Union leaving around 25% for social infrastructure. The research (Alegre, *et. al.*, 2008) showed that transport can be responsible for the biggest infrastructure investments. In Europe Transport related infrastructure was found to have a share of more than 50% of total infrastructure investments while utilities came at the second place (European Investment Bank Papers, 2010).

Debates on whether financing should be bank-based or market-based took place for a long period of time. Langfield and Pagano (2016) concluded that since early nineties of the last century, the banking system of Europe expanded rapidly while its capital market experienced only moderate changes. Thus the financial structure became mostly bank-based. Another wave of academic interest of the financing topic is observed in mid-2010. Reflections from the financial crisis as well as Capital Market Union initiatives driven by the European Commission facilitated academic discussions.

Generally, it is considered that a financial system of the country brings together lenders, borrowers, financial markets and financial intermediaries with the aim to channel financial resources from the financial market participants with the excess to other financial market participants, who have shortage. Mishkin (2009) defined two flows of financial resources between borrowers and lenders:

- _ through financial markets or direct finance
- _ through financial intermediaries or indirect finance.

The practice of dividing market and bank financing is typically used to characterise entire economy. In case of the bank-based financial system, the role of banks is central in redistributing financial resources. On the opposite side, in the market-based financial system, securities markets compete with banks in attracting private savings to companies (Demirguc-Kunt and Levine, 1999).

Governments around the globe used to be only investors in public infrastructure for centuries. Responsibilities for construction, implementation, operation, maintenance and further repair of infrastructure were with governments (Guptaand, Sravat, 1998; Singh, *et. al.*, 2007). However, because of several reasons, public funding started to be replaced with private financing increasingly more often. Private investment can be seen as transferring responsibilities for infrastructure development from the public sector to the private sector (Grimseyand, Lewis, 2004). In 1991 infrastructure in many countries was depleted. Private financing could take over the responsibility of the infrastructure sector from the pure public funding. Therefore, private financing played an increasingly more important role to meet increasing demand for infrastructure funding.

Private financing can take various forms such, for example, bond and equity issues, bank loans, deliveries of alternative services, public-private partnerships and finally foreign direct investment should not be forgotten as well. Foreign direct investment conventionally means funds, which were made available by foreign entities, however within a strict supervision framework of such investments (Rathand, Samal, 2015). Because domestic investments were insufficient, majority of developing countries experienced infrastructure facilities not being up to date. Public-private partnerships have gained a lot of attention in academic literature (Agrawal, *et. al.*,

Private financing and infrastructure

2011; Grimsey and Lewis, 2004). Public-private partnerships are considered to have following key characteristics:

- _ Private financing is supposed for construction, operation, maintenance and overall development of infrastructure sectors.
- _ A long standing contractual arrangement is in place between public and private sectors for development of infrastructure sectors.
- _ Public-private partnership provides infrastructure related services to population on behalf of the public sector.

Public-private partnerships are becoming popular because they ensure adequate funding as well as enable design, planning, scheduling, construction, maintenance and completion of infrastructure projects within defined periods of time (Devan, 2005; Eid, 2008; Elhance, *et. al.*, 2013; Ke, 2010 ; Li, *et. al.*, 2005; Reeves, 2013; Sharma, 2012; Steijn, *et. al.*, 2011; Wojewnik-Filipkowska, Trojanowski; 2013).

Public-private partnerships also were criticised for relatively higher financing costs per unit compared to government debt, which received a label of the so-called public-private partnership premium. The figures presented for difference in costs vary a lot. In particular, cost of capital attracted under public-private partnership projects can be two to three hundred basis points higher compared to cost of public funding (Yescombe, 2007, p. 18). Nonetheless, public-private partnerships are considered to be the most promising vehicle for infrastructure finance in future.

State owned enterprises of Latvia with physical infrastructure

Quite substantial part of infrastructure objects in Latvia is owned by enterprises, which are still under direct state control. Out of ten biggest state owned enterprises with physical infrastructure, only two telecom operators (i.e. Latttelecom, Latvijas Mobilais Telefons) went through a process of partial privatisation. However, the Latvian state still keeps control in these companies. Power sector state owned enterprises cannot be privatised (except Rīgas Siltums, which provides heating services for natural persons and companies in the city of Riga) because of law amendments, which were adopted in 2000. The list of state-owned enterprises with physical infrastructure covered by the research is provided in the Table 1.

Table 1

State Owned Enterprises with Physical Infrastructure included in the research

Enterprise name	Balance value, euro	Fixed assets, euro	Type of infrastructure
Latvenergo, JSC	3 517 372 000	190 461 000	Power
Sadales tīkls, JSC	1 310 085 000	101 885 000	Power
Latvijas dzelzceļš, JSC	1 014 784 000	241 632 000	Transportation
Latttelecom, LLC	319 050 150	29 557 564	Communication
Latvijas Mobilais Telefons, LLC	251 115 715	43 021 517	Communication
Starptautiskā lidosta Rīga, JSC	186 027 759	27 020 460	Transportation
Rīgas siltums, JSC	164 022 813	15 464 845	Power
Augstsprieguma tīkls, JSC	107 187 707	1 489 533	Power
Latvijas valsts radio un televīzijas centrs, JSC	104 402 677	7 543 231	Communication
Latvijas Pasts, JSC	91 701 752	1 178 955	Communication

Source: www.valstskapitals.lv

Companies with physical infrastructure and balance value of at least 100 million euro were included in the research. Latvijas Pasts, which is a national postal service operator, does not reach a balance value of 100 million euro, however was still included in the research because it is a systemically important infrastructure operator. All companies covered by the research use bank financing via loans and leasing arrangements while only one company, Latvenergo also attracted financing via several bond issues. None of the companies included in the research is engaged in public-private partnership projects.

Experts were chosen taking into account their knowledge and competence in infrastructure financing matters in the sectors covered by the research. Out of seven experts in total, four experts represent various institutions playing a role in the infrastructure funding value chain- a stock exchange, a bank (loan issuer), a bank (debt underwriter) as well as a major advisory and consulting company. These experts are considered to possess wide knowledge on all sectors of the research since companies being studied operate in the same country. Three more experts represent specific industries covered by the research- power, communications and transport. Thus, in total a selection of seven experts can be considered to be balanced between industry professionals and financing professionals with no anchoring to a specific industry. A list of experts as well as organisations they represent and positions they take is provided in the Table 2 below.

Expert	Organisation	Position
Mr Indars Aščuks	Nasdaq OMX Baltic	Chief Executive Officer
Mr Guntars Baļčūns	Latvenergo JSC	Chief Financial Officer
Mr Jānis Bokta	State Radio and Television Centre of Latvia JSC	Chief Executive Officer
Mr Jānis Dubrovskis	Blue Orange Bank JSC	Corporate Finance Director
Mr Elmārs Prikšāns	OP Bank Latvia Branch	General Manager
Mr Andris Nātriņš	Latvijas Pasts JSC	Member of the Supervisory Council
Mr Nauris Kļava	Ernst & Young Baltic LLC	Partner, Advisory

Source: prepared by authors

In order to assess funding alternatives, authors conducted expert interviews, which had a structured part, for which the analytic hierarchy process (AHP) was used as well as an open-ended part, which added to the qualitative findings of the research. AHP is considered to be a recognized tool for structured decision making. Decision making, for which we gather most of our information, became a mathematical science today (Figuera, *et. al.*, 2005). The evolving problem is that decision making may involve booth many criteria as well as sub-criteria to be used to rank decision alternatives (Saaty, 2008). Conventionally, data subject to research are gathered from decision making experts corresponding to a hierarchic structure. Further, a pairwise comparison of alternatives on a qualitative scale is conducted as described below. (see Table 3). In the course of the analytic hierarchy process, experts can rate the comparison as equal, marginally strong, strong, very strong, and extremely strong by using a nine point Likert scale where "1" means that alternatives are equal while "9" stands for absolute superiority of one alternative over another. A set of pairwise comparison matrices was constructed in accordance with the overall hierarchy of the process. The hierarchy of the alternatives for preferred private funding sources of infrastructure of state owned companies is presented in the Figure 2.

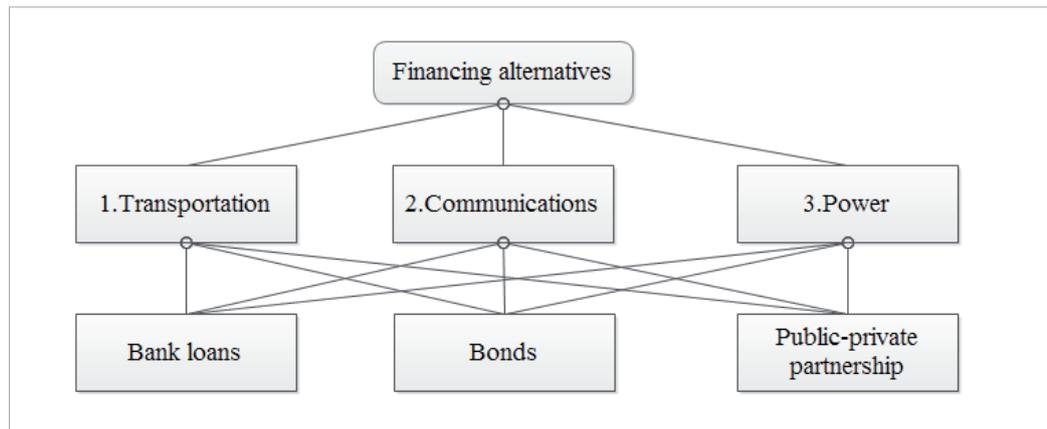
Expert Assessment of Preferred Financing Alternatives

Table 2

Selected experts with knowledge on infrastructure financing alternatives

Figure 2

The hierarchy of alternatives for financing of infrastructure of state owned enterprises companies according to AHP (prepared by authors)



Within the unstructured part of interviews, experts mentioned following reasons for commercial bank loans being the most popular financing alternative while bond issues and public-private partnerships staying largely unexploited:

- _ In Europe, bank-based financing is more popular in general
- _ Highly competitive corporate banking marketplace in Latvia, high degree of flexibility and availability of funding for state owned enterprises in particular
- _ Corporate governance and internal procedures very often need to be improved to meet higher transparency requirements for listed companies
- _ Credit rating is needed to go for bond issues
- _ Resistance to change a regular routine in general
- _ Public-private partnership projects expose top management to political risks.

The structured expert assessment results according to the AHP process findings were processed by the authors while its summary is presented in the Table 3.

Table 3

Expert assessment results for infrastructure financing alternatives

Alternative/Criterion	C1. Transportation	C2. Communication	C3. Power
A1. Commercial bank loans	0.24	0.63	0.28
A2. Bond issues	0.33	0.25	0.62
A3. Public-private partnership	0.43	0.12	0.10
Total	1.00	1.00	1.00

Source: www.valstskapitals.lv

Theoretical preferences of experts clearly tend to exhibit overall anchoring towards certain type of a financing alternative for each sector. For example, banks loans were chosen as experts at the preference number one (i.e. overall score 0.63) for communication (telecoms and postal systems) while bond issues (scored at 0.25) and public-private partnerships (score of 0.12) were considerably left behind in expert assessments. The underlying logic for such a distribution of preferences was that life span of equipment in the communication sector is relatively short and specific know-how as well as competence is normally included in purchase conditions. Some projects can be also financed by using industrial leasing offered by subsidiaries of banks.

Bond issues gained the highest assessment in the power industry related projects (scored at 0.62). One of the arguments was a longer maturity of funding (i.e. advantage compared to bank

loans) as well as no critical need for public-private partnerships since joint ventures are much more common in the given industry.

Finally, public-private partnerships received decent recognition by experts (score of 0.43) for financing transportation related infrastructure projects. The key driver for such an assessment was a need to get an access not only to project funding, but also to know-how and competence in relation to running and maintenance such projects. The problem can be especially relevant for small countries like Latvia is since there is lack of knowledge and experience in implementation of transportation related projects in some areas (i.e. railroads, roads and potential improvements in running airport facilities).

As a final remark it has to be noted that a dispersion of financing alternative assessments for the communication and power sectors is very similar and much bigger than that for the transportation sector. According to expert assessments, the transportation sector might need a very well-balanced approach of funding, which also includes a big part of know-how and competence possible to be accessed via public-private partnerships with financially and technologically strong partners.

- Latvian state owned enterprises with physical infrastructure have been primarily relying on loans from commercial banks. Bond issues as well as public-private partnership projects as alternative private financing sources largely remain unexploited.
- Overall expert assessments showed that commercial bank loans can be prevailing over other private financing means because of a general anchoring towards bank based finance in Europe, highly competitive banking landscape in Latvia, less requirements for corporate transparency and smaller top management exposure to political risks (especially compared to public private partnerships).
- Expert assessments made in accordance with the analytic hierarchy process revealed the most preferred private financing alternative for each sector of infrastructure companies covered by the research, making commercial bank loans as a justified choice only for communications.
- Power infrastructure companies were assessed to be in the highest need of market based financing via bond issues due to long project payback periods, which can match maturity of debt securities.
- Infrastructure companies operating in the transportation industry were given the closest distribution of alternatives with public-private partnerships topping the list. The angle of operational and maintenance know-how as well as competence of a partner was mentioned by experts to be nearly as important as a financial component of participation in a project.

Conclusions

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