
**VALUE BASED MANAGEMENT ANALYSIS FRAMEWORK TOWARDS
TRANSPORT ENTERPRISES RESILIENCE**

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Abstract

Corporate strategies and decisions are tested against potential value creation. Based on Value-Base Management (VBM) methodology an evaluation framework is created to maximize the value of an enterprise. VBM uses valuation techniques for performance management, business control and decision making. In this paper the aim is to fill this gap by introducing a framework to assess differences in the extent of VBM implementation for transport enterprises. This paper argues that the VBM approach can achieve the objectives of a transport enterprise management keeping the right balance between different stakeholders. Therefore, the paper investigates the relationship between transport policy, planning and operation with the implications between objectives functionally split into four directions-strategy, planning, competitiveness and innovation. The extent of VBM implementation using a VBM framework comprising several distinctive elements and dimensions in transport sector enterprises is highlighted. The main goal is to determine how VBM and its component dimensions are related with the value for transport sector in EU.

Keywords: Value Based Management, transport enterprises management, performance management, enterprise value

Introduction

The external environment of a transport enterprise encapsulates many different influences – the difficulty is making sense of the diversity (Fredrick, 2000). The most general layer of the ecosystem environment is often referred as the corporate of the enterprise acting in a sector, that consists of broad factors that impact to a greater or lesser extent on infrastructures. The starting point is to develop an analysis framework that identify how short term trends in the economic, social, technological, environmental aspects might affect the transport enterprise.

Governments and authorities are responsible for the strategic planning in order to develop projects with accurate forecasts and assumptions (Demetrio et al., 2006). Government and authorities aim at planning and management of future interface risks, caused by early-stage decisions regarding project structures and design (Demetrio and Sartzetaki, 2017a). The available tools and key methodologies analyse and plan the strategic position of a transport enterprise and response strategic questions of the external factors affected are SWOT analysis, Competitive analysis, Value Based Management (VBM).

Transport enterprises strategy development is also about what decision makers and stakeholders expect what to achieve and therefore influence other can have over the enterprise's challenges. Transport enterprises development is a decision making process that involves multiple stakeholders, such as Government and governmental authorities, investors, and operators. The highest level goal of the decision making process is the delivery of cost effective, reliable, sustainable, efficient, convenient and safe rail connection and other services to the state's population (Dimitriou and Sartzetaki, 2016).

Transport enterprises management key dimensions analysis

The identification of possible development directions builds on the understanding of a transport enterprise strategic position. Development directions are the strategic options that transport enterprise face considering the strategic capabilities of the infrastructure and the expectations of stakeholders. Transport policy, planning and operation exist with a hierarchy of objectives functionally split into four directions-strategy, planning, competitiveness and innovation(Figure 1).

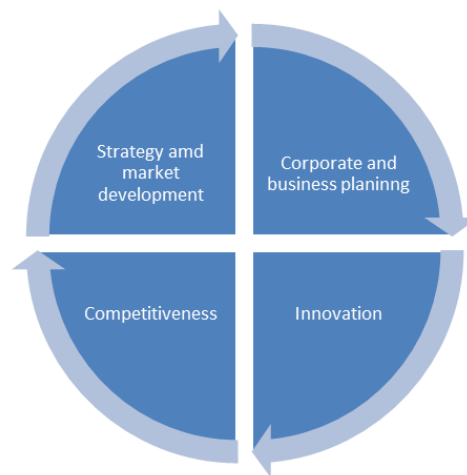


Figure 1. Key dimensions of transport enterprises management actions towards resilience and sustainable development

One of the most important issues of the decision making process in order to invest in new infrastructures in transports by funding agencies is which projects they should spend their limited resources on (Dimitriou and Sartzetaki, 2016). These decisions can be supported by Decision Support Systems and applications which are based on techniques of decision making analysis and resources optimization techniques based on evaluation criteria and indicators lead to decisions towards efficient use of resources and effective pricing (Giffa et al., 2008).

Assessing concrete steps across a transport enterprise decision making process can be a way of making it more resilient and ultimately more profitable for all the stakeholders and agents across the value chain(Dimitriou and Sartzetaki, 2017b).

Each dimension is based on principles that affect the strategic planning process as well as the management of the transport infrastructure project. Strategy and market development is based on regulation and protection, funding and capital leverage and socioeconomic impact. Business Planning is forced by business viability, business development and external variables consideration. The Competitions dimension is forced by the regulatory framework, the Exposure to competition in the product market and the improvement in management performance and finally the Innovation is driven by the Artificial Intelligence, new products and services and Intelligent Transport Systems development.

Transport enterprise strategy and market development dimension

Many times, organizations are selective in their market coverage and this may lead to a situation where there are no further opportunities within the current market segments. In this situation a transport enterprise may develop by market development. An effective new business planning variable is based on the following principles:

- Identify deficiencies including carriers pricing, capacity and reliability;
- Identify major stakeholders and available sources;
- Select strategy and techniques;
- Present a compelling case to carriers;
- Evaluate

For example, one of the most common objectives for transport infrastructures market development are to attract more carriers. Due to the precious nature of transport, especially in smaller communities, it is imperative for airports to proactively engage carriers to maintain existing service or attract new service, routes and destinations (Dimitriou et al., 2018). Strategy and market development are based on regulation and protection, funding and capital leverage and socioeconomic impact (Dimitriou et al., 2017).

Regulation and protection

Transport infrastructures and business are subject to a range of regulatory and market forces, which affect the way in which they forecast and plan their future. Even in markets where there is freedom of entry and exit and where operators are free to set prices and levels of service, regulatory agencies acting in the interest of passengers are trying to ensure that the principles of competitive efficiency and fairness are being complied with. The mixture of market and regulatory forces exist in all sectors of transport operations and impact to many different aspects (Henser et al., 2004).

The discussion of privatization, interpreted as the sale of assets to the private sector, opens a debate on the gain from exposing business to competition through encouraging competition in the delivery of services by competitive tendering or outright economic deregulation, raising the question of whether there is more to gain in introducing competition in various ways rather than changing the ownership of the transport business from public to private control. Since early

1990s a dramatic increase in the liberalization of transport sector and a strengthening of the role of private operators and investors in transport infrastructure worldwide. Decision makers and governmental authorities focus on sustained improvement in efficiency and to find additional financing. Indeed, in addition to the important responsibilities of defining policies and strategies, monitoring safety, and financing some of the less attractive segments of the sectors, governments must also now be ready to become fair economic regulators of many of the privately operated transport services and infrastructures(Dimitriou, 2018a).

Shifts in user demands, made choice, technological development and market forces have increased the need for governments to optimize the transportation system for both public and private sector use. Government regulations generally aim to improve welfare of the public terms of health, safety and efficient use of public funds. Regulation and deregulation have significant impacts on competition (Kockelman, 2006).

The extent of social regulation has grown over the years as the general public has become increasingly alarmed by any number of issues related to the pollution of the environment, employee's safety etc. The many regulations in the transportation sector address a wide range of issues such as the environment, safety and employees' wages.

For transport infrastructure industries without natural monopoly characteristic, the regulator must ensure that competition is promoted, and that fair play ensues. Rail operations, airlines, shipping, trucking and public transport are some very competitive industries. The regulator is charged with the task of creating opportunities to enter the market based on managed competitive policy (Dimitriou, 2018c).

Funding -capital leverage

Transport agencies face budget constraints, so awareness of funding priorities based on the physical condition of transport systems is of high importance. The decision to expand and construct new systems demand on the conditions of existing systems and competing modes. Especially large transport infrastructure requires significant capital investment as well as ongoing funding for operations and maintenance (Mishr, 2015).

There are many different approaches in the way the transport infrastructure network projects on one hand and the terminal projects on the other are financed and then funded (Dimitriou and Sartzetaki, 2017b). For the case of freight rail projects for example as Cascetta et al. (2015) describe, in the United States generate enough operating revenues to cover their capital, operating, and maintenance costs and they are operated as profitable private businesses. On the other hand, passenger rail projects and services, do not have enough operating revenues to cover their operating and maintenance costs, let alone capital.

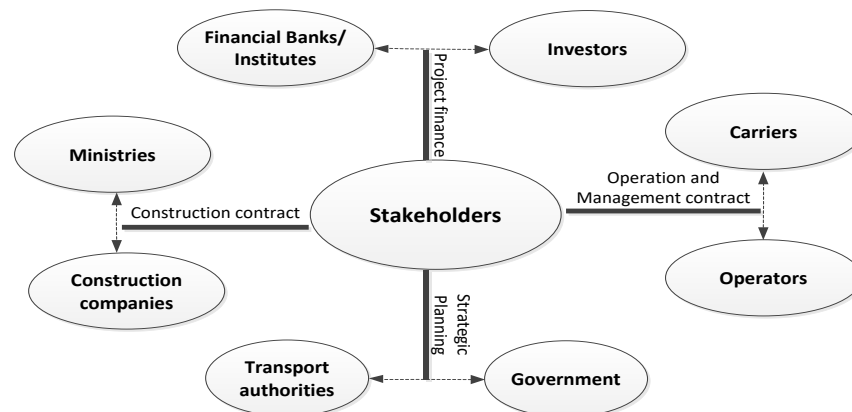


Figure2. Depiction of the stakeholders involved in the corporate performance evaluation (Dimitriou and Sartzetaki, 2017c).

From a financial point of view, these projects have a “funding gap” and require other sources of funding in order to be sustainable. Many of these projects can generate very large non-market public benefits, such as improved connectivity, mobility and accessibility, regional economic development, reduced congestion and reduced environmental impacts (Dimitriou et al., 2017).

Although these public benefits can create a strong incentive for investments in such projects, they do not on their own generate funding sources to pay for such projects. On the case that governments take financial risks in public-procurement structures, they should structure their investment and manage their risks as private investors do. This could clarify their knowledge and application of available alternative risk-allocation models but could also result in a changed approach to how public funds are “allocated” within the government (Dimitriou and Sartzetaki, 2017c).

Transport enterprise corporate and business planningdimension

Transport infrastructure business planning refers to the systematic process used to establish efficient development of transport infrastructure planning that is consistent with national goals, forced by business viability, business development and external variables consideration.

The core principal of transport infrastructure business development is to determine goals. Goals generally encompasses the big picture of new business such as new routes, attracting new carriers, increasing capacity. Although a transport infrastructure may develop a long list of business development goals, it is very important to separate the various goals into distinct categories and develop a business plan with aspects focused on these categories. The most common new business development goals across transport include market expansion and quality improvement. A market focus goal may refer to either a customer or specializing in a service.

For airports especially the focus may be on attracting new routes and new destinations (Dimitriou, 2018). A quality goal can revolve around quality products or services and such as

passenger and customer service. Goal and objectives for new business should be quantified. For example, rather than simply desiring to attract new carrier it is more efficient to express this in terms of numbers of seats in a certain date. A benefit of developing specific objectives is that transport infrastructures can measure the level of success of marketing efforts by determine what degree the various objectives have been achieved.

Business Viability

Several key issues make up the business viability, thus between the strategic and operational levels. The most important are incentives, quality partnerships, preserving network interdependence and integrity, and extending contract or regulatory conditions to accommodate social and economic objectives.

Incentives are an essential counterpart in achieving the tactical link between policy and decision makers strategic planning and transport operations. This relates to a number of key issues at the tactical level, including achieving network coherence, addressing specified social and economic goals and innovation in performance and systems. Incentives can include tax credits and supportive infrastructure with commercial benefits (Dimitriou, 2018a).

Transport enterprise Competitiveness dimension

Competitiveness analysis dimension is forced by the regulatory framework, the Exposure to competition in the product market and the improvement in management performance. Competition is referred to all forms of policy that affect the transport enterprise of competition and the economy, domestically and internationally. It can include elements of law associated with tax, trade, intellectual property and foreign direct investment and associated policies.

Regulatory framework

Transport Infrastructures nowadays new trend in the global transport industry is that except than passengers services have to attract new services and maintain high service levels and low operating costs to enable them to face competition from other transport infrastructures and transport modes, as well as to maximize the generation of revenues, increase accountability and transparency to investors and develop vertical relations with carriers.

In order to encourage efficiency and avoid abuse of market power, a natural monopolist should be subject to economic regulation. According to Czerny (2006), transport infrastructures enjoy both economies of scale and market power hence economic regulation is a relevant and necessary instrument. After the deregulation of the transport and especially air transport industry, the traditional role of a transport infrastructure appears to be shifting. Competition for transport infrastructures services includes a variety of markets: (1) the catchment area, (2) accessibility and connectivity, (3) cargo traffic, (4) market competition, and (6) transport modes competition.

Different types of transport infrastructure management are driven to some extent by the ownership structure and the regulatory regime. Where transport infrastructure is run from

entirely within the public sector, the management type may put the emphasis on conformity to regulation. The introduction of commercialisation or corporatisation is often motivated by the desire to improve the transport infrastructure commercial performance. Consequently, management at commercialised transport infrastructures tends to focus on enhanced revenue generation and reduction of operating costs. The public transport infrastructure operators tend to be responsible for the management of the transport infrastructure, with the private sector investors focusing on providing finance and achieving good returns.

In some cases, private sector involvement is largely limited to managing the transport infrastructure operation, either as a management contract or with a concession requiring relatively little capital investment. However, in many cases, concessions have been established where an important condition for bidders for the concession is to commit to very significant capital expenditure, this being the rationale of the process from the public sector. Regulation of revenues is commonplace where transport infrastructure is privately owned, and often also the case when acting as corporatized entities with a mixture of public and private ownership (Dimitriou, 2018b).

A number of factors influence the transport infrastructure market power (ability to set prices). Especially for infrastructure with high capital insensitivity, such as airports many factors such as incentive regulation policy affects the competition market. As Adler et al. (2015) claims, airports are price capped in several countries belonging to the European Union as the practice of this regulation is changing, and different forms are composed of distinguished elements of incentive regulation. There appear to be three broad forms of incentive regulation that are currently practiced: Price cap regulation, Revenue cap and revenue sharing agreements and Benchmarking and yardstick competition. Another distinguish between airport regulations are pure price caps, hybrid price caps, revenue caps and light handed regulation according to Reinhold et al. (2009).

Market competition

A desirable feature of the strategy to change the ownership profile of a business from public to private is to remove or lower barriers that have previously restricted competition. The private sector has a long history of presence in the competitive market. Consequently, the gains from privatization are not fully extracted, notably in the product market. The essential issue is to extent to which a desirable condition for privatization is economic deregulation. A key issue is the determination of what government should accept for selling its assets. This is increasingly related to the competition ex post.

Despite the attraction of securing greater efficiency gains through exposure to capital and product markets, there is a potential conflict between exposure to the capital markets and increased exposure to product market forces. Even when a business has been dismembered, potential shareholders must have an incentive to invest. The incentive is the government enterprise with a certain rate of return and risk portfolio. The process of establishing an attractive

investment involves establishing that required rate of return by identifying an equivalent risk task (Dimitriou, 2018b).

Monitor/Review performance

Improving management performance and making decisions involve an ongoing understanding of the influences that impact on an infrastructure and the broader sphere of stakeholder's responsibilities (Kutz 2004). There is a tendency in transportation to emphasize the external environment and to treat the infrastructure project a physical entity that can be manipulated with ease through the composition of the variables such as labour, capital and energy (Dimitriou, 2017).

Transport enterprise technological change and Innovation dimension

Innovation process is aimed at ensuring that transport infrastructure project are given the opportunity to be as creative as possible. Issues concerning innovation include developing practices that stimulate new thinking; demonstrating interest in all aspects of business development; investing in skill information in employees; investigating incentives schemes for new ideas (Dimitriou, 2018c).

New products /services and ITS innovation

More investments are needed in market research to analyse and anticipate passenger preferences and reactions to new products and services. These passengers service requirements can be partially addressed by analysing economic, demographic technological, innovation and social trends. Increasingly the demand for products which have not been experienced markets and whose demand is difficult to forecast using information on past behavioural responses.

Passenger expectations for time, place and possession utility, service quality and price quality continue to grow. All enterprises and transport infrastructure projects have been influenced in some ways by immense technological change, principally in the area of information technology systems and telecommunications. This trend means that most businesses are performing quite differently to the way they were some years ago and which many would have thought impossible many more years ago.

In almost each transport infrastructure, public or private, new technology has either lessened the entry barriers, enhanced, cross-national investment, streamlined the supply chain, integrated logistics functions, enhanced or replaced transportation, improved transit and transaction time, led to new service and product innovations and improved service delivery.

Artificial Intelligence

Artificial intelligence methods can be divided into two broad categories: (a) symbolic AI, which focuses on the development of knowledge-based systems (KBS); and (b) computational intelligence, which includes such methods as neural networks (NN), and evolutionary

computing. A very brief introduction to these AI methods is given below, and each method is discussed in more detail in the different sections of this circular.

Stakeholders value orientation in transport enterprises analysis framework

Transport Infrastructures are often independently managed by multiple public agencies and commercial firms and operate more like a collaborative system-of-systems. The lack of a single central agent in a directed system of-systems is a barrier to widespread system-system integration between consequents. In the absence of a central agent, the best integration of component systems, is a significant challenge to decision making process and performance management. Several different parameters and structural features of transport infrastructure projects conceptually represent how those features can enhance performance. The aim of the methodology framework is to analyse the different perspective towards economic development that each stakeholder and decision maker face worldwide by a holistic approach analysis.

The process for considering various forms of investing in transport infrastructure projects involves a multi-step process starting with identification of the different stakeholder's challenges and perspectives comparison of those challenges, identification of ways to mitigate stakeholder risks, review of the transaction's complexity and risk. Decision making theory and strategic planning generally involve setting targets and determine critical issues and key parameters to achieve these targets.

Stakeholders want to ensure the project is developed in a manner that promotes regional economic development and create an operating environment that encourages increased passenger traffic and market development. A key issue also is to take actions to increase traffic levels, drive efficiency and introduce innovation. Continuous changes to traffic growth, regulatory framework and market developments require huge investments into infrastructure to comply with international standards and to stay competitive. In addition, parameters as to attract service and encourage economic development by travel costs and reduced operating expenses, improve passenger service and quality.

Systems of System approach is an approach with complicate interactions between the various independent systems (Shieffield et al., 2012). A system is a combination of the different independent systems to define a function or set of functions (Dimitriou and Sartzetaki,2016). Each system of system has distinguishing traits (Mostafavi et al., 2011). A successful analysis of projects using systems thinking is contingent on correctly identifying these distinguishing traits.

A different experts and different stakeholders have different aspects, strategies and challenges as analytically presented in following figure, there is a need to give a weight to each variable. When a single decision maker chooses the weights of the criteria, the preferences of the community may not be accurate reflected. All members of a group of experts or decision makers would be asked to assign weights to variables. The weights are then circulated among the other group members in order to revise their original weights (Dimitriou and Sartzetaki, 2016).

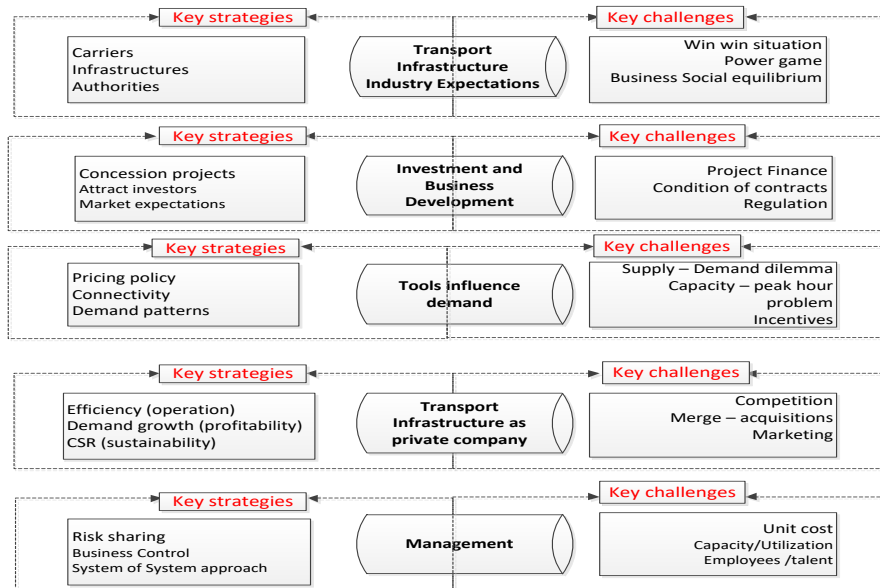


Figure 3. Depiction of different stakeholders aspects (Dimitriou and

Strategic development tends to take the form of systematised, step by procedures to develop or coordinate the transport development strategy.

- The cycles starting point is usually a set of guidelines or assumptions about the external environment and overall priorities, challenges and expectations towards economic development set by the decision makers.
- This is followed by strategic plans drawn by the different stakeholders a decision maker for each challenge and expectation.
- The total perspective results from the aggregation of the business plans. A number of key strategic targets are then likely to be extracted to provide a basis for performance monitoring of the key challenges.

Value Base Management (VBM) framework for transport enterprises

Value Based Management (VBM) analysis is used to set goals, evaluate performance, determine bonuses and communicate with investors and shareholders as well as capital budgeting and valuations. All strategies and decisions are tested against potential value creation. The value-base Management (VBM) is a tool for maximizing the value of a corporation. VBM uses valuation techniques for performance management, business control and decision making. The value of an infrastructure is determined according to the discounted future cash flows (Assen et al., 2009).

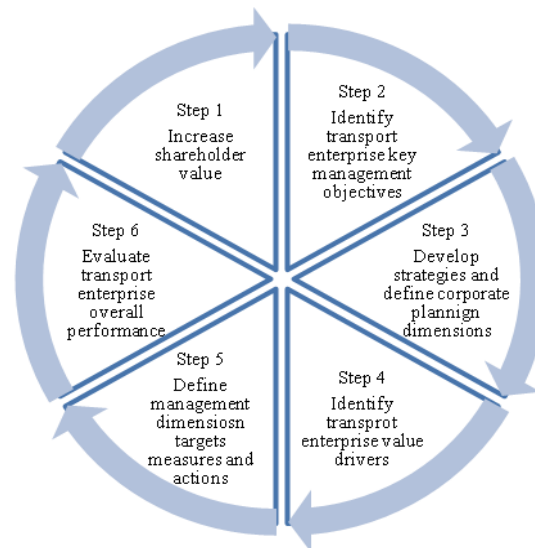


Figure 4. Value Based Management six step analysis for transport

The four pillars that VBM is based are measurement, management, motivation and mindset (Itner et al., 2001). Measuring value is one thing –acting on the results is another. Management and value must therefore become inextricably linked. Budgeting and planning techniques must be adjusted to incorporate the concept and a link must be established between the operating and strategic levels. The VBM framework is analytically depicted in figure 4.

According to Cooper et al. (2008) when VBM is correctly implemented it will help to focus management on value creation and motivate and guide activities toward this end. The highest tenet of return driven strategy is to ethically manage for maximum financial value creation. Cooper et al. (2008) summarise the advantages associated with the adoption of the techniques of VBM:

- Powerful comparative tool - in terms of benchmarking competitive performance.
- Useful for resource allocation - better discrimination between value-creating and value-destroying investment.
- Positive effect on financial performance - achieved through reductions in capital base.
- Powerful strategic tool.
- Regarded as very useful tool to help management focus upon value drivers.
- Helps create more shareholder value by getting more accountability for discrete business units.

How transport enterprises value based management strengthen the value for transport sector in European market

The demand for transport and the structure of global transport operators is changing rapidly. Factors such as competition, changing customer behaviour, new technologies and artificial

intelligence are the key drivers of change in transport operators' value based management. In Europe, some of the most influential trends in the transportation industry will closely relate to these key drivers. The transport sector value in the EU is characterised by divergent national priorities. Fragmentation of the transport market will continue to limit the quality of transport services in Europe and will leave growth.

Different value based management approaches in transport operators lead to different transport sector quality indices. According to World Economic Forum Global Competitiveness (WEFORUM, 2018), and a rating based on a survey by the World Economic Forum, using a scale from 1 (extremely poor, among the worst in the world) to 7 (extremely good, among the best in the world). WEFORUM 2018, highlights the different quality indices in different transport sectors. This can be driven due to different value management in transport operators. As for the transport sector quality indices in Europe average and Greece, the Greek ports and especially the rail infrastructure are rated relatively low, however the quality of roads and air transports are around the EU average.

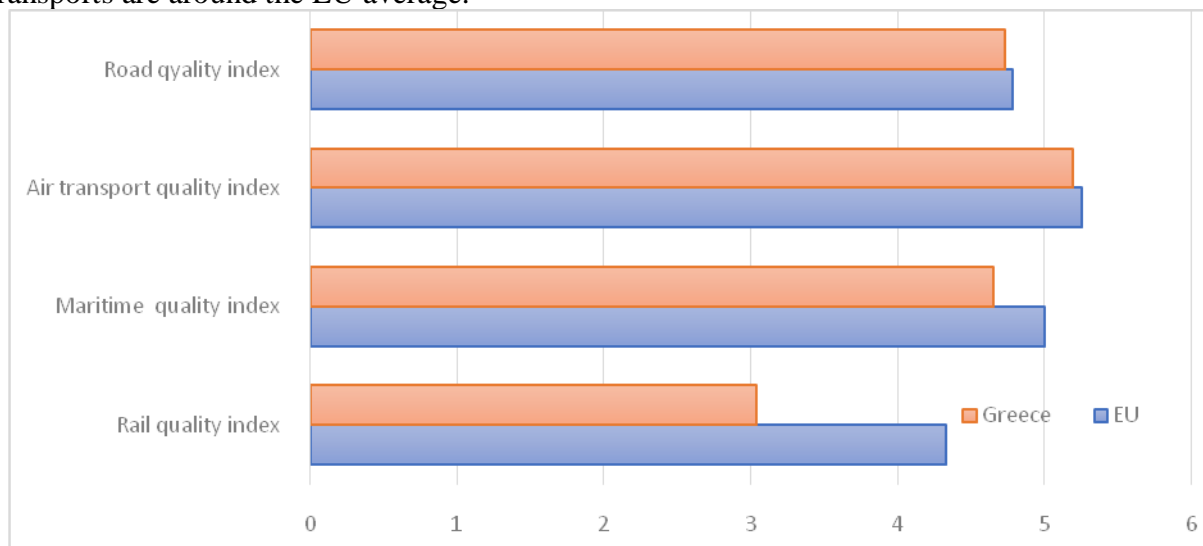


Figure5. Transport services quality indices in European market (WEFORUM, 2018)

In rail sector, digitalization and innovation is a key driver of change in rail operators' value based management. It provides significant opportunities to operators, improve reliability of assets and enhance passenger quality index as well as reducing costs. It is being used to derive real-time information on rail movements and is an enabler of predictive maintenance for fixed assets. The emphasis on smart trains and connected railways at reduced costs demonstrate that the adoption of these digitalisation techniques in value base management will strengthen the value in rail transport sector in EU and Greece.

The road transport sector in the EU is facing a number of challenges. Road safety, rising fuel prices, carbon footprint, smart cars, new technologies and artificial intelligence in public

transport, are some key drivers of change in road operators' value based management. The adoption of these key drivers of change will strengthen the road transport quality index in Europe and Greece.

With air transport demand grows, the range and diversity of new challenges evolve for the value based management analysis are growing. Key of drivers of change such as artificial intelligence, robotics, baggage handling technological improvements, security and safety. Digital transformation is a priority for airports. The challenge is to adopt digital transformation in the airport value based management analysis. All airport operators regardless of size, focus on the need to modernise, attract traffic, improve operational efficiency and enhance the passenger experience. The key component in delivering on each of these is technology and the adoption of innovation and technology to value based management.

Conclusions

Transport operators have to deal with a set of stakeholders which often have different interests. Indeed, transport operators' interests are often different to those of their stakeholders. Costs, revenue and demand growth opportunities are not always aligned. Therefore, transport operators focus on balancing the different interests of passengers, identifying the shared value.

Competition between transport operators and new transport hubs give an opportunity to define more comprehensive value generated. By doing so transport operators can achieve greater value creation for all stakeholders, encourage collaboration and stimulate innovation and artificial intelligence.

As there has been changes in ownership and management of transport operators over the past decade, a move to private and regulatory monitoring of price and service levels has resulted in reorganization and focus on the optimization of the management of value and assets.

The quality indices of different transport operators in Europe give some highlights of how transport operators differ in implementing and applying VBM, and how this reflect to overall quality of each transport sector.

Transport operators should concentrate on the value drivers as passenger experience and revenue generation, by considering the value-add of new technology and artificial intelligence provided by advanced IT systems. The fundamental value of a transport operator, to increase demand is crucial, but as competition increases, not just from competitive transport operators with different ownerships but from other hubs and other forms of transport, every transport operator should focus on encompass the processes for creating and managing value in order to encourage value-creating investments, improve the allocation of resources, maximize value creation and better manage increased complexity and greater uncertainty and risks.

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