Critical drivers of megaprojects success and failure

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Abstract

This paper describes the initial results of analysis of critical factors that can affect megaprojects success or failure. Megaprojects success and failure have been a very popular research topic in the last decade. There is a common understanding that megaprojects are important drivers of society changes. Their impact is an important phenomenon because of the influence on both society itself and its economy. Despite the best practices all around the globe, numerous challenges can move a megaproject from a programmed success to a failure scenario. It creates an interval of uncertainty over the final result of a megaproject and its positive impact as well as over the justification of the enormous amount of resources spent. In spite of many researches done so far, it is still not clear what are the causes of megaproject success and failures. This paper evaluates the topic through the review of researches done so far. The focus of the research is in influence of success and failure factors on the megaprojects to examine whether megaprojects success can be well quantified through success or failure factors. Project management success school of thought is used as a ground for the research approach. The literature review is compiled of the data obtained through a comprehensive search across research center databases, mainly in Europe. In parallel the selected data from practice and known research centers for major projects are compared. The findings from both, literature review and practice, show the selected drivers for improving megaproject success and efficiency. The discussion on results is enclosed, as well as the ground for further research on the topic.

Keywords: megaprojects; project success factors; project failure factors, competence

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1. Introduction

There is a common perception that megaprojects are not only difficult, but often unsuccessful. Whether megaprojects succeed or fail and the ways in which they do so are important for a variety of reasons. A successful megaproject can spur economic growth in LDCs, while a failure can set development back for years.[13] The development of megaproject management as a new profession in project management has increased the attention given to the leadership and professional development megaproject research since 2006. Total global megaproject spending is assessed at US$6 to US$9 trillion annually, or 8% of the total global gross domestic product (GDP), which denotes the biggest investment boom in human history.[2]

Rapid global urbanization has triggered another round of investment boom in megaprojects. The success of these projects is so important to their sponsors that firms and even governments could collapse if they failed. Finally, megaproject are usually long projects; so there is ample time for things that affect project outcomes to change, and there is less likelihood of maintaining continuity in project management. Megaprojects, even when highly successful, are difficult projects.[4] Recent EU Cost Megaprojects research concluded that these are the characteristics of megaprojects: colossal, captivating, costly, controversial and complex.[9] The media’s current interest in the issue of cost overrun is associated with the cost-efficiency issue: cost overruns imply wastage of public resources that could have been otherwise used for productive purposes elsewhere. Another issue is of course that if the initial cost estimation of major projects with large cost overrun had been accurate and realistic, they might not have been implemented and more viable projects could have got priority.[1]

In this paper, success school of thought will be examined in the context of megaprojects. This school of thought in project management looks at the project as a business objective and focuses on the success and failure of the project. This paper is based on 2 stages: literature review and empirical research in the field of megaprojects. Through these steps, main drivers, in this case factors, that affect success and failure on megaprojects, will be analyzed.

2. Megaprojects performance

One of the most widely-accepted definitions is the one given by the US Department of Transportation: a megaproject is a project with at least a USD 1 billion budget [15]. The project cost threshold of USD 1 billion is increasingly advocated worldwide as the key criterion for defining a megaproject.[4] [17] In European Union countries, the International Project Management Association (IPMA) (2011) designated a cost threshold of EUR 1 billion as the basis for defining megaprojects across all industries.[16] The US Federal Highway Administration (FHA) later gave a detailed definition of 79 megaprojects: major infrastructure projects that cost more than 1 billion USD, or projects of a significant cost that attract a high level of public attention or political interest because of 82 substantial direct and indirect impacts on the community, environment, and state budgets“.[15] Megaprojects are extremely large-scale investment projects typically costing more than € 0.5 billion. Megaprojects include power plant (conventional, nuclear or renewable), oil and gas extraction and processing projects and transport projects such as highways and tunnels, bridges, railways, seaports and even cultural events such as the Olympics. Megaprojects are united by their extreme complexity (both in technical and human terms) and by a long record of poor delivery.[9] The performance of megaprojects has long been seen as problematic in terms of overall on-time and too-budget delivery and in terms of the utility of the megaproject once in operation (i.e. the megaproject does produce the intended societal benefits). The proportion of megaproject delivery failure has been put as high as 66%.[13] Some of the key problems encountered in major projects are: cost overruns, tactical budgeting, narrow planning perspective, the wrong choice of concept, adverse effect of uncertainties.[1] In a study by the World Bank [29] of more than 1000 projects, where the quality and extent of the front-end processes were rated against project success, it was concluded that some 80 per cent of the projects that could be characterized by an adequate front-end phase were performing well. Projects that were implemented after an insufficient front-end phase showed a success rate of some 35 per cent.[1] For megaprojects, cost-benefit analyses and environmental and social impact assessments (EIA and SIA) are typically at the core of the documentation and decision making process.[20]

An increase in the size of fixed capital projects has been driven by the desire to exploit economies of scale, the needs of less-developed countries (LCDs) for basic infrastructure development, and the need to exploit increasingly
remote and low-grade energy and other mineral resources. A fixed capital project is any project constructed at a site. This definition excludes anything that is manufactured in one place and then purchased and used elsewhere, such as an airplane. The desire of owners to go through complex and difficult approval processes once for a very large project rather than several times for smaller ones may also have increased the number of megaprojects.[4] With project management making such a significant contribution to the global economy, developing relevant competence at all levels, individual, team, organization and society is seen as a key for better performance.[28] The performance of megaprojects has long been seen as problematic in terms of overall on-time and too-budget delivery and in terms of the utility of the megaproject once in operation (i.e. the megaproject does produce the intended societal benefits). The proportion of megaproject delivery failure has been put as high as 66% and a similar proportion of megaprojects are viewed as failing to meet the objectives for which they were constructed.[3] The risks associated with megaprojects are substantial and cost overruns of over 50% are common.[5] Thus, the ever-increasing demand for infrastructure, primarily in developing countries, yielded huge investments in urban and infrastructure megaprojects, such as in water and sewage, electricity, transportation, and telecommunications. Major developing countries are predicted to invest another USD 22 trillion in infrastructure from 2008 to 2017.[7] Similarly, many megaprojects experience substantial economic and social benefit shortfalls. Differences between estimated and actual outcomes for regional development effects, as well as environmental and social impacts are pronounced.[19] Several authors have encompassed the problem of performance in an approach that seeks to identify success factors.[14]

2.1. Perspectives on success in Megaprojects EU Cost Action

MEGAPROJECT EU Cost Action is based on the fundamental premise that any recommendations on improving megaproject performance must be based on real-life evidence. MEGAPROJECT EU COST Action gained its data for megaproject performance comparisons from two sources: credible publicly available sources (e.g. government reports etc.) and direct interview with stakeholders.[9]

Seville Metro line

The Seville metro line is one of the world’s most advanced subway railway networks, equipped with platform screen doors and a ticketing system based solely on smart-cards. The project scope included the construction of 22 stations, 18 km of railway connecting Ciudad Expo and Olivar de Quintos and 17 trains, provided by CAF, able to reach a speed of 70 km/h and equipped with automatic train operation. The construction initially started in 1974 but after few tunnels construction it was halted due to fears of possible damage to historical buildings and questionable population raise forecasts. The project was reopened in 1999 and the construction formally started in 2003 with the foundation of the Metro de Sevilla Sociedad Concesionaria de la Junta de Andalucía S.A., with an initial budget of about EUR 0.36 billions and a planned completion in 2006. Incurring in construction problems such as ground water and coarse gravel, the project was partially inaugurated on April 2009 reporting an overall cost of about EUR 0.658 billions (81 per cent overbudget). The completion of Puerta Jerez station was delayed until September due to a ground collapse, while the final trait between Condequinto and Oliver de Quintos was opened in November 2009. Lines 2, 3 and 4 have been under construction since 2010 and are planned to be finished by 2017.[12]

Zagreb on the Sava River, Croatia

Project — Zagreb on the Sava River is a multifunctional program of regulation, protection and utilization of river Sava from Slovenian border to the town of Sisak. The experts have been dealing with the regulation of Sava river for some decades now. It all started with a big flood in Zagreb in 1964. Several concepts have been made throughout the years. They were all multifunctional, including power plants, trying to resolve flood protection problems. Probably one of the reasons why neither one of the concepts have even begun with construction is the fact that there hasn’t been a management model which would gather, coordinate and manage all Program stakeholders. In 2012 the new company 4 was established as a subsidiary of HEP Group (Croatian Energy Utility Company) to manage the project. Project manager made a model that puts together stakeholders on one side, and expert council as a verification body on the other side, connecting them through the operational team. Zagreb on the Sava River is a long-term sustainable solution to the problems related to the Sava River and the hinterland area of the Slovenian border to Sisak, and the project benefits are the environmental, social and economic. Potentials and benefits of the project will be realized in water management, transportation, energy and space and will enable long-term sustainable
development of the area. From the WBIF Program the Project management company received a grant funds in the form of Feasibility, Environmental and Social Impact Study. It will evaluate three different solutions/concepts and will select the most acceptable one. Current budget estimation is EUR 1,4 billion, with project time completion of 15 years.[12]

Some findings of the Megaproject EU Cost Action explain that using ‘iron-triangle’ characteristics of project performance is still a very interesting way to investigate projects and where ‘iron-triangle’ characteristics can be used in a quantitative statistical analysis, really interesting results can arise. One can say that the nature of the ‘client(s)-owner(s)’ relationship in megaprojects really matters.

2.2. Perspectives on success in OMEGA

Researchers engaged in this OMEGA seek to identify and highlight, from the evidence gathered, generic and context-specific conclusions regarding how and why MTPs are judged “successful”, why in some instances formally declared judgements of “success” can be misplaced, and the shortcomings of relying to excess on project management criteria of finishing projects on time, within budget, and according to specification.[3] For the purposes of this research, MTPs are defined as land-based transport infrastructure investments within and connecting major urban areas and metropolitan regions in the form of bridges, tunnels, road and rail links, or combinations of these.

They are projects that entail a construction cost of over US$ 1 billion (at 1990 prices), completed since 1990 and are frequently perceived as critical to the ‘success’ of major urban, metropolitan, regional and/or national development.[3] To understand the context of the OMEGA research, 2 MTPs description is mentioned.

The case of the LGV (Lignes a’ Grande Vitesse) Me´diterrane´e high speed railway line

This project experience made it clear to the state that there was a need to take measures to adapt its decision-making process to a society demanding involvement. The opposition to the LGV Me´diterrane´e was so strong that both the state and project promoters came to understand that other (subsequent) large-scale infrastructure projects could as well be exposed to the same types of risks and could face the “success” of the endangered projects if lessons were not learned from the LGV Me´diterrane´e experience. To improve the handling of the social and political risk in subsequent MTPs in France, the state passed a law on 2 February 1995, committing itself to a greater level of environmental protection. This introduced a public debate concerning the building of major infrastructure projects from the outset of the decision-making process.[3]

The Athens Metro Base Project

The authors conclude that establishing a state-owned, special-purpose company to construct, implement, manage and operate the AMB Project was essential. A company of this kind needs to have strong leadership and strong human capital assets. It also needs to be disentangled from individual political agendas in order to make and implement techno-rationalist decisions, especially at the tactical and operational level. Learning from this project, the authors conclude that central government needs to concentrate on its highly strategic functions in infrastructure development and commit to strategic needs without too much interference. The authors also conclude that the planning and appraisal of the AMB Project cannot be regarded as an outcome of a comprehensive and pluralistic decision-making process. The implementation of a heavy, high-cost metro network such as the AMB Project needs, at least reactively, to trigger a city-wide reorganisation of transport in an attempt to move towards both less fragmented urban transport governance and some essential land-use reforms. The findings of the case study reveal that had this taken place, the metro could have had a higher ridership and made a more critical contribution to the sustainable development of Athens. Perhaps most importantly of all, the AMB Project reveals that the whole process of constructing and operating a MTP such as the AMB Project should be seen as a “learning process” for future projects. This will help capitalise on the new “know-how” acquired in the planning and early problem solving, and on taking proactive action to mitigate against project risks, uncertainties and complexities.[3]

The OMEGA findings reveal a great deal about the power of context and how this colours judgements about ‘success.’ Decision-making for MTPs should transparently include a much wider set of complex considerations than those traditionally acknowledged by formal procedures that are ‘Iron Triangle- led’. Acceptance of MTPs as ‘open systems’ with powerful ‘agent of change’ functions necessitates the need for them to be seen as ‘organic’ phenomena requiring time and space to evolve and adapt in response to changing contextual influences that exert themselves over the (often lengthy) project lifecycle.[3]
2.3. Perspectives on success in NETLIPSE

NETLIPSE is a network for the dissemination of knowledge on the management and organisation of large infrastructure projects (LIPs) in Europe.[34] NETLIPSE is the acronym for: NETwork for the dissemination of knowledge on the management and organisation of Large Infrastructure ProjectS in Europe. Research conducted 15 LIPs. To understand the context of the NETLIPSE research, 2 LIPs description is mentioned.

Highway A73-South

The A73-South is a highway, with a length of 42 kilometres in the Province of Limburg in the South-East of The Netherlands. It connects the A73-North that runs from the city of Nijmegen to Venlo, and which opened in 1997, with the A2 in the south at Echt-Susteren. A73-South will relieve the busy provincial roads N271 on the west bank and N273 on the east bank of the river Maas. The intention is to improve road safety, accessibility and ‘liveability’ – the citizens’ quality of life. The decision to locate the A73-South on the east bank was taken after years of discussions by parliament with a majority of only one vote in 1995. The A73-South is part of ‘Via Limburg’. Via Limburg is a co-operation between ‘Rijkswaterstaat’ and the Province of Limburg. Rijkswaterstaat (RWS) is the implementing organisation of the Ministry of Transport, Public Works and Water Management. Together they had planned to construct five new roads in Limburg: A73-South, A74, N280-Oost (N280-East), N293 and N273 Haelen. The A74 would solve a congestion problem in the city of Venlo, because it is the four kilometre long missing link from Highways A67 and A73 to the highway BAB61 in Germany leading to Mönchengladbach. The N280-East would provide a link at a regional level between the middle of Limburg (from Roermond) to the German Ruhr-Rhein area and is 3 kilometres long. The N293 (Oosttangent Roermond) is 1,5 kilometres long and would connect the A73-South with the industrial estates ‘Keulsebaan’ and ‘Heide Roerstreek’. And in addition, the city of Haelen on the left bank of the River Maas (Meuse), would get a diversion of 1,5 kilometres to free its centre from busy traffic and unsafe conditions. It was scheduled to open for traffic in May 2004. All roads have 2x2 lanes. The total budget is 691 million EUR.[34]

Lötschberg Base Tunnel

The Lötschberg Base Tunnel (LBT) is a 34,6 km long railway tunnel that runs from Frutigen in the Kandertal to Raron in the Valais. To the south it links up with the Simplon line. It was officially opened on 15 June 2007. Planning for the Lötschberg Base Tunnel has been in progress since 1988. Today’s route is the result of several years of optimisation, including several preliminary studies, major and detail variants. The early involvement of municipalities, planning regions and cantons ensured an open planning process. The main criteria in the evaluation were technical feasibility, environmental compatibility, construction time and construction and operating costs. The Lötschberg is designed as a tunnel system with two separate one-way single-track tubes. In the first phase, however, only one tunnel tube will be constructed between the north portal of Frutigen and the project service station in Mitholtz. Here, the Kandertal exploration tunnel, runs parallel and performs the function of a rescue and emergency tunnel. To the south of Mitholtz, as far as the southern portal in Raron, two tunnel tubes are envisaged. Initially, the technical railway infrastructure will be installed only between Ferden and Raron. This meant that at the opening in 2007, only one third of the tunnel will have two operational tubes. This phased approach to the Lötschberg AlpTransit project is the result of a decision by the Federal Council on 24 April 1996 to re-dimension NEAT for reasons related to costs. Depending on the costs, a further development phase will be subject to a policy decision by the Federal Council or parliament.[34]

Determining factors have been identified in all 15 case studies, independent of the project status or the national, political, legal or cultural peculiarities. Therefore, the NETLIPSE team has come to the conclusion that these are prevailing factors and that they are of great relevance for any kind of LIP in Europe.

3. Dimensions of the success

According to Turner, the success school looks at the project as a business objective. This school focuses on the success and failure of the project. Project success literature describes two major components of project success: project success factor and project success criteria.[36] In this paper project success factors will be analyzed. Factors
are circumstances which can influence the success (in)directly.[25] Criteria are the measures by which projects can be judged in terms of failure or success.[31] Considerable research has been conducted on the factors that affect the success and failure of projects and project management. Andersen made the first statement in modern project management of what causes project success and failure.[32] No matter what the motivation for the project is, the question of project success is strongly linked to an organization’s effectiveness and to its success in the long run.[3] In project evaluation, five analytical criteria are commonly used to provide a comprehensive yet simple picture of the status of a project. They constitute the key analytical elements in the definitions of the term ‘evaluation’ adopted by OECD and the European Commission. These are efficiency, effectiveness, impact, relevance, and sustainability.[1] Shenhar devised other success dimensions that depend on a larger time scope than execution: project efficiency for users, the impact on a client’s network of infrastructure, the business success and preparing for the future, or the learning possibilities.[27] Goals communication is a factor that can affect project success, whilst the iron triangle’s measurable components are success criteria. The increase in complexity of contracts and projects leads to an increase in criteria number – including maintenance / life cycle performance.[26] Shenhar devised other success dimensions that depend on a larger time scope than execution: project efficiency for users, the impact on a client’s network of infrastructure, the business success and preparing for the future, or the learning possibilities.[27] Still, there is a question what are the key success and failure factors that can affect megaprojects. As far as the authors know, there is no existing paper that compares research done so far on factors that are the main drivers of megaprojects success or failure.

3.1. Success and failure factors in megaprojects

More recently Tabish and Jha conducted a survey with factor analysis and identified from 36 attributes that there are four success factors for public construction projects in India, including awareness of and compliance with rules and regulations; pre-project planning and clarity in scope; effective partnering among project participants; and external monitoring and control.[2] Also, there was another survey presented, related to World Bank project success factors and in particular the relationship between critical success factors and project success. The exploratory factor analysis shows the five factors (monitoring, coordination, design, training, and institutional environment) are correlated to project success.[6] The control and management of projects are of course factors determining project success in an operational perspective, but we argue that a focus on the initial phases is even more important.[1] The NETLIPSE research found that common success factors were: a clear vision and a strong political will; an independent and stable project delivery organisation implemented at an early stage; a charismatic, highly professional project director; a sound financial setup from the start of the project based on a realistic business case; adequate procedures for legal consents with fallback options; a comprehensive and systematic stakeholder management with open communication; a stringent change management process.[38]

Pinto and Kharbanda identify twelve factors that promote project failure: ignore project context and its features, including stakeholders’ behaviour; push a new technology to market too quickly; do not plan possible to possible problems, for example through “what if” analysis; when problems occur, focus on the most visible one ignoring all the other; do not encourage projects based on new ideas because of their uncertainty, with the risk that the inertia could kill innovation; do not conduct feasibility studies ex ante; do not admit that a project is a failure, continuing to push the project even though contextual feature, mismanagement or miscalculation prejudices the project; never conduct post failure reviews, losing the opportunity to learn and understand the main reasons of the failure; allow bureaucracy and internal corporate mechanism to be more important than project success; do not worry about project’s trade offs; let political influence to modify decision making process; chose a not charismatic and skilled project manager.[11] The NETLIPSE research concludes that the following factors turned out to be significant threats to successful delivery: an unrealistic time and cost budget without reserves for contingencies; unstable and delayed decision making processes in the client/ sponsor and the project delivery organisation; frequent changes in key personnel; manipulated and late communication with stakeholders; weak contract management; experiments with new technologies. These determining factors have been identified in all 15 case studies, independent of the project status or the national political, legal or cultural peculiarities. Therefore, the NETLIPSE team has come to the
Flyvbjerg analyses deeply the roots of failure causes, identifying two possible roots: Optimism Bias and Strategic misrepresentation.[10][19] Optimism Bias refers to biased estimations that managers form based on delusional optimism instead of on a rational cost-benefits analysis. In this situation, decision making process is biased because of the underestimation of costs and the overestimation of benefits. The result is that project managers promote initiatives that are difficult to complete without cost overruns and benefit shortfalls.[10][19] This behaviour derives from the “inside view” adopted in project management, meaning a strong tendency toward the consideration of project problems as unique, focusing exclusively on the single situation in the problem solving process. Flyvbjerg identifies strategic misrepresentation when “politicians, planners and project managers deliberately and strategically overestimate benefits and underestimate costs in order to increase the likelihood that their projects gain approval and funding”. According to this definition, project managers voluntarily focus their support on positive scenarios, avoiding explaining the negative ones.[10] Based on the information discussed above, expanded success factors and the failure factors scheme was created. As discussed earlier, each megaproject faces characteristic of singularity, therefore it is challenging to make a list of the general success and failure factors which can apply to each megaproject. Instead, it is crucial to understand macro aspect of the research done so far, and raise awareness of the complexity of megaproject delivery.

Table 1. Comparison of the success factors and failure factors

| Literature | Megaproject EU Cost Action | \( \Omega \) | NETLIPSE |
|---|---|---|---|
| Awareness of and compliance with rules and regulations; pre-project planning and clarity in scope; effective partner in among project participants; and external monitoring and control (Tabish, Jha, 2011) | Engaging external stakeholders; Designing good governance; Learning megaprojects; Stakeholder satisfaction; Front end review; Risk plan | Political leadership; Design changes; The need for the project as measured by the use of it; The capacity of the project to capture value through tolls sufficient to sustain the business that built it; Handling of the social and political risk; Dealing with context and uncertainty; Wakening of the heritage of the city/country through its archaeological findings; The risks and uncertainties from the concerns. | Early approval of finalizing the scope and definition of requirements; Early estimates show interval or with the addition of the optimistic bias; Realistically assessing the certainty of significant changes that increase the scope; Enhancing assessment methods used with a strong control; Accept the changes that can improve the outcomes of the project; Reduce costs and speed up the end; Culture of open communication: formal and informal; Open Culture; Aligning priorities in transnational projects; Innovation Management. |
| Monitoring, coordination, design, training, and institutional environment (Ika, Diallo, Thuiller, 2012) | | Crucial difference between employing a “closed-system” decision-making process in times of uncertainty; Underestimated understanding of these contextual circumstances. | |
| Mission, top management support, schedule/plans Client consultation, Personnel, Technical Task, Client Acceptance, Monitoring & Feedback, Communication, Trouble-shouting (Pinto, Mantel, 1990) | | | |
| The objectives of the project; the uncertainty of technological innovation; privacy; the involvement of the community; the necessity of schedule; the legal problems of the financial side of the contract (Morris, Huges, 1987) Summary of the project; operational concept; support higher management; financial support; logistical needs; support maintenance; market resourcefulness; the manpower and organization; profit; information and communication channels; and revision project (Cleland i King, 1983) | | | |
| Never conduct post failure reviews, losing the opportunity to learn and understand the main reasons of the failure; allow bureaucracy and internal corporate mechanism to be more important than project success, do not worry about project’s trade offs, et political influence to modify decision making process, chose a not charismatic and skilled project manager (Kharbanda, Pinto 1996) | | | |
| Mission, client acceptance (Pinto, Mantel, 1990) Trouble-shouting, personnel, technical tasks; schedule plans; client acceptance (Pinto, Mantel, 1990) | | | |
| Optimism bias; strategic misrepresentation (Flyvbjerg, 2011) | | | |
Shore (2008) highlights that, besides decision making biases that corrupt project management performance, there are many other factors which could influence project outcome, and therefore its long term goals. The Shore’s model illustrates and highlights three influence levels: human factors/behaviours, project management and project; it allows to understand how different variables interact, stressing the hierarchical order that starting from human behaviour leads to project outcome. Pinto and Mantel (1990) split up project life cycle in sub-phases, particularly planning (so called strategic) stage and executive (so called tactical) stage, ignoring post-delivery stages.

In Table 1 authors have summarized core ideas and the key drivers of megaproject success and failure. We have discussed the main issues in megaprojects through this paper, based on the research done so far. The table is split in 2 parts. In the first part authors have summarized the literature focused on success factors. In the table are shown, split by research centres and compared to literature, the main contributions in understanding megaprojects success. In the second part, failure factors are observed.

In Table 2 authors identified main factors that can influence megaproject success and failure. Although the main factors for success and failure are analysed, the strategic perspective of work done so far do not take into consideration competence of the project management of megaproject. Managing megaproject requires people. Understanding behaviour and actions of the people involved in the project could be important link for the success.

Table 2. Success and failure factors on megaprojects

| Success factors | Project Manager aspect |
|-----------------|------------------------|
| Clear Objectives| Risk allocation         |
| Pre-project planning| Front end review       |
| Top management support| Plan                   |
| Stakeholder satisfaction| Benefits              |
| Legal aspect    | Political aspect       |
| Risk aspect     | Information            |
| Political aspect| Communication          |
| Political aspect| Mission                |
| Political aspect| Leadership             |
| Project Manager aspect| Design    |
| Project Manager aspect| Training   |
| Project Manager aspect| Mission      |
| Project Manager aspect| Charismatic PM     |

| Failure factors |
|-----------------|
| Strategy        |
| Result          |
| Mission         |
| Internal corporate mechanism | Underestimated context |
| Ineffective risk allocation | Closed communication |
| Closed-system decision making | Culture |
| Post failure reviews | Information |
| Underestimated context | Innovations |

Experience in South East Europe shows that the situation in small or medium sized countries is not the same as in the large countries. Small and medium sized countries have GDP lower than the developed countries. Therefore, authors conclude that megaprojects should be defined according to the specifics of the small and medium sized European countries. It may be considered that cost for megaprojects in small and medium sized European countries goes from 250 – 300 mil. EURO. One of the important characteristics of these countries is a great need for development (health reform), where megaprojects can have a strong impact on the society. Considering the specific environment in focused region, the authors suggest to add the following specific factors:

- Development of Project Management,
- Competence,
- Experience in megaprojects management,
- Cultural differences,
- Corruption (in some of the countries),
- Political influence and
- Stakeholder management.

Investigation of selected case studies confirmed that corruption, political influence and lack of experience and competence in project management act like failure factors, while appropriate stakeholder management, respect for cultural differences and development of project management contribute to success.
3.2. The suggestion for further research of success and failure factors in the region

The authors suggest that priority for the future research on the project success factors should be competence development and stakeholder management. Those are factors under the highest influence of the profession, so progress is mainly depending on internal decisions.

Fig. 1. Megaprojects governance model

Based on analysis on the main research findings, conceptual framework for megaprojects is suggested. It is important to consider competence in this model. Megaprojects performance is under influence of iron triangle, but, as discussed in the paper, we should go outside of it to understand that performance of megaproject is not related only to projects itself. Megaproject also affects stakeholders and society where is performed.

If project success of the public party is to be measured, the nature of the organisation has to be taken into account.[32] One that has received great attention is the so-called stakeholder satisfaction. But that determinant, in combination with the iron triangle, does not cover all the possible success indicators either: stakeholders is a comprehensive term used to describe all actors that the project managers and clients cannot disregard while developing the project [35] or all individuals or groups that have a special interest in the project or are affected by the outcome.[33] Therefore, a research in which a project outcome would only be considered successful if all stakeholder expectations were met would lead to limited successful projects – or the definition of stakeholders should be greatly altered.[37]

On the other hand, to ensure that the project is managed well here authors address competence of managing projects. As more organisations adopt project management approaches and the demand for project managers grows, there is increasing interest in the competence of project managers and in standards for development and assessment of project management competence. [41] Competence has its origins in the Latin word 'Competentia' which means “authorised to judge” as well as “has the right to speak”. Competent project managers are important to orchestrate project activities.[40] Spencer and Spencer explained that competence as underlying characteristics means “the competency is a fairly deep and enduring part of a person’s personality . . . causes or predicts behavior and performance” and criterion-referenced means “the competency actually predicts who does something well or poorly, as measured on a specific criterion or standard”.[39] The three measures of success (time, budget, quality), are still valid today, although more than 20 years ago, it was shown that these measures alone are not sufficient to determine the project’s success.[30]

Conclusion

Authors conclude that at this moment, competence should have priority in the research activities. As this paper showed, understanding of megaproject performance goes beyond iron triangle, and includes wider participants. This research on success and failure critical factor resulted in RBS of the existing megaprojects analyzed in: OMEGA, Megaprojects EU Cost action and NETLIPSE. After the analysis of literature review and European research centres, a list of success factors and failure factors was identified and presented in Table 1. Through breakdown structure different set of success and failure sources was identified, where the strength of some factors can be clearly monitored. In Table 1 we have illustrated the main research findings from the secondary data of eminent research centres. In Table 2 we gathered main key findings of megaprojects success and failure. To ensure sustainability of project management, it is crucial to recognise success causes and failure causes.

The result of a scientific investigation shows that all research done so far has made great contribution to the megaprojects performance, moving from the main problem to the potential solutions. Analysis of the results has
shown that competence, which is essential to project management, has not been mentioned in a discussion on managing megaprojects, neither regarding its stakeholders. Suggestion to solve this issue should point out that managing megaprojects is related not only to project objectives, benefits and risk, but also to competent project management. Authors would like to remark that main driver of each project are people, and competent project managers are important driver for megaproject success.

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