

A Great Challenge: The Optimization of Engineering Enterprises Management in Brazil

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Abstract

For decades, in North America as well as in several European and Asian countries engineering enterprises, due to their complexity, have been managed according to methodologies focused on the best practices in modern management. Such fact can be observed even in the Engineering curriculums at major universities in these countries, where PMI (*Project Management Institute*)'s project management methodology is taught along with the other technical courses.

In South America, more specifically in Brazil, we may see the widespread use of some management tools with an aim to monitor costs and time issues, but it is a fact that in this business segment the use of project management as the main management tool is not yet a rule, neither in the private nor the public sectors, except in few cases.

There is a clear difference between the management techniques employed in the administration of engineering enterprises and the management model disseminated by the modern managerial methodologies such as PMI's, which involve the integrated management of several areas of knowledge in an enterprise.

However, it is with optimism that we see that this reality is changing and Brazil, although still at an early stage, is rapidly discovering the advantages of the new management model in the field of engineering. Important corporate and sector PMOs are established all over the country and we witness a timidly increasing recognition and the search for important international project management certifications such as the PMP (Project Management Professional) by people involved in civil construction.

We cannot forget that Brazil is now facing one of its biggest challenges and has no time to waste. Important infrastructure enterprises need to be initiated and finished in a short time so that the country is ready for one of its amazing moments: hosting the *2014 World Cup* and the *2016 Olympics*.

Keywords: *Civil Engineering, Project Management, PMO, Public Administration.*

Introduction

Project management has always been important in the field of civil engineering. It was present in, since the dawn of humanity, in all segments of activities and especially in civil construction. The great buildings of ancient Egypt, the Great Wall of China are examples of engineering enterprises which could not be constructed without some kind of efficient project management. Even though it was only last century that techniques to improve project management began to take shape.

Around the world, from the mid 50's, different voluntary organizations emerged from studies to optimize the project management. The best known of these organizations is the PMI - *Project Management Institute*, which since 1969 with its first headquarters in Pennsylvania in the USA established a best practice guide to project management called PMBOK[®] - *Project Management Body of Knowledge* that defines project management as planning, programming and controlling a series of integrated tasks in order to successfully achieve the goals,. The PMBOK also defines a project as an enterprise with identifiable goal, which consumes resources and work under pressure of deadlines, costs and quality[1].

The practice of project management evolved to keep pace with the modern world and have become the main control tool at continuous change world, globalization, competitiveness and emerging technologies, acting as a major ally capable of ensuring the continuity and organizations' survival.

"Today, after two successive periods of U.S. recession, the economic scenario has changed and there is a competition based on speed and quality of product delivery or service, a demand for shorter periods and lower costs due to scarcity of resources" [2].

With increased focus on better results, the use of consolidated practices in project management is presented as a one way road and a clear trend has been established that organizations increasingly, opt to work on projects in order to ensure a better competitive advantage. *"The world is finally recognizing the importance of project management and its impact on company's profitability" [3].*

Over the last year in order to better adapt to this new management model, focused on results, the companies have gone through several waves of management and administrative reengineering in order to increase productivity and tackle the last severe economic crises.

As a result of the search for structural models that best represents the new enterprises' concept, the PMO - Project Management Office emerges as the structure that best fits in the growing need for productivity gains and urgent need for centralization, control and dissemination of information into the companies.

Around the world, the number of PMOs in all business segments has been multiplying and expanding. It is an important support structure that provides both, for its importance, helps for the project managers acting as a link in translating the companies' strategic objectives in results achieving their goals and objectives.

The Transformation of Public Administration in Brazil

Between the sixties and seventies, Brazil experienced the peak of the economic miracle. At that time, the country was a vast construction site and the government was the main contractor, mainly for large and heavy constructions.

During the eighties several economic crises decreased the capability of governments to carry out investment . Therefore those in the business segment of the engineering enterprises were forced to dedicate themselves in an optimization processes in order to reduce costs and remain in the competitive market.

In the nineties there was a period of scarcity of resources and the country also had to face the globalization phenomenon. In Brazil, globalization resulted in a set of specific policy decisions involving economic liberalization and privatization which increased the level of competitiveness, forcing companies to improve their internal processes. It also impacted the public administration structure.

In the new context searching quality as a strategic focus, the public administration as well as private companies, were also pressed to become more competitive and were forced to rethink their internal work processes in order to capture national and international private investments.

The global transformations experienced coupled with a stable and democratic internal political and economic scenario helped to increase the Brazilian awareness for better and more efficient management of their engineering projects.

This set of transformations made public managers, to objectively seek the remodeling of the existing administrative managerial model which was *bureaucratic, centralized and less agile*. In new management model, aligned with modern quality standards and based on best management practices, was directed to meet the demands of the new society and also aiming at attaining best results. In Brazil, this public administration movement was called "*management shock*".

Important corporate and sector PMOs emerges, serving as fundamental structures of support and great allies in order to ensure the success of a new model focused on improving the public results [4].

Representative states of the Brazilian federation such as Minas Gerais and Espirito Santo and Rio de Janeiro were in the lead of the movement, and were followed closely by several other states and municipalities in the country, with corporate and sector PMOs directly linked to higher executives as governors and mayors.

The Brazilian governments PMOs are responsible for managing major infrastructure projects portfolios and for ensuring the success of the main commitments of the political campaign as well as acting jointly responsible for leveraging each of these federal units in the management of large and complex engineering infrastructure and heavy construction.

The Boom of Civil Construction in Brazil and the Engineering Enterprises Management

Nowadays the country is experiencing a *boom* in the civil construction market. With a political and economic establish environment and the effects of world recession under control, Brazil is back as the huge construction site that was once in the past.

More over the current political and economic scenario is completely different from that in the 60's and 70's. The Brazilian government has returned to be the same large and important contractor of the golden era and has been establishing important guidelines for policies aimed at re-growth of the construction industry, especially in the housing segment, and infrastructure, and social development.

Coupled with the developmental time, the country has an important policy agenda for the world-wide sporting events realizations - *the 2014 World Cup and the 2016 World Olympics* - those were recently assumed increasing responsibilities and further boosting the performance of large and complex engineering enterprises in the country.

Much needs to be done and quickly. A considerable number of complex engineering enterprises of all kinds need to be initiated and completed with high quality and parameters of time and costs previously defined.

We bring this subject to reflection, because Brazil, although it recently started optimizing their processes for managing engineering enterprises, in several states and cities across the country through, both in private and in public administration in a movement called "*management shock*", it still needs to mature its management processes in various business segments, mainly in the engineering / EPC and government.

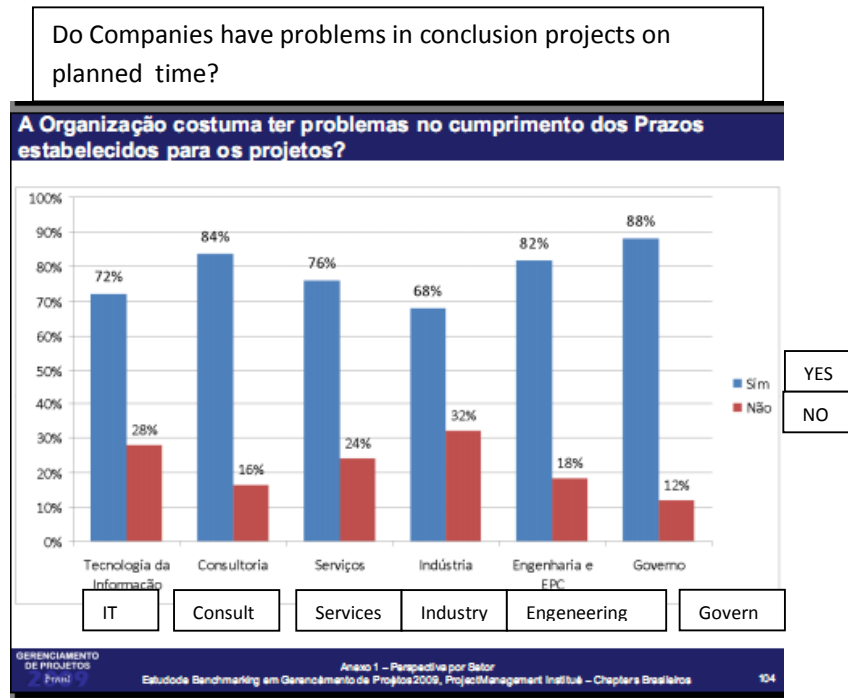
As a general rule, with few exceptions, there is a clear divergence between the management models used in engineering enterprises in Brazil, whose primary focus is almost down to tracking time and costs, and the modern management models widespread by wide world managerial methodologies that involve integrated management of nine knowledge areas of project management in a macro view of the enterprise involving *time, cost, scope, quality, human resources, communications, procurement, integration and mainly risks*.

The above statement is supported by the latest study published in maturity management in Brazil, nationwide, conducted by reputable institution in project management that seeks to assess and disclose annually the progress level of maturity in public and private companies in order to draw a national maturity management profile. The last published research – *The National Benchmarking Study 2009* - could count with the participation of over three hundred voluntary companies from different business segments from all over the country [5].

The National Benchmarking Study 2009 covers several interesting points about the current maturity profile in business management in Brazil. We have selected some of these important graphs to delimit the issues addressed in this academic article.

The national maturity search shows that specific issues as finish projects under time and cost previously established are still real problems. Despite these requirements are the object of concern of the majority Brazilian companies, both in public and private sector.

With respect only the issue time, *The National Benchmarking Study 2009* demonstrates a general, but mainly in the Engineering / EPC and Government business segment, a considerably difficulty in managing this issue. *More than 80% of the interviewed enterprises are assumed to possess problems in meeting the planned deadlines* as can be seen in the graph below.

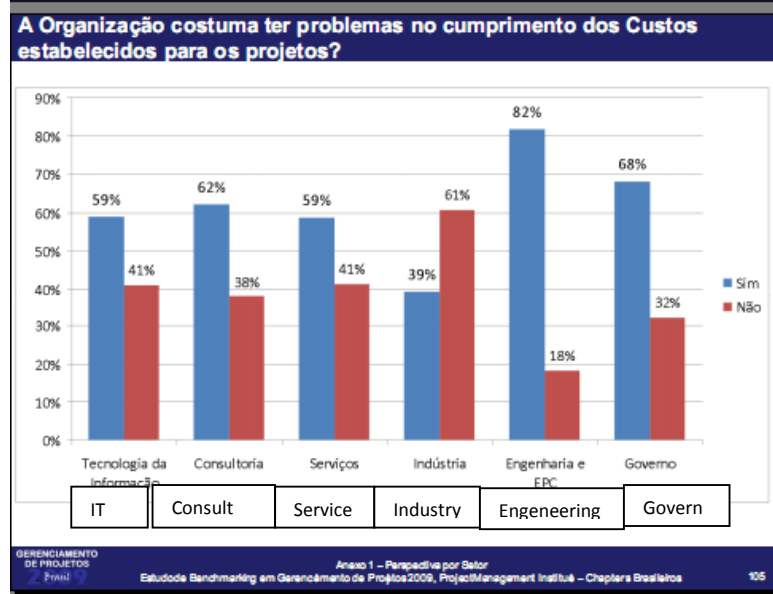


Reference: National Benchmarking Study 2009 - Brazil

FIGURE 1. Showing difficult in managing schedule

Achieve cost previously established in projects also remains a serious issue. The *National Benchmarking Study 2009* shows that this is also a problem for all business segments in Brazil and the situation worsens in the engineering / EPC and government business segments. The number of companies that is still struggling to manage their cost is considerably too high. *In engineering / EPC business segment the problem happens in more than 80% of the interviewed companies and 68% in companies with government segment, both with cost overruns in order of 10% or higher as is the case of engineering companies / EPC, as can be seen in the chart below.*

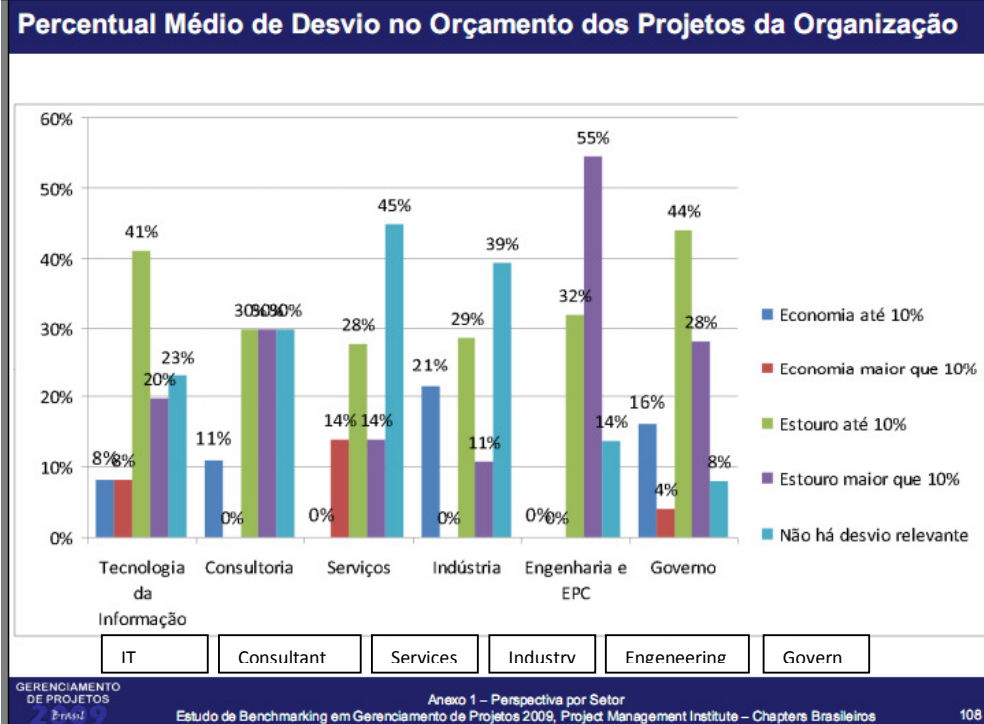
Do Companies have problem in conclusion projects under the budget?



YES
NO

Reference: National Benchmarking Study 2009 – Brazil
FIGURE 2. Showing difficult in managing costs

Medium percentage variation on project budgets in Companies

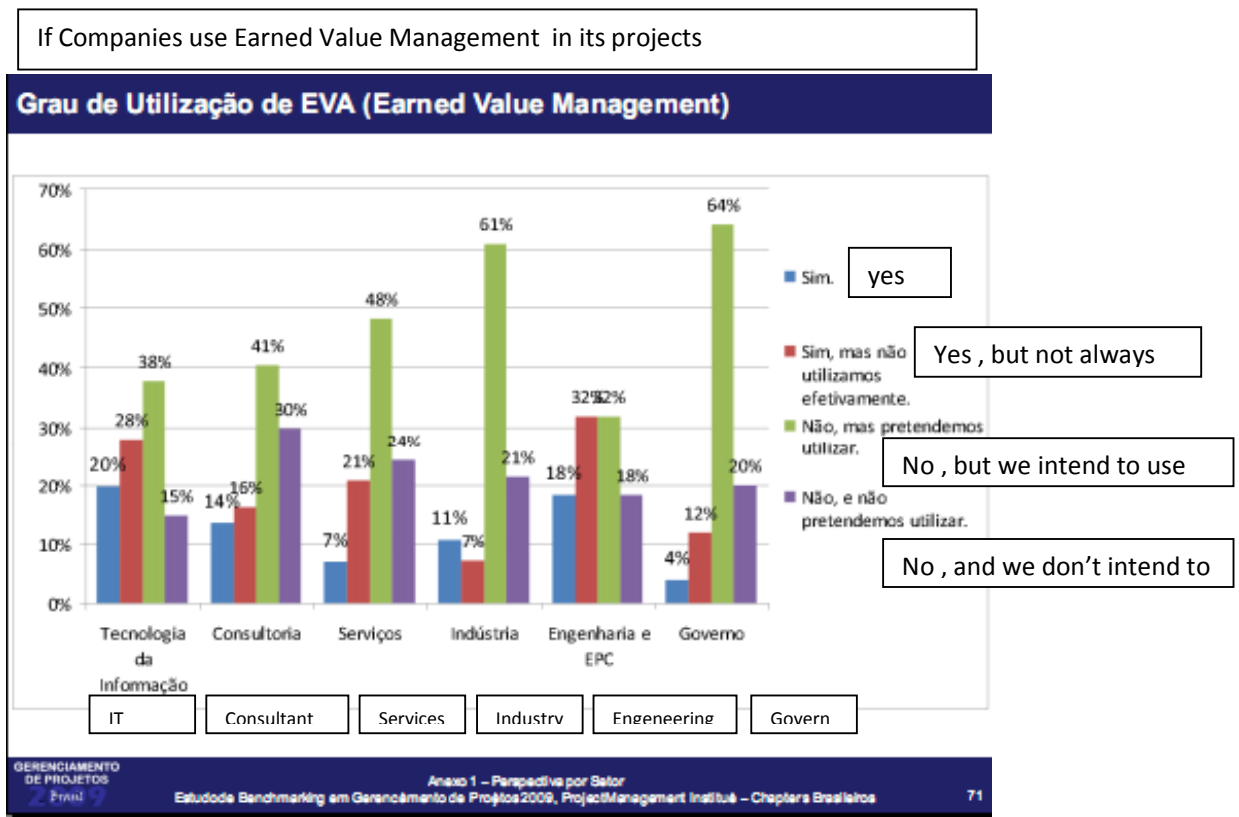


Saving until 10%
Saving over than 10%
Over Budget until 10%
Over Budget superior 10%
No significate variation

Reference: National Benchmarking Study 2009 - Brazil
FIGURE 3. Medium deviation in company's budget

Corroborating with the difficulty that Brazilian companies are meeting with the deadlines and cost estimate, The *National Benchmarking Study 2009* demonstrates a few effective use of the most important management tools, EVA - Earned Value Management, best known as the main ally in the simultaneous monitoring and control of important projects issues: *time, cost and scope*, whose use is widespread on project management best practice while assessing the evolution of the scope, time and cost (expected *versus* realized) of a project during the production phase of deliveries.

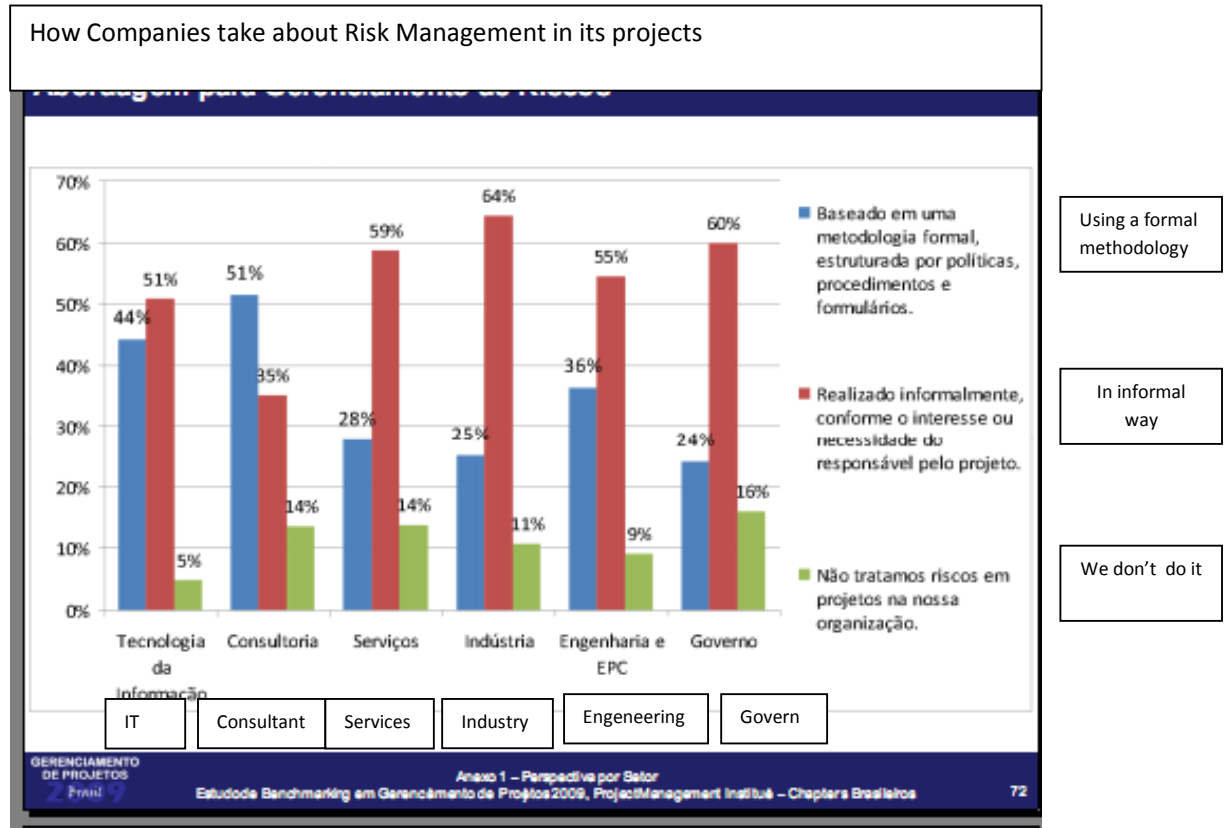
The chart below shows that only 18% of engineering companies / EPC and 4% of companies in the government segment in the country employ the GVA as a management tool. The good news is that the analysis of the same graph can be thought as a positive trend in the evolution of the tool use as only a small contingent of around 18% and 20% (respectively Engineering / EPC and government) declare as categorically not to use the tool even in the future, which makes us suppose that the current situation of difficulty in management issues as time and costs can be reversed and can be possibly, cause probably there is only a little knowledge about the vantagens of the management tool.



Reference: National Benchmarking Study 2009 - Brazil
FIGURE 4. Using Earned Value Management in companies

Besides the points discussed above, another issue that drew the attention of us researchers in analyzing the results of The *National Benchmarking Study 2009* was the approach taken by companies in general in relation to risk management. More than half of engineering / EPC and government companies (55% and 60% respectively) have an admittedly *informal* approach to managing risks and 9% of engineering companies / EPC does not deal with the

risks management. This demonstrates and confirm a low concern about the maturity of risk management in Brazil [6]. The national research shows that *only 36% of engineering / EPC companies and 24% of the government companies uses a formal method for risk management in their projects and enterprises* as shown in the chart below.



Reference: National Benchmarking Study 2009 - Brazil
FIGURE 5 – Showing difficult in managing risks

Conclusion

There is no doubt that Brazil is taking great strides towards modernization. Modernizing as a result both of political and economic stability from the last years and the impact of the modernization wave of the private sector and more recently the public administration that begins to spread all around the country.

However, it must be in mind that for the goals are achieved a long way needs to be quickly traversed. The country needs to rethink in record time their management business models in engineering enterprises to reach with success the challenging goals that have ahead.

On cursory examination of some graphs taken from the last national maturity survey in project management, The *National Benchmarking Study 2009*, presented in this article we seek to build an academic overview of the profile management maturity reached by the country in order to form a precise idea of the enormous challenge that Brazil faces.

A lot of civil constructions, engineering and infrastructure enterprises of all kinds and sizes, under specific quality parameters need to be held simultaneously in various parts of the country in a short time under specific budgets. The country will need to be as prepared as possible to complete in record time important national projects and tackling the also important international sports calendar appointments in conjunction with short-term goals of national growth.

For the challenge be overcome, important concepts related to engineering enterprises management that are now widely used at construction sites in Brazil have to be better reviewed and matured with a focus on modern quality management models and processes and products continuous improvement , benchmarking engineering enterprises methods in developed countries and studying modern concepts as for example the “*lean construction*” .

We also must bear in mind a proven effective strategy to overcome this challenge. At this time, we believe that a strong ally and can be a difference in the success of this challenge is undoubtedly both, adopt the best management consolidated practices in project management along the lines of reputable institutions such as PMI and involves more objectively in the engineering enterprises business professionals from the project management community, PMPs and others PMI certifications.

The best practices in project management are proven to be critical factors in the success of any organization and, therefore, its adoption is growing steadily worldwide, as demonstrated by the recent the Project Management Institute (PMI)’s survey according to which :

- 94% of companies surveyed believe that project management is a valuable aspect to the organization;
- 92% of companies surveyed believe that the use of certified professionals in project management is an effective weapon for the success of the organization;
- 76% of companies surveyed believe that the successful completion of projects and change initiatives whether the use of project management methodologies.

Under this management vision the new engineering Brazilian enterprises, from conception to completion will be coordinated in an integrated manner, with strong focus on planning, but also worrying about the entire life cycle of the project, with special care during the execution procedures when well-designed management implementing and change requests process - including establishing authorization levels - will ensure the continued analysis, before approving, the changes impacts into enterprises’ major components such as *time, cost, scope, quality levels, customer satisfaction and risk*. Only then we will be able to overcome the challenges of the coming years, change the adverse statistics and ensure the brightness of the conclusion party of the all international sports engineering enterprises with quality on time and on cost.

Final Recommendations

The authors hope that the view presented in this paper regarding the Brazilian maturity management model will be useful to alert the authorities about the need for conducting a review on engineering enterprises management and establishing new procedures aligned with the best practices in all over the world, which will be helpful to overcome the coming challenges and avoid problems in tackling the important international sports calendar appointments in conjunction with short-term goals of national growth.

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Biographies

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