

# Public Management: What Methodological Options for Analysis of Public Investment Projects in Portugal?

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**Abstract-** This paper intends to provide a deeper understanding about the current public best practices applied in organizations/countries worldwide.

Although the international advanced practices on cost benefit analysis of public investment projects, in Portugal, the last twenty years it was found serious failures in the process of appraisal and evaluation of public investment projects, which led to high financial deviations with strong consequences for current and future taxpayers.

For this reason, this paper seeks to identify the best international practices for Portuguese public sector, in order to provide managers, auditors and policy makers, tools and technics for successful investment projects in the near future.

This paper presents the main results from a research about the current evaluation projects best practices used by high developed countries, where it was possible to conclude that (1) risk management and (2) examines/review projects at key decisions points are critical in the process of projects appraisals. For example, a peer examine provides the project team with an independent view of the current progress of the project and assurance that it can proceed successfully to the next stage.

**Index Terms-** Best Practices, Evaluating Projects, Gateway Review Process, Public Management.

## I. INTRODUCTION

The State plays several economic and social functions that necessarily imply significant public investment decisions. But these investments supported by taxes and other revenues from taxpayers must meet strict criteria of economic rationality and the principles and good management practices, in order to obtain the best results, with the minimum cost for society.

However, in the last two decades in Portugal, there have been several cases of public investments that have suffered from inefficiency in decision-making, revealing significant failures in terms of efficiency and economic rationality, leading, in this context, to big deviations of cost and time, with significant costs to the taxpayers. These are paradigmatic situations of that phenomenon, with the dozens of projects launched between 1999 and 2010. Beyond to the costs related to direct compensation paid to concessionaires in the form of financial rebalancing, in the case of Public-Private Partnerships, there are other specific cases of public projects, for direct management of the State, with very significant deviations in costs and construction times. The construction of “Centro Cultural de Belém”, the construction of the “House of Music”, the construction of the “Euro Stadium” in 2004, and more recently, the “Parque Escolar” and the “Beja

Airport”, are some examples of these deviations, which cost millions of euros to taxpayers and that could have been avoided if the Governments had been followed international best practices of appraisal projects.

In this context, and analyzing the best practices to cost benefit analysis of public investments projects worldwide, it was identified four methodological options with the purpose to deliver, to Portuguese public managers and politic makers, proven international best practices to help them take the best decisions in the future.

We are convicted that the implementation of the good practices identified in the benchmark can have a great and positive benefit for development and Portuguese economic growth and for avoiding future waste of the scarce public resources.

## II. LITERATURE REVIEW

Good practices are the activities, techniques, methods, processes or mechanisms recognized the best able to improve the performance of an organization, project or program output, and minimize the possibility of error and failures that can compromise its viability [6]. In other words, a best practice is a method or technique that has consistently shown results superior to those achieved with other means, and that is used as a benchmark [7].

From the literature review process was possible to identify four methodologies of best international practices, used in the analysis (ex-ante) and ex-post evaluation (ex post) of public and private investment projects, concretely: the *Gateway Review Process* (GRP, 2009), inspired by the United Kingdom GRP, adopted by the Treasury and Finance of Australia; the *Guide to Cost Benefit Analysis of Investment Projects* (GCBAIP, 2008), published by the European Commission; the *Green Book* (GB, 2003) - Appraisal and Evaluation in Central Government, edited by the Ministry of Finance of the United Kingdom; and *ROI Methodology Institute* (ROII, 2007), one North American methodology.

These are four international references analysis and evaluation of projects which reflects the experience and the practice followed in this matter in Australia, in United Kingdom, in the European Community and in the United States.

The choice of these models results in the nature, underlying objectives of the current research and the information available as well as to the fact that these models constitute an international reference level of best practice in the context of the analysis and evaluation of public investment projects, for its accuracy, detail and objectivity.

To understand the fundamentals of the international methodologies that have been identified, below are presented the main principals and purpose of each one:

### **Gateway Review Process**

Based on the Gateway Program in the United Kingdom, the Gateway Review Process (GRP) was first introduced to Victoria State of Australian in 2003.

With over 300 Gateway reviews completed in the last six years, this cost effective process has assisted in the successful delivery of projects, policy and programs in the Australian public sector [2].

The Gateway Review Process examines projects and programs at key decision points. It aims to provide timely advice to the Senior Responsible Owner (SRO) as the person responsible for a project or program. A review provides the SRO with an independent view on the current progress of the project or program and assurance that it can proceed successfully to the next stage.

The six critical stages of the project lifecycle suggested by GRP is following presented with a resume of purpose of the each review [2].

*Gateway Review 1 – Strategic assessment:* check outcomes and objectives for the policy or program to confirm they contribute to the overall strategy of the organization; ensure the program or project is supported by users and stakeholders; ensure financial and other resources are provided; check the market is appropriately engaged with the feasibility of achieving the required outcome.

*Gateway Review 2 – Business case:* confirm that the business case is robust (i.e. it meets the business need, is affordable and achievable, with appropriate options explored and likely to achieve value for money); confirm potential options have been identified and analyzed and appropriate expert advice has been obtained; ensure the feasibility study has been completed satisfactorily; confirm the market's interest has been measured and appropriate high-level procurement strategies have been considered; ensure the major investment and project level risks are identified and outline risk management plans have been developed; confirm the scope and requirements specifications are realistic and clear; ensure there are plans for the next stage, confirm the planning assumptions, and the project team can deliver the next stage.

*Gateway Review 3 – Readiness for market:* confirm the objectives and desired outputs of the project are still aligned with the program to which it contributes; check the supplier market capability and track record, or existing supplier's capability and performance, is fully understood; confirm there are plans for risk management, business and technical issue management and these plans will be shared with suppliers and/or procurement partners; confirm the stakeholders support the project and are committed to its success;

*Gateway Review 4 – Tender decision:* confirm the business case, including the benefits management plan, after the bid information has been received and assessed; confirm the recommended contract decision is properly executed within a standard, lawful agreement and is likely to deliver the specified outputs and/or outcomes on time and within budget and will provide value-for-money; confirm there are plans for risk

management, technical and business issue and change management and these plans are shared with suppliers and/or delivery partners; confirm the proposed procurement is within financial approvals with an adequate budget to accommodate it.

*Gateway Review 5 – Readiness for service:* confirm that commissioning plans have been developed, and that they are in line with the organization policy and industry best practice; check the business case remains valid, events and changes do not affect it and the original projected business benefit is likely to be achieved; confirm client and supplier implementation plans are still achievable; check lessons for future projects are identified and recorded.

*Gateway Review 6 – Benefits evaluation:* assess whether the business case for the project was realistic at Gateway 4; tender decision; confirm there remains a business need for the investment; assess whether the benefits anticipated at this stage are being delivered; confirm the client continues to have the necessary resources to manage the facility, and any contract, successfully; check there are ongoing continuous improvement mechanisms to improve value-for-money; assess lessons learned and the methodology for sharing information within government. GRP has associated a checklist of questions to get answered by the project managers. If the answers to the questions are unsatisfactory, projects should refrain from proceeding until appropriate assurance is obtained.

Whenever there is a GRP review, the new one edition incorporates the new thinking and best practices that have evolved over the years, effectiveness of risk management, based on the progressive analysis of Gateway Reviews, is reported to Government every six months.

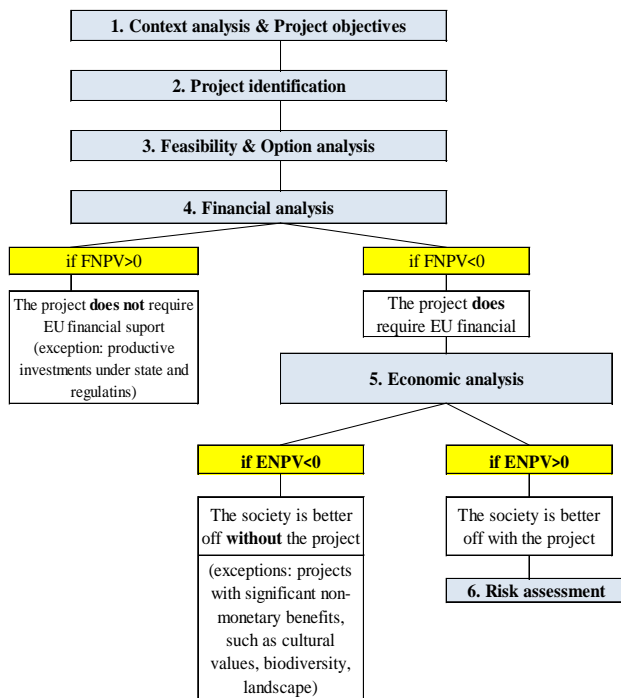
### **Guide to Cost Benefit Analysis of Investment Projects**

The Guide to Cost Benefit Analysis of Investment Projects (GCBAIP, 2008) is an international benchmark in analysis of project evaluation, published by the European Commission. Cost benefit analysis has been used in Cohesion Policy since 1990's and has been a requirement since 2000.

The GCBAIP has been written to helpful managing authorities, public administrators and their advisors in the Member States, when they examine project ideas or pre-feasibility studies at an early stage of the project cycle.

Figure 1 present the structure of project appraisal suggested by GCBAIP.

Figure 1 : Structure of project appraisal



Source: GCBAIP (2008)

According to the framework of project appraisal presented in Figure 2, following are listed some examples of questions, to be answer by the project manager, which integrate the six steps of project appraisal.

*Step 1: Context and Project*

- Are the social, institutional and economic contexts clearly described? Does the project have clearly defined objectives in terms of socio-economic indicators?

*Step 2: Project Identification*

- Does the project constitute a clearly identified self-sufficient unit of analysis? Have the network effects been considered? Whose costs and benefits are going to be considered in the economic welfare calculation?

*Step 3: Feasibility and Options Analysis*

- Does the application dossier contain sufficient evidence of the project’s feasibility (from an engineering, institutional, management, implementation and environmental point of view)?
- Has the do-nothing scenario (‘business as usual’) been identified to compare the situations with and without the project?
- Has the applicant demonstrated that other alternative feasible options have been adequately considered (in terms of do-minimum and a small number of do-something options)?

*Step 4: Financial Analysis*

- Is the choice of the time horizon consistent with the recommended value? If not, why?
- Has the residual value of the investment been calculated? Have the main financial performance indicators been calculated (FNPV(C), FRR(C), FNPV(K), FRR(K)) considering the right cash-flow categories?

*Step 5: Economic Analysis*

- Have externalities been included in the analysis? Have shadow prices been used to better reflect the social opportunity cost of the resources employed?
- Have the main economic performance indicators been calculated (Economic Net Present Value (ENPV) Economic Rate of Return (ERR) and Benefit/Cost Ratio (B/C ratio)?

*Step 6: Risk Assessment*

- Is the choice of the critical variables consistent with the elasticity threshold proposed? Has the sensitivity analysis been carried out variable by variable and possibly using switching values?
- What may cause the project to fail? What mitigations may there be for each risk identified? Have risk mitigation measures been identified?

The Guide provides a reminder of the legal base for the major project and co-financing decisions by the Commission; illustrates the standard methodology for carrying out the six steps for a CBA, especially the financial analysis, economic analysis and calculation of performance indicators; include outlines of project analysis by sector, focusing principally on the transport, environment and industry sectors and provides five case studies in the transport, environment and industry sectors.

**The Green Book**

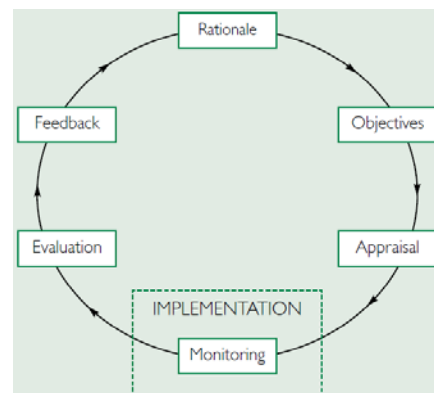
The Green Book (GB) is a guiding document, issued by the UK Government, to help public sector bodies, departments and executive agencies in analytically robust approach to appraisal and evaluation of public investment.

The Green Book presents the techniques and issues that should be considered when carrying out public project assessments (assessments is the general term used in the Green Book to refer to both appraisals before decisions are made, and evaluations of decisions once made).

The Green Book is a best practice guide for all central departments and executive agencies, and covers projects of all types and size. It aims to make the appraisal process throughout government to be more consistent and transparent.

Figure 2 present the GB appraisal and evaluation process form stages formalize in the acronym ROAMEF (Rationale, Objectives, Appraisal, Monitoring, Evaluation and Feedback).

Figure 2 : ROAMEF Cycle



Source: The Green Book (2003)

Following is present a resume of contents concerning the stages mentioned above [11].

#### *Justifying Action*

The first step in the GB process is to carry out an overview to ensure that two pre-requisites are met:

- Firstly, that there is a clearly identified need; and
- Secondly, that any proposed intervention is likely to be worth the cost.

This overview must include an analysis of the negative consequences of intervention, as well as the results of not intervening.

#### *Setting Objectives*

The second step is to set out clearly the desired outcomes and objectives of an intervention in order to identify the full range of options that may be available to deliver them. Targets should be set to help progress towards meeting objectives.

#### *Option Appraisal*

The third step is to carry out an option appraisal. This is often the most significant part of the analysis. Initially a wide range of options should be created and reviewed. This helps to set the parameters of an appropriate solution.

According GB:

*“Appraisal, done properly, is not rocket science, but it is crucially important and needs to be carried out carefully”.*

#### **ROI Methodology**

The ROI Methodology™ (ROII, 2007) is a North American methodology, whose mission is to help managers to assess the contribution of each decision to create wealth, value and corporate sustainability, by applying the main business techniques in the evaluation of investment projects [14].

This methodology is a compilation of practices, techniques, procedures and rules used in the business, with the particularity of being applied either in a public or private logic.

Know capture and estimating tangible and intangible benefits, know how to perform cost and benefits estimates, know how to analyze scenarios and build a decision package are goals to be accomplished by ROII in the analysis of investment projects, which is based on 8 steps or processes [15].

Below are presented the intended goals for each steps of the ROII framework [14] [15].

1. Know to assess which investments create greater wealth for the organization;
2. Know what the best configuration of an initiative to enhance its benefits;
3. Know capture and estimating tangible and intangible benefits;
4. Know perform cost estimates and schedule of the project;
5. Know to assess whether the initiative is economically interesting for the organization;
6. Know to assess how much the organization is prepared for the change;
7. Know how to analyze scenarios and build a decision package;
8. Know measure the benefits over the life cycle.

The ROII is used over 5,000 organizations and considered the most used and implemented evaluation system in the world [16].

The ROI Methodology not only provides the capability to evaluate project performance, but also improves the design of project for optimal impact.

### III. WORKING METHODOLOGY

Considering that Governments must be committed on improvement in the delivery of public services, a major part of this is ensuring that public funds are spent on activities that provide the greatest benefits to society, and that they are spent in the most efficient way, this research aims to obtain a deeper understanding about the current public best practices applied in organizations/countries worldwide [11].

The last few years in Portugal, the debt crisis, political and economic instability together with financial constraints have held the need to rethink the terms that take place the futures public investments [17] [18].

Now, more than ever, public managers and Portuguese politicians have a huge pressure to think, plan, implement and control the right projects with effective and recognized economic value to society, in order to eliminate similar cases occurred in the past twenty years with public investments that have suffered from great inefficiency in decision-making, with significant deviations of cost and time.

For this purpose, the methodology of this study is based on in-depth study of four international methods of analysis and evaluation of public investment project, in order to evaluate the strengths and less strong points of each methodology studied and analyzed in a set of projects that have been implemented in the worldwide and, in particularly, in the last two decade in Portugal and which ran less well [5] [8] [10] [17].

The choice of these models results in essence of nature and underlying goals to paper, the information available and the fact that these methodologies constitute an international reference of the best practice in the context of the analysis and evaluation of public investment projects, by their accuracy, detail and objectivity

In this research, documentation and audit reports elaborated by Portuguese Court of Auditors have been used as well as a research instrument for the data collection purpose. Audit reports were chosen because of its ability to survey a large sample of public investment works for direct management of the State, from different activity sectors (transport, culture, sport, environment, and others) [17] [18].

Following will be done the critical appraisal and presented the main conclusions reached on the main advantages identified of each one of the four methods studied.

### IV. ANALYSIS AND COMPARATIVE DISCUSSION

To better understand the best practices contribution to management teams of projects appraisal and evaluation, bellow is presented the main strong points of each methodology identified in the present study to Portuguese public sector management.

#### *Gateway Review Process*

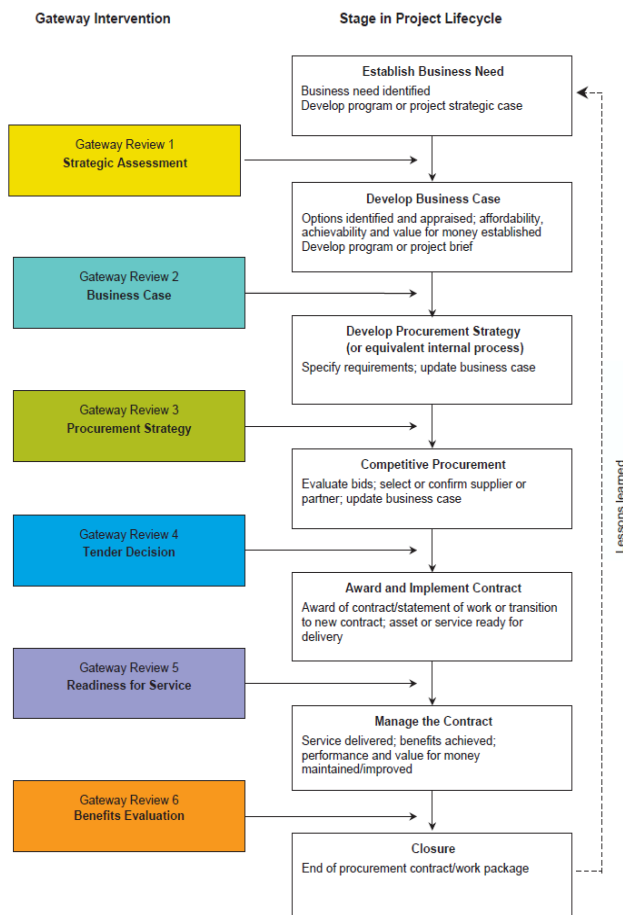
If the concern of the project leaders is the independence of the evaluation and ensure that the process is fully understand the



GRP is highly recommended because Gateway review delivers a peer review, in which independent, external practitioners use their experience and expertise to examine the progress and likelihood of success of the program or project, and says if project is ready to progress to the next stage of development or implementation. It provides a valuable perspective on the issues facing the internal team and an external challenge to the strength of the plans and processes [2].

Figure 3 shows an overview of the GRP.

Figure 3 : Overview of the Gateway Review Process



Source: Department of Treasury and Finance, State Government Victoria - Australia (2009)

As can be seen by examining Figure 3, for the best result, a review is carried out by a review team shortly before a decision is made to next stage of analysis of project, to allow sufficient time for any recommendations to be implemented, and ensure successful project delivery. It involves independent, short, structured reviews at six critical stages of the project lifecycle.

The Gateway Review Process also provides benefits to the overall program or project management process within the project public sector helps provide best practice techniques for timely, efficient and appropriate project delivery, with outcomes improved and risk minimized and Lessons Learned arising from Australian Government Gateway reviews to assist entities in improving their program/project management practices [1] [4].

### Guide to Cost Benefit Analysis of Investment Projects

In appraisals there is always likely to be some difference between what is expected, and what eventually happens, because of biases unwittingly inherent in the appraisal, and risks and uncertainties that materialize [8].

In this context, if the main concern of the team leaders of project is to evaluate in depth the risk of project, the GCBAIP is a good reference to follow.

As a good practice of risk management, GCBAIP recommend a sensitivity and scenarios analysis. However, once sensitivity and scenario analyses have the major limitation of not taking into account the probabilities of occurrence of events, GCBAIP recommend the Monte Carlo method. The method consists of the repeated random extraction of a set of values for the critical variables, taken within the respective defined intervals, and then calculating the performance indices for the project (FRR or NPV) resulting from each set of extracted values [8].

The most helpful way of presenting the result of Monte Carlo analysis is to express it in terms of the probability distribution or cumulated probability of the FRR (Financial Rate of Return of the Investment) or the NPV (Net Present Value) in the resulting interval of values.

Figures 4 and 5 provide graphical examples of probability and cumulative distribution for NPV.

Figure 4: Probability distribution for NPV

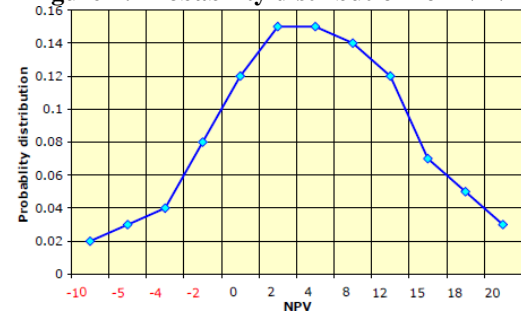
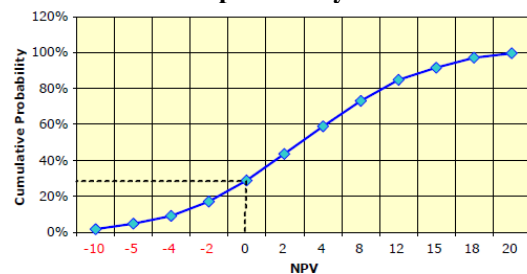


Figure 5 : Cumulative probability distribution for NPV



Source: GCBAIP (2008)

The cumulative probability curve permits an assessment of the project risk, for example by verifying whether the cumulative probability is higher or lower than a reference value that is considered to be critical. One can also assess the probability that the NPV will be lower than a certain value, which is adopted as the benchmark (e.g. zero for NPV and 5% for FRR). In the example, see Figure 5, there is a probability of about 30% that the NPV will be negative.

*The Green Book*

Considering that English society makes a great scrutiny on policy decisions of Government concerning how economically, efficiently and effectively government departments have spent public funds, *The Green Book* is an international reference for countries that want to build a true culture of responsibility of policy makers on the application of public resources and is an excellent support and guidance for a Cost Benefit Analysis (CBA) - methodology for assessing the value of investment projects (such as roads, railway lines, the construction of new), since the cost benefits appraisals as key factor in government decisions about how public money should be spent [11].

The GB is an important and extremely useful guidance, contains worked examples of analyzing costs and benefits, at a greater level of detail to encourage a more thorough, long-term and analytically robust approach to appraisal and evaluation, and it is relevant to all appraisals and evaluations.

**Transparency on Public Sector:**

One important good practice undertaken for English public policies, is essentially based on four approaches, which allow to assess the performance of public managers and the quality and value of the public investment, namely [12]:

- *Value for Money* - related to the efficiency, effectiveness, economy and good practices of the projects;
- *Accountability* - issue related to accountability and transparency in decision-making process and, consequently, the results achieved;
- *Affordability* - has to do with the project sustainability analysis, not only in terms of their expected return, as the existence of financing and ability to repay on acceptable terms;
- *Compliance* - issue related to compliance with the laws and regulations in force.

**Final Evaluation:**

Final Evaluation of projects is also a relevant good practice recommended by GB which, about this question, said: *Final Evaluation is similar in technique to appraisal, although it obviously uses historic (actual or estimated) rather than forecast data, and takes place after the event. Its main purpose is to ensure that lessons are widely learned, communicated and applied when assessing new proposals.*

**Presenting Results:**

Presenting the Results of appraisal is another important good practice suggested by GB to be followed by project team. In this purpose GB said: *Presentations and reports should be clear, logical, well founded, and geared towards helping the decision at hand and should provide sufficient evidence to support their conclusions and an easy audit trail for the reader to check calculations, supporting evidence and assumptions. Major costs and benefits should be described, and the values attached to each clearly shown rather than netted off in the presentation of the analysis. This should help to ensure that decision makers understand the assumptions underlying the conclusions of the analysis, and the recommendations put forward [11].*

*ROI Methodology*

The ROI Methodology gives emphasis to the part of capturing quantitative economic value in each investment, such as, emphasis on economic benefits.

To achieve the ROII goal, the methodology presents the techniques and issues that should be considered when carrying out economic benefits analysis of projects.

Quantifying benefits and comparing total costs and benefits over the lifetime of a project ROII form a useful part methodological toolkit of ROII. These tools and techniques, such as, Focus Groups, Expert Opinion, Literature Searches, can help managers carrying out appraisals which focus clearly on quantified results and impacts of the project implementation.

Below are presented the intended goals for each process of the ROII framework and some techniques recommended for data collection.

**Figure 6 : Tools and Techniques [13].**

Process	Inputs	Tools & Techniques
Process 1 PROJECT REQUEST	Strategic Plan Legal Requirement Market Demand Client Request Innovation Initiative Request for Bid Enterprise Reports Enterprise Risk	POLDAT ZACHMAN Expert Judgment Enterprise Workflow Enterprise Architecture Elevator Pitch Business Requirement Interviews Literature Searches
Process 2 STRATEGIC ALIGNMENT	Project Request Form Strategic Plan & Objectives Organization Capacity Exceptional Condiciona	Scoring Model; Murder Board SWOT Analysis Focus Groups Delphi Technique
Process 3 BENEFITS ESTIMATION	Project Request Strategic Plan & Objectives Enterprise Environment Factors Outer Context Historical Data Market Reports	Parametric Analysis Sensitive Analysis Control Group; Focus Group Prototyping/Simulation Survey's Pareto Analysis
Process 4 COST ESTIMATION	Project Request Form Benefits Estimation Enterprise Environment Factors Outer context Historical Data Market Reports	Cost Breakdown Structure Product Breakdown Structure Parametric Analysis Analogous Estimation Bottom-UP Estimation Expert Judgment
Process 5 ECONOMIC EVALUATION	Benefits Estimation Cost Estimation Sensitive Data	NPV, BCR, ROI PAYBACK Interest Rate ROI Sensitive Analysis
Process 6 ORGANIZATION READINESS	Project Request Form Enterprise Architecture Strategic Alignment ROI analysis	Stakeholder Matrix Force Field anlysis Expert Judgment Climate analysis
Process 7 DECISION MAKING	Enterprise Architecture Strategic Alignment Benefits Estimation Cost Estimation ROI Analysis	SWOT Analysis Expert Judgment Delphi Technique Nominal Group Multi-Criteria Cenarios
Process 8 BENEFITS TRACKING	Data Collection Plan Benefits Plan Business Case Report	Corporate Reports Balanced Scorecard Trend Analysis Control Group

Source: Adapted from Pereira, Leandro (2014)

For ROII, projects they are not decided without knowing the variation and confidence margin of the various criteria for

evaluation of the investment. The projects are decided around conservative scenarios, not around optimistic scenarios.

On the other hand, it is recommended that decisions be said on the worst scenario, but with a level of 80% trust, i.e., the findings of a project must answer the following question:

- Which is the net return of the project for 80% of confidence?

## V. CONCLUSION

From the process of analysis and review of the literature we can see that the developed countries adopt analysis procedures (ex-ante) and evaluation (ex-post) of public investment projects, supported technically and scientifically, which can be a good reference for Portuguese government authorities and public sector, seeking for best practices to appraisal and evaluation public investment.

The current political context of crisis more justifies the need for adoption these best practices, which aims to establish itself as a contribution to the desirable harmonized and consensual process of establishing procedures to facilitate negotiations among political forces, crucial to the approval of priority investments and the expectation that the Government of Portugal uses it as a basis for the preparation of a National Guide of Best Practices to support the Process for Appraisal and Projects Evaluation.

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