

EUROPE 2020 STRATEGY: AN INTEGRATED FRAMEWORK FOR DESIGN OF ENGINEERING SOLUTIONS AND THE ENHANCING SELECTION PROCESS OF ALTERNATIVES

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1.Introduction – Research and innovation are among the main drivers of future growth and have been put at the centre of the Europe 2020 strategy (strategy for smart, sustainable and inclusive growth). Directive 2014/24/eu on public procurement and repealing Directive 2004/18/EC [1], Public Procurement plays a key role as one of the market-based instruments to be used to achieve the objectives of the Europe 2020 strategy while ensuring the most efficient use of public funds. It contributes to achieving best value for public money as well as wider economic, environmental and societal benefits and thus promoting sustainable economic growth. A better guidance, information and support to contracting authorities and economic operators could greatly contribute to enhancing the efficiency of public procurement to fully exploit its potential which is of great importance for future growth in Europe.The main goal of this work is to show a well-founded and complete decision process with the which, the “contracting authorities” and the “economic operators “can investigate different alternatives to find the best balance between total cost, performance, the maintenance strategy and the contribution to the sustainable development and socially responsible of each alternative over its the life cycle period. With this tool, they could make decisions with technical rigor and it will minimize the subjectivity in the entire decision-making process.

2.Methodology and experimental – Our proposal is focused to Cycle Life System and it has a base taken from Systems Engineering. The decision-making process for the optimal design of alternatives is based on the gradual evolution of design details and it is divided into 2 stages: 1. Projects Alternatives (Functional and Technical design). 2. Valuing and selection of cost effective and sustainable solutions. The sustainability factors are identified into alternatives and they are used in environmental evaluation as proactive mitigation measures. Having detected [2-3] a need to incorporate, in an integrated manner, technical, economic, social and environmental aspects in the Design Phase of road infrastructure programs,the capability of the proposed process is analyzed through of a real case of a public works contract (subsystem road pavement) to find the best balance between CAPEX, OPEX, performance, the maintenance strategy and the societal welfare over the life cycle period. Five tenders were considered.

3.Results and discussion - The information obtained in the phases of the proposed process shows that the best choice is the overall cheapest alternative and at the same time has the best overall performance. It is also the one that presents better behavior in the operation phase (lower maintenance and risk cost), and therefore, better service to the road user (better societal welfare) and less uncertainty (economic sustainability). Also, and from environmental improvement point of view for a cleaner production, it offer an abundance of cost effective opportunities for GHG reductions. This work expands the study carried out by [4] and it also provide a basis for solving some of the critical needs raised in [5]. 4.Conclusions– Buying innovative products, works and services is the main driver in improving the efficiency and quality of public services while addressing major societal challenges. We propose a wellfounded and complete decisión process that consider technical, economic, environmental, political and institutional aspects in an integrated manner over the life-cycle of the system to investigate different alternatives to find the most economically advantageous tender from the point of view of the contracting authority in accordance with Articles 67 y 68 of the Directive 2014/24/eu on public procurement [1]. Also, confirms that the criterion in the selection of the tenders exclusively based on CAPEX is incorrect. 5.References [1] Official Journal of the European Union of 28.3.2014. Directive 2014/24/eu of the european parliament and of the council of 26 February 2014 on public procurement and repealing Directive 2004/18/EC. [2] Ang, G., Marchal, V., 2013. Organization for Economic Co-operation and Development, Paris. [3] Chester, M.V., Horvath, A., 2009. doi:10.1088/1748- 9326/4/2/024008.

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