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Prevention and Risk Management in RTD European Projects Developed by University-Company's Consortiums

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Abstract

This study aims to demonstrate the usefulness of a simple methodology to manage and prevent the risk in co promotion projects financed by the European Union through operational programs. The risk prevention is a key factor in the project success, whether singular or plural, research or development. Our focus was directed to present the methodology applied to three Research and Technological Development (RTD) European projects, where companies and universities had to work hand in hand towards the success of the project. Socio-cultural differences between different countries, different methods and work's rhythms between universities and companies alongside the issues of Intellectual Property Rights (IPRs), are some of the sensitive points in all the projects. It is where Project Management has the duty to act proactively in order to control small outbreaks of contention, while maintaining the smooth functioning of the project execution.

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1. Introduction

Currently the world is in a turning period where life is staggering and where knowledge, innovation and new technologies dictate the laws of the market and society. The resulting progress of industrial, technological and digital revolutions have revolutionized the way we live, bringing us modernity and a new way of thinking and living, giving us, comfort that is indispensable for our life [1].

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The European Commission has been making a strong investment in specific research areas such as the aeronautical area, which is currently one of the largest sources of pollution. Projects such as MAAT, ACHEON and CROP are very important research projects that aims to minimize the effects of air pollution [2-4].

This paper is a contribution to risk management control in international co-operation project where in the same consortium, different companies and different universities are working together with the purpose of introducing the knowledge of R&I centers in business projects [5]. Implementing a simple and agile methodology, we can predict and minimize risks within the consortium. This methodology was applied to the three projects mentioned above and could avoid a wide range of risk situations, but not in all cases. With these warning risk situations it was possible to overcome the best way to solve the problems that have emerged [6]. We agree with Rodrigues-da-Silva and Crispim's, when they say that the main objective of the decision-agents is to identify, analyze and evaluate the risks in all project life cycle and use their organizational structure and administrative practices in order to act on the risks to favor of the project [7]. In this work was extremely important to indentify the potential risks and to be proactive at solving them, so we share the Tak Wah Kwan and Hareton's opinions when they said that current risk identification processes involve examining the major areas of a project, collecting input from personnel, learning from past experience, and applying analytical tools and techniques [8-9].

After a previous study about projects risks, it is fundamental to understand the current European policies as well the evaluation reports of the Portuguese situation, regarding the implementation of European funds captured by the Portuguese organizations, which are unanimous in pointing out the positive impact that this investment has caused in our country [10].

In the following chapters we present a theoretical introduction to the UE policies related to the structural funds implementation in Portugal, followed with a theoretical description of the Project Management importance and responsibilities. After, we present the entire methodology highlighting IPR's concerns, the application of Consortium Barometer and the WP-Assessment and Evaluation Questionnaire. Finally, we discuss the results and we write the conclusions emphasizing some work that we can make in the near future.

2. EU Co Promotion projects

According to MAPEER SME, cooperation projects involve only partnership between companies or between universities and entities of the SCT, which, due to its complementarily skills or common interests in the exploitation of results of R&D, they combine with each other to promote synergies and to share costs and risks. These partnership are formalized through a consortium agreement and are coordinated by companies or universities. The projects cover industrial research and / or experimental development leading to the creation of new products, processes or systems or the introduction of significant improvements in products, processes or systems [11].

The two main objectives of these programs are the strengthening of the scientific and technological background of the European industry and encouragement of their international competitiveness.

The Portuguese research and innovation performance relate the knowledge investment input and performance and economic output throughout the innovation cycle. They show thematic strengths in key technologies and also the high-tech and medium-tech contribution to the trade balance. The indicator on excellence in science and technology takes into consideration the qualification of scientific production as well the technological development. The Innovation Output Indicator covers technological innovation, skills in knowledge-intensive activities, the competitiveness of knowledge-intensive goods and services and the innovativeness of fast-growing enterprises, focusing on innovation output. The indicator on knowledge-intensity of the economy focuses on the economy's cluster composition and specialization and shows the evolution of the weight of knowledge-intensive sectors and products [11].

2.1. Framework Programme

The most relevant policy priorities in European Financing for Co Promoting programs are to intensify the efforts of national RTD, support the National Innovation System, promote and strengthen the internal skills of creating new knowledge within firms, improving the competitiveness of enterprises in their value chain through the incorporation of new knowledge and skills to develop new / significantly improved products, processes or services, intensify the

collaboration between business entities and research institutions, promote the development of RTD projects between companies (business cooperation) and to reduce the gap between the priorities and areas of expertise of the research entities and companies necessities [11-12].

The previous Framework Programme FP7, more precisely, the “strengthened support to Future and Emerging Technologies – FET” funded two of the three projects where the methodology was applied where the remaining was funded by another ICT programme.

The FET scheme acts as the pathfinder for the main stream ICT research. It aims to set new foundations for future ICT by exploring new unconventional ideas that can challenge our understanding of the scientific concepts behind ICT and that can impact future industrial ICT research agendas. Hence, its priorities are influenced by new developments and emerging opportunities in a wide range of scientific areas, as well as by the need to nurture the emergence of new, often multidisciplinary, European research communities. FET will operate with a Proactive and an Open scheme, including activities to support new talents and high-tech SMEs, to prepare the set-up of FET Flagship Initiatives, and to strengthen the international dimension of FET [13-14].

2.2. UBI European Projects

The University of Beira Interior (UBI), in particular the Electromechanical Department, have focused their efforts in the field of aeronautical transports. The ClusterDEM, a research group of UBI Electromechanical Department, was involved in three projects funded by FP7. UBI was partner in MAAT - Multibody Advanced Airship for Transport (FP7-AAT-2011-RTD-1) and ACHEON - Aerial Coanda High Efficiency Orienting-jet Nozzle (FP7-AAT-2012-RTD-L0) but, in CROP - Cycloidal Rotor Optimized for Propulsion (FP7-AAT-2012-RTD-L0), it was coordinator and project Leader [2-4]. MAAT project was a level 1 project, which means that MAAT project had bases in technologies and existing studies and, at the end, it created a prototype as a final result of this research study. ACHEON and CROP projects were level zero projects, where the main objective was to study new ideas that may be studied more deeply in other research levels in case it could be proved to be advantageous. The “budgets” of these projects were financed in 75% by the European Union and in 25% by the project partners [2]. MAAT had a budget that exceeded EUR 5 million where the remaining two projects financing rounded the EUR 800 thousand each. CROP project introduced an innovative aircraft propulsion system based on cycloidal rotor concept, using an integrated approach that includes an electric drive as part of a powered structure, integrated in an environmentally friendly energy structure. The CROP’s drive concept is revolutionary, it was introduced in a new aircraft concept designed by IAT21 company and in the Future it will overcome the traditional take-off and landing limitations, including the ability to hover in the air [3]. The ACHEON project exploited an innovative propulsion system for aircraft that overcomes the main traditional systems limitations, introducing a new propulsion system based on an air jet deflection, without any part of the propulsion system in motion. The ACHEON system is based on three physical effects: a) Jets with air mixture at high speed; b) Coanda effect applied to a high speed jet to a convex surface; c) effect of Control Coanda by electrostatic fields [4].

2.3. Universities and Companies cooperation

The relation between universities and companies has been analysed in several studies. Belderbos analyzed the impact of R&D cooperation on firm performance differentiating between four types of R&D partners (competitors, suppliers, customers, and universities and research institutes [5]. Some authors defend determinants of R&D partnerships differ depending on the type of R&D and cooperation partner [15].

The literature in the management and technology policy domain has examined broader motivations for R&D cooperation than internalising involuntary knowledge spillovers and has paid more attention to the voluntary nature of knowledge exchange in R&D alliances [15]. Belderbos defend that Cooperation with a type of partner generally is more likely to be chosen if that type of partner is considered an important source of knowledge for the innovation process, while knowledge sourced from universities and research institutes positively impacts all types of cooperation. R&D cooperation with universities is more likely to be chosen by R&D intensive firms in sectors that exhibit faster technological and product development [16].

Tether agree that cooperation between universities and research institutes with Companies and small firms is generally more aimed at innovations that may open up entire new markets or market segments [17]. Cooperation is comparatively more frequent in chemicals, metallurgy, and business services. But if we look at Science-based industries such as electronics and chemicals, food and metallurgy industries, report a higher share of university cooperation compared to the other types of cooperation [5].

Caloghirou has a great work where he investigates the characteristics of university-industry collaboration in a large set of research joint ventures, established in the context of the European Framework Programmes over a period of fourteen years. We agree with his point of view when he said the companies cooperate with universities to exploit research synergies leading to cost savings or improvements in R&D productivity, keeping up with major technological developments, and sharing R&D cost, but more important than this the companies benefit from such collaboration has been the positive impact on their knowledge base [18].

2.4. Project Management

The Project management is a complex and ongoing activity, which can provide competitive advantage to an organization, but on the other hand, can bring you many problems if not managed in a proper and professional way. Therefore having an appropriate project methodology helps the project to achieve its objectives [19].

Baptista et al, believe that the connection between companies and Universities is the main driver for innovative business success. However the success of this relationship is only possible, if there is a management methodology appropriate to the complexity of the projects which are developed in consortiums, multi- sectorial and are culturally so different [19]. In the same way, Geraildi et al, said that the investment in R&D arises the necessity of new methodologies that are able to follow all the stages of the product creation from the R & D study to its introduction on the market [20].

3. Risk Prevention Methodology

This methodology was based in rules delimited by the European Commission in respect to the functioning of the co-promotion projects that were founding by the old investment Framework Programme FP7 [13-14].

3.1. IPRs

At the start of the project, an IP register has been produced to allow each participating organization to contribute to it. To each partner was required a list in the Register with all of its Background IP (patents, know-how, protocols etc.) or third parties IP that was relevant or could affect the exploitation of foreground that was generated during the project. Each partner was able to insert on the register any external IP that it may discovered that similarly could affect protection, or use, during the course of the project and would support the activities of the CROP Steering Committee in deciding on the areas and nature of IPR protection that will be pursued.

3.2. General Rules Management

The organizational management activity consisted in the rationalization of the technical efforts and outputs of the partners. The general proceeds included:

- The definition of team cooperation software platforms to be adopted.
- monitoring the work, including technical results and deliverable preparation
- monitoring the use of resources according to the technical activities by task leaders against technical milestones
- defining the outputs and project objectives
- coordinating internal review of project's outputs
- addressing and verifying the coordination between related WPs
- verifying the respect of deadlines, technical objectives and technical critical issues
- providing organization of physical and virtual meetings with regular deadlines, in accordance with the project plan, to assess the degree of completion of project objectives.

3.3. Consortium Barometer

We developed a Consortium Barometer – a self-assessment tool for managing the consortia. 12 factors are identified, which can have a major impact on the success or failure of a Consortium. By asking the partners to classify how well they think the Consortium is performing against each of these factors, it is possible to highlight the underlying causes of problems, or to identify factors that may give rise to problems in the future, and assessing of the quality of the collaboration and progress of the activities within each WP. Marked differences in the ratings given by different partners will also help to identify partners who may feel they have been marginalized or whose basic approach to the project differs fundamentally from the majority.

We monitored, in collaboration with the WP leaders, the work performed by the project partners against technical milestones. We also addressed the coordination between related WPs and supported the organization of physical and virtual meetings with regular deadlines.

This may give rise to questions as to whether they are in the right project with the right partners. Exposing fundamental differences of approach early in the life of a Consortium can help avoid major problems later on.

On this Barometer, factors rated with a 4 or 5 are the strong factors and should be cherished. Factors scoring 3 require attention. Factors scoring 2 or 1 represent threats to the viability of the Consortium and should be addressed a matter of urgency. The Barometer is to be submitted by each partner team leader, only 1 per organization (not 1 each person working on the project).

3.4. WP Assessment and Evaluation Questionnaire

The questionnaire applied to the work package (WP) is another key point of the project risks control. When we work in projects like MAAT, a project with 12 partners (8 Universities and 4 Companies), with a budget superior to Eur 5 million, we should be aware of any minimal warning signal. The WP consisted in a set of tasks where one of the partners is dominated leader and where the other partners have responsibilities in the preparation of key documents submitted to the US.

This means that, within the same WP, we have several partners to work together on various activities, where each has a key role to perform. If a partner is late, or has some kind of problems in the performance of their duties, it will be reflected throughout the WP and will imply a delay in the reports elaboration which, as consequence, will affect the overall project.

It is therefore necessary to identify the critical points and control in periods of 6 months (this varies from project to project, in our case was six months because the projects were projects 2 and 3 years) the execution of tasks. This questionnaire is quite simple. It is divided into four key sections. The first section addresses the quality, form and timing of reports. The second one is related to objectives of the work package. The third is associated to the relationship and cooperation between the different partners in the work package and the last one is about the management and coordination of the work package.

4. Conclusion

The application of project management tools as well the existence of project manager are ever more a decisive factor in the successful implementation of a project. If in individual projects within an organization it is not valued, in co-operation projects it is essential. In this case study, where the methodology was applied, it was proved the relevance of the latter to ensure that projects could achieve its objectives.

In a first stage, this methodology addresses elements as important as the protection of data that each partner already has at the beginning of the project. Relating to CROP project, one of its partners owned already several patents related to the theme of the project, which implied a reinforced vigilance in order to avoid the violation of the industrial property rights of the referred partners.

By applying the Consortium barometer and the WP performance evaluation questionnaire it was possible to lift small rising conflicts within the consortium. These problems were analyzed by the project coordinator team and was promptly scheduled a meeting where, in addition to other subjects, was resolved this small conflicts.

The periodic reports, the fulfillment of the documentation delivery dates and essential information exchanges during the work were other tools used by the team management and coordination of the project to detect some deviations of certain project partners. With these warnings it was easier to plan actions to solve these problems. In the future, we can reformulate the used tools, specially, the Consortium barometer and WP Evaluation Questionnaire in order to suit them to the referred project and, with this, to make them even more precise tools to detect the risks in the project.

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