
LISBOA
SCHOOL OF
ECONOMICS &
MANAGEMENT

MESTRADO EM ECONOMIA E GESTÃO DE CIÊNCIA,
TECNOLOGIA E INOVAÇÃO

# TRABALHO FINAL DE MESTRADO

DISSERTAÇÃO

# THE ROLE OF SCIENCE AND TECHNOLOGY MANAGEMENT COMPANIES IN THE SET-UP AND COORDINATION OF MULTI-PARTNER SCIENTIFIC ALLIANCES

INÊS MENDES MATIAS

OUTUBRO - 2015

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**ORIENTAÇÃO:**

PROFESSOR DR. VÍTOR CORADO SIMÕES

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There is something irreversible about acquiring knowledge.

J. Robert Oppenheimer

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# Glossary

BRICS - Brazil, Russia, India, China and South Korea (group of emergent economies)

CERN - European Organization for Nuclear Research

EC - European Commission

EMBL - European Molecular Biology Laboratory

ERA - European Research Area

ERC - European Research Council

ESA- European Space Agency

ESF - European Science Foundation

EU - European Union

FP - Framework Programmes

FP7 - European Commission Seventh Framework Programme

H2020 – Horizon 2020

IP - Intellectual Property

OECD - Organisation for Economic Co-operation and Development

R&D - Research and Development

S&T - Science and Technology

USA - United States of America

WP - Work Packages

# Resumo

Existem, atualmente, poucos estudos académicos realizados sobre Gestão de Ciência e Tecnologia (C&T), nomeadamente sobre o tipo de entidades cuja atividade empresarial se concentra nesta área. Um exemplo de tais entidades são as empresas de Gestão de C&T que, entre outros, oferecem serviços de consultoria na construção de consórcios e na elaboração e submissão de propostas de financiamento.

Neste trabalho propusemo-nos estudar e caracterizar estas empresas com base num painel de 66 empresas que operam na União Europeia. A análise foi realizada com base em doze variáveis estruturais e utilizando um modelo estatístico com base numa análise de *clusters*. Esta análise permitiu-nos identificar cinco grandes grupos de empresas. O tipo de serviços oferecido mostrou ser a variável que mais influenciou o agrupamento das 66 empresas nos cinco *clusters.* Cada *cluster* foi posteriormente caracterizado de acordo com o tamanho das empresas e o tipo de clientes. Não encontramos uma aparente correlação entre o número de serviços oferecidos e o tamanho das equipas das empresas, mas sim entre o tamanho e o tipo de serviços prestados. Encontramos evidências para um maior número de contactos por parte de Pequenas e Médias Empresas (PMEs) do que de Universidades, na requisição de serviços de gestão de C&T. Os resultados obtidos mostram que estas empresas de gestão de C&T são bastante dinâmicas, com qualificações muito especializadas e com um grande foco no cliente e nas suas necessidades. Estes evidenciam um grande potencial de crescimento deste sector, e mostram a importância destas empresas na construção e gestão de consórcios e de propostas de consórcio.

**Palavras-chave**: União Europeia; Colaboração; Ciência e Tecnologia; Investigação; Projetos; Gestão.

## Abstract

Science and Technology (S&T) Management is a poorly studied field to what concerns the type of entities operating in such field. One example of such entities are S&T Management companies that provide a variety of services such as assistance in consortia assembly and in proposal submission. The present thesis proposes an objective characterization of such companies based on a panel of 66 companies operating in the European Union. The analysis was made based on twelve structural dimensions, and through a statistical model based in a clusters analysis for allowing the identification of 5 major groups of companies. Cluster patterns have been largely influenced by the type of service offered. Each cluster has been further characterized according to the size of the companies and type of clients. There is no apparent correlation between the number of offered services and the size of the team but, instead, with the type of services provided. There is, however, a slightly tendency for SMEs (Small and Medium Enterprises) to request more often these companies' services than universities which lead us to conclude that consortia are usually led by SMEs rather than by academic groups. The results obtained show that these are dynamic companies, with very specific skills and a strong focus on the client's needs. The research identifies a great potential for the sector to grow, and highlights the importance of such entities in the assembly of multi-partner alliances but also the need for further studies.


**Keywords**: European Union; Collaboration; Science and Technology; Research; Grants; Management.

# Chapter 1: Introduction

In the European Union (EU) context, efforts have been made towards the construction of a strong and competitive Scientific and Technological (S&T) system such as the promotion of relationships among the actors of the different national S&T systems (Fischer 2012; European Commission 2007; European Commission 2012). However, despite the progress achieved in the last decades, an interim evaluation of the European Commission 7th Framework Programme (FP7) clearly identified the need for the intensification of international cooperation activities focused on engaging with partners outside of Europe (European Commission 2010b). In other words, in order to truly create an European Research Area (ERA), Europe needs to establish sound networks of collaboration in Research and Development (R&D) that work as easily as networks within national borders, in order to create and attract critical mass and investments (European Commission 2010a; European Commission 2007). These R&D networks, specially the ones created in response to the European Commission Framework Programmes funding initiatives, typically involve partners from several different countries and from a broad range of backgrounds, which makes the formation of such consortia a highly complex process (European Commission 2012; European Commission 2015c; Hagedoorn et al. 2000). The complexity of the process and the diversity of the actors involved suggest the need for specialized support in the formation, coordination and management of such consortia. Research Management companies have arisen in response to a specific need identified by the European Commission, and have become important players in the current European scientific and technological scenario (Gusmão 2001; Vidal et al. 2015; Langley 2012).

Based on this, we formulated the following research question: what is the role(s) of

science and technology management companies in the assembly and coordination of multi-partner scientific alliances, such as consortia?

To answer this question, we have established three different approaches. The first was to gather information that might provide metrics to characterize such companies. The second was to establish their profile and business approach within the European scientific scene, and the third approach was to describe their interaction and role in the setup of multi-partners scientific alliances, based in the information previously collected. Within the 66 companies analysed, we have identified 5 groups of companies that mostly differ in the pack of services they are specialized in. There are companies specialized in following the life cycle of funding projects, from cradle to grave, while other companies are more focused in business-related activities or just offer independent services, with no obvious relation to the development of the life cycle of projects.

The methodology and analysis proposed and the presented results correspond to the first approach to this study, and to what could be done with the available information.

This dissertation is structured in 6 chapters. In Chapter 2 we explore the literature about European scientific collaborations and the history and role of research management within the European Research Area (ERA). In Chapter 3 we describe the methods used to collect and analyse information, and in Chapter 4 we present the results obtained with such analysis. In Chapter 5 we discuss the results of the study in light of what has been previously described by other authors and, finally, in Chapter 6 we resume the main conclusions of our study.

# Chapter 2: Literature Review

Collaborative research as been strongly supported by governments and organisations. The decision to enter collaborations affects not only the research process but also the construction and management of such structure as a consortium, as well as the outcomes of such collaboration. Several authors have studied research collaborations but none had addressed the existence of intermediates that may influence the progression of such collaborations.

## 1. An European problem

Global research and innovation were, until recently, dominated by the European Union, the United States of America (USA) and Japan. The European Union (EU) is a world leader in research and innovation, accounting for 24% of world expenditure on research, 32% of high impact publications and 32% of patent applications, while only comprising 7% of the population (European Commission 2012). However, over the past decade, the landscape has rapidly evolved. Emergent countries such as Brazil, Russia, India, China, and South Africa (BRICS) have been catching-up and strengthened their Research and Development (R&D) systems, increasing their influence in the international scene. BRICS share in global expenditure on R&D has doubled between 2000 and 2009 (Luis Fernandes, Ana Saggioro 2012; European Commission 2012).

Europe also needs to pay attention to the third countries[1], as more research and innovation is being performed in it. Europe must be able to have access to this knowledge, and become an attractive location for carrying out research and innovation,

[1] A third country, for the purposes of this study, is a country that is neither a Member State nor a state associated to the research framework programmes.

as well as be competitive enough to attract the best talents (European Commission 2012).

The Green Paper released in April 2007 (European Commission 2007) highlights the importance of the European Research Area (ERA). It signals the need for greater cohesion among the various countries and regions of the EU and for increasing interactions as a method to augment and disseminate the generation of knowledge, and to build more critical mass.

Throughout the years, Europe has been developing a specific model of scientific and technological cooperation across borders. Such examples are the European Organization for Nuclear Research (CERN, founded in 1954), the European Space Agency (ESA, 1964), the European Molecular Biology Laboratory (EMBL, 1973), the European Science Foundation (ESF, 1974) and inter-governmental networking structures such as EUREKA[2] (1985) and COST[3] (1971), as well as the EU Framework Programmes (European Commission 2007). These international research initiatives and multilateral incentive programmes constitute one of the driving forces in the construction and maintenance of the ERA (European Commission 2012; European Commission 2007; Gusmão 2001). Through promoting the formation of multinational R&D consortia, exchanges between researchers, the twinning of laboratories, and access to major research infrastructures, these various initiatives have encouraged the development of research partnerships that extend across national frontiers and, consequently, have

[2] Eureka programme main goal is to fund transnational network projects that perform market-driven innovative research. The "bottom-up" approach allows the project consortia to define the nature of the technologies to be developed and how the project comes together, agree upon the intellectual property rights and build partnerships, to share expertise and ease access to international markets with the results of their research.

[3] COST Actions are "bottom-up" science and technology networks, open to researchers and stakeholders with duration of four years. They are active through a range of networking tools, such as workshops, conferences, training schools, short-term scientific missions (STSMs), and dissemination activities, and do not fund research itself.

fundamentally altered the geography of European science and technology (Gusmão 2001; European Commission 2007).

One of the ERA's pillars lies on the conceptualization of the Framework Programmes (FP), which has provided the opportunities for trans-border cooperation and enhanced EU's quality and quantity of international R&D collaboration agreements across the continent (European Commission 2007; European Commission 2008). The Framework Programmes have gradually been opened up to participation by third countries, with support for international cooperation fully mainstreamed within FP7 (7% of FP7 participants come from third countries) (European Commission 2008).

Progress has been made in increasing the scale and scope of international cooperation activities. Smaller networking and partially co-funded activities, such as the ERA-NETs actions[4] and the Joint Technological Initiatives[5], have accompanied these actions. Despite the progress made, the FP7 interim evaluation (European Commission 2010b) identified a lack of critical mass and the absence of a clear definition of the strategy driving the development of the actions. This evaluation pointed out the need for an intensification of international cooperation activities focused on engaging with partners outside of Europe on equal terms and in programmes and activities of high mutual interest and recommended the coherent strategic development of the Union's policy for

[4] ERA-NET scheme is to develop and strengthen the coordination of national and regional research programme. The ERA-NET actions provide a framework for actors implementing public research programmes to coordinate their activities e.g. by developing joint activities or by mutually supporting joint calls for trans-national proposals.

[5] Joint Technology Initiatives were an entirely new mechanism launched during the 7th Framework Programme. They are long-term Public-Private Partnerships that support large-scale multinational research activities in areas of major interest to European industrial competitiveness and issues of high societal relevance.

international cooperation in research and innovation (Edler 2010; European Commission 2008; European Commission 2010b).

## 2. Trends in international S&T policies

The importance of the development of internationally coordinated policies and funding schemes to support international collaboration in Science and Technology (S&T) can be justified, according to Jakob Edler (Edler 2010), by three mega trends.

The first mega-trend is the growing number of indicators that point to an increasing relevance of international collaboration in S&T, followed by the broadening of international and transnational policy initiatives that aim at modulating instruments to foster international collaborations. These indicators, such as co-publications, co-inventions and joint research projects, show the development of S&T collaborations not only within the OECD (Organisation for Economic Co-operation and Development) countries but also within the emerging economies, like BRICS countries (Edler 2010). One example is that internationally co- authored articles appear to be cited more often than nationally co-authored papers (Leydesdorff & Wagner 2008). This is a very important fact considering the global dispersion of specialised knowledge production, but also shows the need for appropriate international policies. The presence in international networks allow researchers to accelerate the generation of knowledge, to avoid duplicated work, help researchers make a name for themselves and to step up their performance and *curriculum* (Edler 2010). The opportunities for knowledge diffusion are indeed greatly expanded at the global level, possibly benefiting scientists at the periphery in terms of having access to the core group. At the same time, the ability of the core group to access, absorb, and make use of participants from peripheral

countries is made even greater (Wagner & Leydesdorff 2005; Leydesdorff & Wagner 2008).

The second mega-trend is that fostering international S&T is no longer an exclusive concern of scientists and S&T policy makers. Science and Technology are now seen as a mean to drive economic growth and to create jobs, as an investment in our future and as a tool to solve societal challenges (European Commission 2015c).

The third and last mega-trend is the increase and broadening of international and transnational policy initiatives and instruments to foster and modulate international S&T collaborations, such as the European organisations mentioned above (Edler 2010).

European policy and funding scene has changed within the last 10 years and, more recently with the creation of ERA, has became more flexible in a way that enables and support international scientific collaborations. News instruments were created at the European level, such as the European Research Council (ERC) and the ERA-Nets that broadened the toolbox of existing funding opportunities for S&T collaboration, and have been of critical importance for a development towards flexible internationalization policies (Edler 2010).

On 14 September 2012, the Commission adopted a Communication entitled "Enhancing and focusing EU international cooperation in research and innovation: a strategic approach" (European Commission 2012). The Communication sets out a new strategy for international cooperation in research and innovation, in particular with a view to implementing Horizon 2020, the 2014-2020 EU Framework Programme for Research and Innovation. In this strategy, the Union commits itself to continue to engage with countries and regions across the globe by fully opening the new framework programme Horizon 2020 to participation of researchers and institutions from all over the world. An

example is that funding opportunities such as the European Research Council (ERC) grants[6] and the Marie Sklodowska-Curie Actions[7] will be open to researchers from third countries. This will require a strict balance between cooperating with third countries to jointly acquire and advance in scientific knowledge while safeguarding the interest of the European Union countries and citizens (European Commission 2012).

H2020 has a number of new features that make it suitable to the promotion of S&T collaborations. This new strategic approach to international cooperation in research and innovation, implemented by the H2020, can be characterised by: 1) being fully open to third country participants, allowing European researchers to cooperate with the best researchers across the world; 2) targeting international cooperation activities with the scale and scope necessary to maximise the achieved impact; 3) The development of multi-annual roadmaps for cooperation with key partner countries and regions; 4) reinforces the partnership between the EC, the Member States and relevant stakeholders; 5) promoting common principles for the conduct of international cooperation in R&D; 6) enhancing the role of the Union in international organisations; and 7) strengthening implementation, governance, monitoring and evaluation (European Commission 2012). This represents a simplification of the S&T policies and a clear promotion of international collaborations.

## 3. Networks of scientific cooperation

As research in science and engineering becomes increasingly multidisciplinary and competitive, research managers and policy-makers are relying more on multi-

[6] The European Research Council (ERC) is a flagship of the Horizon 2020, and its main mission is to support the highest quality research in Europe through highly competitive funding. Its a "investigator-driven" and "bottom-up" initiative, and awards grants to Project headed by starting and established researchers, independent of their origins, who are working or moving to work in Europe.

[7] The Marie Sklodowska-Curie Actions provide grants for researchers in all stages of their careers and encourage transnational, inter-sectorial and interdisciplinary mobility.

institutional collaborations to develop strong, intellectually diverse teams that can answer complex research questions (Corley et al. 2006). For the last three decades there has been a change of how inter-institutional research collaboration are established: S&T policy has moved from a decentralized support of small investigator-initiated projects to large-scale centralized multidiscipline research (Bozeman & Boardman 2003). This was due to S&T collaborative policies that were implemented in the 1980s and that led to an increased R&D interaction among researchers throughout academic centres, government laboratories and other research organisations. The management model of these multi-organizational research collaborations have developed so fast that researchers interested in participating have had several difficulties to understand it (Corley et al. 2006). There are many differences between universities and businesses and these differences hinder effective collaboration.

### 3.1. Models for collaborative research

Some authors have tried to explain the mechanisms behind collaborative research. Some have focused on the study of particular influence factors, such as success factors, while others developed more complex models and frameworks (Bukvova 2010).

Teresa Amabile (Amabile et al. 2001) has explored the factors responsible for the success of academic-practitioner collaborations, considering three main determinants that modulate research collaborations: collaborative team characteristics, collaboration environment characteristics, and collaboration processes. Based on this research, Leisa Sargent and Lea Waters (Sargent & Waters 2004) developed a conceptual framework for academic research collaboration taking in consideration three dimensions: the collaboration process, the interpersonal processes within the team, and the contextual factors. Several other models have been described (Stokols et al. 2005; Cummings &

Kiesler 2007; Kraut et al. 1987), but they all are descriptive models that explain the interaction between the collaborators and how the process develops. Indeed, throughout their analysis, they found this process model insufficient to explain the functions of collaborative research (Bukvova 2010). None of the previous briefly described models considers the interaction between the academia and companies.

### 3.2. The Triple Helix Model – A model for collaborative research between academia, businesses and the government

The Triple Helix Model may explain the collaborative research between academia and businesses. This concept emerged in the mid-1990s (Leydesdorff & Etzkowitz 1995) when universities and industry were being pressed by policy makers to work together more closely for the benefit of society resulting from the commercialisation of knowledge produced in the academia (Lawton Smith & Leydesdorff 2012). This model of university–industry–government relations can be used for explaining the current research system in its social contexts. It interprets the shift from a dominating industry-government dyad in the Industrial Society to a growing triadic relationship between university-industry-government in the Knowledge Society (Etzkowitz & Leydesdorff 2000).

The Triple Helix thesis is that the potential for innovation and economic development in a Knowledge Society lies in a more prominent role for the university and in the hybridization of elements from university, industry and government to generate new institutional and social formats for the production, transfer and application of knowledge (Leydesdorff 2000; Leydesdorff & Meyer 2006; Leydesdorff & Etzkowitz 1995). The common objective is to create an innovative environment consisting of university spin-off firms, tri-lateral initiatives for knowledge-based economic

development, and strategic alliances among firms large and small, operating in different areas, and with different levels of technology, government laboratories, and academic research groups (Etzkowitz & Leydesdorff 2000). This forces Universities and firms to assume tasks that were formerly the province of the other sectors (Leydesdorff 2000), and to establish relationships with actors of the S&T system that may speak a different "language".

Networks of scientific cooperation spawned by European programs can be distinguished from links that arise spontaneously among researchers in an international scientific environment (Gusmão 2001). These networks are often spread more widely geographically, involving partners from different countries and bring together partners from a broad range of backgrounds (industrial laboratories, academic research, public research centres, professional organizations, as well as certain institutions outside the realm of research) (Gusmão 2001).

The multi-year EU programs have promoted the development of collaborative practices between different organizations within member states and the emergence of cooperative networks (Brocke & Lippe 2015). Collaborative research projects are projects that are jointly financed, planned and executed by a consortium of academic, public and industry partners. Partners share a common research interest and provide inter-disciplinary and complementary resources and competencies to achieve the projects goals (European Commission 2012; European Commission 2015c; Bukvova 2010). This interdisciplinary plays an important role in the portfolio of public and private companies, and has been increasingly promoted in the last decades by public-funding agencies such the European Commission (Gusmão 2001).

On average, the collaborative research projects funded by the EU involve at least three legal entities, each of the three established in a different Member State or associated country (European Commission 2015b). The project tasks and responsibilities are divided among the partners in several work packages (WP), while one partner is responsible for the overall coordination of the project. The overall coordination includes project management, communication and dissemination of the project activities, and coordination of the scientific component. It is the coordinator's responsibility to act as the official channel with the EC (Brocke & Lippe 2015).

International collaboration in science can thus be viewed as an emergent, self-organizing system where the selection of a partner and the location of the research rely upon choices made by the researchers themselves rather than emerging through national or institutional incentives or constraints (Wagner & Leydesdorff 2005). The complexity and diversity of actors involved, and their varied geographical and institutional origins, suggest a whole range of complementary analyses concerning the makeup of these collaborative research networks and the need for specialized support in the coordination and management of such consortia (Gusmão 2001; Boardman & Bozeman 2006; Bukvova 2010).

## 4. Research Management – need for specialized support

Collaborative research projects have emerged as one particular type of relationship between academia and industry: while research activities were mainly conducted by research centres and universities, companies are now starting to be involved in joint research projects with other industry and/or academic partners. This allows solving challenges that cannot be solved individually by each partner. However, coordination of consortia demands a closer collaboration between the different agents, creating a

complexity of managerial processes (Nobelius 2004).

Collaborative research projects are highly demanding on project management capabilities. They are generally associated with high uncertainty and risks, individually oriented project personnel, heterogeneous partners located at different locations (institutions or countries), and significant pressure in terms of creativity and innovativeness. Research consortia are often built as a response to specific calls by funding agencies, such as the one under EC Framework Programmes. Due to this, collaborative research partnerships are often temporary partnerships that exist for the purpose of building and evaluating novel results under a pre-defined research objective and with resources, time and financial constraints (Brocke & Lippe 2015).

Adding to the above described needs, funding opportunities are constantly increasing in number and so is the competitiveness of each one of them. Consequently, the amount of projects to be managed has also been increasing as well as the need for specialized and optimized teams and personnel (Vidal et al. 2015).

Research managers have become key elements in the overall strategy of a research institution and any organisation that depends on public funds (Langley 2012). A study undertaken by the European Research Advisory Board (EURAB) in Research Management in the European Research Area (ERA) in 2007, defined research management as the process of leading, administering and creating value from research, and described it as vital tool for Europe's economic and social prosperity (EURAB 2007). Also, with the increasing difficulty in obtaining funding, the help of professionals in preparing and submitting funding applications has become a valuable asset (Vidal et al. 2015).

Research management is part of an emergent group of professions that has been arising

over the last twenty years due to the need of managing the increasing number of competitive and complex research funding applications (Langley 2012). It has become very common to find, in the majority of the research-intensive institutions, such as universities, a dedicated office that provides support to the individual researcher but that also represents the institution. The majority of the grants managers working in these offices are now highly qualified, but that was not the case until recent years (Langley 2012). One example is the one about the biotechnology and pharmaceutically companies. These companies face constant challenges in the course of the development of new products, but several of them are due to the poor project management skills of managers, who have no formal training in matters of project management. Academic scientists are allocated into management positions with a poor knowledge of the business side of science (Kashyap, 2002). This also applies to universities, R&D centres and other organizations.

The main task of a research manager is the operational control of individual programmes and projects, i.e. the development of both pre-award activities (e.g., search of partners and funding opportunities, proposal writing, budget definition) and post-award activities/project management (e.g., contract negotiation, finances, milestones management, audit management, communication and dissemination activities). Other tasks include making strategic choices about topics and directions (policies), informed by good intelligence about technologies, competitors and markets; the effective transfer and commercialisation of results (Langley 2012; EURAB 2007).

The EURAB experts group called the attention of the EC for the fact that "without excellent research management, Europe's research and technological development will simply not deliver the benefits expected and needed" (EURAB, 2007 - page 7). They

highlighted that "excellence is needed at all stages of the research process, from basic to applied research as well as in collaboration and partnership with the business community as part of research and innovation ecosystems within non-linear complex" (EURAB, 2007 - page 7). Also, the growth of research partnering and open innovation is creating fresh challenges, as research managers increasingly have to operate on a truly global basis and deal with teams whose members come from multiple organisations, nationalities and cultures (EURAB 2007).

According to Sheila Vidal (Vidal et al. 2015), there is an improvement in the success rates for funding applications which have received advanced support, suggesting that Grant Managers providing specialized support are essential for supporting the research activity. There is, however, a difficulty in measuring such improvement, and some authors have defended the need of more precise performance indicators, such as the amount of money and the number of grants secured (Bauer 2001).

After revising the literature, we find ourselves in the presence of enough evidence about the importance of research management structures that mediate the assembly and management of multi-partners alliances. However, there seems to be little information on the literature on science management companies. From the literature review we can conclude that, namely for what concerns the European Commission ideal, excellent research requires excellent management and that further efforts have to be done to raise awareness to the subject and to the importance of highly qualified and specialized services.

Through our study we wanted to answer to the following research question: what is the role(s) of science and technology management companies in the assembly and coordination of multi-partner scientific alliances?

To answer it, we first aimed to characterize and trace the profile of such companies, which will allows us to define new and appropriate metrics or indicators of these companies' success. Lastly, and using such metrics, we aim at understand the reasons and importance behind their participation in the assembly of big research collaborations.

## Chapter 3: Methodology

Our research question was to understand the role of science and technology management companies in the set-up and coordination of multi-partner alliances. To do so, we have established three specific approaches that would allow us to compile the information required to answer our research question.

As mentioned above, the first approach concerned the collection of information that could serve as metrics to characterize such companies. The second approach was to establish their profile and business approach within the European scientific scene, and the third was to describe their interaction and role in the setup of multi-partners scientific alliances, based on the information previously collected.

To successfully accomplish our objectives, we needed to collect from these companies as much information as possible. We started by reviewing the literature, but we realized that there was little empirical source of evidence about these companies. We knew beforehand about the existence of several science management companies, namely European, and therefore we decided to build our own companies' database. In order to restrict our analysis and list of companies, we first had to define the criterion by which we were selecting our subject of study. The criterion to choose if a company was suitable to our research was whether it performed or not scientific ad technological consultancy and management of grants and applications. Through social networks (LinkedIn and Facebook) and an online (Google) search we were able to build a

database of 66 science management companies with European origin or with European offices.

Based on Jakob Edler (Edler 2010) and Mark Newman (Newman 2001), that used surveys to collect information on scientific collaborations, we decided to build an online survey to send to the companies in order to get the most precise information possible. To decide which questions/information we would like to include in the online survey, we briefly analysed each company website. Our goal was to survey both to the companies and to their clients, in order to collect information that would be used to profile these companies, to establish metrics to measure their success, and to understand the main reasons behind their role and importance in multi-partner scientific alliances assembly.

However, we were not able to get a significant number of replies to the online survey, and had to find an alternative method to consolidate the scarce information we had collected. We proceeded with a deep analysis of the websites of each company, but the information available was also very limited. Nonetheless, due to the short period of time we had to complete our study, we proceeded with a statistical analysis using the available information.

## 1. Online survey

We have elaborated two online surveys: one was sent to the analysed companies and the other to a list of consortia that we have collected from the companies' websites. The one sent to the companies was built with the purpose of getting a deeper perspective of the activities undertaken by these companies and their businesses approaches. We built this survey based on information we considered important to establish the profile of such companies. This information was mainly related to the added-value proposition of the

companies, to the number and type of collaborators, to the role of the company in the consortia, to the way these companies advertise and reach to new clients, their success rates and compensation model, the type of partnerships they establish and who they consider to be their main competition, what is their market and what kind of services they value the most, and who are their clients. We present it in Annex I.

The second online survey was built to obtain the customer perspective. We wanted to evaluate what are the main reasons that led to recruit such companies, what are the most valued services and skills, what are the main limitations of this kind of service and what is more valued, and if clients would recruit these companies again and why. We used the information available at the websites on the "clients portfolio" section and built a consortia contacts database, with 52 entries, to which we sent this second online survey. The online survey is presented in Annex II.

This led us to the first main difficulty of the present study, which was the lack of responses to the online survey. Out of the 66 surveys sent to the companies, we could only obtain 10 responses and, out of the 52 surveys sent to consortia, we obtained 3 responses and they were all very incomplete.

Due to this, we decided to try to consolidate the information obtained from the surveys by deeply analysing the companies' websites.

## 2. Website analysis

By visiting each company website, we were able to carry out an analysis of the type of services offered by each one of them. Due to differences in each service's name, and in order to be easy to analyse, we created main categories in which we included several other (subcategories). 14 categories were determined based on the information available at the websites of a selected number of well-established and well-known companies of

the field.

However, the second main difficulty of this study, which was the lack of information available at the companies' websites, forced us to disregard some of the initially defined categories and subcategories due to the high level of missing entries. To proceed with the analysis and the characterization of the companies, we have selected the following 12 categories, which we have divided into pre-award, post-award, business-related and other activities (Table 1).

These 12 categories will be called, from now on, as variables.

**Table 1 - List of categories and subcategories**

| | Categories | Observations/Scope |
|---|---|---|
| **Pre-Award** | EU lobbying and networking | Determine if companies offer lobbying services within the EU. |
| | Proposal preparation | Determine if companies offer isolated services, such as proposal writing and preparation, strategic partnering, etc., or if they offer a full "package". |
| | Strategic partnering | |
| | Identification of funding opportunities | |
| **Post-Award** | Project Management | |
| | Dissemination and Communication | Some companies provide assistance in content writing and use of social media to help clients delivering complex and sophisticated messages in simple, clear and informative language. |
| | Exploitation | Some companies provide specialized support in matters such as IP Rights. |
| **Business-related** | Business development | Some companies offer business development services, which include business plan development, technology and competitive watch, product or service value analysis, private investment search, etc. |
| | Intellectual property & technology Transfer | |
| **Other** | Events Organization | Determine if companies offer services to organize scientific events, such as conferences, seminars and workshops. |
| | Training | Determine if companies offer training sessions in matters such as European programmes, grant writing and proposal preparation. |
| | Website & Tools | Determine if companies offer services in Information and Communication Technologies, such as Design services, Websites construction and maintenance and custom made tools. |

We have also analysed the size of the companies' team, as well as the type of clients that most contact them (Universities and R&D centres or Companies/SMEs).

### 3. Cluster Analysis

Using the information collected from the websites, i.e. the 12 categories analysed, we questioned if we could identify groups of companies using as variables (or characteristics) the services offered by such companies. To do so, we performed a cluster analysis using the 12 relevant variables identified during the website analysis.

A cluster analysis is an exploratory technique that allows to group subjects or variables into homogeneous groups according to one or more shared features (Marôco, 2011). So the subjects or variables can be identified and grouped, the similarity between the various subjects or variables must be measured and the subjects are grouped according to a metric distance between them, while the variables are grouped according to correlation measures or association (Marôco, 2011). We used a two-step cluster analysis, using a Log-likelihood distance measure (categorical and continuous variables) and the Schwarz's Bayesian Criterion, and the 12 variables selected after the analysis of the websites to define the formation of the clusters (Mooi & Sarstedt, 2014).

## Chapter 4: Results

### 1. Online survey results

On what concerns the online survey sent to the consortia, we could only obtain 3 (incomplete) responses, and therefore we do not present such responses and neither analysed it. On the other hand, we were able to collect 10 responses from the online survey sent to the companies and proceeded with a simple excel analysis of the content of each question. We grouped the collected information in the following categories:

**A. Added-value proposition**

The majority claim that their added value is the fact that they are experts in EU R&D funding programmes, and can provide services such as proposal preparation partner search, project management, business development and consortium coordination. One company values the fact that they are one of the few consulting firms to work on success fees only, even on very competitive schemes like the H2020 SME instrument[8].

**B. Collaborators**

On average, the ten respondent companies have 37 collaborators, and when their team is less experienced in the scientific area of the proposal, they recruit external collaborators. These collaborators are recruited based on a well-established network of contacts that are as broad as social networks or Master degrees in EU programmes.

These companies also have networks of specific calls evaluators or ex-evaluators who they contact for pre-evaluation purposes (Figure 3, Annex I).

**C. Role**

When asked about the role, four companies answered they are usually subcontracted to a specific task, one answered they are included as partner, and four companies answered both options (Table 7, Annex I).

**D. Advertising and reaching to new clients**

The most used channels to advertise the company or get new customers are networking, followed by partnering relationships, through existing clients, social networks, events and email, and scientific events (Table 8, Annex I).

[8] H2020 SME Instrument it is a funding tool, aimed at helping high-potential small and medium enterprises (SMEs) to develop ground-breaking innovative ideas for products, services and/or processes that are ready to be launched in the global market competition.

**E. Success rates**

The ten companies gave very different responses to what concerns their application's success rate (Figure 4, Annex I).

**F. Compensation model**

Concerning compensation model, six companies prefer to use upfront payment + success fee, which in 80% of the cases are between 5 to 10% of the proposal total amount (Figure 5, Annex I).

**G. Partnerships**

Seven companies answered that they usually establish partnerships with other grants management companies. The reasons presented to do so are 1) the need for complementarity and added value in order to increase the probability of success; 2) access to external expertise or know-how; 3) over-capacity and difficulty in recruiting specialized support; and 4) the need for consortia cooperation in the case of certain tenders (Figure 6, Annex I).

**H. Competition**

In what concerns competitors, only seven companies see as main competitors other Grants Management companies, and only two have selected Institutional Grants office has their main competition (Figure 7, Annex I).

**I. Market**

When asked the main limitations to this business growth, the companies highlighted 1) the capacity of keep up with high success rates; 2) the ability and availability of outstanding specialized collaborators; 3) the high cost of marketing and recruitment; and 5) the lack of clients awareness.

### J. Services

During the website research, we were able to find the service EU Lobbying in a small number of companies. Most of the respondents answered that they do not consider that lobbying is a key factor in this activity, because it does not affect proposals success rate or influence project management activities.

### K. Clients

The clients that typically look for Grants management services are Small and Medium Enterprises (SMEs) that, according to the respondents, are who establish the contact in 100% of the times. The second biggest client is the University, followed by Research centres and Industry (Table 10, Annex I). Most of the proposals come from the Information and Communication Technologies, followed by Health and Life Science, Engineering and Exact Sciences, Environmental and Natural Sciences, and Humanity and Social Sciences (Table 12, Annex I). As or the main reasons that led clients to recruit grant management companies, the respondents answered that the main reason is the competitiveness and complexity of the funding calls, followed by the complexity of building, coordinating and managing a consortium (Table 11, Annex I).

## 2. Website analysis

In Figure 1 we can observe the raw data obtained from the websites' analysis. The percentages correspond to the number of companies that offered such services when compared to the total number of analysed companies (66). Out of a total of 66 companies, we can conclude that the most offered services are Proposal preparation and Project Management. This matches our companies' selection criterion: companies that provided technological consultancy and management of grants and grants application.

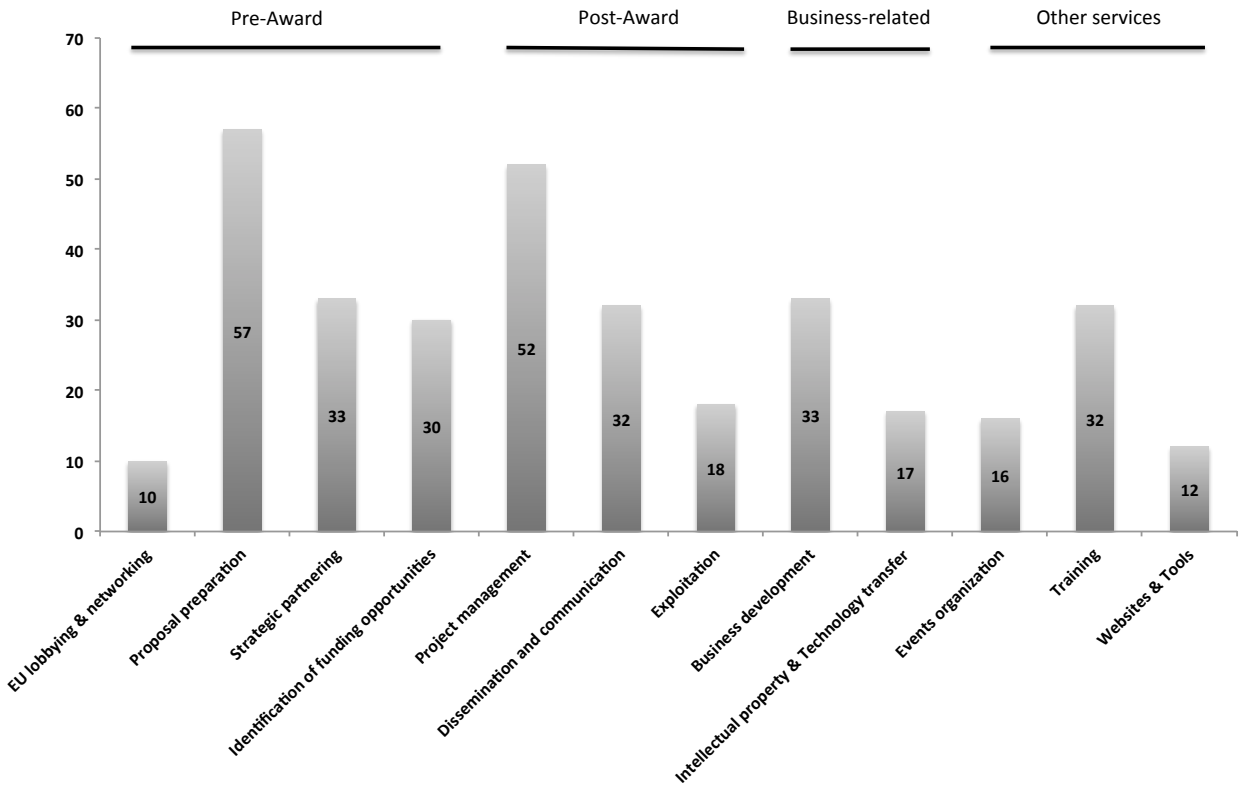


**Figure 1 - Websites' content analysis**

We have also attempted to evaluate the main type of clients that request these companies' services, and based on this information, we can conclude that these services are more requested by other companies or small and medium enterprises (SMEs) than by universities or R&D centres (Figure 2).

| CLIENTS | # |
|---|---|
| Universities R&D centers | 55 |
| Companies/SMEs | 63 |
| TOTAL # COMPANIES = 66 | |

**Figure 2 – Main Clients of S&T management companies**

## 3. Cluster Analysis

Using IBM SPSS Statistics software, version 23, and the two-step cluster method, we analysed the collected information and 5 clusters of companies were obtained (Table 2). The major advantage of using the two-step cluster method is that allows the automatic selection of the number of cluster to be formed (Mooi & Sarstedt, 2014).

**Table 2 - Cluster distribution**

Cluster Distribution

| | | N | % of Combined | % of Total |
|---|---|---|---|---|
| Cluster | 1 | 20 | 30,3% | 30,3% |
| | 2 | 10 | 15,2% | 15,2% |
| | 3 | 13 | 19,7% | 19,7% |
| | 4 | 13 | 19,7% | 19,7% |
| | 5 | 10 | 15,2% | 15,2% |
| | Combined | 66 | 100,0% | 100,0% |
| Total | | 66 | | 100,0% |

Concerning cluster quality, our variables were considered of fair quality (Figure 8, Annex III), which is not perfect but allows us to proceed with the analysis. A Ratio of Sizes of 2 means that no cluster in our cluster set is more than 2 times as large as any other cluster (Figure 9, Annex III), i.e., the companies' distribution within the clusters seems homogeneous, representing the smaller cluster 15,2% of the companies and the largest 30,3%.

Figure 10 (Annex III) shows the importance of each variable in the cluster assembly. Based on this figure, we can conclude that "Identification of funding opportunities", "Business Development" and "Strategic Partnering" were the three main variables that were used to assemble the clusters, indicating that these are the three services that most differ among the 66 companies (either they have it or they do not have it). On the other hand, "Exploitation", "Tools and Websites" and "Intellectual Property/Technology

Transfer" are the three services that contributed less to the division of the 66 companies into the five clusters.

On what regards the characterization of the 5 clusters, by considering Table 10 (Annex III), we were able to characterize each cluster based on the services mainly provided by the companies in it. The characterization is summarized on Table 3

**Table 3 - Cluster characterization**

| Clusters | Characterization | Label |
|---|---|---|
| 1 | Mainly formed by companies that are focused on pre-award activities and in managing the awarded projects (project management activities). These are classic companies that are mainly concerned with finding projects to manage. They follow the life cycle of funding projects, from cradle to grave, i.e., from the search of funding opportunities to the management of the project and related post-award activities. | **Pre-Award + Post-Award** |
| 2 | Formed by companies that also provide pre-award but that are more committed to the post-award time than cluster 1. These companies follow not only the management process of projects, but are in charge of the dissemination, communication and exploitation of the project's results. Additionally, cluster 2 companies provide business development services. Cluster 2 companies' are more dynamic, and show more concern with the project outcomes and whit the innovation potential may come from the projects. | **Pre-Award + Post-Award$^{+}$** |
| 3 | Mainly characterized by companies that are focused on business development, just giving support in getting the innovations products arising from the consortia projects near the market. | **Business Development** |
| 4 | Less focused on specific areas. Although also offering proposal preparation services and project management, cluster 4 companies' seem more focused in business development effort. | **Pre-Award+Post-Award+Business Development+Training** |
| 5 | Less focused on specific areas. Although also offering proposal preparation services and project management, cluster 5 companies' seem more focused in communication services (training, events, websites & tools). | **Pre-Award + Post-Award + Communication activities** |

## The effect of size

Regarding the size of the companies (Table 4), i.e. number of employees, since it is not a qualitative variable as the other twelve variables used, it could not be directly used in

the clusters analysis (Marôco, 2011). We therefore applied the variable size to the two-step clusters as an "Evaluation Field", which calculates cluster data for variables that were not used in the cluster creation (IBM Knowledge Center n.d.). This allowed us to observe the number of companies in each size category within each cluster. The size categories where 1 to 10 workers, 11 to 50, 51 to 200, 201 to 500, 501 to 1000 and 1001 to 5000.

**Table 4 - Number and percentage of companies per size per cluster**

| | Cluster 1 | | Cluster 2 | | Cluster 3 | | Cluster 4 | | Cluster 5 | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Companies' Size** | **#** | **%** | **#** | **%** | **#** | **%** | **#** | **%** | **#** | **%** |
| 1 to 10 | 7 | 35% | 6 | 60% | 3 | 23% | 7 | 54% | 5 | 50% |
| 11 to 50 | 12 | 60% | 1 | 10% | 4 | 31% | 5 | 38% | 5 | 50% |
| 51 to 200 | 1 | 5% | 1 | 10% | 3 | 23% | 1 | 8% | - | - |
| 201 to 500 | - | - | 1 | 10% | - | - | - | - | - | - |
| 501 to 1000 | - | - | 1 | 10% | 2 | 15% | - | - | - | - |
| 1001 to 5000 | - | - | - | - | 1 | 8% | - | - | - | - |
| **TOTAL** | 20 | 100% | 10 | 100% | 13 | 100% | 13 | 100% | 10 | 100% |

By evaluating the size of the companies within each cluster, we wanted to assess whether there was any relation to the average size of the cluster and the services that the companies on the cluster provide the most.

To test whether the variable "size" was in fact different between the 5 clusters, we applied a One-Way ANOVA analysis and observed that to what regards these clusters, they do significantly differ with regards to the size of the companies (p=0,018) (Table 16 from Annex III).

Comparing the cluster characteristics with the average size of each cluster, we observed that interestingly, although cluster 2 companies provide "extra" services (business development, dissemination, communication and exploitation of results) when compared with cluster 1, the average size of companies in this cluster is smaller. As for

cluster 3, although the companies are specialized in mainly one service, the average size of companies in this cluster seems to be very heterogeneous. Finally, cluster 4 and 5 also have very heterogeneous team sizes, not indicating any correlation between the services provided and the number of persons in the team.

The number of the teams may vary according to the number of active projects each company has in their portfolio, and we have no metrics for the number of projects each company was managing in the moment we have analysed the websites.

Regarding clients, in Table5 we can observe the number of times that a University and/or SMEs appears listed in these companies portfolio. When comparing each type of client number with the total number of companies in each cluster, we can conclude that most of the times these companies have both entities as clients. For example, in cluster 1, 18 companies have listed both entities, while 1 company only listed Universities and other listed SMEs as their only clients.

**Table 5 - Type of clients per cluster**

| | Clients | | |
|---|---|---|---|
| | Universities & R&D Centres | Companies/SMEs | # companies in the cluster |
| **Cluster 1** | 18 | 18 | 20 |
| **Cluster 2** | 8 | 10 | 10 |
| **Cluster 3** | 9 | 13 | 13 |
| **Cluster 4** | 11 | 13 | 13 |
| **Cluster 5** | 9 | 9 | 10 |

# Chapter 5: Discussion of results

Researching on a poorly studied field was one of the major difficulties but also one of the major opportunities of this study. The lack of information available at the companies' websites and the lack of responses to the online survey (mainly by the consortia) did not allow to successfully concluding what we have purposed to do in the

beginning of this study and therefore we could not achieve our goals. Despite the difficulties in obtaining information and the need to change the methodology, we have been able to shed some light into what has been described in the literature.

Most of the companies that were analysed offer proposal preparation and project management services (Figure 1). This may indicate the importance these services have for researchers: a good proposal, well structured and well written is crucial to the success of an application, as well as an efficient project management of previous projects may be helpful in getting more grants (Vidal et al. 2015; EURAB 2007). There was also a clear identification, from the supplying companies' perspective, of the most valued services. Partner search seems to be the service that companies believe to add more value, followed by search of funding opportunities. This correlates to the cluster analysis results, in which the variables that most contributed to the clusters formation were identification of funding opportunities, followed by business development and strategic partnering.

We suggest that identification of funding opportunities and especially partner search require specific know-how and skills that cannot be found in institutional offices. This suggestion is supported by what has been described by Sheila Vidal (Vidal et al. 2015) and David Langley (Langley 2012). Also, these services are part of the initial and critical steps of the construction of successful multi-partner alliance, what might increase their value from the clients' perspective. We were not able to find literature on the most valued services on a science and technology management company or office, and without the responses to the online survey sent to the consortia, we have no further information to support such indication.

Concerning the average size of the companies' teams, we wonder there is a relation between this number and the type of services provided, since some may needed more human resources than others. The data collected was not sufficient to elaborate such analysis. However, using the available information, it seems that the size may be, instead, related to the specificities of the services, as well as with the number of projects each company has on going. We would need further information to confirm this finding. It would be interesting to investigate the disparity of teams' size between the companies that belong to the same cluster, i.e., since they offer similar services, and understand why do they have such different team's size. We are sceptical that it may be exclusively related to the number of projects each company has on going.

Although it has become, nowadays, very common to find in universities and other types of research institutions dedicated offices that provide support to the researchers (Langley 2012; Vidal et al. 2015), most of the interviewed companies do not see institutional grants offices as competitors. Due to the lack of information, we can only speculate that these companies believe that their know-how is extremely specialized and qualified, and unless a company/office have a diverse team with a very specific training (which until recently most of the institutional offices did not had (Langley 2012; Kashyap 2002)) it will not be considered as a competitor. Also, we have identified that one of the possible advantages of working with a company is the access to an extensive network of contacts, which most of the grants offices may not have. It would have been good to have more research on this topic. Here we would like to suggest an idea for a new study: it would be very interesting to characterize and compare the background of collaborators of S&T management companies and collaborators of institutional grants offices, and determine differences and/or similarities between their academic and career

track, their experience, their network formation capacity and length, as well as other variables that would allow for a differentiation between them.

Although these companies offer specialized services that can make a difference in obtaining funding from public agencies (Vidal et al. 2015; EURAB 2007; Langley 2012), several companies identified the lack of awareness by the clients as one of the main limitations of an organization's growth in this business sector. We could not confirm such statement since we did not get the clients' perspective, but we are convinced that with the responses to such or similar surveys we would be able to answer such question.

Recent data on the Horizon 2020 first results (European Commission 2015a) show that the participation of industry and SMEs has increased, largely due to the focus of the programme on the deployment of research results through demonstration, proof of concept and pilot actions. This may explain why our results showed that companies/SMEs contact more often science management companies than universities. It would also be interesting to understand who establishes the first contact, especially because according to the H2020 first results (European Commission 2015a), universities are in first place in terms of the overall number of applications, and this indicates that they are the coordinators of the proposals. The high number of SMEs contacting science management companies could also be one possible explanation to the apparent lack of awareness, since SMEs might have more financial capacity to hire upfront science management companies in order to increase their chances of success than universities, mostly due to the fact that universities are mainly funded by the government, and their budget is most of the times restricted.

Although we were not able to have access to the client's perspective, all the 10 companies that replied to our survey agreed that the main reason to hire science management companies is the increasing competitiveness and complexity of the funding calls, followed by the complexity of building, coordinating and managing a consortium. These factors are in accordance to what has been previously reported (EURAB 2007; Brocke & Lippe 2015; Boardman & Bozeman 2006; Gusmão 2000; Nobelius 2004).

As for the technological area in which each proposal falls, we wondered if this correlate to the available funding for each of the areas or is it just a characteristic of the research field. There was no obvious pattern on the proposal distribution in each scientific area, and we were not able to find a budget distribution for each of these specific areas within the Horizon 2020 total budget.

Regarding success rates, the responses obtained from each company may not be compared since such responses report general success rates. We should have specified information about the programmes or calls in which these applications have been submitted. Different programmes have different success rates (European Commission 2015a; Vidal et al. 2015), and also national success rates can be very different from European success rates. Good examples are the European Research Council (ERC) grants. There are 4 different types of grants (Starting, Consolidator, Advanced and Proof of Concept) that have different success rates between them, but even within the same programme, the success rate may be different from one year to the other (European Research Council n.d.).

The difficulties and limitations felt during this study do not allow us to successfully answer our research question, and shows the importance of more studies and the need to

keep shedding light into this unexplored field of study. We have identified important questions, new ideas, and several tips to other researchers to pursue.

# Chapter 6: Conclusions

This piece of research aimed to show how science management companies could be important assets, especially within the increasingly competitive funding opportunities under the European Commission new framework, the Horizon 2020. However, due to the several difficulties and limitations felt during the development of this study, such has lack of information and lack of time, we were not able to collect enough evidence to show it.

We could not identify and/or understand the role of science and technology management companies in the set-up and coordination of multi-partner scientific alliances, but we believe we have unravelled some hints that are interesting enough to catch other researchers attention to these companies' activities and business approaches.

Based on the data collected, we can say that most of these companies do work, most of the times, in consortia assembly and consequently on the submission of the consortium's proposal. We do know that the services are probably required due to the complexity of the assembly process and proposal coordination, but the consortia' perspective would further validate our conclusion. There is a huge potential for grow in this business sector but it may exist a generalized lack of awareness. We wonder if these companies were more visible, there would probably already exist more research and literature on them.

Based on our results, we have highlighted several aspects that we consider to be worth to pursue within this field of study.

We suggest that future studies should definitely start by consolidating our information, maybe by putting efforts in collecting a number of responses to both online surveys that would allow a statistical analysis, or by doing individualized interviews to several companies, institutional offices and consortia.

Also, and since that to the extent of our knowledge it has never been reported, it would be very interesting to acquire the customer's perspective and compare to what have been describe (Vidal et al. 2015; EURAB 2007) about the relevance of such companies and/or offices.

Considering the suggestion that S&T management companies may be more specialized than institutional grants manager, it would be interesting to compare these two groups of research professionals.

It would also be very interesting to analyse the evolution of the collaborations within different EC programmes and their success rates. As for the question of who takes the initiative of contacting such companies, besides understanding if are the universities or the SMEs, would also be challenging to evaluate which are the countries that most take the initiative of collaborating and with whom, since we know that the level of cooperation is not the same in all countries (Leydesdorff & Wagner 2008).

Together with the analysis of the evolution of collaboration, it could also be useful to explore individual European countries' statistics concerning research management companies, e.g., the number of S&T companies registered at each country and identify if some countries are more likely to have more companies of this business sector than others and why. This would definitely enrich our knowledge about the role of Science and Technology management companies in set-up and coordination of multi-partner scientific alliances, and would possible open new areas of study.

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# Annexes

# Annex I

## 1. Companies' Online Survey

**Table 6 - List of questions made to the companies through the online survey**

| # | Question | Answer |
|---|---|---|
| **Q1** | When was your organization created? | Open answer. |
| **Q2** | What is your organization main added-value proposition? | Open answer. |
| **Q3** | How many collaborators (internal and external) does your organization have? | Open answer. |
| **Q4** | When receiving proposals on subjects in which your team may be less experienced, do you seek to recruit new collaborators or experts from the field? | Yes or No. |
| **Q5** | If you chose Yes in the previous question, please briefly explain the procedure usually followed. | Open answer. |
| **Q6** | Does your organization recruit grant evaluators/ex-evaluators from similar calls to the ones your clients are applying to, for pre-evaluation purposes? | Yes or No. |
| **Q7** | What role does your organization usually assume in these proposals? | o Most of the time, the company is included as a partner of the proposal and is responsible for a work package.<br>o Most of the time, the company is subcontracted by the consortium to a specific task/service.<br>o Both options. |
| **Q8** | If none of the above hypotheses fits your organization's model, please briefly describe the type of interaction your organization has with the consortium and its role. | Open answer. |
| **Q9** | Through which channels do you advertise your organization / get customers? | o Social networks (Facebook, LinkedIn, Twitter)<br>o Networking<br>o Partnering<br>o Events<br>o Scientific and / or Technological Events and Fairs<br>o Email<br>o Through existing customers |
| **Q10** | What is your organization application's success rate? | o <10%<br>o 10 - 14%<br>o 15 - 24%<br>o 25 - 49%<br>o 50 - 75%<br>o > 75% |
| **Q11** | What is your favourite compensation model? | o Upfront payment<br>o Upfront payment + success fee<br>o Success fee<br>o Retainer fee<br>o Retainer fee + success fee |
| **Q12** | On average, what is your organization's success fee? | o 5 - 10%<br>o 10 - 15%<br>o >15% |
| **Q13** | Do you usually establish partnerships with other Grant Management companies? | Yes or No. |

| | | |
|---|---|---|
| **Q14** | If you have chosen Yes, please briefly explain what are the two main reasons to establish this kind of partnership. | Open answer. |
| **Q15** | If you have chosen No, please briefly explain what are the two main reasons to not establish this kind of partnership. | Open answer. |
| **Q16** | Who do you consider to be your main competitor? | o Institutional Grant Offices<br>o Grant Management Companies |
| **Q17** | What are the two main limitations to an organization's growth in this business sector? | Open answer. |
| **Q18** | Do you consider that lobbying, especially within the European Commission, is a key factor for this activity? Please explain why. | Open answer. |
| **Q19** | What types of organizations usually look for your services? | o Universities<br>o Research Centres<br>o Industry<br>o Small and Medium Companies (SMEs) |
| **Q20** | What, do you find, are the most important skills in this activity? | o Scientific<br>o Partner search<br>o Search of Funding Opportunities<br>o Business Development<br>o Project Management<br>o Technology Transfer and Intellectual Property<br>o Training |
| **Q21** | In which scientific panels do most of your proposals fit? | o Health and Life Sciences<br>o Engineering and Exact Sciences<br>o Environmental and Natural Sciences<br>o Humanity and Social Sciences<br>o Information and Communication Technologies |
| **Q22** | What are the main reasons clients recruit your organization's services? | o Complexity of the funding calls<br>o Competitiveness of the funding calls<br>o Complexity of building, coordinating and managing a consortium<br>o Need to include a SME in the proposal |

## 2. Companies' Online Survey Responses

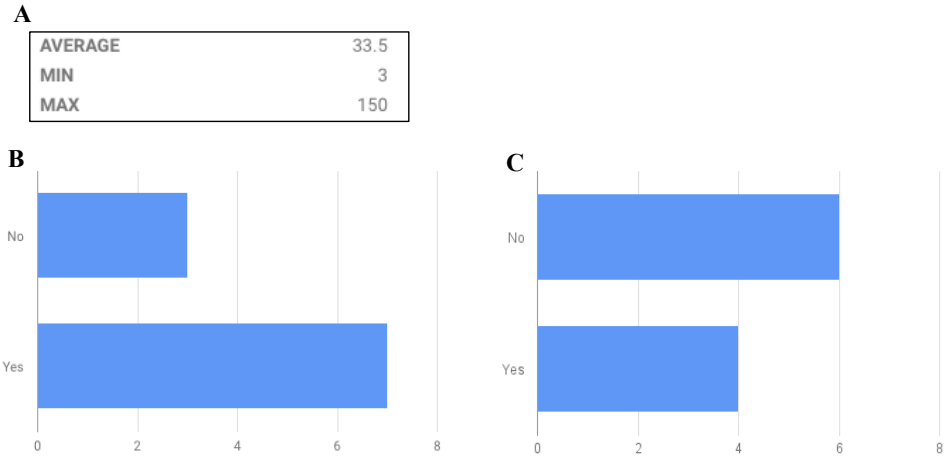



**Figure 3 - Collaborators. (A) Average, minimum and maximum size of the companies. (B) 7 companies recruit external collaborators. (C) 4 companies have networks of evaluators/ex-evaluators.**

**Table 7 - Role of S&T management companies in multi-partner proposals**

| Responses | Most of the time, the company is included as a partner of the proposal and is responsible for a worck package. | Most of the time, the company is subcontracted by the consortium to a specific task/service. | Both options | Other |
|---|---|---|---|---|
| 1 | | | | Only provide consortium building and proposal writing services against a success fee compensation. Do not participate to the project management phase. |
| 2 | | | x | |
| 3 | | | x | |
| 4 | | x | | |
| 5 | | | x | |
| 6 | | x | | |
| 7 | | x | | |
| 8 | x | | | |
| 9 | | x | | |
| 10 | | | x | |
| **TOTAL** | 1 | 4 | 4 | |

**Table 8 - Most used advertising channels**

| Responses | Social networks (Facebook, LinkedIn, Twitter) | Networking | Partnering | Events | Scientific and / or Technological Events and Fairs | Email | Through existing customers | Other |
|---|---|---|---|---|---|---|---|---|
| 1 | x | | | | | | x | |
| 2 | | x | x | | | | x | Word of mouth Google adwords |
| 3 | | x | | | x | x | | |
| 4 | x | x | x | x | | | | |
| 5 | x | x | x | x | x | x | x | |
| 6 | | x | x | | | | x | |
| 7 | x | x | x | | x | x | x | |
| 8 | x | x | x | x | | x | x | |
| 9 | | x | x | x | | | x | |
| 10 | | x | x | x | x | x | x | |
| **TOTAL** | 5 | 9 | 8 | 5 | 4 | 5 | 8 | |

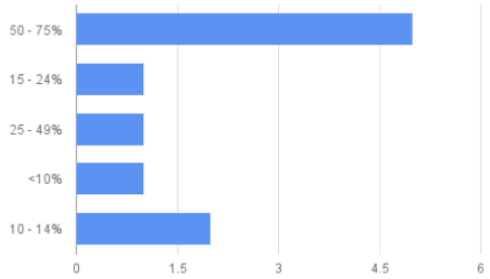



**Figure 4 - Success rates**

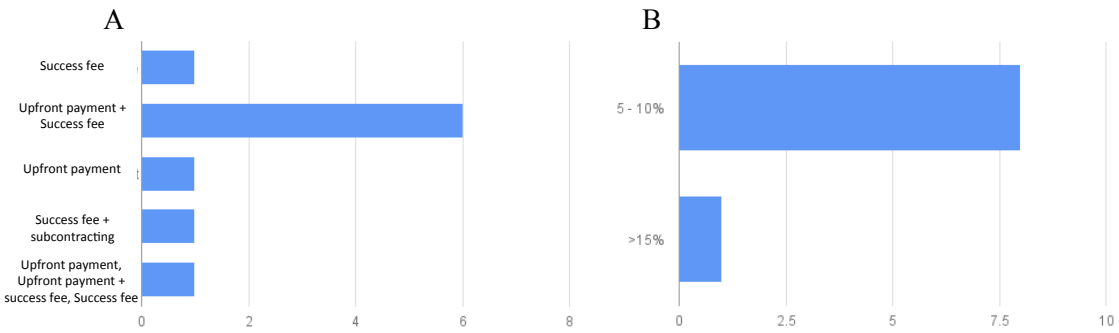
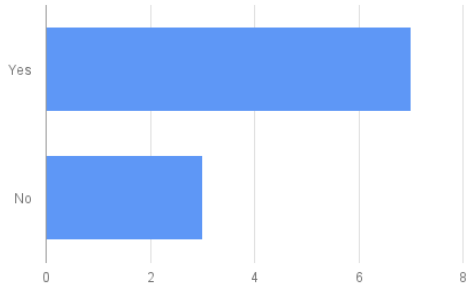



**Figure 5 - Compensation Model. (A) Favorite compensation model. (B) Average success fees.**

**A**




**B**

| Reasons presented to establish partnerships: |
|---|
| The need for complementarity and added value for proposals/projects in order to increase the probability of success. |
| Access to expertise or know-how that a company does not have access to. |
| Over-capacity and difficulty in recruiting specialized support. |
| The need for consortia cooperation in the case of certain tenders. |

**Figure 6 - Partnerships with other grants management companies. (A) Number of companies who establish partnerships. (B) Reasons presented by the companies to establish partnerships.**

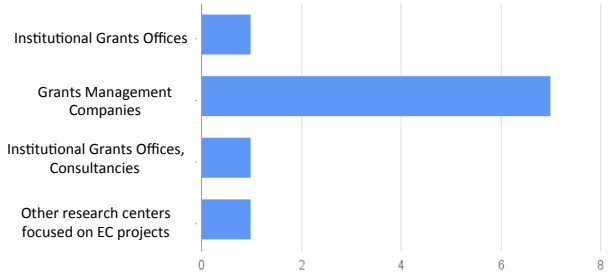



**Figure 7 - Competitors**

**Table 9 - Most important skills**

| Responses | Scientific | Partner Search | Search of Funding Opportunities | Business Development | Project Management | Technology Transfer & IP | Training | Other |
|---|---|---|---|---|---|---|---|---|
| 1 | x | | | | | | | Technical writing |
| 2 | | x | x | | x | | | |
| 3 | x | | | | x | | x | |
| 4 | | x | x | | x | | | |
| 5 | x | x | x | x | x | | | |
| 6 | x | x | x | x | x | x | x | |
| 7 | | x | | x | x | x | | |
| 8 | | x | x | x | | | | |
| 9 | x | x | x | x | x | | | |
| 10 | | x | x | x | | | x | Resilience, Emotional intelligence |
| **TOTAL** | 5 | 8 | 7 | 6 | 7 | 2 | 3 | |

**Table 10 - Types of organizations that contract grants management services**

| Responses | Universities | Research Centres | Industry | Small and Medium Enterprises (SMEs) | Other |
|---|---|---|---|---|---|
| 1 | x | x | x | x | |
| 2 | x | x | x | x | Government agencies |
| 3 | x | | | x | NGO |
| 4 | x | | | x | |
| 5 | | | x | x | |
| 6 | x | x | | x | |
| 7 | | | | x | |
| 8 | x | x | | x | |
| 9 | | x | x | x | |
| 10 | x | x | x | x | Bussiness associations, Clusters, Municipalities |
| **TOTAL** | 7 | 6 | 5 | 10 | |

**Table 11 - Main reasons to contract grants management services**

| Responses | Complexity of the funding calls | Competitiveness of the funding calls | Complexity of building, coordinating and managing a consortium | Need to include a SME in the proposal | Other |
|---|---|---|---|---|---|
| 1 | | x | | | |
| 2 | x | x | x | | |
| 3 | x | x | x | | |
| 4 | x | x | x | | |
| 5 | x | | x | | |
| 6 | x | x | | | |
| 7 | x | x | x | | |
| 8 | x | x | x | | |
| 9 | x | x | x | | Our added value and experience |
| 10 | | x | x | | |
| **TOTAL** | 8 | 9 | 8 | 0 | |

**Table 12 - Proposals scientific panels**

| Responses | Health and Life Sciences | Engineering and Exact Sciences | Environmental and Natural Sciences | Humanity and Social Sciences | Information and Communication Technologies |
|---|---|---|---|---|---|
| 1 | x | x | x | | x |
| 2 | x | x | x | x | x |
| 3 | x | | x | x | |
| 4 | x | | | x | |
| 5 | | x | x | | x |
| 6 | x | x | x | | x |
| 7 | | x | | | x |
| 8 | | | | | x |
| 9 | x | x | x | | x |
| 10 | x | x | | | x |
| **TOTAL** | 7 | 7 | 6 | 3 | 8 |

# Annex II

## 3. Consortia Online Survey

**Table 13 - List of questions made to the consortia through the online survey**

| # | Question | Answer |
|---|---|---|
| **Q1** | What are the main reasons to recruit a Grant Management company's services? | o Complexity of the funding calls.<br>o Competitiveness of the funding calls.<br>o Complexity of building, coordinating and managing a consortium.<br>o Need to include a SME in the proposal. |
| **Q2** | What was the main reason to decide to recruit an external company instead of asking for the support of your (or other partner) Host Institution's Office for Sponsored Programs? | Open answer. |
| **Q3** | What, do you find, are the most important skills these companies have? | o Scientific.<br>o Partner search.<br>o Search of funding opportunities.<br>o Business Development.<br>o Project Management.<br>o Technology Transfer and Intellectual Property.<br>o Training. |
| **Q4** | What role does the Grant Management company assumes in your consortium? | o The company is included as a partner of the proposal and is responsible for a work package.<br>o The company is subcontracted by the consortium to a specific task/service.<br>o Both options. |
| **Q5** | If none of the above hypotheses fits your consortium's model, please briefly describe the type of interaction the company has with the consortium and its role. | Open answer. |
| **Q6** | Do you agree that recruiting the Grant Management company's services was critical (or very important) to the success of the consortium proposal? | Yes or No. |
| **Q7** | What was the compensation model agreed between the consortium and the Grant Management companies? | o Upfront payment.<br>o Upfront payment + success fee.<br>o Success fee.<br>o Retainer.<br>o Retainer + success fee. |
| **Q8** | Through which channels did you first learned about the Grant Management Company you work or worked with? | o Social networks (Facebook, LinkedIn, Twitter).<br>o Networking<br>o Partnering.<br>o Events.<br>o Scientific and / or Technological Events and Fairs.<br>o Email.<br>o Through existing customers. |
| **Q9** | What do you think are the two main limitations of the services rendered by this kind of companies? | Open answer. |
| **Q10** | What do you value the most in these companies' services? | Open answer. |
| **Q11** | Do you consider that lobbying, especially within the European Commission, is a key factor for this activity? Please explain why. | Open answer. |
| **Q12** | Would you consider to recruit a Grant Management company again in future research consortia? | Yes or No. |

# Annex III

## 1. Two-step clusters analysis

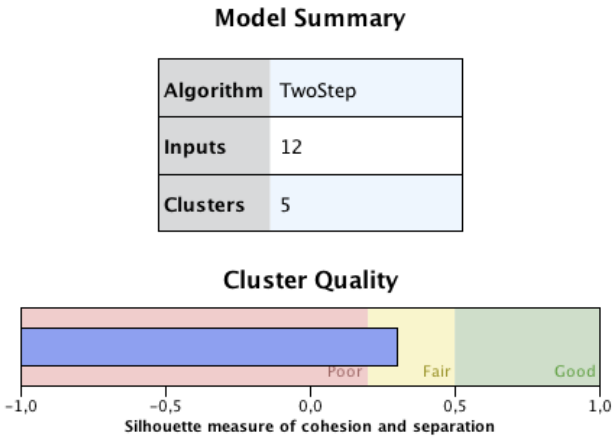



**Figure 8 - Model summary of Two-step Cluster Analysis**

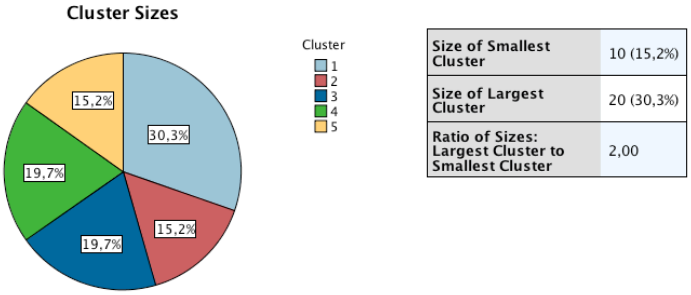



**Figure 9 - Cluster analysis**

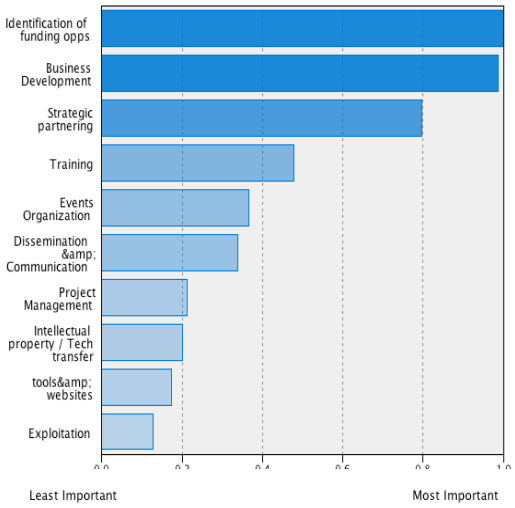



**Figure 10 - Variable importance in cluster assembly**

**Table 14 - Variable frequency within each cluster**

| | Cluster 1 | | Cluster 2 | | Cluster 3 | | Cluster 4 | | Cluster 5 | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Categories** | **No** | **Yes** | **No** | **Yes** | **No** | **Yes** | **No** | **Yes** | **No** | **Yes** |
| **Identification of funding opps** | - | 90% | - | 100% | 85% | - | 100% | - | 100% | - |
| **Business Development** | 100% | - | - | 100% | - | 69% | - | 100% | 90% | - |
| **Strategic partnering** | - | 90% | - | 90% | 100% | - | 54% | - | 100% | - |
| **Training** | 60% | - | 60% | - | 100% | - | - | 92% | - | 80% |
| **Events Organization** | 95% | - | 50% | - | 85% | - | 92% | - | - | 70% |
| **Dissemination & Communication** | 60% | - | - | 80% | 92% | - | 54% | - | - | 90% |
| **Project Management** | - | 80% | - | 100% | 54% | - | - | 77% | - | 100% |
| **Intellectual property / Technology transfer** | 100% | - | 50% | - | 69% | - | 54% | - | 80% | - |
| **Tools & Websites** | 85% | - | 70% | - | 100% | - | 92% | - | - | 50% |
| **Exploitation** | 80% | - | - | 60% | 85% | - | 62% | - | 90% | - |
| **EU lobbying & networking** | 80% | - | 60% | - | 100% | - | 92% | - | 90% | - |
| **Proposal preparation** | - | 90% | - | 100% | 69% | - | - | 77% | - | 100% |

**Table 15 - Companies distribution within clusters**

| Cluster 1 | Cluster 2 | Cluster 3 | Cluster 4 | Cluster 5 |
|---|---|---|---|---|
| Absiskey | AMIRES | Alcimed | Corteam Conseil | Alta |
| Adigest | ARTIC | Alma CG | Econet | city2science |
| Agora Partners | Capital High Tech | Ateknea | EURADIA | Concentris |
| Aristos | Europa +i | Benkei | Finovatis | Cyberall access |
| Beacon Tech | France Europe Innovation | Catalyze | GIS Fusion | GABO:mi |
| BioSci Consulting | Martel Consulting | F Iniciativas | GTI | Horizon Consulting Network |
| BioScience writers | Octopux | Gac Group | Intelligentsia consultants | Pongratz Consulting |
| EPN consulting | PNO | GTE | Lgi Consulting | SYNAPSE |
| Euro Freelancers | Schuman Associates | IBEX | Merience | WIP Bussiness Consultancy |
| Euro Novia | Seeding Science | InnoPole | RTDI | Zeus Consulting |
| Euro Quality | | Inovamais | SPI | |
| Free mind consultants | | Ttopstart | UNIO ICT | |
| Grants Europe | | Zabala | Yellow Research | |
| Horizon 2020 Funds | | | | |
| innovayt | | | | |
| ONECO | | | | |
| Partners Global Funding | | | | |
| Theia | | | | |
| We Welcome Europe | | | | |
| ZAZ Ventures | | | | |

**Table 16 - ANOVA results**

ANOVA

size

| | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|
| Between Groups | 14,019 | 4 | 3,505 | 3,228 | ,018 |
| Within Groups | 66,238 | 61 | 1,086 | | |
| Total | 80,258 | 65 | | | |