IMPACT ANALYSIS OF EUROPEAN FRAMEWORK PROGRAMMES ON TURKISH UNIVERSITIES

PILOT STUDY ON INFORMATION AND COMMUNICATION TECHNOLOGIES, ENERGY, FOOD, AGRICULTURE AND FISHERIES AND BIOTECHNOLOGY THEMES

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ABSTRACT

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The purpose of this study is to determine the scientific and technological, economic, social and organizational impacts of the European Framework Programmes (FPs) on Turkish universities by focusing on the projects in Information and Communication Technologies (ICT), Energy, Food, Agriculture and Fisheries and Biotechnology (KBBE) themes in order to understand, monitor and evaluate outcomes and impacts of FPs as well as to help decision makers and policy makers to develop strategies for maximizing benefits of participation.

Data/document review and survey methods were used as evaluation methods. TÜBİTAK and EC's data and document were reviewed. An online survey was sent to

the academicians who have Seventh Framework Projects (FP7) projects in these themes in Turkey. Data that were gathered by survey were analyzed by using Mann-Whitney U Test Method.

We concluded that the impacts of these four categories of FP7 projects were high on the universities. Value additions of scientific and technological impacts are relatively high compared to other impacts. Universities whose roles were coordinator or WP leader have higher impacts in all factors.

Turkey's participation and success in the FP7 are growing thanks to TÜBİTAK's effort, but further efforts are needed for meeting competitive participation within a defined strategy. Bearing in mind the results of the impact analyses, the study supports Turkey's continuity to forthcoming FPs but there is need for developing national strategies to maximize benefits of participation and to integrate the outcomes with the national innovation strategy.

Keywords: European Framework Programmes, Seventh Framework Programme, impact analysis, Turkish universities, research and development

ÖZ

AB ÇERÇEVE PROGRAMLARI'NIN TÜRKİYE'DEKİ ÜNİVERSİTELER ÜZERİNDEKİ ETKİ ANALİZİ

BİLGİ VE İLETİŞİM TEKNOLOJİLERİ, ENERJİ, GIDA, TARIM VE BALIKÇILIK, BİYOTEKNOLOJİ ALANLARI

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Bu çalışmanın amacı Bilgi ve İletişim Teknolojileri; Enerji; Gıda, Tarım, Balıkçılık ve Biyoteknoloji alanları özelinde Avrupa Birliği Çerçeve Programları'nın Türk üniversiteleri üzerindeki bilimsel ve teknolojik, ekonomik, sosyal ve organizasyonel etkilerini araştırarak, karar vericilere katılımdan elde edilen faydaların artırılması için stratejiler geliştirilmesinde yardımcı olmaktır.

Değerlendirme metodları olarak veri/doküman analizi ve anket metodları kullanışmıştır. Yukarıda bahsedilen alanlarda 7. Çerçeve Programı (FP7) projesi olan akademisyenlere çevrimiçi bir anket gönderilmiş, anket sonuçları Mann-Whitney U Test yöntemi kullanılarak analiz edilmiştir.

Analiz sonuçlarına göre, FP7 projelerinin yukarıda bahsedilen dört temel etki kategorisinde Türk üniversiteleri üzerinde yüksek oranda etkili olduğu sonucuna varılmıştır. Dört temel etki kategorisi arasında en çok bilimsel ve teknolojik etkilerin Türk üniversiteleri üzerinde etkili olduğu saptanmıştır. Bununla beraber, projelerde koordinator rolünde bulunan üniversitelerin tüm kategorilerdeki etkilerinin diğer universitelere göre daha yüksek olduğu olduğu görülmüştür.

Türk ortakların FP7 programına katılım ve başarı oranları TÜBİTAK'ın çabaları ile artmakta ancak belirlenecek stratejiler dahilinde daha rekabetçi katılım gösterilmesi için bu çabaların artırılması gerekmektedir.

Bu çalışma, etki analizi sonuçlarına dayanarak Türkiye'nin bundan sonraki Çerçeve Programları'na katılımını desteklemekte ancak katılımdan elde edilecek faydaların artırılması ve ulusal inovasyon stratejisi ile entegre edilebilmesi için ulusal stratejilerin geliştirilmesi gerektiğini savunmaktadır.

Anahtar Kelimeler: Avrupa Birliği Çerçeve Programları, Yedinci Çerçeve Programı, etki analizi, Türk üniversiteleri, araştırma ve geliştirme

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To My Mother

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LIST OF ABBREVIATIONS

COST:	European Cooperation In Science and Technology
CSA:	Coordination and Support Actions
EC:	European Commission
ERA:	European Research Area
EU:	European Union
EUREKA:	European Research Co-ordination Agency
FP:	European Framework Programme
FPx:	x'th Framework Programme
GDP:	Gross Domestic Products
GERD:	Gross Expenditure on Research and Development:
ICT:	Information and Communication Technologies
IP:	Integrated Project
IPR:	Intellectual Property Rights
IST:	Information Society Technologies
KBBE:	Food, Agriculture and Fisheries, and Biotechnology
NGO:	Non-Governmental Organization
NoE:	Network of Excellence
OECD:	The Organisation for Economic Co-operation and Development
R&D:	Research and Development

RTD:	Research and Technology Development
SA:	Support Action
SANTEZ:	Industry Thesis Programme (Sanayi Tezleri Programı)
SME:	Small and Medium Sized Enterprise
SPSS:	Statistical Package for the Social Sciences
STREP:	Specific Targeted Research Projects
TÜBİTAK:	The Scientific and Technological Research Council of Turkey
TurkStat:	Turkish Statistical Institute
UK:	United Kingdom

CHAPTER 1

INTRODUCTION

1.1 Problem Statement

The Framework Programmes for Research and Technological Development, also called European Framework Programmes (FPs) were launched by European Commission (EC) in order to foster and support research activities in the European Research Area (ERA). Through FPs, EC tries to encourage and coordinate the R&D activities in ERA in order to strengthen the competitiveness of Europe. The First Framework Programme was started in 1984.

Turkey participated in the FPs through the 6th Framework Programme (FP6) which was officially launched in 2002 and ended in 2006, as an associate country and paid financial contribution firstly. The Scientific and Technological Council of Turkey (TÜBİTAK) has been assigned officially by the Turkish government as the contact organization for the FPs. The Seventh Framework Programme (FP7) that is in force will last for seven years from 2007 until 2013. Turkey paid financial contribution in order to join the FP7.

Having paid financial contributions in order to join FPs, Turkish public is questioning FPs with the following two aspects:

1. Did Turkey get back the money from the funding pool that is paid as participation fee?

2. What is the value added of FPs to the Turkish Research Area?

1.2 Motivation

There are very few studies in the literature that analyze the impacts of the FPs on the Turkish participants. Although TÜBİTAK has been publishing some reports related with the Turkey's performance in FP7, these reports do not include impact analysis of the FPs on the Turkish participants. These reports include some basic statistics like number of total projects, number of the projects by organization type, number of projects by cities.

The purpose of this study is to assess the impacts of the FPs on Turkish universities. Economic, scientific and technological, social and organizational impacts of the FPs on Turkish universities will be determined by analyzing the results of the FP7 projects of Turkish universities in the ICT, KBBE and Energy themes in FP7. The relations among the impacts will also be examined in the study.

This study will contribute to the literature in determining the impacts of EU FPs on universities in terms of economic, scientific and technological, social and organizational.

The timing is also good for such a study since discussion regarding the participation of Turkey in the new FP that is Horizon 2020 has just begun in the Turkish public. The decision of participating is now being discussed since Turkey will pay participation fee more than the amount that was paid for FP7. The discussion has started in the last meeting of the Supreme Council of Science and Technology that was held on 7th of August 2012 [1].

Understanding the impacts of FP projects on universities is important not only for the universities but also for the policy makers of the countries. Study results can be used by the universities and the policy makers to develop strategies to maximize the benefits of participation in both FPs and other national and international R&D programmes. Though this study focuses only on Turkey, it will also serve as a reference point for the newcomer countries to the FPs. Newcomers and less experienced countries of FPs can benefit from the results of this study while developing strategies for R&D programmes.

Universities, research centers, industry, SMEs, NGOs and public organizations are eligible for participation to the FP7 projects. The focus of this study is universities since universities are the most successful organizations among all Turkish participants in FP7 in terms of both number of projects and amount of funding received. Turkish universities participated in the 349 projects in FP7 where industry organizations participated in 174, research centers participated in 145, SMEs

participated in 134, NGOs participated in 31 and public organizations participated in 44 projects as of June 2012 [2].

ICT, KBBE and Energy themes are chosen since these 3 themes are among the prioritized themes of Turkey stated in the "Science and Technology Human Resources Strategy and Action Plan 2011-2016" which was approved in the 22th meeting of the Supreme Council of Science and Technology on 15 December 2010 [3]. Moreover, ICT is Turkey's the most successful theme under Cooperation Programme in FPs. Also ICT has the biggest share in terms of budget (€9.1bn) within the Cooperation Programme under FP7 (€32.4 bn). This shows the special importance given to the ICT domain within the whole FPs by the EU as well.

1.3 Assumptions, Limitations, Delimitations

Assumptions:

1. The participants provided accurate and unbiased responses. It is assumed that the participants of the survey were responded accurately and correctly. It is also assumed that responses of participants are not biased.

2. The data were accurately recorded. It is assumed that the data were recorded accurately and there is no error.

Limitations

1. The accuracy of the study is limited to the honesty of the survey participants.

2. The results may not be applied directly to the other countries of FPs .

Delimitations

1. The sample is delimited to ICT, Energy and KBBE themes therefore participant survey was sent to the Turkish academicians who took part in ICT, Energy and KBBE projects in FP7.

2. Survey has been the preferred methodology for this study, however use of interviews may be recommended for further detailed studies in this area.

1.4 Definitions of Terms

Associated Countries: Countries with science and technology cooperation agreements that involved contributing to the framework programme budget.

Beneficiary: A participant that signs a separate agreement with the European Commission with respect to its participation in the contract.

Candidate Countries: Countries that are currently recognized as candidates for future accession to EU.

Consortium: All participants in the same research and technological development activity undertaken by one or more participants by means of a funding scheme of FP7.

Coordinator: Beneficiary identified in the contract who, in addition to its obligations as a beneficiary, is obliged to carry out the specific co-ordination tasks provided for in the contract on behalf of the Consortium.

European Commission: Executive body of the European Union.

European Research Area: All research and development activities, programmes and policies in Europe that involve a transnational perspective.

European Union: Economic and political entity and confederation of 27 member states.

Framework Programmes: The Framework Programmes for Research and Technological Development, also called Framework Programmes, are funding programmes created by the European Union in order to support and encourage research in the European Research Area.

Gross Domestic Product: An aggregate measure of production equal to the sum of the gross values added of all resident institutional units engaged in production (plus

any taxes, and minus any subsidies, on products not included in the value of their outputs).

Gross Expenditure on Research and Development: Total intramural expenditure on research and development performed on the national territory during a given period.

Innovation: Implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organizational method in business practices, workplace organization or external relations.

Intellectual Property Rights: Assignment of property rights through patents, copyrights and trademarks. These property rights allow the holder to exercise a monopoly on the use of the item for a specified period.

Member States: States that are party to treaties of the European Union and thereby subject to the privileges and obligations of EU membership.

Organization for Economic Cooperation and Development: The organization provides a setting where governments compare policy experiences, seek answers to common problems, identify good practice and coordinate domestic and international policies.

Participant: A legal entity contributing to an RTD activity undertaken by one or more participants by means of a funding scheme of FP7 and having rights and obligations with regard to the Community under the terms of the Rules for the Participation or according to the Grant Agreement.

Research and Development: Term covering three activities: basic research, applied research, and experimental development.

Seventh Framework Programme for Research and Technological Development: EU's main instrument for funding research in Europe and it will run from 2007-2013.

Supreme Council of Science and Technology: Highest ranking science, technology and innovation policy-making body in Turkey chaired by the Prime Minister with the decision-making power for national science, technology and innovation policy.

1.5 Thesis Chapters

Chapter I of this thesis presents the introduction, problem statement, motivation of the study, assumptions, limitations, delimitations, definitions of terms and thesis chapters.

Chapter II is a review of recent literature related with rationale of R&D supports, rationale of cooperative R&D, evaluation studies of FPs and impact analysis studies.

Chapter III presents information regarding EU FPs; Turkey's inclusion in FPs; ICT, KBBE and Energy themes in FP7 and participation of Turkish universities in these three themes.

Chapter IV presents the methodology used in the study; formation of categories, hypotheses, survey design and data analysis method.

Chapter V is the chapter where results and analysis of the study are given.

Chapter VI presents an overall evaluation of analysis that is explained in Chapter V in detail as a conclusion. Finally some implications for future studies are given.

CHAPTER 2

BACKGROUND

2.1 Rationale of R&D supports and Cooperative R&D

In this part of the study we will try to understand the relation between R&D and economic growth and productivity as well as the rationale of cooperative R&D.

There are lots of studies in the literature which state that a large proportion of economic growth in developed countries is attributable to technological improvement rather than the accumulation of capital. According to Solow's [4] study which is one of the most recognizable studies in the economics stated that gross output per man hour doubled in United States between 1909 and 1949. 87.5% of this increase is attributable to technological change and the remaining part is to increase of capital. Griliches [5] showed that R&D contributed positively to productivity growth and high rate of return. Nadiri [6] proved that there is a positive and strong relationship between R&D expenditures and growth or productivity. He found that on the average, net rate of return was found between 20% and 30% where social rates of return of R&D was on average close to 50%. Mairesse and Mohen [7] focused on 2253 French firms and analyzed the relationship between R&D and innovation by examining process innovation, product innovations new to the firm,

product innovations new to the market, patent applications, patent holdings, sales shares of new products and patent-protected sales in total sales. As a consequence, they proved that R&D is positively correlated with all measures of innovation output. Jafe proved that firms whose neighbors do much R&D produce more patents per dolar of their own R&D [8]. Griffith, Redding and Van Reenen [9] tried to address the relationship between R&D and economic growth by using a panel of industries across twelve OECD countries over the period 1974-1990. They proved statistically that R&D is statistically and economically important in the catch up process as well as stimulating innovation directly.

There are also many studies claiming that international R&D cooperation has a positive effect on organizations' performance. One of the recent studies conducted by Barajas, Huergo and Moreno [10] tried to analyze the effects of international R&D cooperation on Spanish firms that took part in FPs during the period 1995-2005. They proved that R&D cooperation has a positive impact on the technological capacity of firms and thanks to international R&D cooperation, the technological capacity of firms is positively related to their productivity. Another study [11] conducted by Camerona, Proudmanb and Redding found that technology transfer is important for productivity growth. They also proved that there is a positive direct effect of R&D on productivity growth through rates of innovation. Belderbos, Carree and Lokshin [12] analyzed the impact of R&D cooperation on firm performance by examining data of a large sample of Dutch firms. They found that competitor cooperation has a significant impact on labour productivity growth, while competitor cooperation and collaboration with universities & research institutes positively affects growth in innovative sales per employee. Park [13] found that there is a positive correlation between foreign government research and domestic private research; again there is

positive correlation between domestic private research and domestic and foreign productivity growth.

2.2 Rationale of Evaluations

In previous part, the rationale of R&D supports were discussed, relationship between the R&D and the economic development were stated. In this part of the study, need for the evaluation of the R&D subsidies will be explained.

United Nations Development Programme Evaluation Office defines evaluation as “a selective exercise that attempts to systematically and objectively assess progress towards and the achievement of an outcome” [14].

Monitoring and evaluation help improve the performance and achieve results [14]. Projects or programs cannot be enhanced without having a clear picture of the outcomes and the results. Otherwise, programs would be redesigned with the trial and error method that is time-consuming and inefficient.

Evaluation helps managers, policy makers and decision makers to make decisions or obtain information on one or more of the following [15]:

- Did the program achieve its objectives?
- What are the potential development contributions?
- To what extent and under what circumstances could a program be extended to a larger scale?

- What has been the contribution of the intervention supported by a funding agency to the program?

Decision makers, policy makers and planners use impact evaluation as a decision tool in order to determine if the programmes achieve the defined objectives, to avoid investing inefficient programmes, to be sure about the programs are planned and implemented in the most efficient way, to maximize the benefits for the target population and to enhance the quality of the services, in a nutshell to use limited sources more efficiently [14].

We will refer to the latest statistics of Turkey related with the R&D expenditure in order to have a clear picture of the amount of the money.

According to the latest statistics that was published by Turkish Statistical Institute (TurkStat) about the R&D expenditure of Turkey in terms of GERD (Gross expenditure on research and development) as a percentage of GDP (Gross Domestic Product) is 0.84%. Figure 1 shows GERD on GDP by years [16].

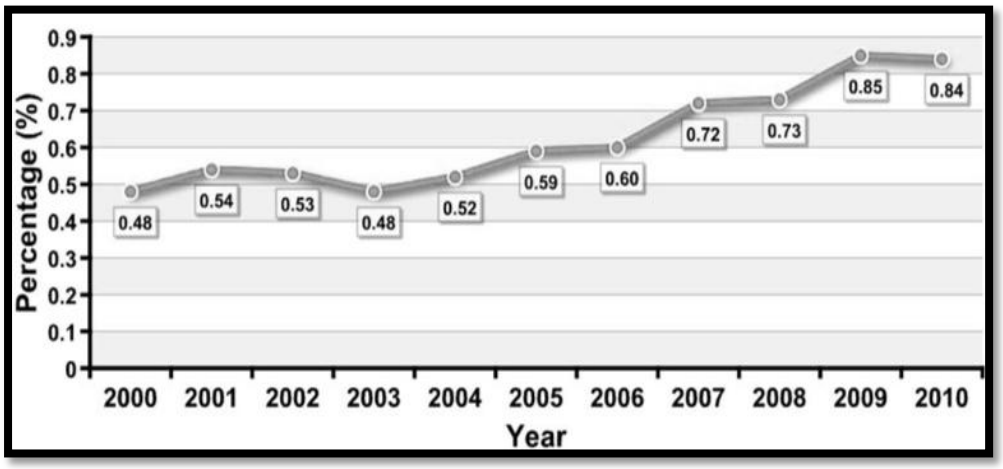

Figure 1 GERD as a percentage of GDP (Turkey)

As it can be seen from the Figure 2 the percentage of GERD by government is 30.8%, by industry is 45.1%, by higher education is 19.6%.

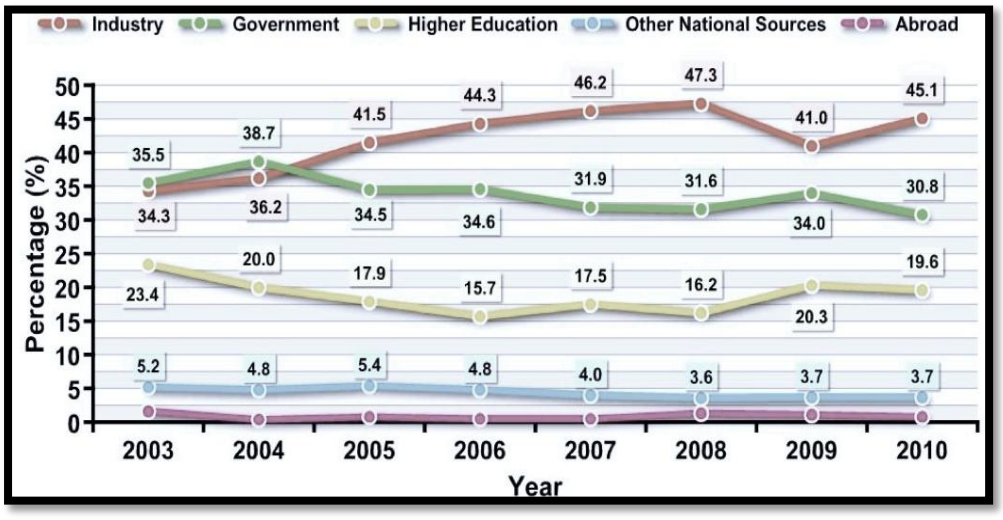

Figure 2 Percentage of GERD by Source of Funds (Turkey)

2.3 Impact Analysis & Methodologies

Arnold and Bohner identify impact analysis as “activity of identifying what to modify to accomplish a change or of identifying the potential consequences of a change” [17].

There are several methods for evaluation. Table 1 summarizes evaluation methods with their strengths, weaknesses and/or limitations.

Table 1 Evaluation methods

Evaluation Methods	**Strengths**	**Weaknesses and/or Limitations**
Survey	Inexpensive Results are easy to visualize and understand	Accuracy of data depends on the participants’ honesty Initial study design remains unchanged
Case Study	Provides a great amount of description and detail	It is hard to generalize the results based on a single case Possible biases in data collection and interpretation process
Social Network Analysis	Provides deeper understanding of the structures and relationships	It is impossible to measure the performance of a programme
Bibliometrics	Accessing related data is easy The results of the analysis are understandable and far from controversy	Outputs are used without considering the quality Study should be checked with time intervals
Expert Judgment	Quality of findings Easy to operate	Quality of the analysis is directly related with the selected experts
Control Group	Free of biases	Expensive It cannot tell the quantitative impacts
Cost-Benefit Analysis	Easy to understand	Difficult to value the intangible benefits and costs

There is not a one design that fits all impact analysis therefore each impact analysis should be designed according to the study. The design depends on what is being evaluated, the purpose of the evaluation, time, data constraints; and the time horizon [15].

Survey Method: A survey is any activity that collects information in an organized and methodical manner about characteristics of interest from some or all units of a population [18]. Survey data can be collected via mail (post), telephone, online surveys, or hybrids of these. The first step in the survey design process is defining research objectives. Then, method of data collection and sampling frame should be determined. After that, questionnaire should be constructed and pretested. After sending and gathering data, post-survey adjustments should be made. Finally, based on the data, analysis should be performed. Gathered data can be represented as frequencies, percentages, means, medians and standard deviations.

One of the advantages of using survey method is that, it is relatively inexpensive. Data collection methods of the survey provide flexibility; using many ways to collect data. The survey results are easy to visualize and understandable. Statistical techniques can be applied to the survey data in order to determine validity, reliability and statistical significance.

One of the disadvantages of survey is that survey cannot unfurl individual project details; instead survey unfurls data about population. Accuracy of data depends on the participants' honesty. Initial study design remains unchanged throughout the data collection.

Case Studies: Institute for Prospective Technological Studies of EC defines case studies as in-depth investigations into a program, project, facility, or phenomenon in order to examine what happened, to explore how and why, and to consider what would have otherwise [19]. Robert K. Yin defines the case study research method as an empirical inquiry that investigates a phenomenon within its real-life context [20]. The case study approach includes multiple methods of data gathering and analysis that are quantitative and qualitative data; including surveys, content analysis, and and statistical analysis [21].

One of the advantages of case studies is that they challenge theoretical assumptions since they focus on a phenomenon. Case studies provide a great amount of description and detail.

One of the disadvantages of case studies is that it is hard to generalize the results based on a single case. In addition to that it may be hard to determine definite cause-effect conclusions. Regarding the accuracy of the data, there may be possible biases in data collection and interpretation process.

Social Network Analysis: Krebs defines social network analysis as mapping and measuring of relationships and flows. Social network analysis is used in order to visualize the connections and the interactions to determine the best way to share knowledge. Social network analysis tries to map and measure how people interact and influence, exchange information and learn each other with a mathematical analysis [22].

Social network studies do not only record the existing relationships, interestingly they also reveal the potential ones in other words non-existent relationships [23].

One of the advantages of social network analysis is that it provides deeper understanding of the structures and relationships of the examined network. This method is the best model for understanding knowledge spillovers and for understanding how to form innovative networks [24].

One of the disadvantages of this method is that it does not measure the performance of a programme since the model focus on the knowledge and the information flow rather than the outputs like paper, patent, etc.

Bibliometrics: Bibliometrics has become a standard tool of science policy and research management. Bibliometrics is a discipline measuring the properties of documents and, by extension, the generation, dissemination and retrieval of knowledge. All significant compilations of science indicators heavily rely on publication and citation statistics [25].

Outputs of the projects or programme are used in bibliometric analysis. The most important data source of bibliometric analysis is bibliometric databases where outputs of the research projects like publication and patent numbers are stored.

One of the advantages of bibliometric is that accessing related data is easy. The results of the analysis are understandable and far from controversy since outputs of the research projects and generally working with numbers are used.

One of the disadvantages of this method is that outputs of the projects are used without considering the quality. Besides, the studies that use bibliometric as an evaluation method should be checked with time intervals whether the numbers like patent numbers or publication numbers that was used in the analysis has changed or not.

Expert Judgment: Expert judgment method relies on a group of members of society who are the most capable and knowledgeable about the subject [26]. These experts are invited to give opinion about programmes, projects, activities and results written or orally. Meyer and Booker defines an expert as a person who has background in the subject area and is recognized by his or her peers or those who are qualified to answer the questions [27].

One of the advantages of expert judgment method is that it is a relatively inexpensive method and simply to operate. Besides, if a panel is included in the method, it gives opportunity to interchange the ideas among experts. It is a good method especially for the analysis of complicated subjects.

One of the disadvantages of expert judgment is that the quality of the analysis is directly related with the selected experts. Expert selection is crucial in order to ensure the quality of the study. There should be no conflict of interest between the subject area and the expert. Besides, there is a risk of geographical bias.

Control Group Method: The control group approach compares the performance of the instrument in supporting one group with the performance of samples taken from the control group. A control group is the untreated group with which a treatment

group is contrasted. The sophistication of the statistical analysis of the method is related to the size and quality of these data sets [19].

One of the advantages of control group method is related with the accuracy of the study; it is free of biases.

One of the disadvantages of control group method is that it cannot tell the quantitative impact of project. Beside, gathering data at the firm level can be difficult. This method is relatively a costly method.

Cost Benefit Analysis: This method is used to estimate the economic costs and benefits of investment projects. Institute for Prospective Technological Studies of EC defines cost benefit analysis as a tool for determining whether a project or a program is economically efficient and introduces three different phases for cost and benefit patterns: (a) the R&D phase, (b) the commercialization phase, and (c) the production phase [19].

The main advantage of cost benefit analysis is that it is easy to understand. Beside it allows making comparisons between investments or projects.
The main disadvantage of cost benefit analysis is to value the intangible benefits and costs that are encountered in the research projects.

2.4 Framework Programme Evaluation Studies of Some Countries

As Fayl pointed out, "to be able to cope with the new objectives (...), the European RTD effort needs to be supported by effective and efficient monitoring and evaluation tools, including an appropriate set of indicators (quantitative and qualitative), capable of demonstrating its impact." [28]

The studies carried out on the impacts of the early FPs have emphasized the importance of knowledge transfer, skills and the stimulation of international cooperation [29].

In this part of the study, we will focus on the evaluation studies of fourteen countries regarding their FPs participation which are Austria, Belgium, Czech Republic, Denmark, Finland, Germany, Hungary, Ireland, Norway, Spain, Sweden, Switzerland, United Kingdom and Turkey. Scope of studies, evaluation methods, sample sizes and the most remarkable outcomes will be mentioned. These studies are important since they will provide inputs for our study especially for the formation of impact categories and hypotheses.

Austria: The evaluation of Austrian participation in FP4, commissioned by the Austrian Federal Ministry for Education, Science and Culture, was prepared in April 2001 [30]. Data/document review and survey methods were chosen as the evaluation methods and a self-conducted survey was designed and sent to the Austrian participants. According to the cost-benefit comparison by universities, research institutes and industry; 73% of the participants from universities estimate the benefits of their participation is higher than the costs.

The study tries to examine the short and mid-term effects of participation on scientific reputation, competitive position, employment, access to new markets, turnover, cost reduction and shorter development time. Regarding the short-term effects on employment, 56% of participants from university research institutes, which is the highest share among participants, indicated highly positive effects. The study concludes based on the results that at the university level participation in EU FPs play an important role for the academic up and coming.

The study includes detailed statistical information of the Austrian participation to the FP4. Data/document review and survey methods are evaluation methods used in the study for impact analysis.

Belgium: Flanders report in the European Fourth Framework Programme (1994-1998) which is commissioned by the Ministry of Flanders; Science, Innovation and Media Department, includes quantitative analysis of the Flemish participation in the FP4 [31].

The only method used in the study is EC data/document review since this study does not attempt to perform any impact analysis of the FP4 on participants instead it presents detailed statistical information about the Flemish and the Brussels' participation to the FP4 like number of submitted proposals, number of participation by organization type, number of participation by areas, countries that cooperated with, amount of participation fee and its return.

Czech Republic: The evaluation study of participation from Czech Republic in FP5 and FP6 named “Assessment of Participation of the Czech Republic in the EU Framework

Programmes" was initiated by Technology Centre of the Academy of Sciences of the Czech Republic in 2008 [32].

This study uses three evaluation methods which are EC data/document review, survey and biblometric. Statistical analysis is made based on the data in the E-CORDA database, which is issued and regularly updated by the EC.

Statistical analysis is presented in the study like number of submitted projects, success rates, basic characteristics of the Czech participation in FP6 projects, the scope of international cooperation, participation in the FP6 by project type, participation in the FP6 by type of participant.

The designed survey was sent to the Czech teams who have FP5 and FP6 projects. Czech teams participated in 890 projects in FP5 and 1068 projects in FP6, a total of 1958 projects. Data was collected from responses from 226 projects which of 145 from FP6 projects, which is approximately 12% of all FP5 and FP6 projects with the Czech teams. Universities had the higher participation rate with 44% of all responders. 58,3% of the responses were belongs to the projects which were still running at the time of the survey. The study states that 92% of the responders considered international collaboration, 90% of them considered financial support and 88% of the them appreciated discovery of new knowledge, about two thirds of the responders indicated project management experience as important outcomes of the projects. New equipment was considered by only 13% of responders. Economic impact of the FP5 and FP6 was questioned by asking questions regarding commercialization, profit and competitiveness. 65% of responders stated that results of the FP project increased their competitiveness. Only 13% of them indicated that

their results have already found commercial use and 15% indicated that results brought some profit to their institution. 21% of responders stated that they expect future profit from results of the projects.

In the “Czech results of FP5 and FP6 projects in bibliometric perspective” part of the study, publication activity of research teams is evaluated. The study proved that citation rate of papers published during FP5 and FP6 projects was about 20% higher than that of the average Czech papers. The publications resulting from FP projects were cited 42% more than the average Czech papers.

Denmark: Evaluation study of Denmark named “Evaluation of Danish Participation in the 6th and 7th Framework Programmes Research: Analysis and Evaluation 2/2010” was initiated by Danish Agency for Science, Technology and Innovation in order to assess the financial, scientific and commercial benefits of Danish participation and develop strategies to maximize these benefits [33].

FP6 and FP7 projects in Health, Food and Nanotechnology areas which involve Danish participation were determined as the sample in order to make more detailed assessment of the benefits and the strategies. Evaluation methods used in the study are EC data/document review, survey and interviews.

The survey which includes 26 core questions [34], was sent to 1111 participants of whom 360 responded which yielded to a response rate of %32. %62 of respondents was from universities and public research organizations. In addition to the survey, 40 telephone and face-to-face interviews were performed in order to have a richer perspective.

The study states that most produced outputs of FP projects are research outputs (publications, conferences, trained personnel, etc.), and there is far less activity regarding innovation outputs such as new products, patents, licenses and so on. One of the major impacts of the FPs is to increase the level of collaboration and networking at international level. The study estimates that during FP6, Danish participants were exposed to 10,000 new partners.

Finland: There are three national evaluation studies of Finland participation in Framework Programmes as a member state. The first one named "Knowledge Creation and Knowledge Diffisuion Networks Impacts in Finland of the EU's Fourth Framework Programme for Research and Development" was initiated by Finnish Secretariat for EU R&D in 2000 [35].

In this study, data/document review, survey and interview evaluation methods were used. The number of participants surveyed was 955 and the response rate was 70. Universities and research institutes had the highest participation with 503 responders. In addition to the survey a few complementing interviews were carried out. Data analysis was performed by using factor analysis method. In the study, universities ranked the goals of participation as knowledge related, resource related, networking and business related respectively. Universities indicated that results achieved by FP projects are knowledge related, resource related, networking and business related respectively. It can be concluded that Finnish universities achieved their initial goals. The study proved also that coordinators are more successful than others with respect to achieving technical and scientific objectives, learning new technical and scientific knowledge and skills, learning to work in an international project, succeeded in developing commercial products.

Another study, **"**Finnish Participation in the EU Fifth Framework Programme and Beyond" study was initiated by Finnish Secretariat For EU R&D in 2004 [36]. This study presents statistical information regarding Finnish participation in the FP5 in addition to benefits and strategic importance. The study was approached from two angles: benefits and strategic importance of the EU FP for the Finnish participants and barriers of achieving scientific, technological, commercial and societal goals. In order to perform these research objectives evaluation methods that are data/document review, survey, interviews and expert judgment were used. The designed survey was sent to 1453 participants, 520 participants responded which means the response rate is %36. In addition to the survey, 15 interviews were conducted. Regarding expert judgment, 11 national experts were invited in order to discuss the needs for coordination of national and EU research programmes and the future challenges. In the study, universities indicated that research funding is the main objective of Finnish universities for participating in EU FPs. Other objectives of universities are acquiring new scientific knowledge and international level cooperation. Finnish universities considered the "three most frequently achieved and expected results in FP4 and FP5" as acquiring new scientific knowledge (94%), visibility or prestige (92%), research funding (91%) and publications (91%). Since research funding and publications had the same percentages, both were included.

Recent study named "Finns in the EU 6th Framework Programme Evaluation of Participation and Networks" was initiated by the Finnish Funding Agency for Technology and Innovation in 2008 in order to evaluate the status of Finnish participation in FP6 and to propose recommendations for the future [37]. Three thematic fields that are energy and environment, forest, and ICT were chosen for the

study. EC data/document review, survey, interviews and social network analysis were used as evaluation methods. The designed survey was sent to 956 participants who have FP6 funded projects. Data was received from 316 participants that correspond to response rate of 33%. In addition to survey, 28 interviews were conducted. Like many others countries, universities have the highest participation rate in FP6 in Finland. In the study universities indicated that international cooperation, new contacts, deepening of collaboration and new scientific knowledge as the three most important objectives related to FP6 participation. Since deepening of collaboration and new scientific knowledge had the same percentage, both were included. It is worth to mention that the main objectives of the Finnish universities were research funding, new scientific knowledge and European cooperation in the FP5. Finnish universities considered the "three most frequently achieved and expected results in FP6" as international cooperation (91%), new contacts (87%), deepening of collaboration (87%) and monitoring S&T development (85%).

Germany: The recent national evaluation study of German participation named "German participation in the Sixth European Framework Programme for Research and Technological Development" was initiated by Federal Ministry of Education and Research in 2009 [38].

EC data/document review and survey methods were used in the study. There is no specific information regarding the sample size.

The study gives statistical information regarding German participants in FP6 in detail. Universities and research institutes had the highest participation rate among German participants. The study says that a quarter of the participants and 30% of the non-

participants indicated that more comprehensive counseling services would lead to more project applications and grant. The study argues that FP6 participation has effects on German participants with respect to networking and scientific output.

Hungary: National evaluation of Hungarian participation was conducted by using case study evaluation method in order to determine socio-economic impacts of FP5 [39]. Six participants three of whom were from SMEs, a research institute, one person from an EU FP5 consultancy service and a policy-maker were interviewed. New knowledge on existing and future markets, improving business networks, learning how to manage international R&D projects and applying for EU grants were determined as the benefits. An interesting result of the study was that accessing to new financial sources does not play a significant role in these six participants' decisions whether to join EU projects. Another interesting result was that FPs are one of the important motivation tools that companies use to motivate the researchers and business staff.

Not surprisingly the study says that scientific and technological outputs are higher valued by academic research institutes than other aspects. As for firms, acquiring new knowledge and skills are the major scientific and technological outputs.

Ireland: National evaluation study of Irish participation named "The Fourth Framework Programme in Ireland An Evaluation of the Operation and Impacts in Ireland of the EU's Fourth Framework Programme for Research and Development" was initiated by The National Policy and Advisory Board for Enterprise, Trade, Science, Technology and Innovation in 2001 [40].

Data/document review, survey and interview methods were used in the study. Data/document review was performed in order to have statistical information regarding Irish participation in FP4. The designed survey was sent to 400 participants of whom 100 answered the survey. In addition to survey, interviews were conducted with 53 of them. Moreover, 22 interviews were conducted with the policymakers and administrators in order to make policy suggestions.

The study states that FP4 was one of the most important contributors to Ireland's efforts in order to become a knowledge-based economy. It is worth to remark that universities, research institutes and industry stated that their main objective regarding participation in FP4 was enhancement of existing knowledge base. 83% of the participants from universities and research institutes stated that publications were the most important outcome of the FP4 projects where 77% of the participants from industry stated that new processes were the most important outcome. Few of the participants stated that the outcome of the project was commercialized. 40% of firms stated that they had not expected commercial returns from projects.

The study suggests that it may be good to develop national plans in order to experience commercial returns.

Norway: The national evaluation study of Norwegian participation named "Evaluation of Norway's participation in the EU's 5th Framework Progamme" was commissioned by Norwegian Ministry of Trade and Industry in 2003 [41].

Data/document review, social network anlaysis, survey, interview evaluation methods were used in the study.

The designed survey was sent to the all Norwegian who participated in the FP5 projects that correspond to 1423 participants and 839 of them answered the survey.

The study states that the main objective for the Norwegian participation in FP5 was accessing the research networks. Establishing network and development of new knowledge were considered by the participants as top two achievements of the projects. Better services and products to end users, transfer of knowledge to research institutions or Norwegian enterprises, improved competitiveness for Norwegian industry and transfer of technology to research institutions or Norwegian enterprises, improved competitiveness were ranked respectively as potential spillovers by the participants. The report also makes suggestions regarding national support system.

Spain: National evaluation study of Spanish participation named "Evaluation of the impact of the FP6 in the RTD Public System in Spain" was published by Spanish Ministry of Science and Innovation in 2009 [42].

Data/document analysis, survey, interview and expert judgment evaluation methods were used in the study. The sample is limited with the universities and public research entities. The survey was sent to 647 participants and 51% of them answered the questions.

The study states that the main impact of FP6 participation was increasing the knowledge base and extending interdisciplinary knowledge. The main complain was related with commercialization or industrial use of projects' outcomes. 89% of survey participants indicated that benefits of participation were equal to or greater than the

costs. The study found that the most of the scientific impacts were in the form of publication of scientific articles, attendance of conferences, new collaboration projects, and exchange visits by researchers. 60% of the participants stated that they have not and will not apply for IPR, mainly patent.

Sweden: National evaluation study of Swedish participation named "Impacts of the Framework Programme in Sweden" was published by the Swedish Governmental Agency for Innovation Systems in 2008 in order to determine the impacts of the FP3 to FP6 on Sweden between 1990 and 2008 [43].

Data/document analysis, interview and bibliometric evaluation methods were used in the study. The scope of the study was limited to four industrial sectors that are sustainable energy; life science and health; ICT; and vehicles, and five Swedish universities.

The study presents statistical information regarding Swedish participation in FPs. Like most of the other countries, universities and research institutes have the higher participation rate among Swedish organizations in FP4, FP5 and FP6.

The study suggests that the FPs had important impacts in Sweden but because of the absence of national strategies some of the impacts are limited. The study concluded based on the interviews that networking is an important aspect consistent with the literature. It is worth to mention that the study states that quite a number of interviewers indicated that FP projects were scientifically less productive than normal Swedish projects. Another important finding is that all of the participants

from universities stated that the biggest impact of the FPs was to increase the size and scope of their international networks.

Bibliometric analysis was made by comparing the publication and citation performance of researchers who took part in FPs projects with the researchers at the five universities. The study states that no apparent effects are found based on the bibliometric analysis. But the study realized that the researchers who took part in FPs projects are already successful in terms of both citation rates and number of collaborations before participating in FPs projects. Therefore the study concluded that established researchers are more successful in FPs.

Switzerland: There are three national evaluation studies of Swiss participation which are "Switzerland's Participation in the 6th European Research Framework Programme" [44], "Switzerland's Participation in the 7th European Research Framework Programme" [45], and "Effects of Swiss participation in EU Research Framework Programmes" [46]. Since the last one that was initiated by State Secretariat for Education and Research in 2009 is the most comprehensive and the recent one, we examined it.

Switzerland joined FPs through FP6 first time by paying contribution fee similarly with Turkey therefore the study is important in order to make comparative analysis. Data/document analysis, survey and interview evaluation methods were used in the study. The sample was limited with the five universities that were most active in FPs, a research institute and eight companies that were most active in FP6.

The study concludes remarkable results. The study states that each Swiss participation in a FP project directly creates about two jobs. The number of people employed in Switzerland thanks to FPs projects can be estimated at 3000 for FP5, and 4000 for FP6. Differently from the evaluation studies of other countries, the report examines the number of established start-up and spin-off as a result of FPs projects and found that more than one in five participations contribute to the establishment of a start-up or spin-off. 29% of participants reported that they have received or expect to receive a patent within three years after the end of a project. The report found that around 200 master's and doctorates degrees are obtained per year thanks to the FPs projects.

United Kingdom: The national evaluation study of British participation named "The impact of the EU RTD Framework Programme on the UK" was commissioned by Department for Business, Innovation and Skills which is a ministerial department of the United Kingdom (UK) Government in 2010 [47].

Data/document analysis, survey and interview evaluation methods were used in the study. The designed survey was sent to 7,869 British FP6 and FP7 participants and 1,208 of them answered the survey completely. In addition to the survey, 53 semi-structured interviews were conducted. Like many other countries universities had the highest participation rate in both the FPs and the survey in UK.

Accessing research funding (89%), developing relationships and networks (88%), developing and extending internal knowledge and capabilities (75%), addressing specific scientific or technological questions or problems (75%) were ranked respectively by the British participants as the main objectives for FPs projects

participation. Publications (66%) and grants (64%) were ranked by the British participants as top two important outcomes of the projects. Improved relationships and networks (61%), increased understanding/knowledge in new areas (55%), increased understanding/knowledge in existing areas (54%), enhanced reputation and image (43%), increased scientific capabilities (41%) were ranked by the British participants as top five benefits achieved through FPs projects. The report also makes recommendations to the Department for Business, Innovation and Skills regarding maximization of benefits that are gained through FPs projects.

Turkey: The only study regarding evaluation of Turkish participation that we are aware is named "Assessing Impacts of The European Framework Programme on Turkish Participants: A Case Study on FP6 IST Priority" which was studied as a master thesis at Middle East Technical University, Department of Industrial Engineering in 2010 [24].

Data/document review and survey evaluation methods were used in the study. The scope of the study was Information Society Technologies (IST). The designed survey was sent to 44 funded participants in the IST area of FP6 who of 32 answered the survey questions completely. The study examines impacts under four categories that are scientific and technological impacts, economic impacts, impacts on collaborations and sector knowledge and other institutional impacts.

More than 90% of the participants indicated that they have acquired new scientific knowledge from the project. The study proved that economic impact of project participation is lower than the scientific and technological impact consistent with the other countries' evaluation reports. Accessing to research grants was found as the

most significant economic impact factors. The study says that impacts on collaborations and sectoral knowledge are quite high. Regarding other institutional impact, the study found that more than 90% of the participants indicated as projects have enhanced personnels' skills and knowledge. The study found that the most recognizable impact is on collaborations and sector knowledge, then other institutional impacts, then scientific and technological impacts and lastly economic impacts. Based on the assessed impacts of FP6 IST area, the study argues that Turkey should continue to participate in the forthcoming FPs.

Summary: We examined evaluation studies of fourteen countries so far. Countries initiate national evaluation studies of participation to FPs in order to understand the participation statistics, to measure the outcomes and effects, to develop strategies for maximizing benefits to develop schemes for increasing participation.

It is worth to mention that all of the studies except those of Hungary and Turkey were commissioned by ministries or governmental institutions that are responsible for EU FPs.

Table 2 summarizes the scope and evaluation methods of these studies. It can be concluded that the most frequently used evaluation methods are data/document review, survey and interview. Although there are few studies that use expert judgment, social network anlaysis and bibliometric evaluation methods, we have not been able to find enough number of studies which would encourage us to use these methods in the study.

Table 2 Scope and Evaluation Methods of the Countries' Evaluation Studies

Evaluation Methods / Countries	Scope	Data/document review	Survey	Interview	Expert Judgement	Social Network Analysis	Bibliometrics
Austria	FP4	X	X				
Belgium	FP4	X					
Czech Republic	FP5-FP6	X	X				X
Denmark	FP6-FP7	X	X	X			
Finland	FP4	X	X	X			
Finland	FP5	X	X	X	X		
Finland	FP6	X	X	X		X	
Germany	FP6	X	X	X			
Hungary	FP5	X		X			
Ireland	FP4	X	X	X			
Norway	FP5	X	X	X		X	
Spain	FP6	X	X	X	X		
Sweden	FP3 to FP6	X		X			X
Switzerland	FP6-FP7	X	X	X			
United Kingdom	FP6-FP7	X	X	X			
Turkey	FP6	X	X				

We can summarize the national evaluation studies for FPs have a great effect in terms of scientific and technological capabilities and outputs, and networking. Economic impacts of FPs are not as high as scientific and technological impact. Bearing in mind that FPs have a target of mid to long term, this result is not so surprising.

CHAPTER 3

EU FRAMEWORK PROGRAMMES

3.1 The History

FPs were launched by EC in order to foster and support research activities in the ERA as depicted in Figure 3 [48]. EU gives special importance to R&D activities since R&D is crucial in order to become a knowledge society. One of the main objectives of the EC is to develop the EU's policy in the field of research and technological development and by this means contribute to the international cooperation of European industry. Through FPs, EC tries to encourage and coordinate the R&D activities in ERA in order to reach to the goals defined in the Lisbon Strategy, namely to become the most dynamic competitive knowledge-based economy in the world [49].

The Lisbon Strategy also known as the Lisbon Agenda was set out by the European Council in Lisbon in March 2000 [50]. It was an action and development plan for the economy of the EU between 2000 and 2010. Its aim was to make the EU by 2010 "the most competitive and dynamic knowledge-based economy in the world capable of sustainable economic growth with more and better jobs and greater social cohesion" [49]. EC believes that these objectives can be only achieved through

research and development activities. EC uses FPs to set priorities in the thematic areas (like ICT, health, transport..) and to coordinate R&D activities which will pave the way to sustainable economic growth.

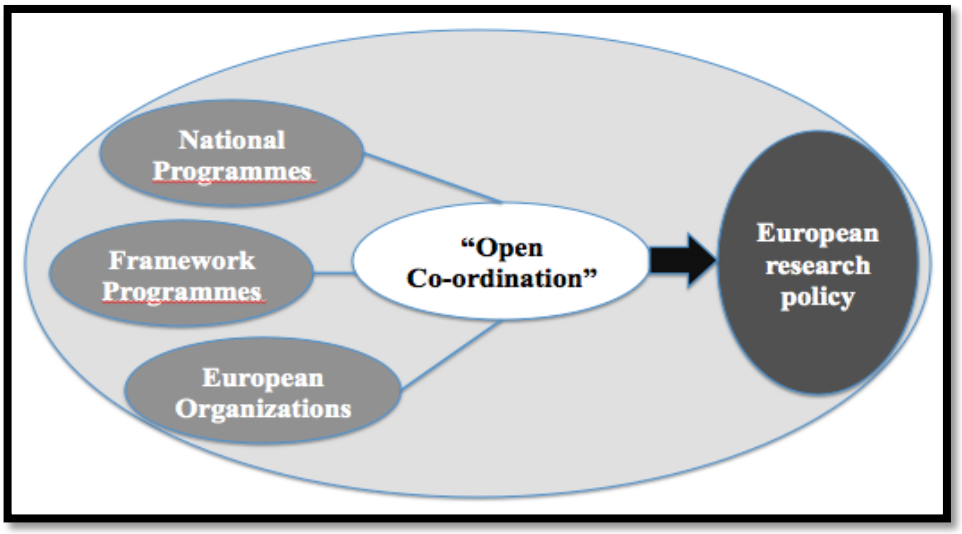

Figure 3 European Research Area

The First Framework Programme (FP1) had no real legal basis. The Single European Act (SEA), signed in Luxembourg and the Hague, and entered into force on 1 July 1987 [51]. This date is known of the legal basis of the Framework Programmes.

The first of the FPs, FP1, run between 1984-1988 with a total budget of €3.75 bn. Until the 7th Framework Programme (FP7) which is currently in charge, FPs were designed to last for five years periods. FP7 was launched at 2007 and will remain in force till 2013 (7 years). Table 3 shows the periods of FPs below:

Table 3 FPs and their periods

Framework Programme	Period
First	1984 – 1988
Second	1987 – 1991
Third	1990 – 1994
Forth	1994 – 1998
Fifth	1998 - 2002
Sixth	2002 - 2006
Seventh	2007 - 2013
Eighth (Horizon 2020)	2014 - 2020

The budget of FP7 is € 53.2 bn. This represents a substantial increase compared with the previous Framework Programme, FP6, which had a budget of € 19.1 bn. This substantial increases also shows the importance attributed to R&D by the EC.

FP7 has the biggest budget (€53,2 bn) within whole FPs. The budgets of all FPs are showed in the Figure 4 :

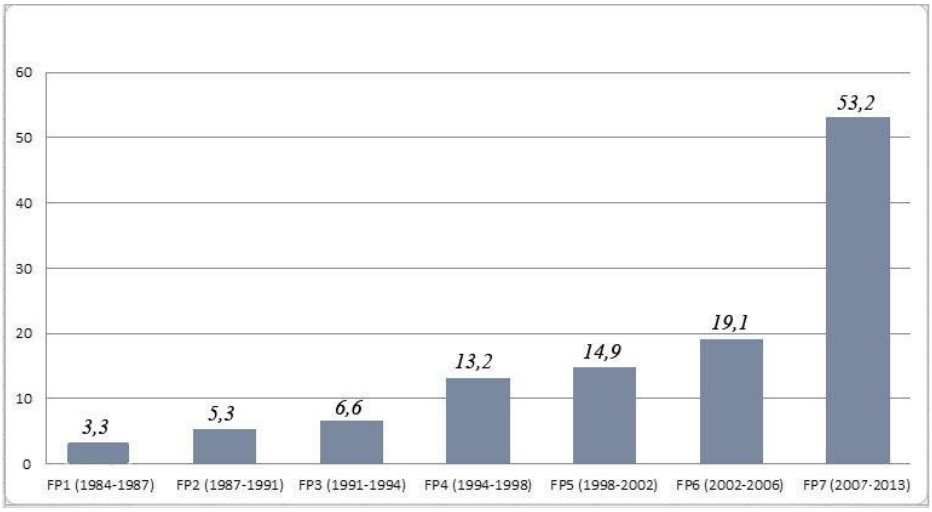

Figure 4 Budgets of all FPs

3.2 The Structure of FP7

FP7 is currently the main instrument of the EU in order to fund and support R&D activities in Europe.

There are 5 main programs under FP7 which are Cooperation, Ideas, People, Capacities and Nuclear Research (EURATOM). Figure 5 [52] shows these programs with their budgets:

COOPERATION (€32.3 bn)	10 Thematic Areas Colloborative Research Projects Industry / Academia
IDEAS (€ 7.4 bn)	Frontier Research Individual Researchers / Temas
PEOPLE (€ 4.7 bn)	Researcher Mobility / Career Development Individual Researchers / Organizastions
CAPACITIES (€4.2 bn)	7 Areas Capacity Development
EURATOM (€2.7 bn)	Nuclear Research Training Activities

Figure 5 Programs under FP7 and their budgets

Within all of the programs, Cooperation Programme is the core of FP7 and has two thirds of the overall FP7 budget. Cooperation Programme is designed to foster and support the collaborative research and has 10 thematic areas which are listed below:

Table 4 Thematic Areas of Cooperation Programme

Health
Energy
Security
Space
Food, agriculture and fisheries, and biotechnology (KBBE)
Information and communication technologies (ICT)
Environment (including climate change)
Socio-economic sciences and the humanities
Transport (including aeronautics)
Nanosciences, nanotechnologies, materials and new production technologies

Figure 6 shows the proportion of FP7 Cooperation Programme's budget [52]:

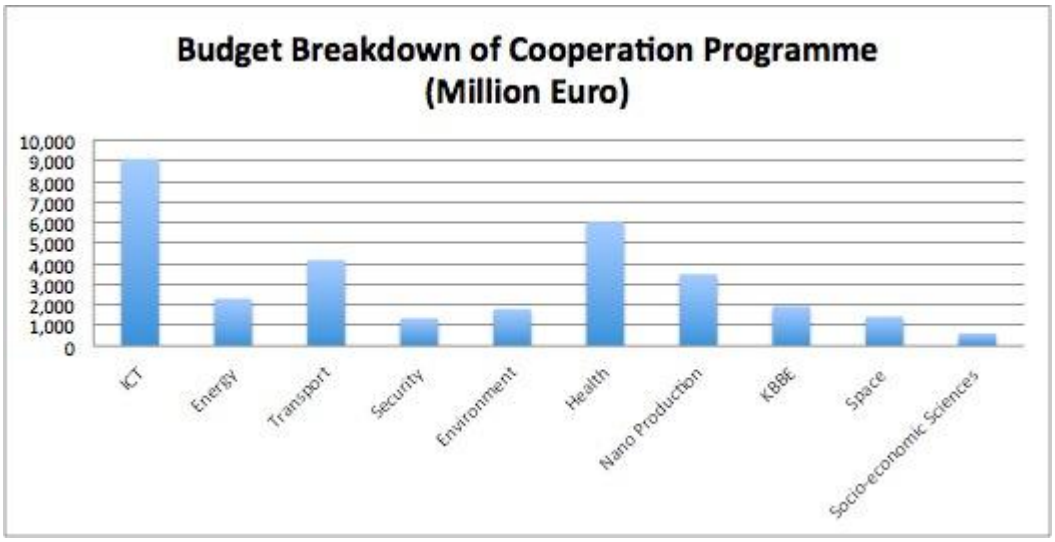

Figure 6 Budget Breakdown of Cooperation Programme

There are different types of projects in the FP7. Collaborative projects and network of excellence projects are included in the study.

Collaborative projects are the research projects with clearly defined scientific and technological objectives. Partners from industry, universities, research centers form consortia in order to achieve the objectives of the research project.

There are two types of collaborative projects that are Large-scale Integrated Project (IP) and Specific Targeted Research Project (STREP). Minimum participants numbers, upper limits in terms of budgets and periods of IPs and STREPs are showed at the Table 5 [52].

Table 5 Minimum participants numbers and upper limits in terms of budgets for IPs and STREPs

Type of Project	**Upper limit (budget)**	**Minimum partners**	**Period**
IP	€12m	≥ 3	3-5 years
STREP	€ 3m or €6m	≥ 3	2-3 years

A Network of Excellence (NoE) is a type of project which aims to strengthen scientific and technological excellence on a particular research topic. The aim is to gather the critical mass in order to achieve the excellence for the specific research topic. NoEs typically include 6 – 12 partners of 4 - 5 years duration [52].

Coordination and Support Actions (CSA) are the projects that aim to coordinate or support research activities and policies. CSA projects do not include any research activities, instead they are used to coordinate or support the research activities.

In this study, CSA projects were not taken into consideration since they do not include any research activities.

3.3 FPs and Turkey

Turkey firstly participated in FP4 and FP5 on project basis but did not pay any contribution fee.

Turkey joined the FPs as an associate country paying financial contribution, through the FP6 since 2002. Joining decision to FPs had been made during the meeting of Supreme Council of Science and Technology on 15 April 2002. After approval of the Memory of Understanding, the joining decision was published on the Official Gazette on 9 January 2003.

Since from the beginning, there is a public debate on national contribution and reimbursement rates. Table 6 shows national and total (national + EC) contribution of FP6 and FP7 and reimbursement rates [2]. It can be concluded that Turkey covered a distance from FP6 to FP7 in terms of participation thanks to TÜBİTAK's effort but there is still room for improvement.

Table 6 Contribution of FP6 and FP7 and reimbursement rates

	FP6 (2003-2006)	FP7 (2007-2011)	Rate of increase (%)	FP7 (2007-2012)
Share of Turkish Participants (Million €)	59	140	137	145
National Contribution (Million €)	185	131	-29	200
Rate of Reimbursement to National Contribution	32%	107%		73%
Total Contribution (Million €)	232	211	-9	280
Rate of Reimbursement to Total Contribution	25%	66%		52%

Turkey's FP7 performance was mentioned at the Science and Turkey 2009 Progress Report, Turkey 2010 Progress Report and Turkey 2011 Progress Report by EC.

Turkey 2009 Progress Report:

"Overall, good progress has been achieved in terms of preparation for EU accession and integration into the European Research Area. The success rate for Turkey's participation in the 7th Framework Programme is increasing. However, there is still room for improvement" [53].

Turkey 2010 Progress Report:

“Turkey is well prepared in the area of science and research and good progress has been achieved towards future integration into the European Research Area. Overall, Turkey’s participation and success rate in Framework Programmes are on the rise. However, further efforts are required to maintain these rates all through the 7th Framework Programme for Research and Technological Development (FP7)” [54].

Turkey 2011 Progress Report:

“Overall, Turkey's participation and success rate in the EU Seventh Framework Programme are growing, but further efforts are needed in order to meet the excellence requirement and competitive participation in the EU research programmes” [55].

The common comment of three reports is Turkey’s participation and success rates are increasing but further efforts are needed for improvement.

3.4 ICT, Energy and KBBE Thematic Priorities

ICT plays crucial role to contribute to the competitiveness of European industry. As it can be seen from the Figure 6, ICT has the biggest share in terms of budget in the Cooperation Programme. It is the largest specific programme of FP7 itself. The objective of the EC is to use ICT as a catalyst both for product and service innovation and the modernization of public services like health, education and transport [56].

According to the EC; ICT brings technology closer to people and organizational needs which means hiding technology complexity and revealing functionality on demand; making technology functional, very simple to use, available and affordable; providing new ICT-based applications, solutions and services that are trusted, reliable, and adaptable to the users' context and preferences [57].

Food, Agriculture and Fisheries, and Biotechnology is one of the thematic priorities in FP7 like ICT. The objective of funding the research projects in this domain is to build a KBBE. European Commission states that KBBE will play an important role to increase productivity and competitiveness and improve the quality of life, while protecting the environment [52].

Energy is one of the thematic priorities in FP7. The objective of funding the research projects in this domain is to aid the development of the technologies to make the current energy system more sustainable, competitive and secure [52].

3.5 Turkish participation in ICT, KBBE and Energy Thematic Priorities

In this part of the study, we will give statistical information about the participation of Turkish organizations to the ICT, KBBE and Energy thematic priorities. Before going in the details of the these three themes, we would like to give the shares of Turkish partners in the thematic priorities of Cooperation Programme [2] in order to have the general picture in Table 7.

Table 7 Shares of Turkish partners in the thematic priorities of Cooperation Programme

10 Thematic Priorities under Cooperation Programme	Share of Turkish Partners (Euro)
Health	5,223,486
Food,Agriculture,Fishing and Biotechnology (KBBE)	7,261,283
Information and Communication Technology (ICT)	14,907,272
Nanosciences,Nanotechnologies,Materials and new Production Technologies	3,942,213
Energy	3,415,278
Environment (Including Climate Change)	8,754,622
Transportation (Including Aviation)	6,902,715
Social-Economic and Human Sciences	2,950,155
Space	1,916,896
Security	4,566,959

ICT: Turkish universities who took part in FP7 projects in ICT area and their projects numbers can be seen from the Table 8 :

Table 8 Turkish universities who have FP7 projects in ICT theme

University	Number of Projects
Bilkent University	8
Koç University	4
Boğaziçi University	3
Middle East Technical University	3
Sabancı University	2
Kadir Has University	1
Yeditepe University	1

Table 9 Number of ICT projects that Turkish universities and their budget information

Number of ICT projects that include Turkish universities	Total budget of the projects	EC contribution
21	58.644.691€	26.305.763€

There are 48 projects in ICT domain in FP7 which has Turkish partners so far. The numbers include the latest projects whose contracts are signed between the beneficiaries and the EC. According to EC-data Turkish universities took part in 21 of 48 projects [52]. The total budgets of these projects are 58.644.691€ which of 26.305.763€ is EC contribution.

KBBE: Turkish universities who took part in FP7 projects in KBBE area and their projects numbers can be seen from the Table 10 :

Table 10 Turkish universities who have FP7 projects in KBBE theme

University	Number of Projects	University	Number of Projects
Cukurova University	4	Gazi University	1
Ege University	3	Gaziantep University	1
Sabancı University	2	Hacettepe University	1
Istanbul Technical University	2	Anadolu University	1
Sabancı University	2	Istanbul University	1
Adnan Menderes University	1	K.Maras Sutcu Imam University	1
Akdeniz University	1	Karadeniz Technical University	1
Anadolu University	1	Marmara University	1
Ankara University	1	Middle East Technical University	1
Ataturk University	1	Mustafa Kemal University	1
Bogazici University	1	Yeditepe University	1

Table 11 Number of KBBE projects that Turkish universities and their budget information

Number of KBBE projects that include Turkish universities	Total budget of the projects	EC contribution
28	97.399.814 €	64.260.095 €

There are 37 projects in KBBE domain in FP7 which has Turkish partners so far. The numbers include the latest projects whose contracts are signed between the beneficiaries and the EC. According to EC-data Turkish universities took part in 28 of 37 projects [52].

Energy: Turkish universities who took part in FP7 projects in Energy area and their projects numbers can be seen from the Table 12 :

Table 12 Turkish universities who have FP7 projects in Energy area

University	Number of Projects
Hacettepe University	1
Middle East Technical University	1

Table 13 Number of Energy projects that Turkish universities and their budget information

Number of Energy projects that include Turkish universities	Total budget of the projects	EC contribution
2	7.923.464 €	5.666.873 €

There are 11 projects in Energy theme in FP7 which has Turkish partners so far. The numbers include the latest projects whose contracts are signed between the beneficiaries and the EC. According to EC-data, Turkish universities took part in 2 of 11 projects [52].

Although energy is one of the priority areas of Turkey determined by Supreme Council of Science and Technology, Turkish participants took part in a very few energy projects in FP7.

CHAPTER 4

METHODOLOGY

In this part of the study, we will focus on the methodology. The approach for the whole study life-cycle is summarized in Figure 7 which is similar to the Spain's national evaluation study for FP6 [56].

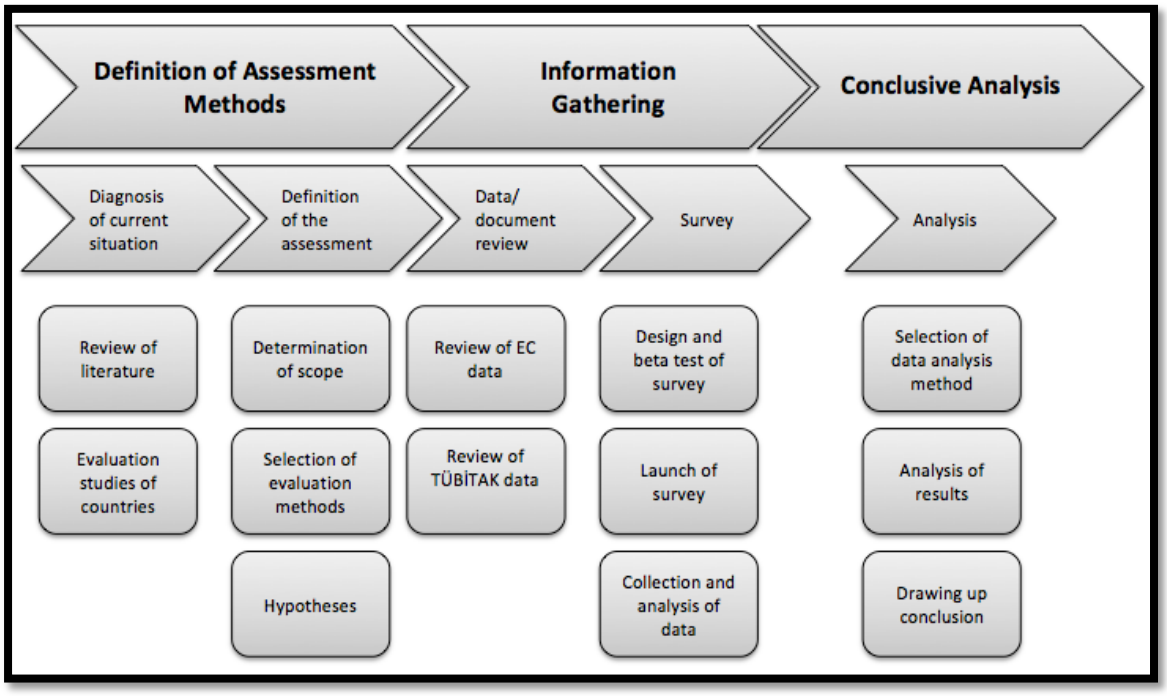

Figure 7 The approach of the study

Definition of assessment methods, information gathering and conclusive analysis are the main steps for the study. Each of main steps have sub-steps and tasks.

Definition of Assessment Methods: This step has two sub-steps that are diagnosis of current situation and definition of the assessment. Diagnosis of current situation has two tasks that are reviewing of literature and evaluation studies of some countries. Reviewing of literature was explained in Chapter II in detail. We reviewed literature with regard to rationale of R&D supports and cooperative R&D in section 2.1, rationale of evaluation in section 2.2, evaluation methods in section 2.3 and determined their strengths, weaknesses and limitations. National evaluation studies of some countries were examined in section 2.4 in detail. Impact categories that were used in national evaluation studies were also examined in the same section.

Definition of assessment sub-task has three tasks that are determination scope, selection of evaluation methods and forming of hypotheses. Selection of evaluation methods and impact categories were explained in section 4.1. Information with regard to formation of hypotheses was explained in section 4.2. We determined the scope of the study as FP7, focus of the study as universities and selected ICT, Energy and KBBE themes. Determination of scope and sample design were explained in section 4.3 in detail.

Information Gathering: We used to EC and TÜBİTAK's data in order to gather information regarding FPs; Turkey's involvement in FPs; ICT, KBBE and Energy themes, Turkey's participation numbers to FP7 and Turkey's participation numbers to selected themes. We gave detailed information about these issues in Chapter III.

Survey: Survey sub-step includes three tasks that are designing and beta-testing of survey, launching of survey, collecting and analyzing of data. Information regarding survey design was explained in section 4.3. Analyzing of data was explained as preliminary findings in section 5.1.

Conclusive Analysis: This step has analysis sub-step where we selected data analysis method, analyzed results and drawn up conclusions. Data analysis method was explained in section 4.4 in detail. Analysis of results was mentioned in section 5.2 as verification of hypotheses and examining correlations. Finally, conclusions were drawn up based on the analyzed results and further studies were mentioned in Chapter VI.

4.1 Evaluation Methods and Categories

Evaluation Methods: Impact analysis methods in the literature and national evaluation studies of some countries were examined in the Chapter 2. We analyzed evaluation studies of fourteen countries and concluded that the most frequently used evaluation methods are data/document review, survey and interview. Although there are few studies that use expert judgment, social network analysis and bibliometric evaluation methods, we have not been able to find enough number of studies that would encourage us to use these methods in the study. Based on these analyses, data/document review and survey evaluation methods were decided to be used in our study however use of interviews may be recommended for further detailed studies in this area. We can list our methods as follows:

1. Analyses of EC and TÜBİTAK data on Turkish participation in the FP7

2. A survey directed to Turkish universities who took part in ICT, Energy and KBBE themes of FP7. The survey was designed to gather information on the outputs and impacts arising from FP7 projects

Formation of Impact Categories: We analyzed national evaluation studies of fourteen countries and examined how they categorize the impacts in Chapter 2. Since impact categorization is a subjective matter, there is no "one size fits all" model.

Table 14 Finland's impact categorization

Business-oriented goals	Qualitative improvements in products, product diversification, increase of productivity, new or substantially improved production processes, expansion of markets, new business activities, prototypes, software, norms and standards, patents, licenses, taking part in the commercialisation of products
Societal Relevance	Enviromental questions, health care and nutrition, transportation, telecommunications, energy saving and management, urbanisation and related problems, employment, problems related to ageing population, security related to ageing population, education, new promising growth areas
Knowledge-related goals	New scientific knowledge, monitoring scientific and technology development in the field, new or substantially improved research methods or equipment, publications, training of personel, post-graduate degrees
Resource-related goals	Sharing risks and costs, research funding, joint use of equipment
Networking goals	New contacts, European co-operation

Finland's national evaluation study [35] categorizes impacts under business-oriented goals, knowledge related goals, resource related goals, networking goals and societal relevance. Table 14 shows Finland's impact categorization.

Switzerland's national evaluation study [46] categorizes impacts under effects on support for research, effects on the economy and employement, effects on scientific collaboration networks, effects on generation of knowledge and skills. Table 15 shows Switzerland's impact categorization.

Table 15 Switzerland's impact categorization

Effects on support for research	Cost and risk sharing, access to research infrastructure, access to funding, etc.
Effects on the economy and employment	Services, products, standards, patents, spin-offs, jobs, etc.
Effects on scientific collaboration networks	Access to/expansion of networks, access to complementary expertise, internationalisation of activities, etc.
Effects on the generation of knowledge and skills	Employee qualifications, publications, expansion of knowledge base, etc.

Spain's national evaluation study [56] categorizes impacts under people and organization, knowledge, processes, equipment and installations and financial capital.

United Kingdom's evaluation study [47] categorizes impacts under capabilities, skills and careers, industrial development and competitiveness, policy development and RTD funding, and collaboration between academic and industrial communities.

"Assessing Impacts of The European Framework Programme on Turkish Participants: A Case Study on FP6 IST Priority" [24] study categorizes impacts under scientific and technological impacts, economic impacts, impacts on collaborations and sector knowledge and other institutional impacts.

University of Manchester categorizes impacts under direct effects, indirect effects, technological effects, commercial effects, organization and methods effect and work factors effects in the "Assessing the Socio-economic Impacts of the Framework Programme" document [39]. Table 16 shows University of Manchester's impact categorization.

Table 16 University of Manchester's impact categorization

DIRECT EFFECTS	Product, process, sales, IPR, cost reduction
INDIRECT EFFECTS	All types of learning leading to the creation of all types of knowledge are taken into account: technological,organizational,networking, management, industrial, individual/collective, through experience/transfer, from other partners and so on.
TECHNOLOGICAL EFFECTS	Transfer of product technology, transfer of process technology, transfer of service technology, patents
COMMERCIAL EFFECTS	Network effect, reputation effect
ORGANIZATION & METHODS EFFECTS	Project management, other methods, organisation
WORK FACTOR EFFECTS	Impact of the project on the 'critical mass' relative to the human capital of the partner ie the range of competences related to more or less diversified scientific and technological fields, which are considered to be critical for the future development of the organization

"RTD Evaluation Toolbox" document that was published by Institute for Prospective Technological Studies of EC recommends using four categories in impact analysis studies that are scientific and technological impacts, economic impacts, social impacts and policy impacts. Table 17 shows the impact categories of EC [19].

Table 17 Impact categories of RTD Evaluation Toolbox

SCIENTIFIC & TECHNOLOGICAL IMPACTS	New knowledge, exchange of knowledge, culture of collaboration, network formation, scientific reputation, community development
ECONOMIC IMPACTS	Economic performance, industrial competitiveness, organizational innovation, employment
SOCIAL IMPACTS	Quality of life, social development & services, control & care of the environment
POLICY IMPACTS	Economic & industrial development, follow-on projects, regulatory change, contribution to policies

Another categorization used by EC is Comeval (Common Methodology for the Evaluation of RTD Results) Toolkit [58]. Impacts are categorized under competitiveness, employement, organization, quality of life, control and care of the environment, cohesion, development infrastructure, production and rational use of energy, industrial development, regulation and policy.

Table 18 summarizes impact items of other countries and institutions analyzed above.

Table 18 Impact Items of Other Countries and Institutions

Country / Item	Finland	Switzerland	Uni. of Manchester	RTD Toolbox	Comeval Toolkit	Turkey
Standard	X	X				X
Spin-offs		X				
Software	X					X
Sharing Risk and Costs	X	X	X			X
Services		X				X
Publications	X	X				X
Prototype	X		X			X
Product	X	X			X	X
Post Graduate Degrees	X					X
Patent	X	X				X
New Knowledge	X	X	X	X		X
New Contacts	X	X	X	X		X
Monitoring Developments	X					X
License	X					X
Infrastructures	X	X			X	X
Funding	X	X				X
Equipment	X					X
Employment	X	X		X	X	X
Qualifications		X	X			X
Process			X			X
Sales/Profitability			X	X		X
Reputation			X	X		X
Quality of Life	X			X	X	
Competitiveness				X	X	X
Policy Impacts				X	X	
Environment	X			X	X	
Productivity						X

Sharing risks and costs, research funding and joint use of equipment were categorized as resource related goals in Finland's evaluation study. We considered these to be under economic impacts due to the fact that they are directly related with spending. Cost and risk sharing, access to research infrastructure, access to funding were categorized as effects on support for research in Switzerland's evaluation study. We considered these to be under economic impacts. It means effects on support for research in Switzerland's evaluation study correspond economic impacts in our study.

Prototype, software, patent, standard, license were categorized as business oriented goals in Finland's evaluation study. Services, products, standards, patents, spin-offs, jobs were categorized as effects on the economy and employment in Switzerland's evaluation study. We categorized these elements under scientific and technological impacts since they are among STI indicators according to the OECD [59].

New scientific knowledge, monitoring scientific and technology development in the field, new or substantially improved research methods or equipment, publications, training of personnel, post-graduate degrees were categorized as knowledge related goals in the Finland's evaluation study. Knowledge related goals in Finland's impact categorization correspond scientific and technological impacts in our study since these elements are among STI indicators according to the OECD [59].

New contacts and cooperation were categorized as networking goals in Finland's evaluation study. Access to/expansion of networks, access to complementary expertise, internationalization of activities were categorized as effects on scientific collaboration networks in Switzerland's evaluation study. We categorized these

elements under social impacts due to the fact with these elements gathering new relationships have been questioned therefore we classified them as social.

Employee qualifications, publications, expansion of knowledge base were categorized as effects on the generation of knowledge and skills in Switzerland's evaluation study. We categorized publications, expansion of knowledge base under science and technological impacts as publications and know-how transfer. Employee qualifications have been considered either technological skills or administrative skills. We categorized technological skills under scientific and technological impacts and administrative skills under organizational skills in our study.

Categories of Spain and United Kingdom's evaluation studies were different from the ones of other countries. Impact categories of these two countries were considered as elements of main impact categories of other countries' studies especially the ones of Finland and Switzerland.

The categorization of "Assessing Impacts of The European Framework Programme on Turkish Participants: A Case Study on FP6 IST Priority" [24] study is similar to ours except the fact that we considered impacts on collaborations and sector knowledge under social impacts due to the fact with these elements gathering new relationships have been questioned therefore we classified them as social.

University of Manchester classified impacts in two main categorizations. First one is being direct or indirect; second one is domain based that are technological, commercial, organization and methods, and work force effects. Although there is not a one to one relationship between these categories and ours; technological,

commercial, organization and methods effects were very similar to our categorization. Commercial effects of this study and economic impacts of our study were different since focuses of these studies are different. We focused only on universities whereas this study includes all types of organizations.

Impact categories of RTD Evaluation Toolbox looks like similar to ours nevertheless impact elements are different. This is again due to the fact that our focus was only on universities.

We developed a model in order to assess the impacts of FP7 on Turkish universities by considering the studies above:

Economic Impacts: Economic impacts are the impacts that effect the universities with regard to five elements which are R&D spending, infrastructure, risk of cost, equipment, research laboratory.

Scientific and Technological Impacts: Scientific and technological impacts are the impacts that effect the universities with regard to thirteen elements which are know-how transfer, new technologies, technological skills, prototype, software, production process, service, standard, publication, patent, IPR, MsC and PhD thesis.

Social Impacts: Social impacts are the impacts that effect the universities with regard to five elements which are prestige, reputation, opportunity of monitoring developments, national connections and international connections.

Organizational Impacts: Organizational impacts are the impacts that effect the universities with regard to nine elements which are administrative skills, national projects, international projects, national proposal preparation skills, international proposal preparation skills, R&D awareness, new project ideas, post graduate degree staff and new researcher positions. Figure 8 shows the proposed model.

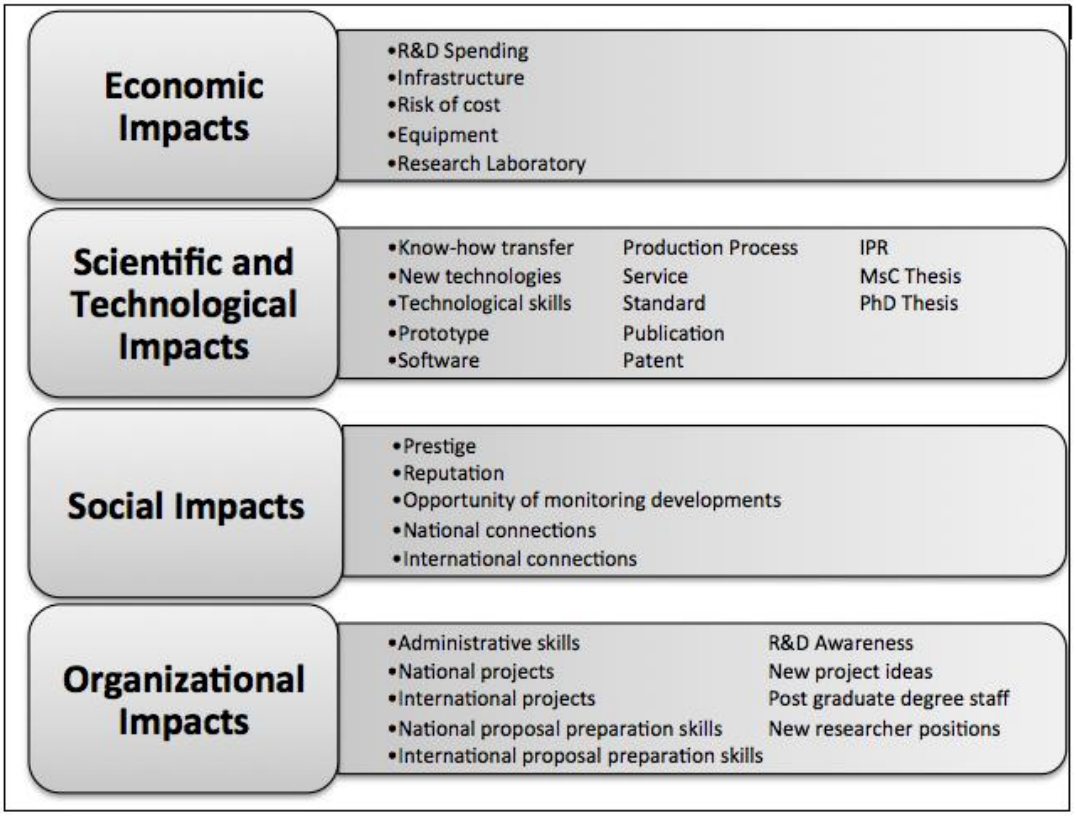

Figure 8 Proposed model with 4 main categories

Likert-scale questions, yes/no questions, multiple choice questions and open-ended questions were asked to participants in order to assess these impacts. Table 19 shows the related questions of survey with each impacts.

Table 19 Impact Group and The Related Survey Questions

Impact Group	Questions in Survey
Economic Impacts	5.1,5.2,5.3,6.13,6.14
Social Impacts	5.7,5.8,5.9,5.10,5.11,6.15
Scientific and Technological Impacts	5.4,5.5,5.6,5.12,6.1,6.2,6.3,6.4,6.5,6.6,6.7,6.8,6.10 6.11,7,8,9,10,11,12
Organizational Impacts	5.13,5.14,5.15,5.16,5.17,5.18,5.19,6.9,6.12

4.2 Hypotheses

12 hypotheses were formed according to the categories and examined according to the results of the survey. These hypotheses are listed at the Table 20.

The hypotheses were formed considering to impacts of the each category, structure the FP7 projects and results of national evaluation studies. We examined hypotheses and used some of them which were in the "Assessing Impacts of The European Framework Programme on Turkish Participants: A Case Study on FP6 IST Priority" [24] study in order to make comparisons and observe the improvement.

After completing the first version, hypotheses were sent to the three academicians who took part in FP7 projects in order to receive their feedback then the study reached the final version.

Table 20 List of Hypotheses

Hypotheses	Control Factor
1. Universities whose roles were coordinator or WP leader have higher impacts in all factors than universities who were task leaders	Project Role
2. Universities taking part in IP or STREP projects have higher scientific and technological impacts than universities taking part in NoE projects	Project Type
3. Universities taking part in IP or STREP projects have lower social impacts than universities taking part in NoE projects.	Project Type
4. Universities taking part in IP or STREP projects have higher organizational impacts than universities taking part in NoE projects.	Project Type
5. Universities conducting research activities have higher impacts in all factors than the universities who only take part in demonstration activities.	Project Activity
6. Universities who take part in both research and demonstration activities have higher impacts in all factors than the Universities who only take part in research activities.	Project Activity
7. Universities who have the support of EU Project Offices of their universities have higher impacts in all factors	EU Project Office
8. Universities who have publications have higher scientific and technological impacts	Publications
9. Universities who applied for patents have higher scientific and technological impacts	Patent
10. Universities who applied for patents have higher economic impacts than the universities who did not	Patent
11. Universities have had FP6, FP7, EUREKA, COST projects before have higher scientific and technological impacts than the Universities who don't	Old Projects
12. Universities have had international projects before like FP6, FP7, EUREKA, COST have higher economic impacts than the Universities who don't	Old Projects

4.3 Survey Design

The quantitative survey attempted to determine the economic; social; scientific and technological; organizational impacts of the FPs on the Turkish universities. The survey is designed by considering national evaluation studies of some countries and impact analysis of R&D projects in the literature.

During the process of the survey design, five academicians who are experienced with the FP7 projects contributed. There were seven iterations until reaching the final design of the survey, each one of which was revised according to the comments and the advices of these academicians.

Four types of questions were used in the designed survey that are rating scale questions/Likert, multiple-choice questions, yes/no questions and open-ended questions.

Rating Scale Questions: Respondents assess the issue based on a given dimension. One of the most used types of this kind of questions is Likert-scale questions. The possible answers of the Likert-scale questions in the survey were as follow:

1- Totally disagree, 2- Disagree, 3- Neither agree nor disagree, 4- Agree, 5- Totally Agree

Multiple Choice Questions: Multiple choice is a form of assessment in which respondents are asked to select the best possible answer(s) out of the choices from a list.

Yes/No Questions: A yes–no question, formally known as a polar question, is a question whose expected answer is either "yes" or "no".

Open-ended questions: Data entry is required by the respondents. In the survey, respondents are required to enter a numerical data entry.

4.3.1 Sampling

Survey questions were asked to the academicians who took part in the FP7 projects in the ICT, Energy and KBBE themes from Turkey.

Universities, research centers, industry, SMEs, NGOs and public organizations are eligible for participation to FP7 projects. Universities were chosen among these organizations since universities are the most successful organizations among Turkish participants in both FP6 and FP7 in terms of the project number. According to the report which was published by TÜBİTAK, universities have the 51% of the EC funded FP6 projects which includes Turkish participants [60] as shown in Figure 9.

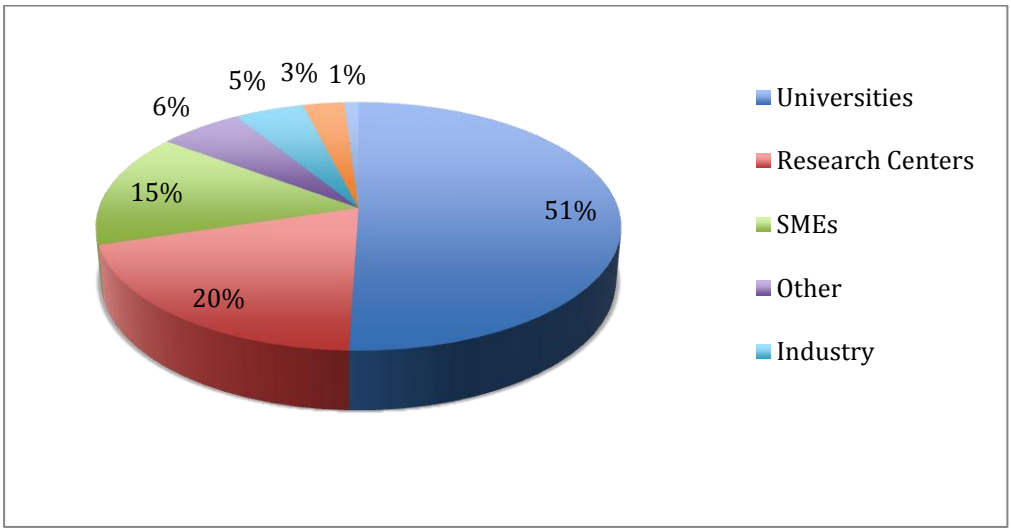

Figure 9 Proportion of the Turkish organizations by organization type in the EC funded FP6 projects

Another report that was published again by TÜBİTAK states that Turkish universities participated in the 434 projects in FP7 out of 879 [2] as shown in Figure 10.

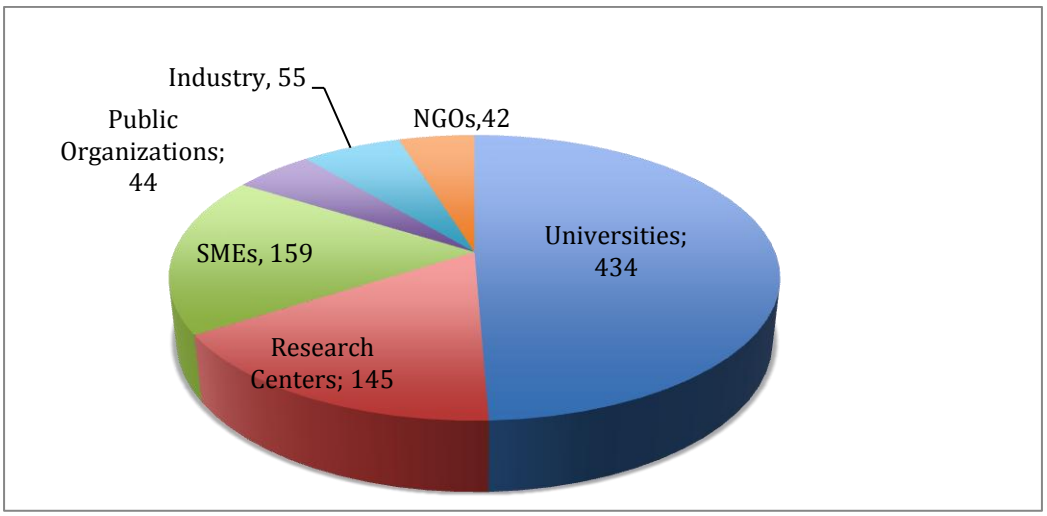

Figure 10 Number of FP7 projects from Turkish organizations

ICT, KBBE and Energy themes are chosen since these 3 themes are among the prioritized themes of Turkey stated in the "Science and Technology Human Resources Strategy and Action Plan 2011-2016" which was approved in the 22th meeting of the Supreme Council of Science and Technology on 15 December 2010 [61].

ICT is Turkey's the most successful theme under Cooperation Programme in FPs. Also ICT has the biggest share in terms of budget (€9.1bn) within the Cooperation Programme under FP7 (€32.4 bn). This shows the special importance given to the ICT domain within the whole FPs by the EU as well.

The contact information of the academicians who have FP7 projects in ICT, Energy and KBBE themes were gathered from TÜBİTAK and EC. There were 53 participants from Turkish universities in these themes. There were three CSA and two SA projects which are out of our scope therefore we sent to the survey questions to 48 participants. The survey was open for four weeks. We are aware that some of the participants have forwarded the survey questions to their colleagues who worked in the same project. As a result 57 participants responded the survey. More than 60% of the projects were finished or will be finished within four months by the time of our study. Since national evaluation studies of some countries use ongoing projects, we have included them in our study.

4.3.2 Control Factors

There are seven control factors that were used in order to test the hypotheses. These control factors are listed in the table below:

Table 21 List of Control Factors and related survey questions

Control Factors	Related Survey Questions
Project Activity	Q1 (Multiple choice question)
Project Type	Q2 (Multiple choice question)
Project Role	Q3 (Multiple choice question)
EU Project Office	Q4 (Yes/No question)
Publications	Q6 (Yes/No question)
Patent	Q6 (Yes/No question)
Old Projects	Q6 (Yes/No question)

4.4 Data Analysis Method

We analyzed data by using Statistical Package for the Social Sciences (SPSS) 20.0. We used mean values in the part where preliminary results are given.

Mann-Whitney U Test method was used in order to verify the hypotheses. The Mann-Whitney U Test is a non-parametric method which is used to compare the differences between two independent groups by using median values. Parametric implies that a distribution is assumed for the population whereas non-parametric implies that there is no assumption of a specific distribution for the population.

This method is used for assessing whether one of two samples of independent observations tends to have larger values than the other. This method is the same with Independent T-Test method. Normal distribution of data is not necessary for the use of Mann-Whitney U Test where it is necessary for the use of Independent T-Test method. This is the major difference between two methods. Since we had not have chance to be sure about the distribution of data at the beginning, we preferred to use Mann-Whitney U Test method instead of Independent T-Test method.

In order to see whether there is a significant difference between impacts for different groups, we set following hypotheses where Ho represents null hypothesis and Ha represents alternative hypothesis in Mann-Whitney U Test method:

Ho: There is no significant difference between sample1 and sample2 defined by control factor.

Ha: There is significant difference between sample1 and sample2 defined by control factor.

For the reliability of the estimates, 95% confidence level is accepted to be significant enough. Common choices for the confidence level are 90%, 95% and 99%. The confidence level corresponds with the level of significance. In our study 95% confidence interval reflects a significance level of 0.05.

Regarding correlation analysis, we used Kendall's Tau method which is the most common method with regard to correlation analysis. The strength of a relationship is indicated by a correlation coefficient that can be between -1 and 1. Negative value

means there is a negative relation between two variables. If the value is 0, it means there is no relation between two variables. Positive value means there is a positive relation between two variables.

4.5 Reliability and Validity Issues of the Study

Two things have been done to increase the credibility of the study: Member checking and data gathering. Member checking was accomplished by going back to participants to verify the categories.

The external reliability of the study was improved with rich description for the questions. Action items taken to increase the internal reliability of the study were peer examination and mechanically recorded data.

The deadline for the questions was kept long enough to ensure the study's dependability and conformability.

CHAPTER 5

SURVEY RESULTS

5.1 Preliminary Findings

As stated in previous chapters, our analytical survey questions included both Likert-scale questions and Yes/no questions.

Likert-scale questions were supposed to measure outputs of projects in the range of 1-5 (1: totally disagree, 5: totally agree).

For the following analysis in this section we have made the conversion below for the sake simplicity of graphs.

Table 22 Mapping for Likert-scale questions

Value in Survey	Value in Graph
Totally Agree	Agree
Agree	Agree
Neither Disagree or Agree	Neutral
Disagree	Disagree
Totally Disagree	Disagree

Table 23 Mapping for Yes/No questions

Value in Survey	Value in Graph
Yes	Agree
No	Disagree

Analysis in this part has been done separately for each area. Economic impacts, social impacts, scientific and technological impacts and organizational impacts will be presented respectively and at the end, an overall analysis will be presented.

For yes/no questions, 1 refers to “No” and 2 refers to “Yes”.

Economic Impacts

As we can see in the Table 24, there are five economic impact questions out of which three are Likert-scale questions and two are yes/no questions. We can conclude that economic impacts of FP7 projects are considerably high. Answers given to Likert-scale questions are between “Agree” and “Totally Agree”.

Table 24 Mean and Standard Deviations for Economic Impacts

		Mean	**Std Dev**
5.1	Project increased our total R&D spending	4,21	0,55
5.2	Our infrastructure enhanced thanks to the project	4,21	0,55
5.3	Project partnership decreased the risk of our R&D expenses	4,30	0,59
	Mean and Standard Deviation for Likert-scale	4,24	0,57
6.13	We bought a new equipment	1,79	0,41
6.14	We opened a new research laboratory	1,05	0,22
	Mean and standard deviation in average	1,42	0,32

In most of the national evaluation studies, economic impacts were relatively low. Since our scope is limited to universities, our question set to measure economic impacts differs from that of other studies. For instance, we have not had any question addressing any impact on sales growth since universities do not have such business operations.

In Figure 11, we can see that almost 80% of the participants responded that they have bought new equipment whereas only 5% of participants responded that they opened a new research laboratory, which is very reasonable. We had expected that most of the projects have been implemented in current laboratories.

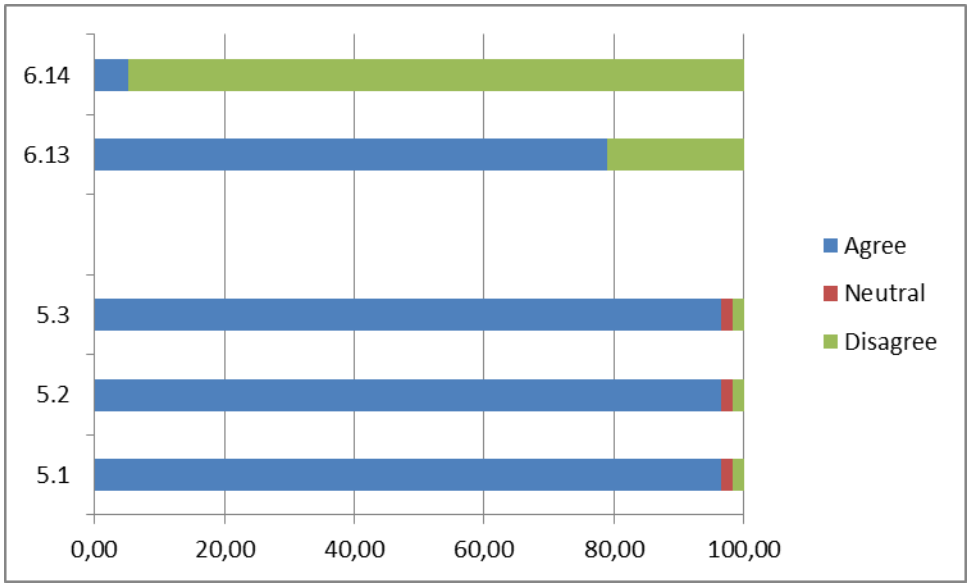

Figure 11 Bar Chart for Economic Impacts

Radar chart for Likert-scale questions economic impacts is depicted in Figure 12. Average of mean values for economic impacts is 4.24. When we look at the converted values of Likert-scale responses, we see that more than 95% of the

responses are “Agree”. Thus we can conclude that we have significant value added in economic perspective for universities.

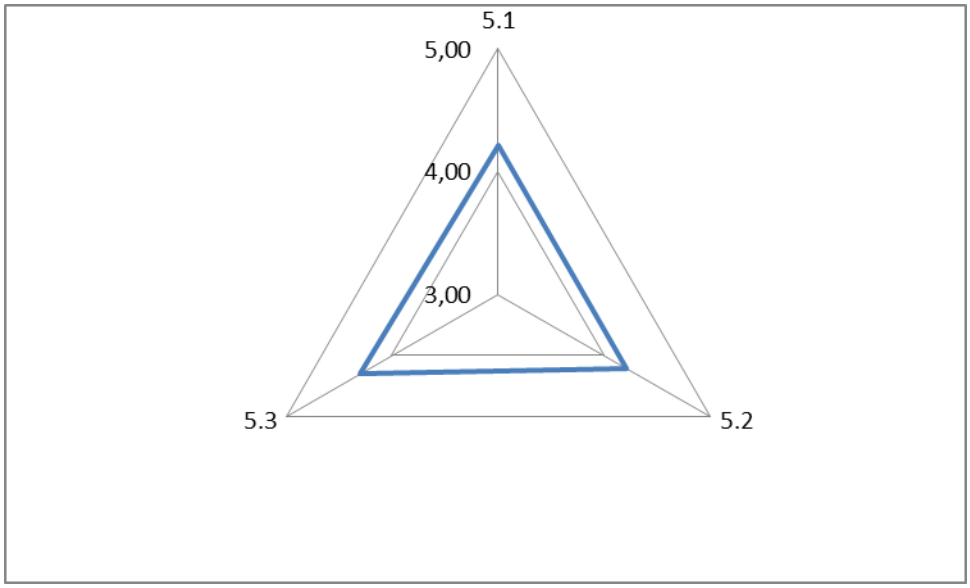

Figure 12 Radar Chart for Economic Impacts

Social Impacts

We have five Likert-scale questions and one yes/no question for measuring social impacts. Table 25 shows means and standard deviations for responses of these questions.

Table 25 Mean and Standard Deviations for Social Impacts

		Mean	Std Dev
5.7	Our university gained prestige	4,67	0,47
5.8	The reputation of our university has increased	4,60	0,53
5.9	We monitored scientific and technological developments in our research field closely thanks to the project	4,53	0,53
5.10	We set new national collaborations	2,28	1,00
5.11	We set new international collaborations	4,65	0,48
	Mean and Standard Deviation for Likert-scale	4,14	0,60
6.15	We made other multinational project applications with the same partners in the consortium	1,84	0,36
	Mean and standard deviation in average	1,84	0,36

For social impacts part, we can see that we have considerably high means in all responses except the one which is questioning whether participants have set new national collaborations. Though the mean value for this reponse is 2.28, it is reasonable. FP7 is an international program and local parties rarely take role in the same project with national parties.

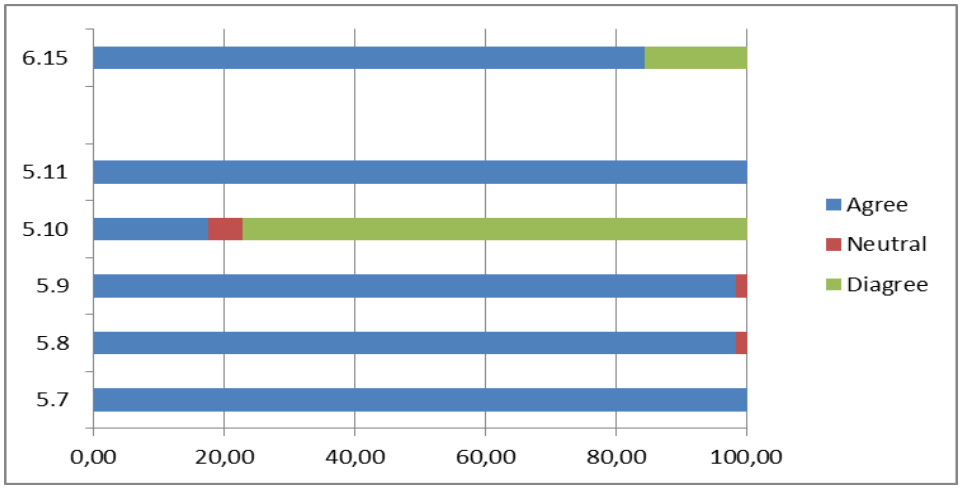

Figure 13 Bar Chart for Social Impacts

All of the respondents indicated that their university gained prestige. There is a huge competition in FPs to get fund. FPs proposals are evaluated by experts and ranked according to three criteria which are scientific and/or technological quality, implementation and potential impact. Only those of the highest quality are selected for funding based on these three criteria. Therefore organizations who took part in FPs projects have approval about research quality. Based on this fact, gaining prestige by having FPs projects is not surprising.

Another remarkable result is that 92% of the respondents indicated that they monitored scientific and technological developments in their research field closely thanks to the project. As we mentioned before only those of the highest quality are selected for funding which of have a consortium that a group of partners having the relevant expertise, this result is not surprising.

Another important conclusion here is that 85% of the participants responded that they have made other multinational project applications with the same partners in the consortium. This result is very important in the sense that we are establishing long-term relationships with other parties which probably brings more succesful applications in coming FPs.

Currently, institutions from the countries which have been participating FPs since the beginning have established onging relationships with other institutions and these established relationships increase their chance to get fund. On the other hand, institutions from countries which have just started to attend FPs are not so successful to enter these pre-established project groups. So this answer tells us our participants are likely to have higher chances in next FPs.

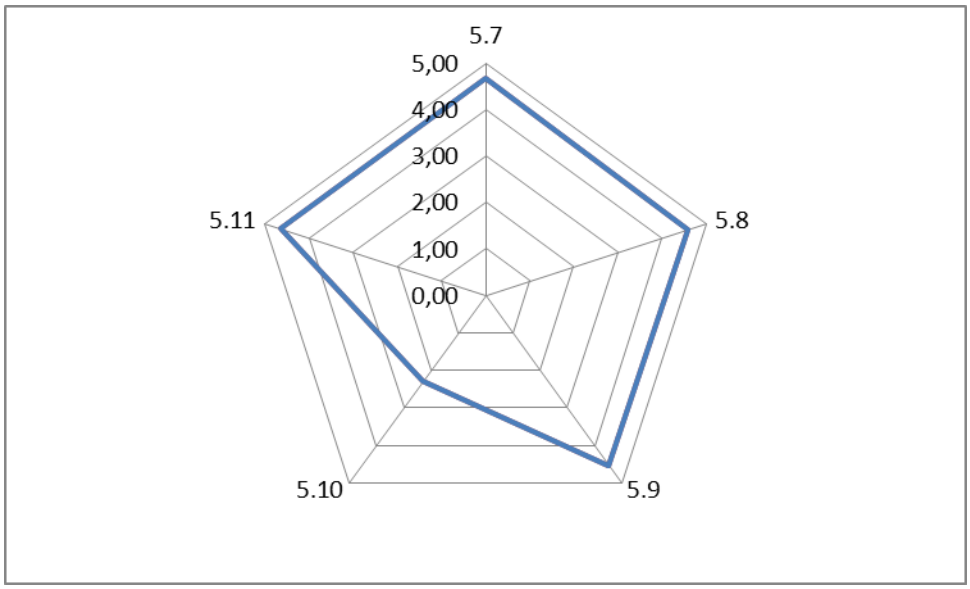

Figure 14 Radar Chart for Social Impacts

Again; in Figure 14, we can see that only response give to question 5.10 is lower than the others. Question 5.10 analyzes whether participants have set new national collaborations.

Scientific and Technological Impacts

We have four Likert-scale questions and ten yes/no questions for measuring scientific and technological impacts. Table 26 shows means and standard deviations for responses of these questions. As we can see in this table, in most of the responses, participants responded that FP7 have significantly high scientific and technological impacts.

Table 26 Mean and Standard Deviations for Scientific and Technologial Impacts

		Mean	**Std Dev**
5.4	We gained know-how thanks to the project	4,75	0,43
5.5	We learned new technologies	4,88	0,33
5.6	We transferred new technologies we have never used before	4,49	0,65
5.12	We acquired new technological skills	4,74	0,44
	Mean and Standard Deviation for Likert-scale	4,71	0,46
6.1	We delivered a prototype	1,09	0,28
6.2	We delivered a new software	1,77	0,42
6.3	We delivered a new service	1,53	0,50
6.4	We delivered a new production process	1,11	0,31
6.5	We delivered a new standard	1,05	0,22
6.6	Our work in the project has been published as an academic paper (journal paper, conference proceedings..)	1,89	0,31
6.7	We acquired new intellectual property rights (IPR)	1,11	0,31
6.8	We applied for patent(s)	1,05	0,22
6.10	M.Sc. theses were completed thanks to the project	1,95	0,22
6.11	PhD theses were completed thanks to the project	1,54	0,50
	Mean and standard deviation in average	1,41	0,33

Delivery of prototype, delivery of production process, delivery of standards, acquiring new IPR's and applying for patents have relatively low impacts which are again reasonable. Delivering a prototype is generally not relevant for university projects, instead; it is relevant for industrial projects. Delivery of a production process is low because almost half of the projects analyzed here are ICT projects and in ICT projects it is very rare to deliver a production process. Standards and patents are relevant for university projects but they are very difficult to deliver or register. Only in 5% of the projects, they have applied for patent which is relativey low for the long term research projects like FPs.

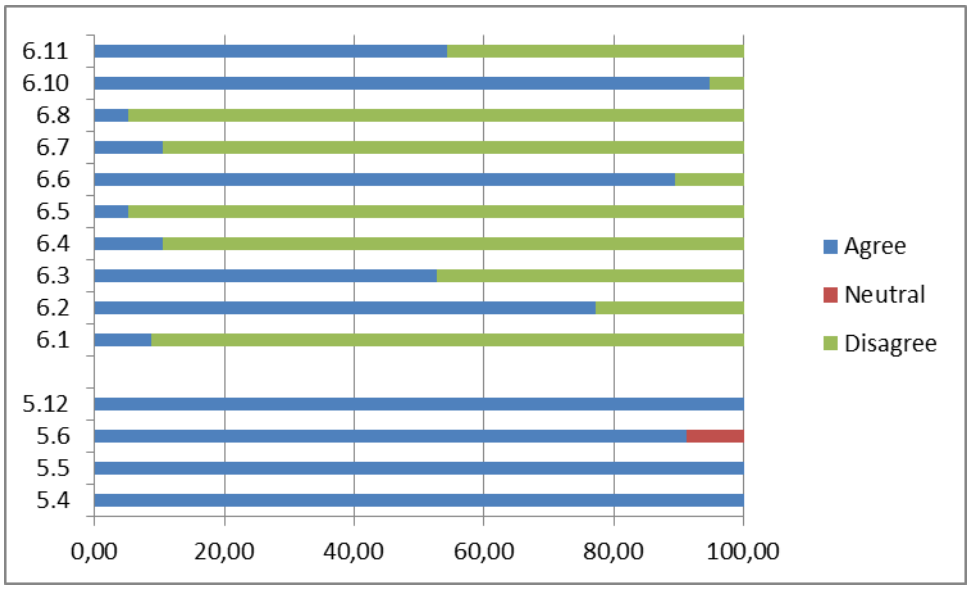

Figure 15 Bar Chart for Scientific and Technological Impacts

We have two radar charts in scientific and technological impacts. One is for Likert-scale questions and the other is for yes/no questions.

As we can see in the second radar chart, responses of 6.6 which is “Our work in the project has been published as an academic paper (journal paper, conference proceedings..)” and 6.10 which is “M.Sc. theses were completed thanks to the project” are relatively higher than the other.

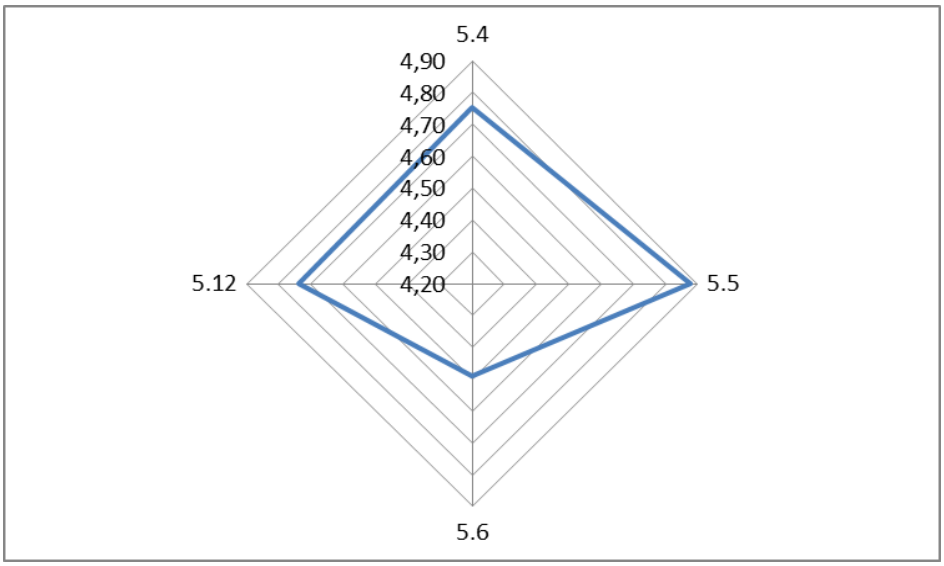

Figure 16 Radar Chart for Scientific and Technologial Impacts (Likert-Scale Quesitons)

Responses of 6.6 states that in 89% of the projects, at least one academic paper has been published which is very reasonable. Academic publications are very important for universities therefore it is not surprising that they focus on publications.

Responses of 6.10 states that in 95% of the projects, at least one M.Sc. thesis has been published which is again not surprising since M.Sc. students are taking part in the projects.

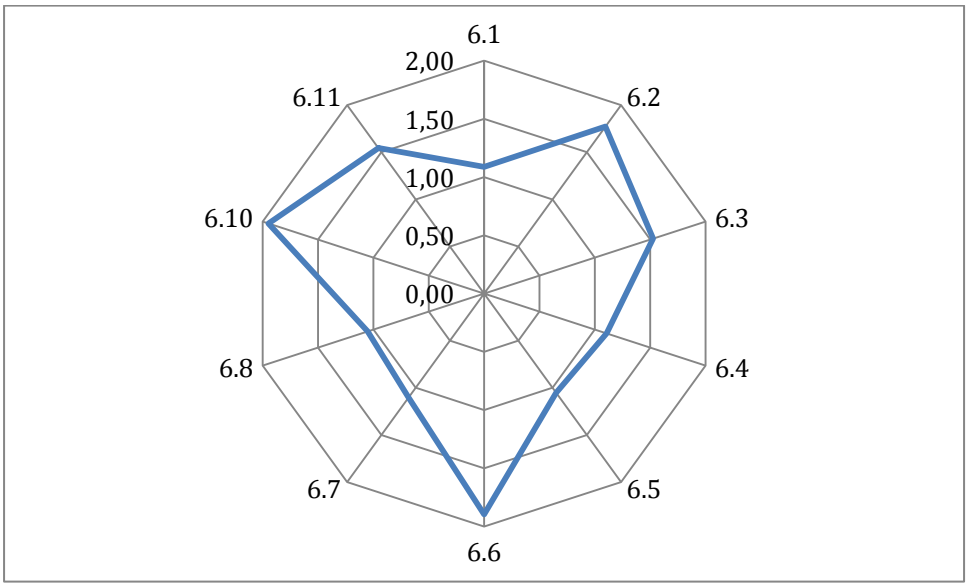

Figure 17 Radar Chart for Scientific and Technologial Impacts (Yes/no Quesitons)

Table 27 shows mean and standard deviations for scientific and technologial impacts (Open Ended Questions).

Table 27 Mean and Standard Deviations for Scientific and Technologial Impacts (Open Ended Questions)

		Mean	**Std Dvt**
7	How many prototypes did you deliver throughout the project?	0,07	0,32
8	How many standards did you deliver throughout the project?	0,05	0,56
9	How many academic paper were published (journal paper, conference proceedings..) throughout the project?	1,98	2,05
10	How many post-graduate degree staff joined your university thanks to the project?	3,61	2,32
11	How many M.Sc. theses were completed thanks to the project?	2,16	1,02
12	How many PhD theses were completed thanks to the project?	0,67	0,73

In scientific and technological impacts, there were a couple of numerical questions asking about quantity of some outputs. As we can see in the table above, around two academic papers were published and around two M.Sc. thesis have been completed in each project. Average number of post graduate students is 3.6 who have worked in the project.

Organizational Impacts

We have seven Likert-scale questions and two yes/no questions for measuring organizational impacts. Table 28 shows means and standard deviations for responses of these questions.

Table 28 Mean and Standard Deviations for Organizational Impacts

		Mean	**Std Dev**
5.13	We acquired new administrative skills	4,49	0,50
5.14	Project increased our participation in national R&D programs like ARDEB, TEYDEB, SANTEZ etc.	2,07	0,70
5.15	Project increased our participation in international programs like FP7, EURKEA, COST etc.	4,09	0,51
5.16	We acquired new skills in national proposal preparation	3,96	0,82
5.17	We acquired new skills in international proposal preparation	4,33	0,57
5.18	R&D awareness in our university has increased	4,54	0,50
5.19	New project ideas triggered thanks to the project	4,07	0,45
	Mean and Standard Deviation for Likert-scale	3,94	0,58
6.9	Number of post graduate degree staff in our university has increased thanks to the project	1,84	0,36
6.12	New research seats were opened	1,37	0,48
	Mean and standard deviation in average	1,61	0,42

Increase in R&D awareness turned out to be the highest impact among all organizational impacts. Mean for this impact is around 4.5. Another finding for this impact, which can be seen in Figure 18 is that all of the participants responded Agree or Totallay Agree. Mean for acquiring new administrative skills is 4.49 and Figure 18 shows that all of the participants responded either Agree or Totally Agree for this impact.

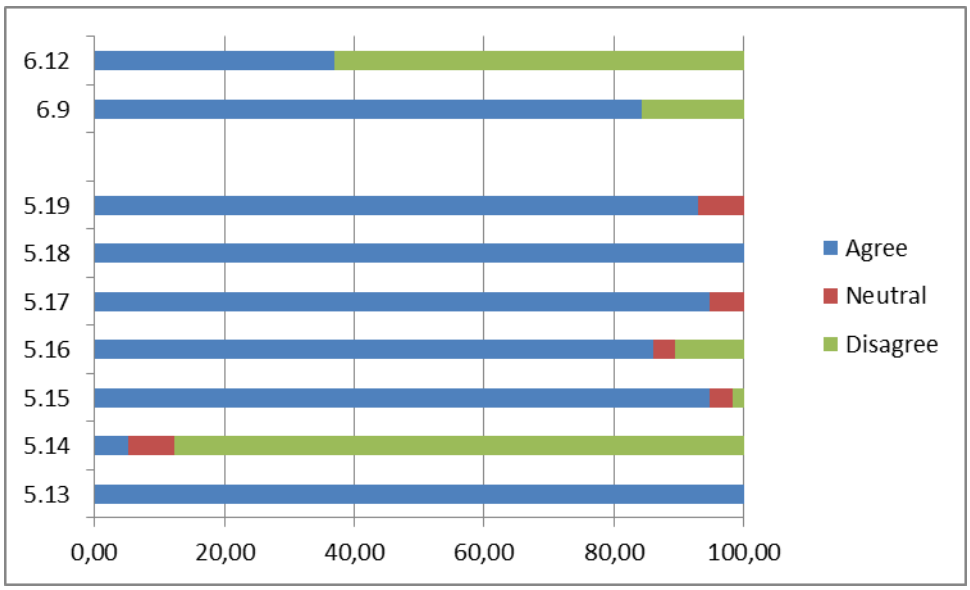

Figure 18 Bar Chart for Other Organizational Impacts

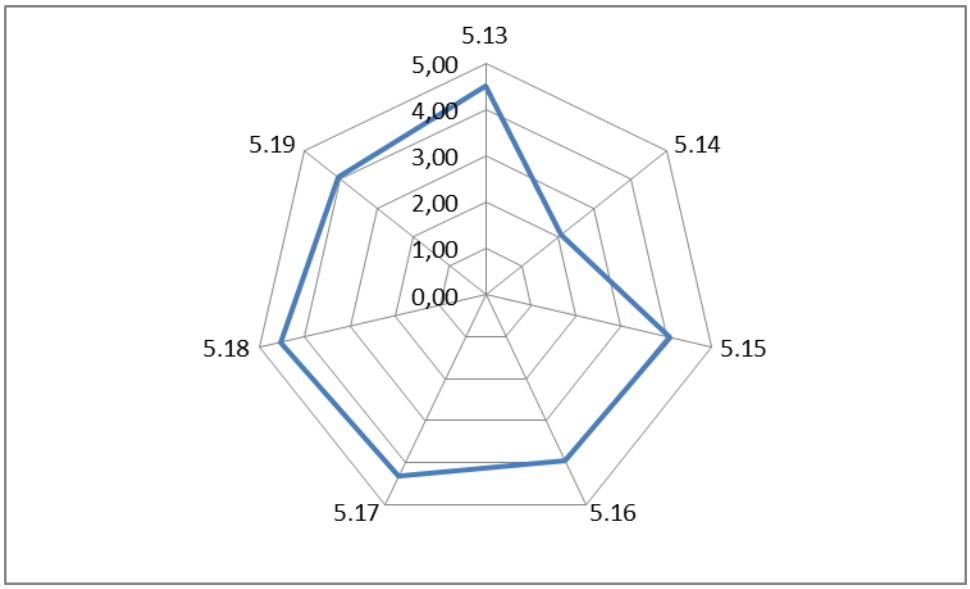

Figure 19 Radar Chart for Other Organizational Impacts

One of the most significant findings here is that participants responded that project did not increase their participation in national R&D programs like ARDEB, TEYDEB, SANTEZ etc. Though this result is considerably lower than other results in this set, this is still reasonable. Again FP7 is an international program and we have not expected such a value addition in national R&D programs.

All Impacts

Table 29 shows overall means for each set of impacts. As we can see in the table, highest result is for scientific and technological impacts which is nor surprising. Having relatively lower economic impacts was also a result that we expected due two main reasons: First; this study has focused on universities whose main objective is not profit. Second; FPs economic target gainings usually be realized in mid and long terms.

As it can be seen in Table 29, lowest mean for set of impacts belongs to Organizational Impacts which can be considered as surprising. Nevertheless there are variety of questions in Organizational Impacts and one of them questions whether project increased their participation in national R&D programs like ARDEB, TEYDEB, and SANTEZ. Mean for this question was 2.07 which reduced overall mean for Organizational Impacts.

Table 29 Overall Means for Four Set of Impacts

Impact Class	**Mean**
Economic Impacts	4,24
Social Impacts	4,14
Scientific and Technological Impacts	4,71
Organizational Impacts	3,94

Figure 20 shows Radar Chart for All Likert-Scale Questions.

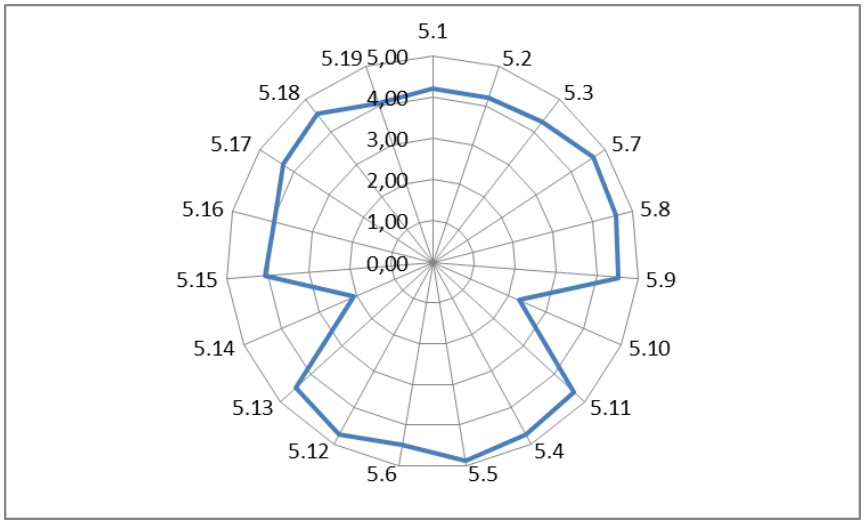

Figure 20 Radar Chart for All Likert-Scale Questions

Table 30 shows all Likert-scale questions.

Table 30 Mean for All Likert-scale Questions

		Mean	Std Dvt
5.1	Project increased our total R&D spending	4,21	0,55
5.2	Our infrastructure enhanced thanks to the project	4,21	0,55
5.3	Project partnership decreased the risk of our R&D expenses	4,30	0,59
5.7	Our university gained prestige	4,67	0,47
5.8	The reputation of our university has increased	4,60	0,53
5.9	We monitored scientific and technological developments in our research field closely thanks to the project	4,53	0,53
5.10	We set new national collaborations	2,28	1,00
5.11	We set new international collaborations	4,65	0,48
5.4	We gained know-how thanks to the project	4,75	0,43
5.5	We learned new technologies	4,88	0,33
5.6	We transferred new technologies we have never used before	4,49	0,65
5.12	We acquired new technological skills	4,74	0,44
5.13	We acquired new administrative skills	4,49	0,50
5.14	Project increased our participation in national R&D programs like ARDEB, TEYDEB, SANTEZ etc.	2,07	0,70
5.15	Project increased our participation in international programs like FP7, EURKEA, COST etc.	4,09	0,51
5.16	We acquired new skills in national proposal preparation	3,96	0,82
5.17	We acquired new skills in international proposal preparation	4,33	0,57
5.18	R&D awareness in our university has increased	4,54	0,50
5.19	New project ideas triggered thanks to the project	4,07	0,45

Most significant finding that we can see in the radar chart above is that, among all Likert-scale questions (independent from family of questions) 5.10 and 5.14 are lower than other responses.

5.10 asks whether participants have set new national collaborations or not. 5.14 in turn asks whether these FP7 projects have increased our participation in national R&D programs like ARDEB, TEYDEB, SANTEZ or not.

Table 31 Mean for All Yes/No Questions

		Mean	**Std Dvt**
6.13	We bought a new equipment	1,79	0,41
6.14	We opened a new research laboratory	1,05	0,22
6.15	We made other multinational project applications with the same partners in the consortium	1,84	0,36
6.1	We delivered a prototype	1,09	0,28
6.2	We delivered a new software	1,77	0,42
6.3	We delivered a new service	1,53	0,50
6.4	We delivered a new production process	1,11	0,31
6.5	We delivered a new standard	1,05	0,22
6.6	Our work in the project has been published as an academic paper (journal paper, conference proceedings..)	1,89	0,31
6.7	We acquired new intellectual property rights (IPR)	1,11	0,31
6.8	We applied for patent(s)	1,05	0,22
6.10	M.Sc. theses were completed thanks to the project	1,95	0,22
6.11	PhD theses were completed thanks to the project	1,54	0,50
6.9	Number of post graduate degree staff in our university has increased thanks to the project	1,84	0,36
6.12	New research seats were opened	1,37	0,48

Among yes/no all questions; opening a new research laboratory, delivering a new standard, and applying for patents have had the lowest mean scores. Only 5% of the respondents answered “Yes” for these questions.

Highest mean score belongs to the question of completion of M.Sc. theses. Mean score is 1.95 which represents that 95% of the participants responded “Yes” for this question.

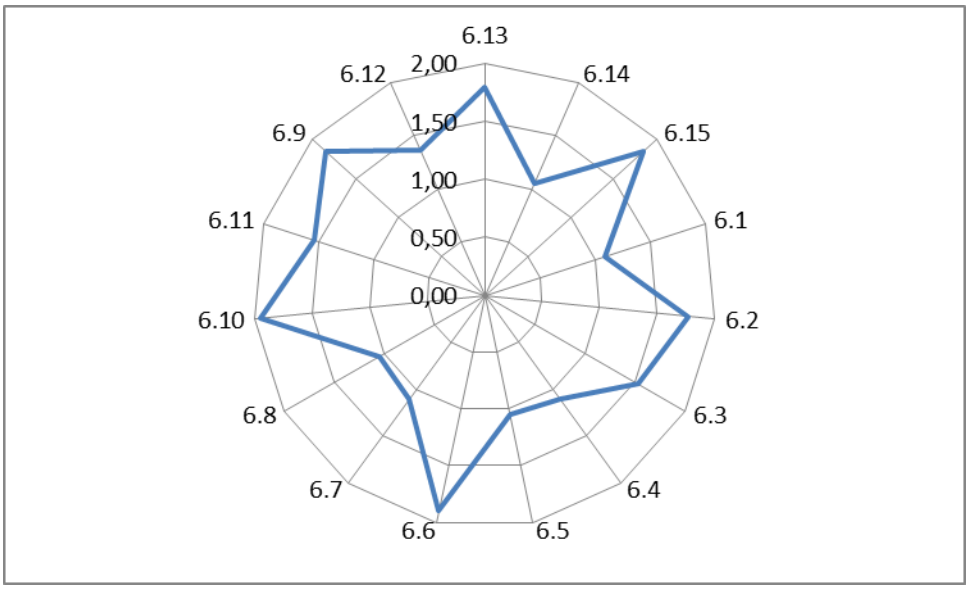

Figure 21 Radar Chart for All Yes/no Questions

5.2 Verification of Hypotheses

We have used Mann-Whitney U test for the verification of hypotheses and below are the results and analysis. All analysis explained in following sections are conducted in SPSS. First we wanted to see whether there is a significant difference between impacts for different groups and we set following hypotheses to test this where Ho represents null hypothesis and Ha represents alternative hypothesis.

Ho: There is no significant difference between sample1 and sample2 defined by control factor.

Ha: There is significant difference between sample1 and sample2 defined by control factor.

For the reliability of the estimates, 95% confidence interval is accepted to be significant enough.

Verification of Hypothesis 1

Control factor in Hypothesis 1 is project role. It says that universities whose role is coordinator or WP leader should have higher impacts than universities which are task leaders. As it can be understood from the name, coordinator has the biggest role in the project and in each project there can only be one coordinator. So we can expect that these universities should have higher impacts. Role of WP leader is in turn bigger than the role of a task leader. WP consists of several tasks.

As it can be seen from the Table B 2, hypothesis is verifed for most of the varibles.

For setting new national collaborations (Question 5.10) universities who are task leaders have more impacts however this is not so important in terms of hypothesis verification. We had not expected that universities would set new national collaborations with FP7.

Another variable that task leaders have had higher impacts is applying for patents. This is not what we have expected this is because the number of patent applications was very limited: it is only three. These three applications are not normally distributed and somehow applied by task leader universities. In order to undertstand this more, we concluded that conducting interviews with the participants would be a good way therefore using of interview method will be recommended for further detailed studies in this area in Chapter VI.

SPSS results for the verification of this hypothesis are depicted in Table B 1 and Table B 2 in Appendix B.

Verification of Hypotheses 2,3 and 4

Since control factor of Hypotheses 2, 3 and 4 is project type we analyzed these three hypotheses here in the same section.

Hypothesis 2 claims that universities taking part in IP and STREP projects have higher scientific and technological impacts than universities taking part in NoE projects. Scientific and technological impacts have been questioned in variables from 6.8 through 6.10 in the Table B 3 and Table B 4 and it is obvious that for all scientific and technological variables, universities in IP or STREP projects have higher impacts.

Hypothesis 3 claims that universities taking part in IP and STREP projects have lower social impacts than universities taking part in NoE projects. Questions from 5.7 through 6.15 in the Table B 3 and Table B 4 question social impacts and as we can see, most of them are lower for universities who have taken role IP or STREP

projects. For setting new national collaborations, it has been higher for NoE projects which denies the hypothesis but national collaborations are that related with our FP7 program.

Again, for setting international collaborations, NoE turned out to be lower than IP or STREP projects which denies our hypothesis but which in turn is acceptable. Argument behind this fact is that, IP and STREP projects are technically more complex compared to NoE projects and generally there are more parties in these projects. Due to the fact that nature of IP and STREP is more complex than NoE projects we can expect NoE projects to have less number of international collaborations set.

Hypothesis 4 claims that universities taking part in IP and STREP projects have higher organizational impacts than universities taking part in NoE projects. Questions from 5.13 through 6.12 in the Table B 3 and Table B 4 are for organizational factors. For all of the variables of organizational factors, IP or STREP projects have higher impacts than NoE projects. This has been verified except acquiring new skills in national proposal preparation.

SPSS results for the verification of these hypotheses are depicted in Table B 3 and Table B 4 in Appendix B.

Verification of Hypotheses 5 and 6

Hypothesis 5 questions whether universities conducting research activities have higher impacts in all factors than the universities who only take part in

demonstration activities. As we can see in the Table B 6 in median column, most of the variables are higher for universities who have conducted research projects.

Hypothesis 6 questions whether universities who take part in both research and demonstration activities have higher impacts in all factors than the Universities who only take part in research activities. Since we do not have any data about universities which have roles in both research and demonstration projects, we have not been able to test this hypothesis.

SPSS results for the verification of these hypotheses are depicted in Table B 5 and Table B 6 in Appendix B.

Verification of Hypothesis 7

Hypothesis 7 questions whether universities who have the support of EU project offices of their universities have higher impacts in all factors. As we can see in the Table B 8, impacts for most of the factors are higher for universities which have EU project office.

It is known that there is huge bureaucracy in both proposal preparation and execution phases of FPs projects. Having an EU project office would simplifies the task of academic staff in the sense that there is a team for administrative tasks and academic staff can concentrate on their technical tasks.

SPSS results for the verification of this hypothesis are depicted in Table B 7 and Table B 8 in Appendix B.

Verification of Hypothesis 8

Hypothesis 8 questions whether universities who have publications have higher scientific and technological impacts. As we can see in the Table B 10, for most of the factors impacts are higher for universities who have published paper within the scope of project. We can expect that if an FP7 project has yielded a publication, content of the project is richer or value addition in terms of scientific factors is higher.

SPSS results for the verification of this hypothesis are depicted in Table B 9 and Table B 10 in Appendix B.

Verification of Hypotheses 9 and 10

Hypothesis 9 questions whether universities who obtained patents have higher scientific and technological impacts. Scientific and technological impacts have been questioned in variables from 6.8 through 6.10 in the Table B 12 and it is obvious that for all scientific and technological variables, universities who applied for patents have higher impacts.

Hypothesis 10 questions whether universities who obtained patents have higher economic impacts. Economic impacts have been questioned in variables from 5.1 through 6.14 in the Table B 12. For most of the variables they are higher for universities who have obtained patents except the question which questions buying a new equipment. It is lower for universities who have obtained patents. This is what

we did not expected but since there were only three participants who have applied for patents, this might be because of the fact that sample was not big enough to have this analysis.

SPSS results for the verification of these hypotheses are depicted in Table B 11 and Table B 12 in Appendix B.

Verification of Hypotheses 11 and 12

Hypothesis 11 questions whether universities have had FP6, FP7, EUREKA, COST projects before have higher scientific and technological impacts than the universities who don't. Scientific and technological impacts have been questioned in variables from 6.10 through 6.8 in the Table B 14 and it is obvious that for all scientific and technological variables, universities who have had FP6, FP7, EUREKA, COST projects before have higher impacts.

Hypothesis 12 questions whether universities have had international projects before like FP6, FP7, EUREKA, COST have higher economic impacts than the universities who do not. Economic impacts have been questioned in variables from 5.1 through 6.14 in the Table B 14. For most of the variables they are higher for universities who have had FP6, FP7, EUREKA, COST projects before.

SPSS results for the verification of these hypotheses are depicted in Table B 13 and Table B 14 in Appendix B.

5.3 Correlations

Another important analysis that we have performed is correlations analysis. This analysis has been done both in separate family of impacts (scientific and technological, economic, social, and organizational) and in whole group of impacts (independent from family of impacts).

By principle; we have expected corelations between two variables which are in the same group, to be higher than that of two variables which are in different group. This is by principle however there are certain cases that we have high correlation between two variables which are in different group.

As it is explained in the Section 4.4 that is Data Analysis Method, the confidence level corresponds with the level of significance. In our study 95% confidence interval reflects a significance level of 0.05.

"*" in the correlation tables indicates that correlation is significant at the 0.05 level.
"**" in the correlation tables indicates that correlation is significant at the 0.01 level.
0.01 significance level is assigned automatically by SPSS.

Correlations Among Economial Impact Variables

We analyzed correlations among economic impacts. Results can be seen in the following table.

Table 32 Correlation Coefficients Among Economic Impacts

	5.1	**5.2**	**5.3**	**6.13**	**6.14**
5.1	1,00	,506**	,262*	,382**	0,18
5.2	,506**	1,00	,598**	,278*	,328*
5.3	,262*	,598**	1,00	0,24	-0,01
6.13	,382**	,278*	0,24	1,00	0,10
6.14	0,18	,328*	-0,01	0,10	1,00

Most significant correlation in economic impacts are the ones between 5.2 (Our infrastructure enhanced thanks to the project) - 5.1 (Project increased our total R&D spending) and 5.2 - 5.3 (Project partnership decreased the risk of our R&D expenses). These correlations are relatively higher than the others. First is around 0.5 and the second is 0.6.

For the first correlation (Our infrastructure enhanced thanks to the project - Project increased our total R&D spending) we can definitele expect that as R&D spending increases, infrastructure will also enhance.

Correlations Among Social Impact Variables

We analyzed correlations among social impacts. Results can be seen in the following table.

Table 33 Correlation Coefficients Among Social Impacts

	5.7	**5.8**	**5.9**	**5.10**	**5.11**	**6.15**
5.7	1,00	,781**	0,23	0,07	,410**	0,11
5.8	,781**	1,00	0,23	0,07	,270*	0,11
5.9	0,23	0,23	1,00	0,20	0,19	,477**
5.10	0,07	0,07	0,20	1,00	-0,07	,656**
5.11	,410**	,270*	0,19	-0,07	1,00	0,02
6.15	0,11	0,11	,477**	,656**	0,02	1,00

Most significant findings in correlations of social impacts are the correlations of 5.7 (Our university gained prestige) - 5.8 (The reputation of our university has increased) and 5.10 (We set new national collaborations) - 6.15 (We made other multinational project applications with the same partners in the consortium). Gaining prestige and increase of reputation should definitely be correlated.

Other correlation between 5.10 (We set new national collaborations)- and 6.15 (We made other multinational project applications with the same partners in the consortium) is relatively high (0,65) but this is not what we have expected. This correlation might be high because of the fact that positive responses for 5.10 was very low.

Correlations Among Scientific and Technological Impact Variables

We analyzed correlations among scientific and technological impacts. Results can be seen in the following table.

Table 34 Significant Correlations Among Scientific and Technologial Impacts

	5.5	**5.6**	**5.12**	**6.5**	**6.7**	**6.8**
5.5	1,00	,540**	,567**	0,21	,537**	0,23
5.6	,540**	1,00	,422**	0,24	,554**	0,16
5.12	,567**	,422**	1,00	0,23	,350**	,385**
6.5	0,21	0,24	0,23	1,00	,524**	,531**
6.7	,537**	,554**	,350**	,524**	1,00	,369**
6.8	0,23	0,16	,385**	,531**	,369**	1,00

In scientific and technological impacts, there more correlations than other set of impacts. First correlation is between questions 5.5 (We learned new technologies) and 5.6 (We transferred new technologies we have never used before) and the correlation coefficient is 0.54. There should definitely be a positive correlation between learning new technologies and transferring new technologies that they have never used.

Second significant correlation is the one between questions 5.5 (We learned new technologies) and 6.7 (We acquired new intellectual property rights). Learning new technologies and publishing papers are correlated and this coefficient of 0.56 is reasonable.

Next significant correlation is between the question of 6.5 (We delivered a new standard) and 6.7 (We acquired new intellectual property rights). First is questioning the delivery of a standard and second is questioning acquiring new IPR's.

Correlation between these two question is 0.52 and this relatively high correlation is reasonable.

Another considerably high correlation is the one between questions 6.5 (We delivered a new standard) and 6.8 (We applied for patent). Correlation coefficient for this relation is 0.53. First question is for delivery of a new standard and second one is applying for patents. Again it is very reasonable that there is positive and high correlation between these two variables.

Another positive and high correlation is the one between variables 5.5 (We learned new technologies) and 5.12 (We acquired new technological skills). First variable questions whether they have learned new technologies and the second one questions whether they have acquired new technological skills. There should definitely be a positive and high correlation coefficient between these two variables.
Last significant correlation is the one between questions 5.5 (We learned new technologies) and 6.7 (We acquired new intellectual property rights). Learning new technologies and acquiring new IPR's turned out to be correlated. Value for this correlation is 0.53.

Correlations Among Organizational Impact Variables

We analyzed correlations among organizational impacts. Results can be seen in the following table.

Table 35 Significant Correlations Among Organizational Impacts

	5.13	**5.15**	**5.17**	**5.18**	**5.19**	**6.12**
5.13	1,00	,428**	,364**	,607**	,390**	0,03
5.15	,428**	1,00	0,04	,398**	,329*	0,20
5.17	,364**	0,04	1,00	,512**	0,22	-0,09
5.18	,607**	,398**	,512**	1,00	0,17	0,06
5.19	,390**	,329*	0,22	0,17	1,00	0,13
6.12	0,03	0,20	-0,09	0,06	0,13	1,00

First significant correlation in organizational factors is the one between questions 5.13 (We acquired new administrative skills) and 5.18 (R&D awareness in our university has increased). 5.13 questions whether they have acquired new administrative skills and 5.18 questions whether R&D awareness has increased in the university.

Correlation coefficient is 0.60 and we have expected such a correlation. By developing new administrative skills, there would be a positive reflection on R&D awareness level in the university.

Another considerably high correlation is the between question 5.17 (We had new skills in international proposal preparation) and 5.18 (R&D awareness in our university has increased). Developing new skills in international proposal preparation should be correlated with R&D awareness level.

Correlations Among All Factors

We analyzed correlations among all impacts. Results can be seen in the following table.

Table 36 Signifant Correlations Among All Factors

	5.6	**5.7**	**5.8**	**5.10**	**5.13**	**5.17**	**6.5**	**6.7**	**6.8**	**6.9**	**6.10**	**6.12**	**6.15**
5.6	1,00	0,09	0,09	-,350**	0,09	0,15	0,24	,554**	0,16	0,16	0,13	-,366**	-,647**
5.7	0,09	1,00	,781**	0,07	,301*	,327*	0,10	-0,06	,275*	-0,04	-0,20	0,15	0,11
5.10	-,350**	0,07	0,07	1,00	-0,05	-0,18	-0,17	-,479**	-0,20	-0,20	-,247*	,545**	,656**
5.18	0,16	,617**	,617**	-0,07	,607**	,512**	0,21	0,12	0,24	-0,05	-0,17	0,06	-0,10
6.5	0,24	0,10	0,10	-0,17	0,20	0,08	1,00	,524**	,531**	,286*	0,21	-0,16	-,422**
6.7	,554**	-0,06	-0,06	-,479**	0,06	0,10	,524**	1,00	,369**	,430**	,347**	-,420**	-,840**
6.8	0,16	,275*	0,13	-0,20	0,17	0,12	,531**	,369**	1,00	0,12	0,13	0,02	-,310*
6.9	0,16	-0,04	-0,04	-0,20	0,04	0,14	,286*	,430**	0,12	1,00	,544**	-0,07	-,424**
6.10	0,13	-0,20	-0,20	-,247*	-0,19	-0,03	0,21	,347**	0,13	,544**	1,00	-0,15	-,413**
6.12	-,366**	0,15	0,15	,545**	0,03	-0,09	-0,16	-,420**	0,02	-0,07	-0,15	1,00	,578**
6.15	-,647**	0,11	0,11	,656**	-0,04	-0,19	-,422**	-,840**	-,310*	-,424**	-,413**	,578**	1,00

When we look at all variables, highest correlation is the one between 6.7 (We acquired new intellectual property rights) and 6.15 (We made other multinational project applications with the same partners in the consortium). This value turned out to be 0,84. Though we did not expect such a big correlation, we were expecting that the correlation between these variables would be p**o**sitive and more than 0.5.

CHAPTER 6

CONCLUSION

Turkey's FP journey as an associate country started on January 9, 2003 with FP6 and since then we have progressed a lot in terms of project applications and executions. Since we are also paying contribution fee to join these programs, there is public question mark about both return of contribution fee and impacts of these programs.

Other participant countries conduct impact analysis studies in order to understand, monitor and evaluate outcomes and impacts of FPs as well as to develop strategies for maximizing benefits of participation. All of the studies except those of Hungary and Turkey were commissioned by ministries or governmental institutions that are responsible for governing EU FPs. However for the instance of Turkey, this issue has been addressed at the last Supreme Council of Science and Technology which was held on August 2012.

Regarding the return of contribution fee, we can conclude that Turkey has progressed thanks to TÜBİTAK's efforts by considering the FP6 and FP7 return rates. However, there is still room for improvement. It should be kept in mind that measuring benefits of FPs should not be limited to amount of fund received. Impacts

like scientific and technological, social, economic and organizational should be also considered.

This study aimed to analyze outcomes and impacts of FP7 in four main impact catogories for universities which are economic impacts, social impacts, scientific and technological impacts and finally organizational impacts in order to understand outcomes and impacts of FPs and help decision makers as well as policy makers to develop strategies. Universities have been selected as the main focus of the study due to the fact that universities are the ones that have the highest participation in FP7 in Turkey in terms of both number of projects and amount of funding received. ICT, Energy and KBBE themes have been selected since ICT is the theme where Turkish participants have been most successful among all other themes and, Energy and KBBE themes are prioritized themes of Turkey determined by Supreme Council of Science and Technology.

Based on EC-data there were 53 participants from Turkish universities in these themes. There were three CSA and two SA projects which are out of our scope therefore we sent to the survey questions to 48 participants. The survey was open for four weeks. We are aware that some of the participants have forwarded the survey questions to their colleagues who worked in the same project. As a result 57 participants responded the survey.

Scientific and technological impacts, social impacts, economic impacts and organizational impacts of FP7 were analyzed in the study. We concluded that the impacts of these four categories of FP7 projects were high on the universities. Value additions of scientific and technological impacts are relatively high compared to

other impacts. Since our focus is on universities, it is reasonable that scientific and technological impacts should be higher than economic, social or organizational impacts.

Based on the results of our study, we have concluded that economic impacts of FP7 are high on universities. Economic impacts were relatively low compared to the study which attempts to analyze impacts of IST projects in FP6 on Turkish participants. Since focus of this study were all organization types including industry and SMEs and our study focused only on universities, the difference is reasonable.

One of the important findings of the study that universities whose roles were coordinator or WP leader have higher impacts in all factors than universities who were task leaders.

Turkey's participation and success in the FP7 are growing, but further efforts are needed for meeting competitive participation within a defined strategy. Bearing in mind the results of the impact analyses, the study supports Turkey’s continuity to forthcoming FPs but there is need for developing national strategies to maximize benefits of participation and to integrate the outcomes with the national innovation strategy.

6.1 Further Studies

This study aimed to analyze the impacts of FP7 projects on Turkish universities by focusing on ICT, Energy and KBBE themes. One study that can yield high value

addition can be focused on developing a national FPs strategy based on data and analysis conducted in this study. In this strategy study, action plans for maximizing project applications and project fundings could be developed as well as maximizing benefits.

Another study can be conducted by focusing on the all themes of FP7 as well as indivudial projects with bigger samples. This study can also be designed for each organization type especially for SMEs and industry since they are at the core of the national innovation systems.

Since networks and patterns of networks are important in FPs, social network analysis can be used as evaluation method in further studies in order to understand the patterns of networks of Turkish participants.

Survey has been the preferred methodology for this study, however use of interviews may be recommended for further detailed studies in this area in order to have a clearer picture.

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APPENDIX A: PARTICIPANT SURVEY

Please answer the following questions regarding your FP7 project participation:

1- What was the type of your project activity?

a) Research

b) Development

c) Both

2- What was the type of your project?

a) IP (Integrated project)

b) STREP (Specific Targeted Research Project)

c) NoE (Network of Excellence)

3- What was your role in the project?

a) Coordinator

b) Work Package Leader

c) Task Leader

d) None

4- Considering the proposal preparation process, please answer the questions below: (1- Totally disagree, 2- Disagree, 3- Neither agree nor disagree, 4- Agree, 5- Totally Agree)

4.1 We knew the project partners before.

4.2 We influenced the idea creation process.

4.3 We influenced the partner selection process.

4.4 We influenced the proposal reformulation and orientation process.

4.5 We have an EU Projects Office that supports us during the whole process including finding partners, proposal writing, proposal submission, administrative duties, project management.

4.6 Prior to our FP7 project, we had had multinational research projects like FP6, FP7, EUREKA, COST (1-Yes, 2-No).

5- Considering your project participation, please answer the questions below: (1- Totally disagree, 2- Disagree, 3- Neither agree nor disagree, 4- Agree, 5- Totally Agree)

5.1 Project increased our total R&D spending.

5.2 Our infrastructure enhanced thanks to the project.

5.3 Project partnership decreased the risk of our R&D expenses.

5.4 We gained know-how thanks to the project.

5.5 We learned new technologies.

5.6 We transferred new technologies we have never used before.

5.7 Our university gained prestige.

5.8 The reputation of our university has increased.

5.9 We monitored scientific and technological developments in our research field closely thanks to the project.

5.10 We set new national collaborations.

5.11 We set new international collaborations.

5.12 We acquired new technological skills.

5.13 We acquired new administrative skills.

5.14 Project increased our participation in national R&D programs like ARDEB, TEYDEB, SANTEZ etc.

5.15 Project increased our participation in international programs like FP7, EURKEA, COST etc.

5.16 We had new skills in national proposal preparation.

5.17 We had new skills in international proposal preparation.

5.18 R&D awareness in our university has increased.

5.19 New project ideas triggered thanks to the project.

6- Considering your project participation, please answer yes or no to the questions below:

6.1 We delivered a new prototype. (1- Yes, 2- No)

6.2 We delivered a new software. (1- Yes, 2- No)

6.3 We delivered a new service. (1- Yes, 2- No)

6.4 We delivered a new production process. (1- Yes, 2- No)

6.5 We delivered a new standard. (1- Yes, 2- No)

6.6 We published academic publications (journal paper, conference proceedings..). (1- Yes, 2- No)

6.7 We acquired new intellectual property rights (IPR). (1- Yes, 2- No)

6.8 We applied for patent(s). (1- Yes, 2- No)

6.9 Number of post graduate degree personals in our university has increased thanks to the project. (1- Yes, 2- No)

6.10 M.Sc. thesis' were completed thanks to the project. (1- Yes, 2- No)

6.11 PhD thesis' were completed thanks to the project. (1- Yes, 2- No)

6.12 New researcher positions were open. (1- Yes, 2- No)

6.13 We bought a new equipment. (1- Yes, 2- No)

6.14 We opened a new research laboratory. (1- Yes, 2- No)

6.15 We made other multinational project applications with the same partners in the consortium.

7- How many new prototypes you delivered throughout the project?

8- How many standards you developed throughout the project?

9- How many academic publications you published (journal paper, conference proceedings..) throughout the project?

10- How many post-graduate degrees personal joined to your team thanks to the project?

11- How many M.Sc. thesis completed thanks to the project?

12- How many PhD thesis completed thanks to the project?

APPENDIX B: TABLES USED IN ANALYSIS

General explanation for all tables in Appendix B:

a: not corrected for ties

Table B 1 Mean Rank Results for Hypothesis 1

ROLE		N	Mean Rank	Sum of Ranks
5.1 Project increased our total R&D spending	Coordinator or WP Leader	50	29,77	1488,50
	Task Leader	7	23,50	164,50
	Total	57		
5.2 Our infrastructure enhanced thanks to the project	Coordinator or WP Leader	50	29,36	1468,00
	Task Leader	7	26,43	185,00
	Total	57		
5.3 Project partnership decreased the risk of our R&D expenses	Coordinator or WP Leader	50	31,00	1550,00
	Task Leader	7	14,71	103,00
	Total	57		
6.13 We bought a new equipment	Coordinator or WP Leader	50	30,65	1532,50
	Task Leader	7	17,21	120,50
	Total	57		
6.14 We opened a new research laboratory	Coordinator or WP Leader	50	29,21	1460,50
	Task Leader	7	27,50	192,50
	Total	57		
5.7 Our university gained prestige	Coordinator or WP Leader	50	31,09	1554,50
	Task Leader	7	14,07	98,50
	Total	57		
5.8 The reputation of our university has increased	Coordinator or WP Leader	50	30,26	1513,00
	Task Leader	7	20,00	140,00
	Total	57		
5.9 We monitored scientific and technological developments in our research field closely thanks to the project	Coordinator or WP Leader	50	31,21	1560,50
	Task Leader	7	13,21	92,50
	Total	57		

5.10 We set new national collaborations	Coordinator or WP Leader	50	28,05	1402,50
	Task Leader	7	35,79	250,50
	Total	57		
5.11 We set new international collaborations	Coordinator or WP Leader	50	29,88	1494,00
	Task Leader	7	22,71	159,00
	Total	57		
6.15 We made other multinational project applications with the same partners in the consortium	Coordinator or WP Leader	50	29,51	1475,50
	Task Leader	7	25,36	177,50
	Total	57		
6.10 M.Sc. theses were completed thanks to the project	Coordinator or WP Leader	50	29,36	1468,00
	Task Leader	7	26,43	185,00
	Total	57		
6.11 PhD theses were completed thanks to the project	Coordinator or WP Leader	50	30,46	1523,00
	Task Leader	7	18,57	130,00
	Total	57		
5.4 We gained know-how thanks to the project	Coordinator or WP Leader	50	29,63	1481,50
	Task Leader	7	24,50	171,50
	Total	57		
5.5 We learned new technologies	Coordinator or WP Leader	50	30,15	1507,50
	Task Leader	7	20,79	145,50
	Total	57		
5.6 We transferred new technologies we have never used before	Coordinator or WP Leader	50	30,38	1519,00
	Task Leader	7	19,14	134,00
	Total	57		
5.12 We acquired new technological skills	Coordinator or WP Leader	50	29,41	1470,50
	Task Leader	7	26,07	182,50
	Total	57		
6.1 We delivered a prototype	Coordinator or WP Leader	50	29,28	1464,00
	Task Leader	7	27,00	189,00
	Total	57		
6.2 We delivered a new software	Coordinator or WP Leader	50	29,44	1472,00
	Task Leader	7	25,86	181,00
	Total	57		
6.3 We delivered a new	Coordinator or WP Leader	50	30,54	1527,00

service	Task Leader	7	18,00	126,00
	Total	57		
6.4 We delivered a new production process	Coordinator or WP Leader	50	29,35	1467,50
	Task Leader	7	26,50	185,50
	Total	57		
6.5 We delivered a new standard	Coordinator or WP Leader	50	29,21	1460,50
	Task Leader	7	27,50	192,50
	Total	57		
6.6 Our work in the project has been published as an academic paper (journal paper, conference proceedings..)	Coordinator or WP Leader	50	30,36	1518,00
	Task Leader	7	19,29	135,00
	Total	57		
6.7 We acquired new intellectual property rights (IPR)	Coordinator or WP Leader	50	29,35	1467,50
	Task Leader	7	26,50	185,50
	Total	57		
6.8 We applied for patent(s)	Coordinator or WP Leader	50	28,71	1435,50
	Task Leader	7	31,07	217,50
	Total	57		
5.13 We acquired new administrative skills	Coordinator or WP Leader	50	29,12	1456,00
	Task Leader	7	28,14	197,00
	Total	57		
5.14 Project increased our participation in national R&D programs like ARDEB, TEYDEB, SANTEZ etc.	Coordinator or WP Leader	50	28,41	1420,50
	Task Leader	7	33,21	232,50
	Total	57		
5.15 Project increased our participation in international programs like FP7, EURKEA, COST etc.	Coordinator or WP Leader	50	30,32	1516,00
	Task Leader	7	19,57	137,00
	Total	57		
5.16 We acquired new skills in national proposal preparation	Coordinator or WP Leader	50	28,82	1441,00
	Task Leader	7	30,29	212,00
	Total	57		
5.17 We acquired new skills in international proposal preparation	Coordinator or WP Leader	50	30,64	1532,00
	Task Leader	7	17,29	121,00
	Total	57		
5.18 R&D awareness in	Coordinator or WP Leader	50	29,24	1462,00

our university has increased	Task Leader	7	27,29	191,00
	Total	57		
5.19 New project ideas triggered thanks to the project	Coordinator or WP Leader	50	29,24	1462,00
	Task Leader	7	27,29	191,00
	Total	57		
6.9 Number of post graduate degree staff in our university has increased thanks to the project	Coordinator or WP Leader	50	30,08	1504,00
	Task Leader	7	21,29	149,00
	Total	57		
6.12 New research seats were opened	Coordinator or WP Leader	50	29,90	1495,00
	Task Leader	7	22,57	158,00
	Total	57		

Table B 2 Median Analysis for Hypothesis 1

	Median 1 (Coordinator or WP Leader)	Median 2 (Task Leader)	Mann-Whitney U	Z	Asymp. Sig. (2-tailed)	Exact Sig. [2*(1-tailed Sig.)]
5.1 Project increased our total R&D spending	4,00	4,00	136,500	-1,173	,241	,357[a]
5.2 Our infrastructure enhanced thanks to the project	4,00	4,00	157,000	-,549	,583	,677[a]
5.3 Project partnership decreased the risk of our R&D expenses	4,00	4,00	75,000	-2,854	,004	,013[a]
6.13 We bought a new equipment	2,00	1,00	103,000	-2,479	,013	,082[a]
6.14 We opened a new research laboratory	1,00	1,00	164,500	-,660	,509	,803[a]
5.7 Our university gained prestige	5,00	4,00	70,500	-3,111	,002	,009[a]
5.8 The reputation of our university has increased	5,00	4,00	112,000	-1,807	,071	,131[a]
5.9 We monitored scientific and technological developments in our research field closely thanks to the project	5,00	4,00	85,000	-2,518	,012	,027[a]
5.10 We set new national collaborations	2,00	2,00	127,500	-1,323	,186	,254[a]
5.11 We set new international collaborations	5,00	4,00	131,000	-1,294	,196	,297[a]
6.15 We made other multinational project applications with the same partners in the consortium	2,00	2,00	149,500	-,981	,326	,543[a]
6.10 M.Sc. theses were completed thanks to the project	2,00	2,00	157,000	-1,131	,258	,677[a]

6.11 PhD theses were completed thanks to the project	2,00	1,00	123,500	-1,451	,147	,216[a]
5.4 We gained know-how thanks to the project	5,00	5,00	138,500	-1,190	,234	,383[a]
5.5 We learned new technologies	5,00	5,00	171,000	-,171	,864	,934[a]
5.6 We transferred new technologies we have never used before	5,00	5,00	169,000	-,166	,868	,896[a]
5.12 We acquired new technological skills	5,00	5,00	170,500	-,143	,886	,915[a]
6.1 We delivered a prototype	1,00	1,00	164,000	-,546	,585	,803[a]
6.2 We delivered a new software	2,00	2,00	129,500	-1,522	,128	,275[a]
6.3 We delivered a new service	2,00	2,00	166,000	-,253	,800	,840[a]
6.4 We delivered a new production process	1,00	1,00	167,500	-,343	,732	,858[a]
6.5 We delivered a new standard	1,00	1,00	157,000	-1,131	,258	,677[a]
6.6 Our work in the project has been published as an academic paper (journal paper, conference proceedings..)	2,00	2,00	167,500	-,343	,732	,858[a]
6.7 We acquired new intellectual property rights (IPR)	1,00	1,00	167,500	-,343	,732	,858[a]
6.8 We applied for patent(s)	1,00	1,00	157,000	-1,131	,258	,677[a]
5.13 We acquired new administrative skills	4,50	4,00	162,500	-,351	,726	,766[a]
5.14 Project increased our participation in national R&D programs like ARDEB, TEYDEB, SANTEZ etc.	2,00	2,00	145,500	-,951	,342	,481[a]
5.15 Project increased our participation in international programs like FP7, EURKEA, COST etc.	4,00	4,00	109,000	-2,260	,024	,113[a]
5.16 We acquired new skills in national proposal preparation	4,00	4,00	163,500	-,330	,741	,784[a]
5.17 We acquired new skills in international proposal preparation	4,00	5,00	133,500	-1,153	,249	,320[a]
5.18 R&D awareness in our university has increased	5,00	4,00	152,000	-,648	,517	,592[a]
5.19 New project ideas triggered thanks to the project	4,00	4,00	163,000	-,411	,681	,784[a]
6.9 Number of post graduate degree staff in our university has increased thanks to the project	2,00	2,00	172,000	-,115	,908	,953[a]
6.12 New research seats were opened	1,00	1,00	130,000	-1,309	,190	,286[a]

Table B 3 Mean Rank Results for Hypothesis 2,3 and 4

	Type of Project	N	Mean Rank	Sum of Ranks
5.1 Project increased our total R&D spending	IP or STREP	48	30,09	1444,50
	NoE	9	23,17	208,50

	Total	57		
5.2 Our infrastructure enhanced thanks to the project	IP or STREP	48	29,52	1417,00
	NoE	9	26,22	236,00
	Total	57		
5.3 Project partnership decreased the risk of our R&D expenses	IP or STREP	48	30,11	1445,50
	NoE	9	23,06	207,50
	Total	57		
6.13 We bought a new equipment	IP or STREP	48	29,66	1423,50
	NoE	9	25,50	229,50
	Total	57		
6.14 We opened a new research laboratory	IP or STREP	48	29,28	1405,50
	NoE	9	27,50	247,50
	Total	57		
5.7 Our university gained prestige	IP or STREP	48	27,81	1335,00
	NoE	9	35,33	318,00
	Total	57		
5.8 The reputation of our university has increased	IP or STREP	48	28,69	1377,00
	NoE	9	30,67	276,00
	Total	57		
5.9 We monitored scientific and technological developments in our research field closely thanks to the project	IP or STREP	48	28,95	1389,50
	NoE	9	29,28	263,50
	Total	57		
5.10 We set new national collaborations	IP or STREP	48	29,44	1413,00
	NoE	9	26,67	240,00
	Total	57		
5.11 We set new international collaborations	IP or STREP	48	30,09	1444,50
	NoE	9	23,17	208,50
	Total	57		
6.15 We made other multinational project applications with the same partners in the consortium	IP or STREP	48	28,75	1380,00
	NoE	9	30,33	273,00
	Total	57		
6.10 M.Sc. theses were completed thanks to the project	IP or STREP	48	29,31	1407,00
	NoE	9	27,33	246,00

	Total	57		
6.11 PhD theses were completed thanks to the project	IP or STREP	48	31,72	1522,50
	NoE	9	14,50	130,50
	Total	57		
5.4 We gained know-how thanks to the project	IP or STREP	48	28,59	1372,50
	NoE	9	31,17	280,50
	Total	57		
5.5 We learned new technologies	IP or STREP	48	29,08	1396,00
	NoE	9	28,56	257,00
	Total	57		
5.6 We transferred new technologies we have never used before	IP or STREP	48	30,80	1478,50
	NoE	9	19,39	174,50
	Total	57		
5.12 We acquired new technological skills	IP or STREP	48	31,00	1488,00
	NoE	9	18,33	165,00
	Total	57		
6.1 We delivered a prototype	IP or STREP	48	29,47	1414,50
	NoE	9	26,50	238,50
	Total	57		
6.2 We delivered a new software	IP or STREP	48	32,53	1561,50
	NoE	9	10,17	91,50
	Total	57		
6.3 We delivered a new service	IP or STREP	48	29,56	1419,00
	NoE	9	26,00	234,00
	Total	57		
6.4 We delivered a new production process	IP or STREP	48	29,56	1419,00
	NoE	9	26,00	234,00
	Total	57		
6.5 We delivered a new standard	IP or STREP	48	29,28	1405,50
	NoE	9	27,50	247,50
	Total	57		
6.6 Our work in the project has been published as an academic paper (journal	IP or STREP	48	30,22	1450,50
	NoE	9	22,50	202,50

paper, conference proceedings..)	Total	57		
6.7 We acquired new intellectual property rights (IPR)	IP or STREP	48	29,56	1419,00
	NoE	9	26,00	234,00
	Total	57		
6.8 We applied for patent(s)	IP or STREP	48	29,28	1405,50
	NoE	9	27,50	247,50
	Total	57		
5.13 We acquired new administrative skills	IP or STREP	48	30,22	1450,50
	NoE	9	22,50	202,50
	Total	57		
5.14 Project increased our participation in national R&D programs like ARDEB, TEYDEB, SANTEZ etc.	IP or STREP	48	29,03	1393,50
	NoE	9	28,83	259,50
	Total	57		
5.15 Project increased our participation in international programs like FP7, EURKEA, COST etc.	IP or STREP	48	29,00	1392,00
	NoE	9	29,00	261,00
	Total	57		
5.16 We acquired new skills in national proposal preparation	IP or STREP	48	28,44	1365,00
	NoE	9	32,00	288,00
	Total	57		
5.17 We acquired new skills in international proposal preparation	IP or STREP	48	30,94	1485,00
	NoE	9	18,67	168,00
	Total	57		
5.18 R&D awareness in our university has increased	IP or STREP	48	30,85	1481,00
	NoE	9	19,11	172,00
	Total	57		
5.19 New project ideas triggered thanks to the project	IP or STREP	48	29,33	1408,00
	NoE	9	27,22	245,00
	Total	57		
6.9 Number of post graduate degree staff in our university has increased thanks to the project	IP or STREP	48	29,34	1408,50
	NoE	9	27,17	244,50
	Total	57		
6.12 New research seats were opened	IP or STREP	48	30,38	1458,00
	NoE	9	21,67	195,00

Total	57		

Table B 4 Median Analysis for Hypothesis 2,3 and 4

	Median 1 (IP or STREP)	Median 2 (NoE)	Mann-Whitney U	Z	Asymp. Sig. (2-tailed)	Exact Sig. (2-tailed)	Exact Sig. (1-tailed)
5.1 Project increased our total R&D spending	4,00	4,00	163,500	-1,440	,150	,131	,087
5.2 Our infrastructure enhanced thanks to the project	4,00	4,00	191,000	-,686	,493	,471	,299
5.3 Project partnership decreased the risk of our R&D expenses	4,00	4,00	162,500	-1,375	,169	,236	,107
6.13 We bought a new equipment	2,00	2,00	184,500	-,976	,329	,380	,281
6.14 We opened a new research laboratory	1,00	1,00	202,500	-,764	,445	1,000	,591
5.7 Our university gained prestige	5,00	5,00	159,000	-1,528	,127	,247	,121
5.8 The reputation of our university has increased	5,00	5,00	201,000	-,387	,699	,746	,478
5.9 We monitored scientific and technological developments in our research field closely thanks to the project	5,00	4,00	193,000	-,579	,562	,693	,385
5.10 We set new national collaborations	2,00	2,00	195,000	-,527	,599	,586	,280
5.11 We set new international collaborations	5,00	4,00	163,500	-1,390	,165	,253	,154
6.15 We made other multinational project applications with the same partners in the consortium	2,00	2,00	204,000	-,416	,678	1,000	,564
6.10 M.Sc. theses were completed thanks to the project	2,00	2,00	202,500	-,764	,445	1,000	,591
6.11 PhD theses were completed thanks to the project	2,00	1,00	76,500	-3,538	,000	,000	,000
5.4 We gained know-how thanks to the project	5,00	5,00	193,500	-,660	,509	,674	,386
5.5 We learned new technologies	5,00	5,00	133,500	-3,175	,001	,009	,009
5.6 We transferred new technologies we have never used before	5,00	4,00	94,000	-3,046	,002	,002	,002
5.12 We acquired new technological skills	5,00	4,00	141,000	-2,152	,031	,044	,044
6.1 We delivered a prototype	1,00	1,00	193,500	-1,005	,315	,582	,409
6.2 We delivered a new software	2,00	1,00	46,500	-5,103	,000	,000	,000
6.3 We delivered a new service	2,00	1,00	138,000	-1,973	,048	,070	,051
6.4 We delivered a new production	1,00	1,00	189,000	-1,111	,266	,575	,338

process							
6.5 We delivered a new standard	1,00	1,00	202,500	-,764	,445	1,000	,591
6.6 Our work in the project has been published as an academic paper (journal paper, conference proceedings..)	2,00	2,00	157,500	-2,408	,016	,044	,044
6.7 We acquired new intellectual property rights (IPR)	1,00	1,00	189,000	-1,111	,266	,575	,338
6.8 We applied for patent(s)	1,00	1,00	202,500	-,764	,445	1,000	,591
5.13 We acquired new administrative skills	5,00	4,00	118,500	-2,464	,014	,025	,014
5.14 Project increased our participation in national R&D programs like ARDEB, TEYDEB, SANTEZ etc.	2,00	2,00	214,500	-,044	,965	,919	,471
5.15 Project increased our participation in international programs like FP7, EURKEA, COST etc.	4,00	4,00	216,000	,000	1,000	1,000	,579
5.16 We acquired new skills in national proposal preparation	4,00	4,00	209,500	-,168	,867	1,000	,533
5.17 We acquired new skills in international proposal preparation	4,00	4,00	105,000	-2,776	,006	,003	,002
5.18 R&D awareness in our university has increased	5,00	4,00	105,000	-2,815	,005	,008	,006
5.19 New project ideas triggered thanks to the project	4,00	4,00	200,000	-,493	,622	,678	,440
6.9 Number of post graduate degree staff in our university has increased thanks to the project	2,00	2,00	171,000	-1,559	,119	,141	,141
6.12 New research seats were opened	1,00	1,00	150,000	-1,728	,084	,133	,081

Table B 5 Mean Rank Results for Hypothesis 5,6

	Project Activity	N	Mean Rank	Sum of Ranks
5.1 Project increased our total R&D spending	Research	48	30,07	1443,50
	Demonstration	9	23,28	209,50
	Total	57		
5.2 Our infrastructure enhanced thanks to the project	Research	48	29,07	1395,50
	Demonstration	9	28,61	257,50
	Total	57		
5.3 Project partnership decreased the risk of our R&D expenses	Research	48	29,54	1418,00
	Demonstration	9	26,11	235,00
	Total	57		
6.13 We bought a new	Research	48	29,66	1423,50

equipment	Demonstration	9	25,50	229,50
	Total	57		
6.14 We opened a new research laboratory	Research	48	29,28	1405,50
	Demonstration	9	27,50	247,50
	Total	57		
5.7 Our university gained prestige	Research	48	28,41	1363,50
	Demonstration	9	32,17	289,50
	Total	57		
5.8 The reputation of our university has increased	Research	48	28,69	1377,00
	Demonstration	9	30,67	276,00
	Total	57		
5.9 We monitored scientific and technological developments in our research field closely thanks to the project	Research	48	32,08	1540,00
	Demonstration	9	12,56	113,00
	Total	57		
5.10 We set new national collaborations	Research	48	29,83	1432,00
	Demonstration	9	24,56	221,00
	Total	57		
5.11 We set new international collaborations	Research	48	30,69	1473,00
	Demonstration	9	20,00	180,00
	Total	57		
6.15 We made other multinational project applications with the same partners in the consortium	Research	48	29,94	1437,00
	Demonstration	9	24,00	216,00
	Total	57		
6.10 M.Sc. theses were completed thanks to the project	Research	48	29,00	1392,00
	Demonstration	9	29,00	261,00
	Total	57		
6.11 PhD theses were completed thanks to the project	Research	48	30,53	1465,50
	Demonstration	9	20,83	187,50
	Total	57		
5.4 We gained know-how thanks to the project	Research	48	31,25	1500,00
	Demonstration	9	17,00	153,00
	Total	57		
5.5 We learned new	Research	48	31,53	1513,50

technologies	Demonstration	9	15,50	139,50
	Total	57		
5.6 We transferred new technologies we have never used before	Research	48	30,33	1456,00
	Demonstration	9	21,89	197,00
	Total	57		
5.12 We acquired new technological skills	Research	48	30,23	1451,00
	Demonstration	9	22,44	202,00
	Total	57		
6.1 We delivered a prototype	Research	48	29,47	1414,50
	Demonstration	9	26,50	238,50
	Total	57		
6.2 We delivered a new software	Research	48	30,75	1476,00
	Demonstration	9	19,67	177,00
	Total	57		
6.3 We delivered a new service	Research	48	30,16	1447,50
	Demonstration	9	22,83	205,50
	Total	57		
6.4 We delivered a new production process	Research	48	28,97	1390,50
	Demonstration	9	29,17	262,50
	Total	57		
6.5 We delivered a new standard	Research	48	29,28	1405,50
	Demonstration	9	27,50	247,50
	Total	57		
6.6 Our work in the project has been published as an academic paper (journal paper, conference proceedings..)	Research	48	29,03	1393,50
	Demonstration	9	28,83	259,50
	Total	57		
6.7 We acquired new intellectual property rights (IPR)	Research	48	29,56	1419,00
	Demonstration	9	26,00	234,00
	Total	57		
6.8 We applied for patent(s)	Research	48	29,28	1405,50
	Demonstration	9	27,50	247,50
	Total	57		
5.13 We acquired new	Research	48	29,66	1423,50

administrative skills	Demonstration	9	25,50	229,50
	Total	57		
5.14 Project increased our participation in national R&D programs like ARDEB, TEYDEB, SANTEZ etc.	Research	48	29,00	1392,00
	Demonstration	9	29,00	261,00
	Total	57		
5.15 Project increased our participation in international programs like FP7, EURKEA, COST etc.	Research	48	30,08	1444,00
	Demonstration	9	23,22	209,00
	Total	57		
5.16 We acquired new skills in national proposal preparation	Research	48	28,44	1365,00
	Demonstration	9	32,00	288,00
	Total	57		
5.17 We acquired new skills in international proposal preparation	Research	48	30,41	1459,50
	Demonstration	9	21,50	193,50
	Total	57		
5.18 R&D awareness in our university has increased	Research	48	30,27	1453,00
	Demonstration	9	22,22	200,00
	Total	57		
5.19 New project ideas triggered thanks to the project	Research	48	29,33	1408,00
	Demonstration	9	27,22	245,00
	Total	57		
6.9 Number of post graduate degree staff in our university has increased thanks to the project	Research	48	29,34	1408,50
	Demonstration	9	27,17	244,50
	Total	57		
6.12 New research seats were opened	Research	48	29,19	1401,00
	Demonstration	9	28,00	252,00
	Total	57		

Table B 6 Median Analysis for Hypothesis 5 and 6

	Median 1 (Research)	Median 2 (Demonstration)	Mann-Whitney U	Z	Asymp. Sig. (2-tailed)	Exact Sig. (2-tailed)	Exact Sig. (1-tailed)
5.1 Project increased our	4,00	4,00	164,500	-1,413	,158	,262	,118

total R&D spending							
5.2 Our infrastructure enhanced thanks to the project	4,00	4,00	212,500	-,096	,924	,967	,566
5.3 Project partnership decreased the risk of our R&D expenses	4,00	4,00	190,000	-,668	,504	,651	,324
6.13 We bought a new equipment	2,00	2,00	184,500	-,976	,329	,380	,281
6.14 We opened a new research laboratory	1,00	1,00	202,500	-,764	,445	1,000	,591
5.7 Our university gained prestige	5,00	5,00	187,500	-,764	,445	,703	,361
5.8 The reputation of our university has increased	5,00	5,00	201,000	-,387	,699	,746	,478
5.9 We monitored scientific and technological developments in our research field closely thanks to the project	5,00	4,00	68,000	-3,728	,000	,000	,000
5.10 We set new national collaborations	2,00	2,00	176,000	-1,003	,316	,306	,162
5.11 We set new international collaborations	5,00	4,00	135,000	-2,144	,032	,054	,040
6.15 We made other multinational project applications with the same partners in the consortium	2,00	2,00	171,000	-1,559	,119	,141	,141
6.10 M.Sc. theses were completed thanks to the project	2,00	2,00	201,000	-,849	,396	,409	,409
6.11 PhD theses were completed thanks to the project	2,00	1,00	133,500	-2,093	,036	,065	,040
5.4 We gained know-how thanks to the project	5,00	4,00	108,000	-3,170	,002	,004	,004
5.5 We learned new technologies	5,00	4,00	76,500	-5,369	,000	,000	,000
5.6 We transferred new technologies we have never used before	5,00	4,00	94,000	-3,046	,002	,002	,002
5.12 We acquired new technological skills	5,00	4,00	141,000	-2,152	,031	,044	,044
6.1 We delivered a prototype	1,00	1,00	193,500	-1,005	,315	,582	,409
6.2 We delivered a new software	2,00	1,00	103,500	-3,387	,001	,003	,003
6.3 We delivered a new service	2,00	1,00	109,500	-2,695	,007	,010	,008
6.4 We delivered a new production process	1,00	1,00	189,000	-1,111	,266	,575	,338
6.5 We delivered a new standard	1,00	1,00	202,500	-,764	,445	1,000	,591

6.6 Our work in the project has been published as an academic paper (journal paper, conference proceedings..)	2,00	2,00	214,500	-,062	,951	1,000	,662
6.7 We acquired new intellectual property rights (IPR)	1,00	1,00	189,000	-1,111	,266	,575	,338
6.8 We applied for patent(s)	1,00	1,00	202,500	-,764	,445	1,000	,591
5.13 We acquired new administrative skills	5,00	4,00	147,000	-1,744	,081	,144	,080
5.14 Project increased our participation in national R&D programs like ARDEB, TEYDEB, SANTEZ etc.	2,00	2,00	216,000	,000	1,000	1,000	,529
5.15 Project increased our participation in international programs like FP7, EURKEA, COST etc.	4,00	4,00	164,000	-1,603	,109	,144	,041
5.16 We acquired new skills in national proposal preparation	4,00	4,00	174,500	-1,073	,283	,244	,120
5.17 We acquired new skills in international proposal preparation	4,00	4,00	105,000	-2,776	,006	,003	,002
5.18 R&D awareness in our university has increased	5,00	4,00	133,500	-2,093	,036	,065	,040
5.19 New project ideas triggered thanks to the project	4,00	4,00	200,000	-,493	,622	,678	,440
6.9 Number of post graduate degree staff in our university has increased thanks to the project	2,00	2,00	142,500	-2,546	,011	,027	,027
6.12 New research seats were opened	1,00	1,00	207,000	-,236	,814	1,000	,564

Table B 7 Mean Rank Results for Hypothesis 7

	EU Project Office Exists	N	Mean Rank	Sum of Ranks
5.1 Project increased our total R&D spending	Yes	50	29,77	1488,50
	No	7	23,50	164,50
	Total	57		
5.2 Our infrastructure enhanced thanks to the project	Yes	50	29,36	1468,00
	No	7	26,43	185,00
	Total	57		

5.3 Project partnership decreased the risk of our R&D expenses	Yes	50	31,00	1550,00
	No	7	14,71	103,00
	Total	57		
6.13 We bought a new equipment	Yes	50	30,44	1522,00
	No	7	18,71	131,00
	Total	57		
6.14 We opened a new research laboratory	Yes	50	29,21	1460,50
	No	7	27,50	192,50
	Total	57		
5.7 Our university gained prestige	Yes	50	31,09	1554,50
	No	7	14,07	98,50
	Total	57		
5.8 The reputation of our university has increased	Yes	50	30,26	1513,00
	No	7	20,00	140,00
	Total	57		
5.9 We monitored scientific and technological developments in our research field closely thanks to the project	Yes	50	30,80	1540,00
	No	7	16,14	113,00
	Total	57		
5.10 We set new national collaborations	Yes	50	28,05	1402,50
	No	7	35,79	250,50
	Total	57		
5.11 We set new international collaborations	Yes	50	29,88	1494,00
	No	7	22,71	159,00
	Total	57		
6.15 We made other multinational project applications with the same partners in the consortium	Yes	50	29,51	1475,50
	No	7	25,36	177,50
	Total	57		
6.10 M.Sc. theses were completed thanks to the project	Yes	50	29,00	1450,00
	No	7	29,00	203,00
	Total	57		
6.11 PhD theses were completed thanks to the project	Yes	50	30,46	1523,00
	No	7	18,57	130,00
	Total	57		

5.4 We gained know-how thanks to the project	Yes	50	29,73	1486,50
	No	7	23,79	166,50
	Total	57		
5.5 We learned new technologies	Yes	50	30,51	1525,50
	No	7	18,21	127,50
	Total	57		
5.6 We transferred new technologies we have never used before	Yes	50	29,89	1494,50
	No	7	22,64	158,50
	Total	57		
5.12 We acquired new technological skills	Yes	50	29,42	1471,00
	No	7	26,00	182,00
	Total	57		
6.1 We delivered a prototype	Yes	50	29,35	1467,50
	No	7	26,50	185,50
	Total	57		
6.2 We delivered a new software	Yes	50	29,23	1461,50
	No	7	27,36	191,50
	Total	57		
6.3 We delivered a new service	Yes	50	30,75	1537,50
	No	7	16,50	115,50
	Total	57		
6.4 We delivered a new production process	Yes	50	29,42	1471,00
	No	7	26,00	182,00
	Total	57		
6.5 We delivered a new standard	Yes	50	29,21	1460,50
	No	7	27,50	192,50
	Total	57		
6.6 Our work in the project has been published as an academic paper (journal paper, conference proceedings..)	Yes	50	30,29	1514,50
	No	7	19,79	138,50
	Total	57		
6.7 We acquired new intellectual property rights (IPR)	Yes	50	29,42	1471,00
	No	7	26,00	182,00
	Total	57		

6.8 We applied for patent(s)	Yes	50	28,64	1432,00
	No	7	31,57	221,00
	Total	57		
5.13 We acquired new administrative skills	Yes	50	30,14	1507,00
	No	7	20,86	146,00
	Total	57		
5.14 Project increased our participation in national R&D programs like ARDEB, TEYDEB, SANTEZ etc.	Yes	50	28,41	1420,50
	No	7	33,21	232,50
	Total	57		
5.15 Project increased our participation in international programs like FP7, EURKEA, COST etc.	Yes	50	30,32	1516,00
	No	7	19,57	137,00
	Total	57		
5.16 We acquired new skills in national proposal preparation	Yes	50	28,82	1441,00
	No	7	30,29	212,00
	Total	57		
5.17 We acquired new skills in international proposal preparation	Yes	50	30,36	1518,00
	No	7	19,29	135,00
	Total	57		
5.18 R&D awareness in our university has increased	Yes	50	30,00	1500,00
	No	7	21,86	153,00
	Total	57		
5.19 New project ideas triggered thanks to the project	Yes	50	29,24	1462,00
	No	7	27,29	191,00
	Total	57		
6.9 Number of post graduate degree staff in our university has increased thanks to the project	Yes	50	30,08	1504,00
	No	7	21,29	149,00
	Total	57		
6.12 New research seats were opened	Yes	50	29,90	1495,00
	No	7	22,57	158,00
	Total	57		

Table B 8 Median Analysis for Hypothesis 7

	Median 1 (EU Project Office-Yes)	Median 2 (EU Project Office-No)	Mann-Whitney U	Z	Asymp. Sig. (2-tailed)	Exact Sig. [2*(1-tailed Sig.)]	Exact Sig. (2-tailed)	Exact Sig. (1-tailed)
5.1 Project increased our total R&D spending	4,00	4,00	171,500	-,706	,480	,580[a]	,619	,322
5.2 Our infrastructure enhanced thanks to the project	4,00	4,00	193,000	-,086	,931	,955[a]	1,000	,592
5.3 Project partnership decreased the risk of our R&D expenses	4,00	4,00	133,500	-1,686	,092	,154[a]	,145	,067
6.13 We bought a new equipment	2,00	2,00	158,500	-1,220	,223	,396[a]	,345	,215
6.14 We opened a new research laboratory	1,00	1,00	179,500	-,980	,327	,710[a]	,370	,370
5.7 Our university gained prestige	5,00	4,50	158,000	-1,069	,285	,396[a]	,420	,245
5.8 The reputation of our university has increased	5,00	4,50	172,000	-,650	,515	,596[a]	,677	,367
5.9 We monitored scientific and technological developments in our research field closely thanks to the project	5,00	4,50	188,000	-,212	,832	,866[a]	,969	,542
5.10 We set new national collaborations	2,00	4,00	41,000	-4,080	,000	,000[a]	,000	,000
5.11 We set new international collaborations	5,00	4,50	162,000	-,945	,345	,449[a]	,432	,284
6.15 We made other multinational project applications with the same partners in the consortium	2,00	2,00	160,000	-1,309	,190	,422[a]	,332	,228
6.10 M.Sc. theses were completed thanks to the project	2,00	2,00	184,000	-,713	,476	,795[a]	1,000	,630
6.11 PhD theses were completed thanks to the project	2,00	2,00	149,000	-1,251	,211	,291[a]	,269	,191
5.4 We gained know-how thanks to the project	5,00	5,00	168,500	-,847	,397	,535[a]	,664	,361
5.5 We learned new technologies	5,00	5,00	168,000	-1,131	,258	,535[a]	,577	,325
5.6 We transferred new technologies we have never used before	5,00	5,00	100,000	-2,516	,012	,026[a]	,018	,008
5.12 We acquired new technological skills	5,00	5,00	164,500	-,949	,343	,476[a]	,432	,316
6.1 We delivered a prototype	1,00	1,00	159,000	-1,735	,083	,409[a]	,140	,140
6.2 We delivered a new software	2,00	2,00	144,000	-1,644	,100	,242[a]	,177	,107
6.3 We delivered a new service	1,00	2,00	116,500	-2,112	,035	,067[a]	,054	,037
6.4 We delivered a new production process	1,00	1,00	134,500	-2,658	,008	,161[a]	,031	,031
6.5 We delivered a new standard	1,00	1,00	151,000	-2,673	,008	,313[a]	,049	,049
6.6 Our work in the project has been published as an academic	2,00	2,00	172,000	-1,037	,300	,596[a]	,580	,385

paper (journal paper, conference proceedings..)								
6.7 We acquired new intellectual property rights (IPR)	1,00	1,00	191,500	-,194	,846	,919[a]	1,000	,615
6.8 We applied for patent(s)	1,00	1,00	184,000	-,713	,476	,795[a]	1,000	,630
5.13 We acquired new administrative skills	4,00	5,00	137,000	-1,565	,118	,183[a]	,144	,115
5.14 Project increased our participation in national R&D programs like ARDEB, TEYDEB, SANTEZ etc.	2,00	2,50	121,000	-2,285	,022	,087[a]	,039	,015
5.15 Project increased our participation in international programs like FP7, EURKEA, COST etc.	4,00	4,00	189,500	-,210	,833	,884[a]	,726	,334
5.16 We acquired new skills in national proposal preparation	4,00	5,00	89,500	-2,891	,004	,012[a]	,005	,004
5.17 We acquired new skills in international proposal preparation	4,00	5,00	83,000	-2,967	,003	,008[a]	,004	,003
5.18 R&D awareness in our university has increased	5,00	5,00	177,500	-,493	,622	,677[a]	,715	,458
5.19 New project ideas triggered thanks to the project	4,00	4,00	184,000	-,388	,698	,795[a]	,780	,485
6.9 Number of post graduate degree staff in our university has increased thanks to the project	2,00	2,00	160,000	-1,309	,190	,422[a]	,332	,228
6.12 New research seats were opened	1,00	2,00	109,000	-2,392	,017	,045[a]	,023	,023

Table B 9 Mean Rank Results for Hypothesis 1

	Publication	N	Mean Rank	Sum of Ranks
5.1 Project increased our total R&D spending	No	6	18,92	113,50
	Yes	51	30,19	1539,50
	Total	57		
5.2 Our infrastructure enhanced thanks to the project	No	6	18,92	113,50
	Yes	51	30,19	1539,50
	Total	57		
5.3 Project partnership decreased the risk of our R&D expenses	No	6	21,58	129,50
	Yes	51	29,87	1523,50
	Total	57		
6.13 We bought a new equipment	No	6	16,00	96,00
	Yes	51	30,53	1557,00
	Total	57		
6.14 We opened a new	No	6	27,50	165,00

research laboratory	Yes	51	29,18	1488,00
	Total	57		
5.7 Our university gained prestige	No	6	24,25	145,50
	Yes	51	29,56	1507,50
	Total	57		
5.8 The reputation of our university has increased	No	6	26,00	156,00
	Yes	51	29,35	1497,00
	Total	57		
5.9 We monitored scientific and technological developments in our research field closely thanks to the project	No	6	23,33	140,00
	Yes	51	29,67	1513,00
	Total	57		
5.10 We set new national collaborations	No	6	30,58	183,50
	Yes	51	28,81	1469,50
	Total	57		
5.11 We set new international collaborations	No	6	20,00	120,00
	Yes	51	30,06	1533,00
	Total	57		
6.15 We made other multinational project applications with the same partners in the consortium	No	6	28,75	172,50
	Yes	51	29,03	1480,50
	Total	57		
6.10 M.Sc. theses were completed thanks to the project	No	6	29,00	174,00
	Yes	51	29,00	1479,00
	Total	57		
6.11 PhD theses were completed thanks to the project	No	6	19,25	115,50
	Yes	51	30,15	1537,50
	Total	57		
5.4 We gained know-how thanks to the project	No	6	21,75	130,50
	Yes	51	29,85	1522,50
	Total	57		
5.5 We learned new technologies	No	6	20,25	121,50
	Yes	51	30,03	1531,50
	Total	57		
5.6 We transferred new	No	6	18,67	112,00

technologies we have never used before	Yes	51	30,22	1541,00
	Total	57		
5.12 We acquired new technological skills	No	6	17,83	107,00
	Yes	51	30,31	1546,00
	Total	57		
6.1 We delivered a prototype	No	6	26,50	159,00
	Yes	51	29,29	1494,00
	Total	57		
6.2 We delivered a new software	No	6	16,50	99,00
	Yes	51	30,47	1554,00
	Total	57		
6.3 We delivered a new service	No	6	26,00	156,00
	Yes	51	29,35	1497,00
	Total	57		
6.4 We delivered a new production process	No	6	26,00	156,00
	Yes	51	29,35	1497,00
	Total	57		
6.5 We delivered a new standard	No	6	27,50	165,00
	Yes	51	29,18	1488,00
	Total	57		
6.7 We acquired new intellectual property rights (IPR)	No	6	26,00	156,00
	Yes	51	29,35	1497,00
	Total	57		
6.8 We applied for patent(s)	No	6	27,50	165,00
	Yes	51	29,18	1488,00
	Total	57		
5.13 We acquired new administrative skills	No	6	16,58	99,50
	Yes	51	30,46	1553,50
	Total	57		
5.14 Project increased our participation in national R&D programs like ARDEB, TEYDEB, SANTEZ etc.	No	6	24,83	149,00
	Yes	51	29,49	1504,00
	Total	57		
5.15 Project increased our participation in international programs like	No	6	26,58	159,50
	Yes	51	29,28	1493,50

FP7, EURKEA, COST etc.	Total	57		
5.16 We acquired new skills in national proposal preparation	No	6	26,00	156,00
	Yes	51	29,35	1497,00
	Total	57		
5.17 We acquired new skills in international proposal preparation	No	6	18,17	109,00
	Yes	51	30,27	1544,00
	Total	57		
5.18 R&D awareness in our university has increased	No	6	18,17	109,00
	Yes	51	30,27	1544,00
	Total	57		
5.19 New project ideas triggered thanks to the project	No	6	18,83	113,00
	Yes	51	30,20	1540,00
	Total	57		
6.9 Number of post graduate degree staff in our university has increased thanks to the project	No	6	24,00	144,00
	Yes	51	29,59	1509,00
	Total	57		
6.12 New research seats were opened	No	6	18,50	111,00
	Yes	51	30,24	1542,00
	Total	57		

Table B 10 Median Analysis for Hypothesis 8

	Median 1 (have publications)	Median 2 (do not have publications)	Mann-Whitney U	Z	Asymp. Sig. (2-tailed)	Exact Sig. [2*(1-tailed Sig.)]	Exact Sig. (2-tailed)	Exact Sig. (1-tailed)
5.1 Project increased our total R&D spending	4,00	4,00	114,000	-1,271	,204	,325[a]	,308	,149
5.2 Our infrastructure enhanced thanks to the project	4,00	4,00	114,000	-1,271	,204	,325[a]	,308	,149
5.3 Project partnership decreased the risk of our R&D expenses	4,00	4,00	126,500	-,809	,419	,500[a]	,619	,307
6.13 We bought a new equipment	1,50	2,00	103,500	-1,823	,068	,204[a]	,101	,101

6.14 We opened a new research laboratory	1,00	1,00	144,000	-,605	,545	,829[a]	1,000	,712
5.7 Our university gained prestige	5,00	5,00	124,500	-,907	,364	,468[a]	,652	,339
5.8 The reputation of our university has increased	5,00	5,00	115,000	-1,166	,244	,338[a]	,380	,233
5.9 We monitored scientific and technological developments in our research field closely thanks to the project	4,50	5,00	147,000	-,180	,858	,889[a]	1,000	,576
5.10 We set new national collaborations	2,00	2,00	138,000	-,447	,655	,713[a]	,625	,301
5.11 We set new international collaborations	4,50	5,00	127,500	-,802	,423	,517[a]	,654	,350
6.15 We made other multinational project applications with the same partners in the consortium	2,00	2,00	151,500	-,062	,951	,970[a]	1,000	,662
6.10 M.Sc. theses were completed thanks to the project	2,00	2,00	144,000	-,605	,545	,829[a]	1,000	,712
6.11 PhD theses were completed thanks to the project	1,00	2,00	88,500	-1,944	,052	,094[a]	,083	,063
5.4 We gained know-how thanks to the project	5,00	5,00	138,000	-,523	,601	,713[a]	,629	,461
5.5 We learned new technologies	5,00	5,00	145,500	-,343	,732	,849[a]	1,000	,562
5.6 We transferred new technologies we have never used before	4,00	5,00	57,000	-2,848	,004	,010[a]	,003	,003
5.12 We acquired new technological skills	5,00	5,00	141,000	-,409	,683	,771[a]	1,000	,504
6.1 We delivered a prototype	1,00	1,00	138,000	-,796	,426	,713[a]	,642	,561
6.2 We delivered a new software	1,50	2,00	106,500	-1,663	,096	,233[a]	,125	,125
6.3 We delivered a new service	1,50	2,00	148,500	-,135	,892	,909[a]	1,000	,613
6.4 We delivered a new production process	1,00	1,00	135,000	-,880	,379	,657[a]	,612	,496
6.5 We delivered a new standard	1,00	1,00	144,000	-,605	,545	,829[a]	1,000	,712
6.7 We acquired new intellectual property rights (IPR)	1,00	1,00	142,500	-,514	,608	,790[a]	1,000	,504
6.8 We applied for	1,00	1,00	144,000	-,605	,545	,829[a]	1,000	,712

patent(s)								
5.13 We acquired new administrative skills	4,00	5,00	126,000	-,811	,418	,500[a]	,670	,352
5.14 Project increased our participation in national R&D programs like ARDEB, TEYDEB, SANTEZ etc.	2,00	2,00	128,000	-,862	,389	,533[a]	,512	,305
5.15 Project increased our participation in international programs like FP7, EURKEA, COST etc.	4,00	4,00	135,000	-,659	,510	,657[a]	,541	,349
5.16 We acquired new skills in national proposal preparation	4,00	4,00	141,000	-,369	,712	,771[a]	,791	,314
5.17 We acquired new skills in international proposal preparation	4,00	4,00	96,000	-1,694	,090	,145[a]	,082	,054
5.18 R&D awareness in our university has increased	4,50	5,00	145,500	-,226	,821	,849[a]	1,000	,576
5.19 New project ideas triggered thanks to the project	4,00	4,00	141,000	-,439	,661	,771[a]	,864	,405
6.9 Number of post graduate degree staff in our university has increased thanks to the project	2,00	2,00	151,500	-,062	,951	,970[a]	1,000	,662
6.12 New research seats were opened	1,00	1,00	118,500	-1,074	,283	,379[a]	,397	,272

Table B 11 Mean Rank Results for Hypothesis 9 and 10

	Applied for patentes	N	Mean Rank	Sum of Ranks
5.1 Project increased our total R&D spending	No	54	28,85	1558,00
	Yes	3	31,67	95,00
	Total	57		
5.2 Our infrastructure enhanced thanks to the project	No	54	28,34	1530,50
	Yes	3	40,83	122,50
	Total	57		
5.3 Project partnership decreased the risk of our R&D expenses	No	54	28,99	1565,50
	Yes	3	29,17	87,50

	Total	57		
6.13 We bought a new equipment	No	54	29,72	1605,00
	Yes	3	16,00	48,00
	Total	57		
6.14 We opened a new research laboratory	No	54	28,56	1542,00
	Yes	3	37,00	111,00
	Total	57		
5.7 Our university gained prestige	No	54	29,00	1566,00
	Yes	3	29,00	87,00
	Total	57		
5.8 The reputation of our university has increased	No	54	29,43	1589,00
	Yes	3	21,33	64,00
	Total	57		
5.9 We monitored scientific and technological developments in our research field closely thanks to the project	No	54	29,31	1583,00
	Yes	3	23,33	70,00
	Total	57		
5.10 We set new national collaborations	No	54	28,76	1553,00
	Yes	3	33,33	100,00
	Total	57		
5.11 We set new international collaborations	No	54	28,97	1564,50
	Yes	3	29,50	88,50
	Total	57		
6.15 We made other multinational project applications with the same partners in the consortium	No	54	28,75	1552,50
	Yes	3	33,50	100,50
	Total	57		
6.10 M.Sc. theses were completed thanks to the project	No	54	29,00	1566,00
	Yes	3	29,00	87,00
	Total	57		
6.11 PhD theses were completed thanks to the project	No	54	28,75	1552,50
	Yes	3	33,50	100,50
	Total	57		
5.4 We gained know-how thanks to the project	No	54	28,61	1545,00
	Yes	3	36,00	108,00

	Total	57		
5.5 We learned new technologies	No	54	28,69	1549,50
	Yes	3	34,50	103,50
	Total	57		
5.6 We transferred new technologies we have never used before	No	54	28,44	1536,00
	Yes	3	39,00	117,00
	Total	57		
5.12 We acquired new technological skills	No	54	28,50	1539,00
	Yes	3	38,00	114,00
	Total	57		
6.1 We delivered a prototype	No	54	28,08	1516,50
	Yes	3	45,50	136,50
	Total	57		
6.2 We delivered a new software	No	54	28,64	1546,50
	Yes	3	35,50	106,50
	Total	57		
6.3 We delivered a new service	No	54	28,11	1518,00
	Yes	3	45,00	135,00
	Total	57		
6.4 We delivered a new production process	No	54	29,17	1575,00
	Yes	3	26,00	78,00
	Total	57		
6.5 We delivered a new standard	No	54	28,56	1542,00
	Yes	3	37,00	111,00
	Total	57		
6.7 We acquired new intellectual property rights (IPR)	No	54	27,58	1489,50
	Yes	3	54,50	163,50
	Total	57		
5.13 We acquired new administrative skills	No	54	28,56	1542,00
	Yes	3	37,00	111,00
	Total	57		
5.14 Project increased our participation in national R&D programs like ARDEB, TEYDEB, SANTEZ etc.	No	54	28,51	1539,50
	Yes	3	37,83	113,50
	Total	57		

5.15 Project increased our participation in international programs like FP7, EURKEA, COST etc.	No	54	27,72	1497,00
	Yes	3	52,00	156,00
	Total	57		
5.16 We acquired new skills in national proposal preparation	No	54	27,58	1489,50
	Yes	3	54,50	163,50
	Total	57		
5.17 We acquired new skills in international proposal preparation	No	54	27,81	1501,50
	Yes	3	50,50	151,50
	Total	57		
5.18 R&D awareness in our university has increased	No	54	28,19	1522,50
	Yes	3	43,50	130,50
	Total	57		
5.19 New project ideas triggered thanks to the project	No	54	27,72	1497,00
	Yes	3	52,00	156,00
	Total	57		
6.9 Number of post graduate degree staff in our university has increased thanks to the project	No	54	28,75	1552,50
	Yes	3	33,50	100,50
	Total	57		
6.12 New research seats were opened	No	54	28,00	1512,00
	Yes	3	47,00	141,00
	Total	57		
6.6 Our work in the project has been published as an academic paper (journal paper, conference proceedings..)	No	54	28,83	1557,00
	Yes	3	32,00	96,00
	Total	57		

Table B 12 Median Analysis for Hypotheses 9 and 10

	Median 1 (have patents)	Median 2 (do not have patents)	Mann-Whitney U	Z	Asymp. Sig. (2-tailed)	Exact Sig. [2*(1-tailed Sig.)]	Exact Sig. (2-tailed)	Exact Sig. (1-tailed)

5.1 Project increased our total R&D spending	4,00	4,00	73,000	-,358	,720	,801[a]	1,000	,566
5.2 Our infrastructure enhanced thanks to the project	4,00	5,00	45,500	-1,590	,112	,216[a]	,214	,159
5.3 Project partnership decreased the risk of our R&D expenses	4,00	4,00	80,500	-,021	,983	,987[a]	1,000	,686
6.13 We bought a new equipment	2,00	1,00	42,000	-1,973	,048	,179[a]	,109	,109
6.14 We opened a new research laboratory	1,00	1,00	57,000	-2,217	,027	,420[a]	,152	,152
5.7 Our university gained prestige	5,00	5,00	81,000	,000	1,000	1,000[a]	1,000	,745
5.8 The reputation of our university has increased	5,00	4,00	58,000	-,970	,332	,440[a]	,553	,329
5.9 We monitored scientific and technological developments in our research field closely thanks to the project	5,00	4,00	64,000	-,699	,484	,575[a]	,587	,433
5.10 We set new national collaborations	2,00	2,00	68,000	-,532	,595	,672[a]	,635	,390
5.11 We set new international collaborations	5,00	5,00	79,500	-,065	,948	,960[a]	1,000	,721
6.15 We made other multinational project applications with the same partners in the consortium	2,00	2,00	67,500	-,764	,445	,648[a]	1,000	,591
6.10 M.Sc. theses were completed thanks to the project	2,00	2,00	76,500	-,416	,678	,880[a]	1,000	,848
6.11 PhD theses were completed thanks to the project	2,00	2,00	70,500	-,435	,664	,723[a]	1,000	,567
5.4 We gained know-how thanks to the project	5,00	5,00	60,000	-1,006	,314	,483[a]	,568	,422
5.5 We learned new technologies	5,00	5,00	70,500	-,660	,509	,723[a]	1,000	,670
5.6 We transferred new technologies we have never used before	5,00	5,00	71,000	-,408	,684	,749[a]	,910	,529
5.12 We acquired new technological skills	5,00	5,00	58,500	-1,054	,292	,440[a]	,559	,392
6.1 We delivered a prototype	1,00	1,00	73,500	-,547	,584	,801[a]	1,000	,755
6.2 We delivered a new software	2,00	2,00	61,500	-,959	,338	,506[a]	,580	,453
6.3 We delivered a new service	2,00	1,00	64,500	-,682	,495	,575[a]	,599	,460
6.4We delivered a new production process	1,00	1,00	72,000	-,605	,545	,775[a]	1,000	,712
6.5 We delivered a new standard	1,00	1,00	76,500	-,416	,678	,880[a]	1,000	,848
6.6 Our work in the project has been published as an academic paper (journal paper, conference proceedings..)	2,00	2,00	72,000	-,605	,545	,775[a]	1,000	,712
6.7 We acquired new intellectual property rights (IPR)	1,00	1,00	72,000	-,605	,545	,775[a]	1,000	,712

5.13 We acquired new administrative skills	4,50	4,00	67,500	-,557	,577	,648[a]	1,000	,513
5.14 Project increased our participation in national R&D programs like ARDEB, TEYDEB, SANTEZ etc.	2,00	2,00	81,000	,000	1,000	1,000[a]	1,000	,706
5.15 Project increased our participation in international programs like FP7, EURKEA, COST etc.	4,00	4,00	75,500	-,277	,782	,853[a]	1,000	,634
5.16 We acquired new skills in national proposal preparation	4,00	4,00	75,000	-,253	,800	,853[a]	,879	,496
5.17 We acquired new skills in international proposal preparation	4,00	4,00	79,500	-,061	,951	,960[a]	1,000	,671
5.18 R&D awareness in our university has increased	5,00	5,00	70,500	-,435	,664	,723[a]	1,000	,567
5.19 New project ideas triggered thanks to the project	4,00	4,00	75,000	-,302	,763	,853[a]	,951	,631
6.9 Number of post graduate degree staff in our university has increased thanks to the project	2,00	2,00	67,500	-,764	,445	,648[a]	1,000	,591
6.12 New research seats were opened	1,00	1,00	78,000	-,128	,898	,933[a]	1,000	,696

Table B 13 Mean Rank Results for Hypothesis 11 and 12

	Projects History	N	Mean Rank	Sum of Ranks
5.1 Project increased our total R&D spending	Yes	14	32,75	458,50
	No	43	27,78	1194,50
	Total	57		
5.2 Our infrastructure enhanced thanks to the project	Yes	14	34,71	486,00
	No	43	27,14	1167,00
	Total	57		
5.3 Project partnership decreased the risk of our R& D expenses	Yes	14	27,18	380,50
	No	43	29,59	1272,50
	Total	57		
6.13 We bought a new equipment	Yes	14	28,89	404,50
	No	43	29,03	1248,50
	Total	57		
6.14 We opened a new	Yes	14	31,57	442,00

research laboratory	No	43	28,16	1211,00
	Total	57		
5.7 Our university gained prestige	Yes	14	28,32	396,50
	No	43	29,22	1256,50
	Total	57		
5.8 The reputation of our university has increased	Yes	14	30,00	420,00
	No	43	28,67	1233,00
	Total	57		
5.9 We monitored scientific and technological developments in our research field closely thanks to the project	Yes	14	30,00	420,00
	No	43	28,67	1233,00
	Total	57		
5.10 We set new national collaborations	Yes	14	46,57	652,00
	No	43	23,28	1001,00
	Total	57		
5.11 We set new international collaborations	Yes	14	28,82	403,50
	No	43	29,06	1249,50
	Total	57		
6.15 We made other multinational project applications with the same partners in the consortium	Yes	14	33,50	469,00
	No	43	27,53	1184,00
	Total	57		
6.10 M.Sc. theses were completed thanks to the project	Yes	14	30,50	427,00
	No	43	28,51	1226,00
	Total	57		
6.11 PhD theses were completed thanks to the project	Yes	14	35,89	502,50
	No	43	26,76	1150,50
	Total	57		
5.4 We gained know-how thanks to the project	Yes	14	31,93	447,00
	No	43	28,05	1206,00
	Total	57		
5.5 We learned new technologies	Yes	14	32,50	455,00
	No	43	27,86	1198,00
	Total	57		
5.6 We transferred new	Yes	14	41,00	574,00

technologies we have never used before	No	43	25,09	1079,00
	Total	57		
5.12 We acquired new technological skills	Yes	14	32,43	454,00
	No	43	27,88	1199,00
	Total	57		
6.1 We delivered a prototype	Yes	14	30,57	428,00
	No	43	28,49	1225,00
	Total	57		
6.2 We delivered a new software	Yes	14	33,46	468,50
	No	43	27,55	1184,50
	Total	57		
6.3 We delivered a new service	Yes	14	36,39	509,50
	No	43	26,59	1143,50
	Total	57		
6.4 We delivered a new production process	Yes	14	32,11	449,50
	No	43	27,99	1203,50
	Total	57		
6.5 We delivered a new standard	Yes	14	31,57	442,00
	No	43	28,16	1211,00
	Total	57		
6.6 Our work in the project has been published as an academic paper (journal paper, conference proceedings..)	Yes	14	32,00	448,00
	No	43	28,02	1205,00
	Total	57		
6.7 We acquired new intellectual property rights (IPR)	Yes	14	32,11	449,50
	No	43	27,99	1203,50
	Total	57		
6.8 We applied for patent(s)	Yes	14	27,50	385,00
	No	43	29,49	1268,00
	Total	57		
5.13 We acquired new administrative skills	Yes	14	33,32	466,50
	No	43	27,59	1186,50
	Total	57		
5.14 Project increased our	Yes	14	34,57	484,00

participation in national R&D programs like ARDEB, TEYDEB, SANTEZ etc.	No	43	27,19	1169,00
	Total	57		
5.15 Project increased our participation in international programs like FP7, EURKEA, COST etc.	Yes	14	32,04	448,50
	No	43	28,01	1204,50
	Total	57		
5.16 We acquired new skills in national proposal preparation	Yes	14	44,50	623,00
	No	43	23,95	1030,00
	Total	57		
5.17 We acquired new skills in international proposal preparation	Yes	14	42,64	597,00
	No	43	24,56	1056,00
	Total	57		
5.18 R&D awareness in our university has increased	Yes	14	31,82	445,50
	No	43	28,08	1207,50
	Total	57		
5.19 New project ideas triggered thanks to the project	Yes	14	31,21	437,00
	No	43	28,28	1216,00
	Total	57		
6.9 Number of post graduate degree staff in our university has increased thanks to the project	Yes	14	33,50	469,00
	No	43	27,53	1184,00
	Total	57		
6.12 New research seats were opened	Yes	14	38,86	544,00
	No	43	25,79	1109,00
	Total	57		

Table B 14 Median Analysis for Hypotheses 11 and 12

	Median 1 (have old projects)	Median 2 (do not have old projects)	Mann-Whitney U	Z	Asymp. Sig. (2-tailed)	Exact Sig. (2-tailed)	Exact Sig. (1-tailed)
5.1 Project increased our total R&D spending	4,00	4,00	248,500	-1,220	,222	,233	,102
5.2 Our infrastructure enhanced thanks to the project	5,00	4,00	221,000	-1,859	,063	,060	,027

5.3 Project partnership decreased the risk of our R&D expenses	4,00	4,00	275,500	-,555	,579	,571	,300
6.13 We bought a new equipment	2,00	2,00	299,500	-,039	,969	1,000	,618
6.14 We opened a new research laboratory	1,00	1,00	265,000	-1,725	,084	,146	,146
5.7 Our university gained prestige	5,00	5,00	291,500	-,216	,829	1,000	,536
5.8 The reputation of our university has increased	5,00	5,00	287,000	-,306	,759	,945	,474
5.9 We monitored scientific and technological developments in our research field closely thanks to the project	5,00	5,00	287,000	-,299	,765	,946	,475
5.10 We set new national collaborations	4,00	2,00	55,000	-5,225	,000	,000	,000
5.11 We set new international collaborations	5,00	5,00	298,500	-,056	,955	1,000	,598
6.15 We made other multinational project applications with the same partners in the consortium	2,00	2,00	238,000	-1,849	,064	,095	,063
6.10 M.Sc. theses were completed thanks to the project	2,00	2,00	280,000	-1,006	,314	,568	,422
6.11 PhD theses were completed thanks to the project	2,00	1,00	204,500	-2,073	,038	,062	,035
5.4 We gained know-how thanks to the project	5,00	5,00	260,000	-1,019	,308	,478	,258
5.5 We learned new technologies	5,00	5,00	252,000	-1,598	,110	,176	,122
5.6 We transferred new technologies we have never used before	5,00	4,00	133,000	-3,553	,000	,000	,000
5.12 We acquired new technological skills	5,00	5,00	253,000	-1,167	,243	,312	,208
6.1 We delivered a prototype	1,00	1,00	279,000	-,832	,405	,587	,357
6.2 We delivered a new software	2,00	2,00	238,500	-1,594	,111	,152	,103
6.3 We delivered a new service	2,00	1,00	197,500	-2,218	,027	,033	,025
6.4We delivered a new production process	1,00	1,00	257,500	-1,517	,129	,151	,151
6.5 We delivered a new standard	1,00	1,00	265,000	-1,725	,084	,146	,146
6.6 Our work in the project has been published as an academic paper (journal paper, conference proceedings..)	2,00	2,00	259,000	-1,465	,143	,319	,168
6.7 We acquired new intellectual property rights (IPR)	1,00	1,00	257,500	-1,517	,129	,151	,151
5.13 We acquired new administrative skills	5,00	4,00	240,500	-1,295	,195	,230	,159
5.14 Project increased our participation in national R&D programs like ARDEB, TEYDEB, SANTEZ etc.	2,00	2,00	223,000	-1,918	,055	,037	,023
5.15 Project increased our participation in international programs like FP7, EURKEA, COST etc.	4,00	4,00	258,500	-1,110	,267	,198	,113

5.16 We acquired new skills in national proposal preparation	5,00	4,00	84,000	-4,754	,000	,000	,000
5.17 We acquired new skills in international proposal preparation	5,00	4,00	110,000	-4,047	,000	,000	,000
5.18 R&D awareness in our university has increased	5,00	5,00	261,500	-,849	,396	,539	,294
5.19 New project ideas triggered thanks to the project	4,00	4,00	270,000	-,809	,419	,309	,152
6.9 Number of post graduate degree staff in our university has increased thanks to the project	2,00	2,00	238,000	-1,849	,064	,095	,063
6.12 New research seats were opened	2,00	1,00	163,000	-3,062	,002	,004	,003
6.8 We applied for patent(s)	1,00	1,00	280,000	-1,006	,314	,568	,422

ODTÜ
ENFORMATİK ENSTİTÜSÜ

YAZARIN

Soyadı : Öktem

Adı : Duygu

Bölümü : Bilişim Sistemleri

TEZİN ADI (İngilizce) : Impact Analysis of European Framework Programmes on Turkish Universities : Pilot Study on Information and Communication Technologies, Energy, Food, Agriculture and Fisheries and Biotechnology Themes

TEZİN TÜRÜ : Yüksek Lisans X Doktora .....

1) Tezimden fotokopi yapılmasına izin vermiyorum ☐

2) Tezimden dipnot gösterilmek şartıyla bir bölümünün fotokopisi alınabilir ☐

3) Kaynak gösterilmak şartıyla tezimin tamamının fotokopisi alınabilir [X]

Yazarın imzası ..... Tarih 28.09.2012