# HEIDEGGERIAN UNDERSTANDING OF MODERN SCIENCE: THE CASE OF EUROPEAN RESEARCH AREA

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## ABSTRACT

HEIDEGGERIAN UNDERSTANDING OF MODERN SCIENCE: THE CASE OF EUROPEAN RESEARCH AREA

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This thesis undertakes the analysis of European Research Area on the basis of Heideggerian conception of modern science. In 2000, European Research Area is initiated by the members of European Union in the light of European policies on knowledge production. European Commission establishes this area on the purpose of creating a large, active and common area where production, circulation and communication of scientific knowledge and researchers are ensured Based on the analysis of official documents of Commission, this study, instead of reading this process as a neoliberal attempt to change the knowledge production process in terms of predominant market relations, discusses these EU policies on knowledge and knowledge production in accord with the Heideggerian understanding of modern science, that is, within the context of a distinct and unified epoch.Thus, European Research Area is scrutinized with regard to three foundational characters of modern science: (1) its institutionalized and (2) specialized character, and (3) its researcher. This thesis asserts that European Research Area is established and furthered by modern science as a specific and unified historical intelligibility which bases the understanding of what and how entities are in modern age.

**Keywords**: European Research Area, Heidegger, modern science, institutionalization and specialization, researcher.

# ÖZ

HEIDEGGERCİ MODERN BİLİM ANLAYIŞI: AVRUPA ARAŞTIRMA ALANI ÖRNEĞİ

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Bu tez, Avrupa Araştırma Alanı'nı Heidegger'in modern bilim anlayışı temelinde analiz eder. Avrupa Araştırma Alanı, 2000 yılında, Avrupa Birliği üyeleri tarafından, Avrupa'nın bilgi üretimi üzerine politikaları ışığında başlatılmıştır. Avrupa Komisyonu, bu alanı bilimsel bilginin ve araştırmacıların üretimi, dolaşımı ve iletişiminin sürdürüldüğü geniş, aktif ve ortak bir alan olarak kurmuştur. Komisyon'un resmi dokümanlarının analizine dayanan bu çalışma, Avrupa'nın bilgi ve bilgi üretimi üzerine olan bu politikalarını, baskın market ilişkilerine uygun olarak bilgi üretim sürecini değiştirmeyi amaçlayan neoliberal bir girişim olarak okumak yerine, modern bilimin Heideggerci anlayışı temelinde, yani, ayrı ve bütünleşik bir çağ bağlamında tartışır. Avrupa Araştırma Alanı modern bilimin üç kurucu özelliğine dayanarak incelenmiştir: (1) kurumlaşmış ve (2) uzmanlaşmış olması ve (3) modern bilimin araştırmacısı. Bu tez, Avrupa Araştırma Alanı'nın, şeylerin modern çağda ne ve nasıl olduklarını belirleyen özgün ve birleşik bir tarihsel anlaşılabilirlik olarak modern bilim tarafından kurulup, sürdürüldüğünü iddia eder.

**Anahtar Kelimeler:** Avrupa Araştırma Alanı, Heidegger, modern bilim, kurumsallaşma ve uzmanlaşma, araştırmacı.

*To my family…*

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# CHAPTER I

# INTRODUCTION

## 1.1.Research Problem

> The year is 2030. Open science has become a reality and is offering a whole range of new, unlimited opportunities for research and discovery worldwide. Scientists, citizens, publishers, research institutions, public and private research funders, students and education professionals as well as companies and citizens from around the globe are sharing an open, virtual research environment, called the Lab. Open source communities and scientists, publishing companies and the high-tech industry have pushed the EU and UNESCO to develop common open research standards, establishing a virtual learning gateway, offering free public access to all scientific data as well as to all publicly funded research. The OECD (which now includes Brazil, India, China and Russia), as well as many countries from Africa, Asia and Latin America have adopted these new standards, allowing users to share a common platform to exchange knowledge at a global scale. High-tech start-ups and small public-private partnerships have spread across the globe to become the service providers of the new digital science learning network, empowering researchers, educators and students worldwide to share knowledge by using the best available technology. Free and open, high quality and crowdsource science, focusing on the grand challenges of our time, shape the daily life of a new generation of researchers. (European Commission, 2015c, p.1)

This is a part from the official document of European Commission and describes the possible and desirable scenario for the future of collaboration and integration in the field of research and innovation in European Union and the wider part of the world in 2030: to create a common area where production and dissemination of scientific knowledge is proceeded and also where collaboration and exchange between academics and their mobility are achieved in order to strengthen the scientific quality, excellence and impact at European and world-level. Then, the important question arises: what is the main drive of EU for the desire of such collaboration and integration? Why does European Union put knowledge and knowledge-production on its agenda, at the center of its policy-reform?

In one of its Communication, Commission of European Communities gives the following answer: "Even more so than the century that has just finished the XXIst century we are now entering will be the century of science and technology. More than ever, investing in research and technological development offers the most promise for the future" (2000, p. 4). Thus, European Commission's strong motivation for policy reform and implementations about research emerges upon their belief in the importance and decisiveness of knowledge in, what they call knowledge-based society. Through the creation of new products, processes and markets, Commission says, "research and technology provide one of the principal driving forces of economic growth, competitiveness and employment" (2000, p. 5). Hence, the production, acquisition and use of knowledge and its different forms are, for Commission, essential for economic and social development.

Thus, with the aim of achieving such an ideal position for science and innovation, and in turn, increasing "Europe's research and development effort to the 3% of the GDP", European Union, in 2000, have launched the process of the creation of a European Research Area (ERA)[1]: "a unified research area open to the world based on the Internal Market, in which researchers, scientific knowledge and technology circulate freely and through which the Union and its Member States strengthen their scientific and technological bases, their competitiveness and their capacity to collectively address grand challenges" (European Commission, 2012a, p.3). It is a common European scientific community which aims the promoting and facilitating cooperation of fragmented, isolated and compartmentalized national research efforts and systems at European level in order to produce, disseminate and communicate scientific knowledge.

Correspondingly, in the last decade, Bologna Process, and especially the process of the establishment of a European research area, because of its enormous influences on state-policies, researchers and other stakeholders, has been very popular in academic

[1] European Research Area is the policy reform proceeded through and in cooperation with Bologna Process. It is Bologna Process's one of the two constitutive parts: European Higher Education Area and European Research Area.

studies. This process, its implementations and the expected and realized outcomes have been studied from several disciplinary perspectives. However, there are mainly two predominant approaches; and one of these approaches studies this process from neoliberal perspective while the other takes critical position to these, what they call, neoliberal policies.

Respectively, neoliberal perspective claims that the predominant market tendencies should be determinant in the policy-making process of state and thus, the state should be reconfigured in terms of market-interests. This reconfiguration is, for this perspective, is crucial especially in a society where knowledge is thought as a driver for economic growth, development and competitiveness for nations under globalized market relations. Thus, the purpose behind the establishment of ERA should be the advancement of applied and fundamental sciences, excellence and research-quality through improving the competition, and also the collaboration and integrity of research and innovation activities and researchers at European level.

On the other hand, critical approaches to these neoliberal policies agree with the conceptualization of Bologna Process as the European policy reform process about research, rearranging knowledge and knowledge production with the market terms. Through this process, this critical perspective states, knowledge is financialized, that is, turns into market-value good, an output of science and technology, and spontaneously an input ready to be used in capitalist production process. University also experiences a great transformation through this neoliberal policy-reform process, and become a commercially-driven corporation. Moreover, according to Moutsios (2012), one of the critical thinkers, this market-driven characteristic of Bologna Process causes academics to lose their autonomy and transforms them into human resources with pre-determined quality ready to be exploited in the activities of research and innovation.

Even if these two dominant approaches seem opposite to each other, there is a common point in all these studies that they all claim that Bologna Process [should or does] lead knowledge, its production, and scientist into significant transformation.

Particularly, while one proposes these policies as something that has to be, the other claims what is happening and criticizes it. In common, both perspectives talk about a break from previous position because the world experiences a change in economic policies and this new predominant market relations and neoliberal policies determine all relation, and in our case, state-policies about knowledge and knowledge-production.

In this thesis, unlike those approaches, I analyze European Research Area, as EU policies on knowledge and knowledge production, with the light of Heideggerian conception of modern science; thus, understand these policies within the context of a distinct and unified epoch, of modern age which was initiated by Descartes's separation of the subject from the external world and by his placement of this subject at the center of subject-object relation as the constituent and representative of the object and their relationality. Instead of reading this process as a consequence of changing economic relations after 1970s, Heidegger's understanding of modern sciences enables us to scrutinize ERA on the ground of a specific and unified historical intelligibility which bases our understanding of what and how entities are, of reality (economic relations are also included).

Accordingly, the main concern and question of this research is as following: Are the EU policies on knowledge and knowledge production in accord with the Heideggerian conception of modern sciences? Thus: Does the modern science, as the decisive understanding of what and how entities are in modern age, experience a change in ERA, or does it still preserve and further itself through necessarily preserving its three essential characters: its (1) institutionalized and (2) specialized character, and (3) its researcher? Consequently, ERA, in this thesis, is conceptualized and understood as an institution of modern sciences which is essentially constituted by and in turn constitutes modern sciences, and which necessarily preserve these sciences' specialized character through its research projects about specific research topics and through particular object domains. Moreover, researchers are also

established in ERA in terms of the criteria determined fundamentally with the aim of making secure and promoting modern science as research.

In a more comprehensive way, I will use Heidegger's conceptualization of modern science as a tool to understand the condition of knowledge production in European Research Area. Through putting documentary analysis at the center of my analysis as the exclusive method, I will deeply investigate the official documents of European Commission from the point of view of Heideggerian understanding of modern science. Accordingly, because modern science, for Heidegger, establishes the truth and knowledge in the modern age, it is essential for understanding the rationality of this epoch. In the age what Heidegger calls *modern* and which is distinctively determined by representational thinking- i.e. modern science, the world necessarily turns into picture: the world stands before subjects as picture, and in which all things are established as the objects of this subject and stand together (Heidegger, 1977a, p.129)[2]. Because of the subject's capability of measuring and executing, and its desire to control and master over the nature, modern science becomes decisive in modern age, and thus, through experiment as its decisive methodology, sets upon, hold sways, controls and masters over nature. Thus, this representational character of thinking, the objectifying whatever is founds modern science as research; and modern science as research in modern age has some essential characters to ensure and promote itself.

Accordingly, Heidegger first states that scientific research is necessarily ensured in institutions. Because of its fundamental character as ongoing activity, it should be maintained and promoted in a scientific community. Because the dissemination,

[2] "Where the world becomes picture, what is, in its entirety, is juxtaposed as that for which man is prepared and which, correspondingly, he therefore intends to bring before himself and have before himself, and consequently intends in a decisive sense to set in place before himself […]. Hence world picture, when understood essentially, does not mean a picture of the world but the world conceived and grasped as picture. What is, in its entirety, is now taken in such a way that it first is in being and only is in being to the extent that it is set up by man, who represents and sets forth. Wherever we have the world picture, an essential decision takes place regarding what is, in its entirety. The Being of whatever is, is sought and found in the representedness of the latter." (Heidegger, 1977a, p.129-130)

communication, use and reuse of knowledge become possible only in a common scientific community, sciences are necessarily proceeded in various scientific communities. The continuous and increasing control over and mastery of nature becomes possible only in this way. Respectively, in the first chapter of my analysis, I examine the European Research Area on the basis of this institutional character of modern sciences, and claim that ERA, as a European scientific community, is established because of the very character of research as ongoing activity. I will demonstrate ERA's institutionalized character by, first, showing that ERA's stakeholders and members already have institutionalized character, and so, the researchers and science in modern age, and in my case in ERA, exist only when it is ensured in a scientific community. In the second part of this chapter, I will especially focus on various structured and institutionalized initiatives of ERA in order to show the institutionalized character of ERA. Each of these initiatives, through various legal, normative and administrative arrangements about some aspects of ERA, provides the existence and maintenance of ERA.

In the second chapter of my analysis, I will investigate other essential feature of modern science as specialized activity. Because the objectification process and the control of nature necessitate the delimitation of object area, modern sciences are fundamentally specialized. These specific, foundational objective projections of nature essentially bring out specialized sciences.

> For Heidegger, the essence of modern research consists in a projection (reissen: tearing, sketching out, or design) of beings out of a phenomenological totality and a making present of those beings as empirical entities within a structure or system of knowledge (that is, as particular species of bird or plant, particular behaviors, particular types of men, and so on). (Day, 2001, p. 96)

Thus, these demarcated domains of objects establish certain research division and constitutes today's disciplines. Accordingly, in the second part of my analysis, I specifically look into ERA with the aim of searching whether specialized character

of research holds sway. In this sense, I will explain the internal and networked specialization, and interdisciplinarity in ERA's discourse with the Heideggerian perspective of modern sciences.

In the last chapter of my analysis, I focus on the modern science's other essential character: its researcher. Parallel with the Heidegger's conception, researchers, in ERA, are defined as "professionals engaged in the conception or creation of new knowledge, products, processes, methods and systems, and in the management of the projects concerned" (Commission of European Communities, 2003, p.6). They are essentially professionals because of the science's two foundational characters as ongoing and specialized activity. Researcher is specialized through specific education, and thus socialized and joined in a scientific community through this specific training.

Moreover, in ERA, researchers are conceptualized as human resources which should be produced through specific education in accordance with the qualifications predetermined according to the foundational characters of research as specialized and ongoing activity, and become standing-reserve[3], ready to be used when they are needed. That is, researcher "is ordered to stand by, to be immediately at hand, indeed to stand there just so that it may be on call for a further ordering" (Heidegger, 1977a, p.17). Therefore, while this recognition of researchers as human resources determines the main drive for the objectives and actions of ERA, their essential establishment as professionals constitutes the areas of EU policies about researcher: now the only and main objective of ERA about researcher is the increasing their number, stock of human resources through various actions: including women in research profession, developing open, transparent and merit-based recruitment procedures, rearranging research education and training in order to increase its attractiveness to young people, enhancing the working conditions in research

[3] Standing-reserve is closely linked with the instrumentality. Now, the nature and human beings exists for something, rather than having value in themselves.

profession, advancing the collaboration between academia and non-academia, and finally improving the international and inter-sectional mobility.

Finally, I conclude my thesis by mentioning the *enframing* which is the essence of science and also technology in modern age and provide plentiful source to understand and predict the possible conditions and realities about the future of the age in general and the characters of modern sciences in particular.

### 1.2. Debates on Knowledge and Research in Bologna Process

Bologna Process has been very popular in academic studies in the last decade. Thus, enormous literature exists on this process and approaches this issue from different disciplinary perspectives. With this context, the progress of the Process, its implementations, and its expected and realized policy outcomes for member states are studied. Throughout these academic works, the lack of an analysis of the condition of knowledge in the Process within the context of the distinct and unified historical epoch that grounds our understanding of reality (social reality is also included) is noticeably seen. In other words, in these investigations, the question how knowledge, - also its production and scientist- is constructed through Bologna Process is never asked on the unified and foundational ground that determines both beings and knowledge.

Before deepening into my analysis of the condition of knowledge and its production in Bologna Process, I aim to review the literature about this phenomenon in order to show what has been studied about this issue, and how it is conceptualized by different disciplinary approaches.

#### 1.2.1. Neoliberal Perspectives on Research Policy Reforms

Neoliberal perspective represents a set of ideas which had become popular in the 1970s, and have been directly connected to “the economic policies introduced by Margaret Thatcher in the United Kingdom and Ronald Reagan in the United States”

(Jones &Parker & Bos, 2005, p.100). The prefix “neo” signifies its newness: “it is an updated version of older ideas about 'liberal economics' which has long argued that markets should be free from intervention by the state.” (Jones &Parker & Bos, 2005, p.100) Extensive economic liberalization policies (such as privatization, deregulation, free trade, enhancement of the role of private sectors in the economy through reductions in government expenditures…) is supported by its advocates. While liberalism makes a division between state and society (market); and presents states as an outsider to the market, neoliberalism reconceptualizes state’s role as “creating appropriate market by providing the conditions, laws and institutions necessary for its operation” (Olssen & Peters, 2005, p. 315) Thus, the state should be reconfigured in terms of market-interests and also encouraged to privatization which is followed by deregulation and competitiveness (Friedman, 1980, p.26). As Graham Burchell states:

> …the rational principle for regulating and limiting governmental activity must be determined by reference to artificially arranged or contrived forms of free, entrepreneurial and competitive conduct of economic-rational individuals (Burchell, 1996, pp. 23-24)

In this context, the predominant market tendencies should be determinant also in the policy-process of a state. Knowledge is included to the agenda of capitalist production at both national and international level via discourse relating to the knowledge society, the enterprise society (Brancaleone &O'Brien, 2011, p. 509), and more often the knowledge society (Powell &Snellman, 2004, p. 200). According to this perspective, knowledge is and will be “a driver for economic growth, development, or improved competitiveness for nations under globalized market conditions” (Patrick, 2013, p. 2) Thus, reforms on research policies should be done in order to have the most competitive and dynamic knowledge-based economy. Under this market-driven logic, research should be commercialized in terms of three principles: “deregulation, competitiveness, and privatization” (Yang &Huang, 2016, p.82). This means that knowledge and research should be reconfigured with the aim of economic growth by enhancing the quality and efficiency of Research and

Development (R&D), and with more R&D outputs. In order to increase this quality and efficiency of R&D, some political implementations should be established: first of all, an open and free market for researchers should be created in order to have "genuine European research labour market" where researchers can freely move, compete and co-operate across borders and can find extensive funds for their research projects and also where knowledge can freely circulate. (European Commission, 2014c, p. 45). This implementation brings along the second one with it: the stakeholders. In Bologna Process, according to this approach, the interaction and interdependence of science, business and other societal actors to each other has great importance: The Research and Innovation (R&I) is the way to achieve economic growth and job creation; and so the enhancement of R&I chain (which consists of industry, universities, other research performing organisations (RPOs), Research and Technology Organisations (RTOs) and regional/national public actors) should be one of the main implementations of this Process. The funding of researches by these stakeholders will increase the quality and efficiency of research; and as a result of this increase, with the cooperation of stakeholders, the scientific knowledge's circulation in open space and its use by stakeholders in economic development will rise.

In short, in order to have the most competitive and dynamic knowledge-based economy, the purpose of the establishment of European Research Area (ERA), through the European research policy, should be the enhancing the applied science, the establishing the basis for nations in order "to carry out their research policies, including the advancing fundamental science and excellence", the boosting quality and excellence through competition, and the increasing "integration by encouraging networked projects of several member states" (Dorst, 2016, p. 2)

At the end, these neoliberal approaches to Bologna Process have many supporters, and by analyzing current situation of the Process, they also develop various studies in order to revise and enhance it with the more neoliberal perspectives.

### 1.2.2. Critical Perspectives on Neoliberal Research Policy Reforms

Like the popularity of the neoliberal approaches to policy-reforms on knowledge and research, the critical perspectives to these neoliberal policies have also been very widespread in the last decade. According to one of these critical thoughts, university, as an institution and as a concept, undergoes a huge transformation with the incredible increase in commercialization in 2000s. Bologna Process, as the European policy-reform process about university, means the restatement of knowledge and knowledge-production practices with the market terms. Through this Process, university who was once producing knowledge for market, now itself become a market (Ergur, 2016, p. 151) This marketizing of knowledge-production triggers some changes which are twofold: on the one side, this causes the transformation of practices in academia through: increase in focus on research evolution and accountability, sudden rise in university-industry cooperation, great use of Information and Communication Techniques, internationalization of research, professionalization of researcher, the essentiality of publishing in best scientific journals, the increase importance of quality and excellence, "the patenting of university research outputs" (Shore &Taitz, 2012, p.204). On the other hand, these institutional transformations cause also the transformation in discourse of this issue: "networking", "evaluation", "quality (control)", "benchmarking", "spin-off", "(research) market", "(knowledge) production" … are all common in university campuses. (Gaspard &Založnik, 2011, p.205)

Thus, according to this critical perspective, the projects of European education reform and knowledge production are dominated by the neoliberal discourse. European Higher Education Area and European Research Area, "as constituent pillar of the 'Europe of Knowledge', rely heavily on market-driven economic rationale which favors the liberation of markets, in tandem with regulations from the World Trade Organization and the General Agreement on Trade in Services for education services" (Yang &Huang, 2016, p.83). In other words, within this context established under the global and competitive market conditions, the universities are reconceptualized and redefined by this neoliberal discourse "as institutions

embedded in a global Knowledge Economy that establishes competitiveness between universities as an explicit goal" (Gaspard &Založnik, 2011, p.203) Commercialization of research and higher education now becomes determinant more and more in university activities which are at the center of university policies and strategic plans; and redefine "the mission of the modern global university" (Shore &Taitz, 2012; Etzkowitz, 2003; Dale & Robertson, 2009).

In this sense, behavioral pattern of universities who act like business manager is expected to be the same with the commercially-driven corporations. As a result of this type of knowledge economy, knowledge is "financialized" as a market-value good, as an asset with economic potential" (Foray, 2004, p. 24) In other words, knowledge, the main product produced in these universities, is commoditized in its absolute term: it turns into "marketable research products" (Hearn, Cunnigham & Ordoñez, 2004, p. 189) In short, neoliberal pragmatism, by reducing university to the functional tool of commercial mentality, brings a new order through which knowledge can be expressed in terms of its exchange-value. It now transforms to the output of science and technology (Narin, 2011, p.2) and being ready to participate in capitalist production process as an input produced with the aim of being efficient and by neglecting the unique inquisitive nature of knowledge-production.

The other outcome of these neoliberal policy-reforms on university, as Ergur states, is the domination of the scientist and its activities in a systematic way (2016, p. 151) This market-driven characteristic of the Bologna Process causes academics to lose their autonomy and be "disable from deciding, not only about the governance of their institutions, but also about their research". Moutsios states that because universities become part of EU's "knowledge industry", academics lose their feature of being independent; and turn out to be human sources, or "brainpower". (2012, p. 14) Now, university, with the significant development and dissemination of Bologna Process, leaves the modernity's intellectual ideals and meets with the short-term commercial logic of market. In other words, university, in an environment reconstituted by the neoliberal policies, favors "short-term benefits over academic quality and long-term

developments" (Kıyak, 2013, p.92); and in such an environment, intellectuals are "transformed into workers in the knowledge-production industry" (Tomusk, 2006, p.150)

Moreover, Moutsios claims that, in the Bologna Process, there is hierarchy between "non-useful" (non-profitable) knowledge and "useful" (profitable) research and this forces academics to work for the interest of market (2012, p. 14) The consequences of the academics' obligation to sell off their research, as this perspective puts, are obviously seen in science. Once science was neutral, as Pain states, but now it has "an array of paymasters to please". "In place of impartiality, research results are being discreetly managed and massaged, or even locked away if they don't serve the right interests" (Pain, 1997) In addition to the restrictions dictated by external agencies, academics should also follow bureaucratic rules and decision-making process. As a result, they are institutionally obstructed from knowledge-production process (in accordance with their own intellectual interests and judgement), and are obliged to produce marketized and bureaucratized knowledge.

In other critique on this policy-process, standardization and quantification of knowledge-production is problematized. Through the Bologna Process which progresses with the mentality of capitalist market -acting with the principle of minimum cost-maximum profit-, scientific activity is dominated by the methods and concepts of applied sciences (Sheldon and Hsue, 2015, p.19). As the natural products of the modern age, applied sciences divide nature into measurable pieces and predict the outcomes because the very precondition of their existence is their capacity of producing industrious knowledge providing technical progress. Currently, with the monstrous expansion of finance capitalism, processing of information instead of physical commodity, and the idea of transforming the world to an integrated market have become dominant and every action is started to be defined in the context of absolute pragmatism. In such an environment, Bologna Process is understood as a step to be a part of this global, flexible capitalism. (Ergur, 2016, p. 158) And the effort to reconfigure activities of all scientific disciplines in terms of applied

sciences' measurements is the consequence of this economic transformation. The notion of establishing European Research Area as the only and the common space for knowledge production and circulation serves the idea of this new form of capitalism. In the world where knowledge is standardized with the mission of serving to this economic system, local dynamics of its production is expected to be disappeared in a large scale.

As an example, one of the implementations of this standardization process has been European Credit Transfer System (ECTS): It means the standardization of "planning, delivery, evaluation, recognition and validation of qualifications and units of learning" (European Union, 2009, p. 11); and is mostly determinant in the process of acceptance to a master or doctoral program. The language of a research also gets its share from this standardization-process: the language which becomes widespread in applied sciences as a result of its methods and concepts dominates knowledge production of all scientific disciplines. The foundation reason under this implementation is the will to produce knowledge which can easily be adapted to the market. The other aspect of standardization of publication language is the dilemma of mother tongue-foreign language (Ergur, 2016, p. 164). The domination of English in the production of scientific articles is clearly seen; and it is all about the creation of a common space where knowledge circulation becomes possible. New scientific qualification criteria make "citation" also a major element in this process: it causes changes in both quantity and quality of citation. While it determines the academic journals (scanned by international citation indexes) in which scientific articles can be published, the number of citation (at least, the determination of its lower limit) is also stated at the very beginning of scientific activity.

"The adoption of a system of easily readable and comparable degrees, the adoption of a system essentially based on bachelor/master's degrees, the establishment of a system of credits, and the promotion of European cooperation in quality assurance and lifelong learning", as Haukland states, are included to Bologna Process with the demands of standardization "in order to build a uniform market of knowledge in

Europe" (2014, pp. 12-13) This standardization process causes the disappearance of locality and diversity of knowledge in terms of both distinct scientific disciplines and different nations.

At that point, I also want to mention one more crucial approach that criticizes Bologna Process in the perspective of post-colonialism.

In general, internationalization of research is conceptualized in two ways: Americanization and Europeanization. If the changes in research is studied from capitalist perspective, this Process is analyzed as a political structure which integrates commodification and socialization (Cafruny & Ryner, 2007, p. 147) It is named as Americanization because "the strong presence of the US in the structural dynamic of the Bologna Process" and appearance of international research determined by market demands are constitutive of this policy-reform. The knowledge now begins to be regarded and constructed as a commodity, or an input produced to be used in capitalist production. This is accomplished "through standardization processes and contents" bringing out "neoliberal strategies" which follow the globalization process and replace the policies of welfare state with the notions of market (Figueroa, 2010, p. 248). Implementations of European Credit Transfer System (ECTS) and Diploma Supplement (DS), the use of English as a common language, the dominance of quality and excellence in policy-discourse, the hegemonic appearance of methods and language of applied sciences on all kinds of scientific activities are shown as examples of this Americanization Process. However, I should also note that the understanding of Bologna Process as an Americanization of both higher education and research, in general, comes generally from the continental studies (Borghans & Cörvers, 2010; Mollis, 2001); however, scholars both from Continent and beyond its border conceptualizes this policy-process also as Europeanization (Dorst, 2016; Kaya, 2015; Tampayeva, 2015; Maassen & Musselin, 2009)

Accordingly, post-colonial study, which has emerged in the 1990s in Great Britain and US and predominated in the field of cultural studies, concerns the social, cultural

and political relations of colonized and colonizer. What is common in all these approaches is that they all "oppose[s] to the notion of a universal validity of Eurocentric or Western norms, challenging imperialistic and hegemonic discourses and critically examining the discursive creation of "other," as inferior" (Kriebernegg, 2011, p. 21) Thus, cultural concepts are questioned, and division of cultural systems into binary oppositions -such as "Occident" and "Orient"- are contradicted by this post-colonial approaches. Edward Said, about this issue, presents useful theoretical and methodological framework. In the preface of his Orientalism, he indicates the relationship and dependence between power-relations and knowledge production (2003, xxix). In that sense, the analysis of EU and its policies can be proceeded by using these post-colonial tools.

Bologna Process, according to this perspective, is conceptualized as a policy-reform started and pursued in order to reproduce and reinforce Europe as a common space for knowledge production and education. This creation of a common space for research and higher education is seen as a hegemonic process "based solely on Eurocentric discourse, a post-colonialist strategy" (Figueroa, 2010, p. 248). It is Europeanization of university practices because in this process, European model is recognized as an appropriate, even an ideal one in the internationalization of knowledge production and higher education, especially in the collaboration within the European Union (Gacel-Avila, 2005, p.269) It is the diffusion of European values and culture as universal and ideal ones. Ideas, norms, opinions and values underlying this process provide the reproduction and reinforcement of Europe as a hegemonic power.

These policies have several impacts on students, and academics, and also the content, design and the quality of research. In other words, these realities about university (higher education and research) are constructed and grasped by language which is "vehicle for hegemonic practices" (Figueroa, 2010, p. 254). Processes of inclusion and exclusion are embraced by these practices. In this context, the creation of common space for knowledge production is achieved through the construction of a

strong European Bologna discourse. Realities, in this Process, is created through "European eyes" by excluding "other developing parts of the world" (Figueroa, 2010, p. 254).

Thereupon, the unidirectional mobility of researchers and knowledge from periphery to center (from non-Europe to Europe), the determination of curriculum, ECTS, and Diploma Supplement according to European model, the use of English as the only common language, reconfiguration of knowledge-production process with the criteria and values of Europe, and many others are all practices of European hegemonic process.

### 1.2.3. Contribution of this Study

At that point, I want to emphasize on these approaches in critical way and show the necessity of a fresh perspective to this issue by locating my study within the context of this existing literature. First of all, there is the common point in all these studies that they all claim that, through the Bologna Process, knowledge, its production, and scientist [does or should] experience a significant transformation. In a more detail way, neoliberal perspective states that "universities, in order to really fuel the economy, should cooperate more closely with business" (Hyvönen, 2013, p. 97) because the integration of education, research and innovation is seen as a powerful driver for economic growth, "an urgent and radical reform" on "the purposes of universities, the criteria for quality and success, the kinds of research to be produced, and for whom" is needed (Olsen & Maassen, 2007, p. 3) On the other hand, critiques to this neoliberal approach also begin their analysis with the presupposition that knowledge -its production and academics, with the neoliberal policy-reforms on universities, transform in a crucial degree: with changing meaning of knowledge as an input for capitalist production in both national and international level, research as a dominant form of knowledge production also acquires capitalist characteristics. Furthermore, this changing situation of knowledge and research, according to this perspective, also changes the nature of academics who loses their autonomy on the decisions about both governances of their institutions and their research and turns

into workers of knowledge-production industry. Postcolonial studies on this issue also talk about the change: the locality and diversity of knowledge disappears with the internationalization and standardization of knowledge production by policy-reforms provided and implemented by Eurocentric discourse and post-colonialist strategies.

However, in this thesis, unlike those approaches, I analyze the condition of knowledge, its production in European Research Area within the context of a distinct and unified historical epoch that ground our understanding of the reality (economic, political, social etc. all realities are included). By investigating the European Research Area on the basis of [Heidegger's conceptualization of] modern sciences' three constitutive characters -institutionalized and specialized character, and its researcher-, in this study, I state that European Research Area, as a scientific community at European level, is essentially an institution of modern sciences and necessarily founded because of its fundamental character as ongoing activity, and with the aim of making secure and promoting modern sciences.

Moreover, through particularly looking into ERA's objectives and actions about specialization -particularly internal and networked specialization, and inter-disciplinarity, I demonstrate also the continuation of knowledge production necessarily with its specialized character: the knowledge and its production in ERA is fragmented into disciplines. The research projects of ERA are evidence of this particularized feature of modern sciences because they necessarily delimit their object-domain and studies particular issues from particular perspectives.

Lastly, I point out that researcher preserves its professional character in ERA and as a member of scientific community, is produced in terms of two constitutive features of research: while specialized character necessitates the specialization of scientist, research as ongoing activity requires the training and preparation of researcher for and in scientific community.

Consequently, at the end, I assert in this thesis that modern science as the decisive and constitutive understanding of what and how entities are, the intelligibility of modern age, enables European Research Area as an institution of modern sciences where its individualized character and also its researcher are essentially made secure and endured. Thus, European Research Area is not a result of changing economic relations constituted with the aim of transforming the nature of knowledge and knowledge production in favor and for the service of predominant market relations. Rather, its establishment is essentially preconditioned by the continuation and advancement of sciences as research, as the decisive understanding of what and how entities are in the modern age.

### 1.3. Conceptual Framework and Method

In this thesis, Heidegger's conceptualization of modern sciences will be employed as a tool to analyze the condition of knowledge production in European Research Area. On the basis of this conceptualization, in order to understand how knowledge and its production is constructed in ERA, documentary analysis will be exclusive method of my research. I choose this method because Bologna Process and especially European Research Area is the process which is followed and executed by European Commission under the European Parliament and thus, gathers Member states/Associated Countries on the bureaucratic and legislative ground, its all declarations, communications, meetings, studies etc. are necessarily documented. Thus, the huge amounts of official and also secondary documents are available about this issue and provide great resources for my study.

Moreover, because I benefit from these official documents in a very broad framework, I cannot particularly specify them. However, I scrutinize the documents carefully and I was attentive while collecting documents: I extracted the documents only from the official website of European Commission and from CORDIS (Community Research and Development Information Service) which is "the European Commission's primary public repository and portal to disseminate

information on all EU-funded research projects and their results in the broadest sense"[4].

Accordingly, I will critically discuss the European Research Area through the window of Heideggerian conceptualization of modern science. Then, what does modern science mean for Heidegger? How does he understand and conceptualize it?

Modern science, in Heidegger's philosophy, is conceptualized as the epochal understanding of what and how entities are, the intelligibility of modern age. It signifies the modern epoch in the long history of metaphysics. However, one should note that metaphysics, here, does not mean mere academic discipline, but rather it, as Heidegger puts, shapes our historical understanding of "what is", and by doing this, it makes presuppositions and interpretation of reality possible. It constructs and reconstructs the very understanding of everything by founding the understanding of "what is-ness". All western humanity's comportments towards entities and even towards itself is maintained and guided by this metaphysics. This foundational role of metaphysics operates in the establishment and maintenance of our very sense of intelligibility of all things; ourselves also included.

Correspondingly, modern science is the latest epoch of the distinct and unified intelligibility, the modern way of understanding what and how entities are. Then, what is the modern way of understanding reality? How are entities understood in this modern age?

Again, because modern sciences constitute the truth and knowledge in modernity, Heidegger is preoccupied with them in order to understand the rationality of the modern epoch. Correspondingly, he conceptualizes this age as the age of the world picture, that is, representational thinking is the distinguishing characteristic of modernity, and, in *The Age of the World Picture*, gives a broad definition of representation:

[4] It is from http://cordis.europa.eu/home_en.html

> To represent means here: of oneself to set something before oneself and to make secure what has been set in place, as something set in place. This making secure must be a calculating, for calculability alone guarantees being certain in advance, and firmly and constantly, of that which is to be represented. Representing is no longer the apprehending of that which presences, within whose unconcealment apprehending itself belongs, belongs indeed as a unique kind of presencing toward that which presences that is unconcealed. Representing is no longer a self-unconcealing for . . . , but is a laying hold and grasping of . . . . What presences does not hold sway, but rather assault rules. Representing is now, in keeping with the new freedom, a going forth -from out of itself- into the sphere, first to be made secure, of what is made secure. That which is, is no longer that which presences; it is rather that which, in representing, is first set over against, that which stands fixedly over against, which has the character of object [das Gegen-stiindige]. Representing is making stand-over-against, an objectifying that goes forward and masters. (1977a, Appendix 9, p.149-150)

Thus, Heidegger's ontological understanding of modern science does not let us to conceptualize it as the way of decontextualizing things and seeing them disinterestedly. Instead, science sets upon things to show themselves in a definite and constrained way, objectively. Science sets upon, ensnares, controls and masters over nature by representing it as object. As object, nature "appears and is represented by the scientist as a coherence of forces to be reckoned in advance" (Glazebrook, 2000, p. 107). In modern science, nature is limited to "exhibit itself as an interacting network, i.e., in surveyable series of related causes" (Heidegger, 1977a. p. 168). Nature is the object which is necessarily calculable and secured so the subject, through modern science, becomes able to maintain and promote its control over nature as its object.

In this context, modern representing is different from Greek apprehending. The Greek thinkers apprehend what is, i.e. gathers what is presencing, what opens itself. On the other hand, in modern age "to represent [vor-stellen] means to bring what is present at hand [da Vor-handende] before oneself as something standing over against, to relate it oneself, to the one representing it, and to force it back into this relationship to oneself, as the normative realm" (Heidegger, 1977a, p.131). Entities as objects must comply with the requirements of the modern representative mind.

Hence, human beings put itself into the scientific picture in preeminence over whatever is.

Accordingly, this "setting-before", a representing, is the objectification of whatever is, that makes secure, for human beings as subject, a certainty with regard to objects represented. Representation is the constitutive of science as research, because the representation of nature as calculable coherence of forces establishes the rigor of science as exactitude.

In this sense, modern science, in the modern age, is essentially established in the form of research. Research is the constitutive way of knowing that "establish itself as a procedure within some realm of what is, in nature or in history" (Heidegger, 1977a, p.118). However, one should not confuse this procedure with mere method or methodology. For every procedure essentially and already necessitates "an open-sphere in which procedure moves" (Heidegger, 1977a, p118)

The fundamental event in establishing a science is this opening up of an object sphere, and it is succeeded through projection of "a ground plan of natural events" (Heidegger, 1977a, p.118). This ground-plan, this basis, is the pre-condition for an event in nature in order to become visible. The way knowledge gets into relationship with its object is determined by this projection. This relationality which binds knowing to known is, what Heidegger calls, "rigor". This binding adherence, the rigor of scientific research is exactitude: all events, if they are represented in modern sciences, must be determined beforehand as calculable and controllable. This is why mathematical physics is the normative science of modern age. It is the projection of the nature as quantifiable; and this determines the quantitiveness of science: science measures, researcher calculates.

Correspondingly, this projected plan and "the securing of that plan in the rigor of procedure" are prerequisites for science as research; and they first appear in methodology. Physics, in modern age, proceeds by means of experiment. Rigor of procedure is constituted by experimentation. Heidegger "characterizes modern

science as the a priori formulation of hypotheses which are then tested in experimentation" (Glazebrook, 2000, p.70) Experimental method is, then, a projection of a priori concepts onto nature.

Accordingly, experiment begins with the establishment of a law as a ground. To build up an experiment means "to represent or conceive the conditions" under which "specific series of motions" can be made suitable for being proceeded in its essential progression. It is the determination of conditions under which researcher encounters with a thing through intervention. But law is laid down with regard to the ground plan of the object-sphere: that ground-plan provides a criteria and restrains "the anticipatory representing of the conditions" (Heidegger, 1977a p. 121)

Therefore, experiment, the foundational methodology of modern science, is built up and proceeds on the basis of fundamental law, in order to assert the facts that either affirms the law, or rejects it. The modern research experiment is a methodology concerning the verification or falsification of a law "in the framework, and at the service, of an exact plan of nature" (Heidegger, 1977a, p. 122). For Heidegger, modern science is exact thus the experiment: It is necessary for modern science because it demands accuracy. And since nature is projected as reckonable in research, it employs calculation and measurement. At that point, it is important to note that modern science does not become research through experiment; rather experiment is possible only where knowledge of nature has transformed to research and projected as quantifiable. Thus, since modern physics is mathematical, it should also be experimental. That is, mathematical projection of nature brings with the precondition of necessity of experiment.

Briefly, the foundational characteristic of modern science is, according to Heidegger, the mathematical physical sciences. These sciences establish the standard of being scientific in modernity by designing theory, method, objects, and subjectivity in terms of representation. This form of science has two aspects dominating and

founding other forms of modern knowledge and its production: “quantitative measurement and the systematic relating of objects in logical system of representation” (Day, 2001, p.96)

Herein, Heidegger’s understanding of modern science as the distinct and unified way of understanding and establishing the real in modern age cannot be restricted to philosophical rhetoric, because this conceptualization, especially in his public lecture *The Age of the World Picture (1937)*, has great importance for sociological analysis, both in broader sense, of the age we live, and in narrow sense, of the knowledge and its production.

Relying on this text, with the guidance of Heidegger’s conceptualization of modern science, I want to mention its three crucial characters which are not mere results of this dominant knowledge production. Rather, they are essential foundations of modern science as research. They are necessitated in order to ensure and further research in modern age. I am emphasizing these fundamental features because they will be my grounds on which I will investigate European Research Area. Through looking for these three characters, I will be allowed to scrutinize modern science in ERA.

The first character of modern science is necessarily constituted by its drive, “incessant drive to expand its calculative control over the course of natural events” (Rouse, 1985, p. 85). The methodology, rather than amassing results, is circumscribed by its results and demanded to adjust itself to a new procedure by the help of these results. This essential character of methodology as “having-to-adapt-itself” to its own results as ongoing activity, provides the intrinsic basis for other foundational feature of modern science: its institutional nature. The strengthening and reinforcing of its institutional character, accordingly, means “the making secure of the precedence of methodology” (Heidegger, 1977a, 125) over entities (nature and history) which become objective in research at any given time. The appropriate

solidarity and unity is created for themselves by sciences on the ground of their character as ongoing activity. In this sense, university is the institution that is constituted by and in turn constitutes scientific production. However, it is not an only sole institutions of modern sciences. There are, today, many scientific community where knowledge production is proceeded: research organizations, professional associations, R&D departments of private corporations etc.

In more sociological terms, modern sciences are necessarily established and furthered in scientific community. The continuation of research activities and the dissemination and communication of research results is possible only in a community where knowledge and scientist freely circulate. Accordingly, this institutionalized character of modern sciences requires some arrangements for the making secure of research. But, note that these adjustments and regulations that facilitates the checking and communication of results and further them through new research works are not mere external consequences of modern sciences, but necessarily established because of the essential character of sciences. thus, with the aim of maintenance and promotion of modern science, the arrangement about the training and preparation of human beings as researchers, working conditions, funding opportunities, the execution of science etc. are all necessary.

Second foundational feature of modern sciences is their individualized character. “In research, in Heidegger’s view, there is a prior determination of what counts as an object for a particular science. For example, in the case of physics, the scientific method has a priority over nature, for physics as a specialized science entails the determination in advance what nature is” (Glazebrook, 2000, p.111) In other words, research has individual character because it is “grounded upon the projection of a circumscribed object-sphere” (Heidegger, 1977a, p. 123) Since every individualized sciences progress in its particular projected plan by its distinct means of methodology, its particularization (specialization) is essential. Modern science’s projection of specific realm of objects is fundamental in order to both constitute itself

as research and also differentiate itself from other fields. “Only within the perspective of this ground plan does an event in nature become visible as such an event. This projected plan of nature finds its guarantee in the fact that physical research, in every one of its questioning steps, is bound in advance to adhere to it” (Heidegger, 1977a, p. 119). Thus, this individualized character of modern science is not a mere consequence but needed by all research to be able to progress.

As research, modern science essentially characterized by this projection-plan of specific fields of investigations constituted and delimited by the means of respective methodology. Thus, each science in modern age must restrain, confine these spheres in order to secure and promote its object-spheres. Departmentalized feature is then intrinsic to modern sciences.

Moreover, Heidegger insists that modern science must and does continually fight against mere busyness[5] because of the research’s intrinsic feature as ongoing activity. This clearly means that each science, with the aim of progressing itself through its own results, should be critical about its own contributing results and calculations. To do otherwise means the denial of the research’s essential character and going after the ‘serene erudition’ which does not exist in modern age and is against its nature.

As long as the interest is the objectification of everything, ‘a solidarity and attitude’ is the precondition for the formation of a research system: a solidarity which is constituted on the ground of projected plan of delimited object-domains and guaranteed by promoting itself by using its results for further researches. The emergence and development of new disciplines assured by new questions emerged from these results. Thus, it is this essential feature of research as ongoing activity and

[5] With the words of Heidegger: “Ongoing activity becomes mere busyness whenever, in the pursuing of its methodology, it no longer keeps itself open on the basis of an ever-new accomplishing of its projection-plan, but only leaves that plan behind itself as a given; never again confirms and verifies its own self-accumulating results and the calculation of them, but simply chases after such results and calculations” (Heidegger, 1977a, p.138)

the main drive as productivity and efficiency which provides the disappearance of non-productive and inefficient disciplines and emergence of new ones. Likewise, multi- and inter-disciplinarity which are quite popular in academic community nowadays are also current optimization of specialization. The collaboration and integration of various disciplines in research projects is necessary in order to obtain optimal outcomes from these projects.

Thirdly, as the specialized and ongoing activity, research also constitutes other fundamental component of modern science: its researcher. Even if Heidegger has the image of ideal scholar in his mind and places the researcher over against this ideal while he is analyzing scientist in modern age, his conception of researcher is still important to understand this social entity. Researcher, according to Heidegger, acts "according to institutional research agendas, produce findings, and display and industriousness rooted in the busyness of meetings and conferences" (Day, 2001, p. 97) The research worker, because of his/her essential character, can exist only when s/he engages in projects and work for the preservation of modern sciences as research.

Thus, researcher exists only as long as s/he is a member of the scientific community. This diverse network of communicating researchers is essential to make possible the communication of scientific knowledge; thus, to ensure and promote modern science as research. Now, researcher does not need a library at his/her home or solitude because s/he has his/her computer which provides the access to various research results and the communication and integration of researchers all over the world. Likewise, s/he should now necessarily be interaction with other members of community, work with them in research projects and disseminate and gather research results through constantly and actively participating in meetings and conferences.

Consequently, modern science which has individualized character and is ensured in various scientific communities establishes researchers as professionals. That is,

researcher, because of the demarcated object-domains of his/her fields, is also particularized. Through specific training about specific disciplines in and for institutions of modern science, they are socialized and become a member of this institutions. This specialized feature of researcher is, thus, ensured through special education, and furthered through full time devotion to his/her work and regular payment for his/her effort.

After all, in this thesis I will scrutinize the knowledge production in ERA, through analyzing its official documents, specially by investigating modern sciences' three constitutive characters in this area: its institutionalized and specialized character and its researcher.

# CHAPTER II

# MODERN SCIENCE IN INSTITUTIONS

## 2.1.Institutionalized Character of Modern Sciences

Science is, in modern age, intrinsically and necessarily institutionalized. As Heidegger claims, because modern science as research has the essential character of ongoing activity, institutions are necessitated. In order to ensure and promote itself through communication and circulation of researchers and scientific knowledge and also using and reusing research results for further researches, science is necessarily assured in scientific community. Thus, one must be alert about the fact that modern science is not an ongoing activity because it is accomplished in institutions; rather it determines institutions of modern sciences because of its essential feature as ongoing activity. Researcher now should be in interaction with other researchers, work with them in research projects, share their results in conferences and meetings. Thus, institutions are necessary to maintain and advance modern science as research through both educating and integrating researchers and also disseminating and furthering scientific knowledge. In short, scientific institutions are fundamentally established by and also establish modern sciences.

In a more detailed way, in modern age, research attempts to enhance "the domain within which facts can be exhibited as regulated by law, by working on and with the laws already articulated" (Craig, 1998, p. 325). The extension of their scope and also the justification of earlier laws are, by showing their richness, succeeded by this elucidation of scientific laws. Theoretical projection of nature as lawful is the precondition for the scientific experiment because it is guided by this projected plan. Experiment starts with the establishment of a law as a ground: "To set up an

experiment means", Heidegger claims, "to represent or to conceive the conditions under which a specific series of motions can be made susceptible of being followed in its necessary progression" (1977a, p. 121). Thus, research and experimentation consistently and essentially open up new possibilities for research. The results of scientific research are adapted and used as the resources for further researches. Thus, this enduring expansion and enhancement of research as an ongoing activity, sets the basis for modern institutions. Consequently, it is because modern sciences should and do create "the solidarity and the unity appropriate to them" on the foundation of their character as ongoing activity, in order to facilitate this unity and solidarity that "further the reciprocal checking and communication of results, and that regulate the exchange of talents" (Heidegger, 1977a, p.125), adjustments and regulations are essentially required: the institution of modern sciences "is real as orderly establishment" made secured by some legal, administrative and normative adjustments and regulations.

Moreover, since this dominant form of knowledge production provides a ground - "through a specific interpretation of what is and through a specific comprehension of truth" (Heidegger, 1977a, 115)-, on which the reality is established, institutions which are constructed on this basis cannot be limited to institutions of modern science: the ongoing character of modern scientific research which is determinant of the reality also determines the institutions in general.

At this point, I must note that because Heidegger, instead of working on institutions and institutionalization process specifically, rather deals with the history of metaphysical understanding of what entities are, more sociological understanding of institutions and its becoming process is needed for this thesis. For this purpose, I now want to examine sociological uses of these phenomena by keeping Heidegger's understanding in mind.

Accordingly, in more sociological way, institutions are, as Veblen puts it, broadly defined as "habits of thought common to generality of men" (1990, p.239). In different terms, they are composed of structures and actions through which human

behavior gains sense and stability (Scott, 1995, p. 33). The main characteristic of institution is establishment and endurance of the ways of acting: the ways of living and the ways of dealing with various situations. Thus, in the process of institutionalization, the reproductive processes are necessary, and in operation as stable patterns that make sure their own endurance and also are habitually endorsed (Jepperson, 1991, pp.144-145)

Put another and more detailed way, institution means, according to Jepperson, "social order or pattern" which has acquired "a certain state or property"; and thus, institutionalization signifies the process of this acquirement. By pattern or order, Jepperson means "the standardized interaction sequences". (Jepperson, 1991, p.145) Thus, institution represents social pattern which discloses specific reproduction process. A pattern is said to be institutionalized when the deviations from it are regulated through socially constructed rewards and sanctions in a controlled and repeated manner. That is to say, institutions, as social patterns, when reproduced continually, can ensure their endurance only by "self-activating social process". Then, the main point here is that: at the core of the institutions, there is a pattern, which is endorsed and prolonged by "routine reproductive procedures" (Jepperson, 1991, p145) Consequently, academic disciplines can be shown as examples of institutions, whose presence as an institution is supported and ensured by fixed salaries for researchers, tenured professorships, public funding of universities etc.

Once again, modern science is accordingly, accomplished by a community of researchers in institutions. And certainly, the most rooted and prevailing examples of these institutions are academic disciplines within the modern university system. The university, according to Heidegger, is the structure that holds the individualized sciences (which appear as other constituent character of science and will be mentioned, in this thesis, in the next chapter) together in their pursuit and determination of their object. The specialized sciences are, as he states, kept together in university by technical organization. In more detailed way, when science, because of its foundational feature as an ongoing activity, particularizes itself more and more

with a view to the total enduring and "mastering of its work process", the more these sciences as "ongoing activities are shifted into separate research institutes and professional schools" (Heidegger, 1977a, p.126) Thus, Heidegger, in the *Rektoratsrede* of 1933, anticipates the university as a "technical organizational-institutional pseudo-unity" (1985, p. 482). This shows that universities are not one and only institutions which are constituted by and in turn constitute scientific understanding. Research institutes and organizations (both public and private), R&D (Research and Development) departments of industrial companies, various scientific journals are only few examples of institutions essentially constructed as social realities because of the necessary feature of modern scientific research.

With this perspective, European Research Area (ERA) -as the policy reform proceeded through and in cooperation with Bologna Process[6]- will be scrutinized and constructed with the attempt to understand whether modern sciences, in ERA, are done and furthered in institutions. In other word, the aim of this part is to show that institutionalized character of modern sciences as their foundational character is also maintained in ERA. To this end, I will first introduce the institutions of modern sciences which are 'stakeholders' and components of ERA, and the bodies where research is still done and proceeded by researches. The reason why I emphasize on these stakeholders is that the members of ERA are essentially already become a scientific community or a member of these communities. It is the precondition in order to participate in this European scientific community. In the second part, I will focus on ERA initiatives which are undertaken with the aim of forming 'prosperous European research community' and essentially institutionalized in order to communicate, disseminate and thus further research results. Through analyzing these institutionalized initiatives, I will propose that ERA, with various legal, structural

[6] Even if Bologna Process is initiated mainly with the aim of the creation of European Higher Education Area, the importance of research is mentioned at any stage of this Process and specifically in Berlin Communique, European Research Area is first mentioned and it is stated that, in order to accomplish this common area, any initiative carried out through the process, should and will be supported and considered as a part of Bologna Process. For more information, Berlin Communique is reachable at: http://www.ehea.info/Uploads/Declarations/Berlin_Communique1.pdf

and normative arrangements, is itself an institution where knowledge is produced, transferred and furthered. However, above all, a brief account on the emergence of ERA is needed in order to prepare the ground for a better analysis.

### 2.2. The Emergence and Development of European Research Policy and ERA

The beginning of the establishment of science policy in Europe was first at national level rather than European one. The European Atomic Energy Community (ERUATOM) is found in 1957, on a legal basis (the Treaty of Rome) for community-based Research and Technological Development (RTD). However, national nuclear programmes in Germany, Britain and France prevent this foundation being successful. This nation-based programmes and nationalist policies hinder the development of international foundations about research and development. In other disciplines, instead of foundation of research communities under the European Commission, intergovernmental organizations (e.g. CERN and ESA) were constructed (Banchoff, 2002, p.2)

After several failed attempts, the first major initiatives have been undertaken, as pre-competitive funding programmes, in 1980s. The main two initiatives were on information technologies (European Strategic Program on Research in Information Technology (ESPRIT)) and communication technologies (Research into Advanced Communications for Europe (RACE)). However, a systematic research policy only began with the establishment of first framework programme in 1984: "As the name suggests, the FPs [Framework Programmes] are conceived as a common framework under which EU RTD policies should be organized and as programmes that last several years to enable long term investments in specific strategic areas such as ICTs [Information and Communication Technologies], sustainable development, biotechnology and energy."(Frenken & Hoekman & van Oort, 2007, p.25) This framework programme has been organized multiannually and provided funds for "transnational networks of researchers in firm, universities and public laboratories." (Edler & Kuhlmann & Behrens, 2003, p.81) The main aim of this Framework Programme was to eliminate the obstacles to ensure the collaboration at European

level and the integration of national research policies. Trough specific rules and procedures, European Research policy has been legalized by The Single European Act (SEA, 1986) and the Maastricht Treaty on European Union (TEU, 1992). Its focus was to become "a multiannual framework programme, setting out all activities of the community, which would "establish the scientific and technological objectives to be achieved […] fix the relevant priorities, indicate the broad lines of such activities […] fix the maximum overall amount and the detailed rules for community financial participation" (Guzetti, 1995, p.112). Through several framework programmes, more and more national organizations which represent academic, governmental and industrial researchers advanced contacts within the Commission; and especially in Fourth Framework Programme (FP4 – ran from 1994 to 1998) and Fifth Framework Programme (FP5 ran from 1998 to 2002), the idea of collectiveness and interaction have started to dominate these collective research and innovation processes. "Emphasis shifted from knowledge production alone towards knowledge transfer and technology diffusion" (Frenken & Hoekman & van Oort, 2007, p.26). With this changing emphasis, the organization of research policies in Europe also changed in 2000.

In 2000, European Council meets in Lisbon, and in that meeting a common agenda, known as Lisbon Agenda, is developed by the member states of European Union. The establishment of Lisbon Agenda is also beginning of a programme which aims to help Europe "to become the most competitive and dynamic knowledge-based economy in the world", by 2020 (European Council, 2000, p.2). The key pillar of Lisbon Agenda is the creation of a European Research Area (ERA), a concept which was first launched at this same Lisbon Agenda. The European Council states that in order to create an ERA, "research activities at national and Union level must be better integrated and coordinated to make as efficient and innovative as possible, and to ensure that Europe offers attractive prospect to its best brains" (European Council, 2000, p.4)

According to Commission, three main weaknesses of European research are insufficient funding, lack of industrial exploitation of scientific research and lack of coordination between research activities and resources; and these bring into the need of a common research area (2002, p.4)

Accordingly, the first step for the creation of an ERA by coordinating and integrating research policy in Europe has been taken, on January 18, 2000, with the Commissioner Busquin's announcement of a Communication from the Commission to the Council, the European Parliament, The Economic and Social Committee and the Committee of the Regions entitled: *Towards a European Research Area*. The Communication starts with the assessment of present situation of European research efforts which are determinant of its 'position in the emerging global order':

> European research effort as it stands today is no more than the simple addition of the efforts of the 15 Member States and the Union. This fragmentation, isolation and compartmentalization of national research efforts and systems and the disparity of regulatory and administrative systems only serve to compound the impact of lower global investment in knowledge. (Commission of the European Communities, 2000, p. 7)

Accordingly, ERA, as a common area for production, dissemination and preservation of scientific knowledge, should be created in order to deal with this national/regional fragmentation of research activities and institutions. The collaboration of scientists and thus the establishment of common research community are, according to Commission, necessary for the free circulation of knowledge and researchers in Europe. Thus, the European Council declares that "a prosperous Europe requires, and will be marked by, a large and active research community with a substantial output of successful research" (European Council, 2000, p.5). In the Communication named *A Reinforced European Research Area Partnership for Excellence and Growth* (2012a), European Commission declares that in order to achieve "lasting economic recovery, and to secure "European's position in the emerging global order, a world-leading research and innovation capacity, built on a strong public science base" is seen as critical and necessary (p. 2) Thus, the policy reform at the level of European Union (EU) is needed to strengthen the scientific quality, excellence and impact by

creating an area where production and dissemination of scientific knowledge is proceeded and also where collaboration and exchange between academics and their mobility are achieved.

Consequently, with the idea of attaining "unified research area open to the world […] in which researchers, scientific knowledge and technology circulate freely and through which the Union and its Member States strengthen their scientific and technological bases, their competitiveness and their capacity to collectively address grand challenges", Commission emphasizes on the "a joint effort by the EU, its Member States and research stakeholders" (European Commission, 2012a, p. 3)

The main characteristics of the future European science and research landscape, according to the ERA green paper, should be the sufficient flow of qualified researchers with great mobility between institutions, impressive knowledge sharing between public research and industry, and integrated, networked and accessible infrastructures, (Commission of the European Communities, 2007, pp. 7-8). And these characteristics can be achieved, as Scherngell and Lata (2011) states, only by "the removal of barriers – such as geographical, cultural, institutional and technological impediments – for knowledge flows, knowledge diffusion and researcher mobility by a European-wide coordination of national and regional research activities and policy programmes, including a considerable amount of jointly-programmed public research investment" (p.5)

To put it in more detail way, the Commission, in 2002, declares three main objectives of ERA (p.3):

1. The creation of an 'internal market' in research, an area of free movement of knowledge, researchers and technology, with the aim of increasing cooperation, stimulating competition and achieving a better allocation of resources;
2. A restructuring of European research fabric, in particular by improves coordination of national research activities and policies,

which account for most of the research carried out and financed in Europe;

3. The development of an European Research policy which not only addresses the funding of research activities, but also takes account of all relevant aspects of other EU and national policies.

The reason I particularly focus on these three objectives is that, according to the recent assessment of ERA (2015), they are still valid and will continue to guide ERA policy. Accordingly, these three objectives will be the policy background through which several policy implementations and activities have been ensured. Thus, in this thesis, modern sciences' institutionalized character will be investigated through the analyzing these objectives and initiatives derived from these objectives.

In other words, these three objectives are crucial for this chapter of my analysis because each objective shows the EU's main aim to create more communicating and integrated scientific community where knowledge and researchers can freely circulate, communicate, and be used at European level. Instead of research programmes and projects with deadlines and finite relationality, EU, through realizing ERA on the basis of legal, governmental and organizational arrangements, intends to create a common scientific area where the continuation and advancement of knowledge production at European level is ensured.

Correspondingly, on the basis of these objectives and actions, I will first point out the institutions of modern sciences which are components and important stakeholders of ERA and in which research is still, trough ERA's initiatives, done and proceeded. I also mention these institutions because being a member of this scientific community preconditions to be already a member of established scientific community. Even if Commission talks about individual scientists they always presuppose the researchers which are already trained and constituted as a member of a modern scientific community.

In the second part, I will specifically emphasize on Commission's initiatives which are necessarily institutionalized through established norms, rules and practices; and in turn provide a European Research Area being institutionalized. In other words, second part will cover European Research Council (ERC), ERA-Networks, Article 185 initiatives, Joint Technological Initiatives, European Strategy Forum on Research Infrastructures (ESFRI) and Marie Sklodowska-Curie Actions which are institutionalized through specific legal, normative and administrative organization; and in turn through which ERA is itself institutionalized and essentially constituted as an institution of modern sciences.

### 2.3.Institutions of Modern Sciences as the Components of ERA

In ERA, as before, scientists do their research in various institutions [of modern science]. These scientific activities are whether proceeded in national framework or arranged by European Organizations, and what is common for all is that science and research are established and prolonged in institutions through some administrative regulations and adjustments. In this process of creating a common European zone, the transnational networks of researchers in firms, public laboratories and universities are aimed in order to make secure the communication and dissemination of scientific knowledge. In ERA, accordingly, the production, communication, and dissemination of scientific knowledge is proceeded in institutions - in universities, national research organizations, professional associations, and European intergovernmental research institutions - through different level of coordination and integration at national, international, transnational or European level. As stated in Commission staff working document accompanying the *Green Paper: The European Research Area: New Perspectives*, these institutions are all introduced as the component of ERA to establish it in most efficient and productive way. Thus, in this section, I particularly focus on these institutions in order to demonstrate modern sciences are still essentially ensured and proceeded in institutions (by research community).

I emphasize on these institutions in this special part with the aim of showing that the scientists and knowledge can exist in ERA only when they are already socialized in scientific communities. Scientists and knowledge become visible in this common scientific community only when they are produced and reproduced in various scientific institutions beforehand.

Accordingly, in the next four parts, the conceptualization of universities, national research organizations, professional associations and European intergovernmental research organizations in the documents of ERA and Commission's policy-reforms will respectively be scrutinized. And at the end, I identify these reforms and arrangements about respective institutions as the initiatives launched with the aim of creating a common and free platform which is needed because of the very foundational character of modern science as ongoing activity. Various arrangements and implementations are initiated because the maintenance and advancement of modern sciences as research depend on a common scientific area where knowledge and its scientist is produced, disseminated, used with the aim of making secure and furthering sciences.

### 2.3.1. Universities

European universities[7] are, by European Union, seen as key actors in producing scientific knowledge, training researchers, and furthering innovation. In order to strengthen "its scientific and technological bases by achieving a European research area in which researchers, scientific knowledge and technology circulate freely", it is legally declared that "the Union shall, throughout the Union, encourage […] universities in their research and technological development activities of high quality" (Art. 179 TFEU). In a communication entitled *Mobilising the Brainpower of Europe: Enabling Universities to Make their Full Contribution to the Lisbon Strategy,* Commission (2005b) notes the importance of universities as follows:

> Europe must strengthen the three poles of its knowledge triangle: education, research and innovation. Universities are essential in all three. Investing

[7] The term "universities" are used to refer all higher education institutions.

> more and better in the modernization and quality of universities is a direct investment in the future of Europe and Europeans (p.2)

Likewise, in other document of Commission (2007), it is stated that:

> Research active universities are the main producers of scientific knowledge in Europe today, acting as 'knowledge creators' and an important training ground for researchers […] Research-active universities also contribute to economic competitive advantages through consultancy, access to specialist know-how and facilities, and other forms of knowledge transfer. (p.49)

Thus, universities are main components of European Research Area: they are recognized as 'key stakeholders' in European research: one third of European researchers, according to commission, are employed by European Universities; and also 80% of significant research in Europe is done in these institutions (European Commission, 2005a). Thus, in the Action Plan of the Commission, in which "the need for coherence in research policies, for increasing public support and resources for research and for improving the framework conditions for research and development in Europe in order to contribute to the Lisbon goals" (Keeling, 2006, p.205) is clearly stressed, the maintaining and strengthening the role of universities in European society is considered crucial for achieving these goals.

Thus, the claim was that universities need some changes in order to create this common European zone. First of all, Commission talks about the need for the increase of "geographical and inter-sectoral mobility" (2006, p.5). In order to further the researchers and staff mobility, and hence innovation, obstacles for the professional, international, and inter-sectoral mobility should be removed. Within the context of Bologna Process, special effort and some regulations, in all Member States and Associated Countries, are needed to assure this mobility with great success: "comparable qualifications (short cycle, Bachelor, Master, Doctorate); flexible, modernized curricula at all levels which correspond to the needs of the labor market; and trustworthy quality assurance systems" (Commission of European Communities, 2006, p. 5) These regulations are expected to develop 'unified

research area' where scientific and technological enhancement is promoted through great mobility of researchers, and cross-border cooperation.[8]

The open access to "the peer-reviewed scientific publications and research data" is other arrangement -that universities should also follow- providing preservation, dissemination, use and reuse of scientific research results at European level in order to further scientific research as an ongoing activity: "Open access to scientific research data enhances data quality, reduces the need for duplication of research, speeds up scientific progress and helps to combat scientific fraud" (European Commission, 2012b, p. 3)

This "optimal circulation, access to, and transfer of scientific knowledge", according to Commission, also works for the benefits of businesses: this will improve their capacity to innovate (European Commission, 2012b, p. 3). Likewise, the strategic collaborations and networks developed between universities, non-university institutions, and also industry at national and European level, according to Commission, is also required for knowledge transfer. Knowledge transfer which "takes place via networking, informal flows, and circulation of researchers between public and private institutions as well as collaboration and contractual arrangements between public research institutions and industry, licensing and spin-offs", as reported by ERA Framework Public Consultation (2011), is needed to enhance research and support innovation (p.6). Knowledge transfer and the inter-sectoral mobility is important for the production and promotion of efficient knowledge because, with the modern science, as Heidegger also states, the production of knowledge is saved from the monopoly of university and ensured in various -both public and private- institutions by the constitutive character of modern science as ongoing activity. Moreover, this transfer and mobility provides a broader and more proper area where sciences make secure and advance themselves.

[8] At that point, I should note that many criticisms come to this arrangements, and understand this process as the standardization of sciences and marketization of universities (Ergur, 2016) Conversely, I propose, through this thesis, that these arrangements are essentially provided by and in turn provide, and make secure scientific research as ongoing activity, in institutions at European level.

Accordingly, the establishment of a strong European research area and the advancement of sciences are aimed to be succeeded through the regulations about the improvement of mobility, development of standards and criteria in main issues of science (for example, open access to publications, and research results) and creation of European legal framework for research infrastructures. Thus, the guidelines on research integrity established by the European Science Foundation (ESF) and the Organization for Economic Co-operation and Development (OECD), as Commission recommends, should be followed by universities and other institutions in order to achieve good scientific practices in European context, and also avoid the conflicts within collaborated studies. Consequently, the importance and the place of European universities in ERA can effectively and clearly summarized by the words of Gaehtgens and Peter (2009):

> It becomes clear that the developments of both European universities and the ERA with regard to successfully meeting the challenges of globalization are interconnected processes. Flexible, internationally networking universities with an individually recognisable research profile are crucial for the implementation of a genuine and viable common research policy in Europe. At the same time, in their efforts to sharpen their institutional profile European universities rely on a functioning ERA that not only provides a variety of funding instruments, but also a regulatory framework that efficiently coordinates resources and diminishes legal as well as administrative barriers to academic mobility, cross-border cooperation and public–private financing (p.127).

Consequently, for building prosperous ERA, the importance of universities, as main institutions of modern science, are clearly declared by Commission. Universities, by producing and furthering scientific knowledge and also training future's researchers, is included to EU's policy-reforms on science, and perform as significant stakeholders in creating European research community. However, universities are not only institutions where scientific activities are proceeded. There are many other institutions where scientific knowledge is produced, managed, disseminated, and furthered, and hence which are components of ERA.

### 2.3.2. National Research Organizations

National research organizations "which as their predominant activity provide research and development, technology and innovation services to enterprises, governments and other clients…"[9] are also added to the policy agenda of Commission in order to utilize their expertise in European research and funding corporation. In order to include them to European research community, their interests, according to Commission, should be effectively represented, and also they should be encouraged to cooperate at European level, thus promote the scientific exchange, and further their access to infrastructures, researchers, and research topics:

> The necessary coordination process should involve not only Member States and EU institutions but also the national research organizations, so as to take advantage of their expertise on international research and funding cooperation. The implementation of actions (e.g. through strategic research agendas and joint liaison offices outside of Europe) should be promoted by variable groups composed of EU institutions, Member States and research organizations, according to each party's interests, experience and resources' (German Research Foundation (DFG), 2012c, p.22)

The strong collaboration and expanded coordination between European and national/regional research agendas and programmes, and the involvement of higher number of stakeholders in the definition of priorities are determined as main objectives of ERA. Thus, the acceleration of "the evolution of ERA" is, Science Europe (2012c) states, succeeded effectively "by supporting the efforts of national research organizations to enhance and intensify their cooperation in research activity and policy development" (p. 25) Thus, national research organizations, as institutions of modern science, also participate in ERA through the activities of knowledge production and policy development.

### 2.3.3. Professional Associations

National and international professional associations and societies also, with the motive of placing their scientific disciplines and fields' desires at European level,

[9] This definition is made by The European Association of Research and Technology Organizations (EARTO) and its electronic version is available at: http://www.earto.eu/about-earto/membership.html

engage in European cooperation. In order to represent their member's interest, they participate in many tasks at EU level, including agenda setting and arrangement of funding programs.

Professional associations are, at national level, are "the forum and voice of their respective disciplines" (German Research Foundation, 2010, p.96). They work for the enhancement and proliferation of their science and research, and particularly for the advancement of their disciplines. They achieve these goals through meetings, conferences, arranging congresses, publishing and funding scientific journals and periodicals, and organizing summer schools etc. As an example, academic professional associations, through developing and supporting infrastructure of professional communication, i.e. through publishing professional journals, provides "the communication and criticism of research results" (Goetz & Mair & Smith, 2009, p. 385)

Accordingly, these associations and societies are accepted as important figures in the formulation of criteria for assessment and evaluation of scientific studies of their disciplines, determination of subject matters, and the arrangement of the communication between their members.

Moreover, in order to build and enhance respective disciplines at European level, transnational professional associations are also established with the awareness of the need of collaboration and exchange with researchers across Europe. These European associations play key role in the establishment of European community of sciences through conferences and supporting scientists. Likewise, they, in a crucial manner, support the planning of major and large-scale European research cooperation and its successful realization through instruments of European research funding by initiating and forming European group of researchers (German Research Foundation, 2010, p.96) Thus, other important objective of ERA is the involvement of national professional associations to the process of constitution of European professional associations in order to both ensure the development and the enhancement of their disciplines and take part in the formation of European standards.

Consequently, in 17 July 2012, on the basis of adoption of ERA Communication "A Reinforced European Research Area Partnership for Excellence and Growth, Commissioner Geoghegan-Quinn and five European Associations, as stakeholders, sign a Joint Statement, four Memoranda of Understanding, and accepted on Unilateral Statement in which these associations begin to "work together towards the achievement of ERA by 2014"[10]. The names of these associations are European Association of Research and Technology Organizations (EARTO), European University Associations (EUA), League of European Research Universities (LERU), NordForsk, and Science Europe. With this partnership, the plan is the increasing awareness of member institutions of these stakeholder organizations about ERA, and the encouragement of these institutions to take action toward ERA priorities.

As seen clearly, professional associations are also main stakeholders in ERA and have great importance in improvement, preservation, and propagation of their scientific disciplines, and also promotion of communication between their members at European level.

### 2.3.4. European Intergovernmental Research Organizations

In addition to the universities, national research organizations, and professional associations which are established and furthered at national/regional, international, or European level, the European intergovernmental research organizations (EIRO) are also pillars of the ERA (Commission, 2007). They "are supported by their member states, have solid experience in certain basic applied research fields, and operate world-class infrastructures for the benefit of European science" (EIROforum[11], 2007, p.4)

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[10] It is cited from ERA's official website: http://ec.europa.eu/research/era/partnership_en.htm

[11] "EIROforum provides a platform for partnership and collaboration between the largest European intergovernmental research organisations. It also pools the substantial expertise of each partner organisation in basic and/or applied research, and in the management of large international projects, combining them for the wider benefit of European scientific research and technological development.

The EIROforum partners have endorsed the ERA vision, and agreed with the features of the original ERA concept as launched by Commissioner Philippe Busquin. The EIROforum Science Policy paper states that the ERA is a framework and facilitator for close cooperation between all the participants on

European intergovernmental research organizations (EIROs) are constituted on the ground of the issues and interests of science and the European Organization of Nuclear Research (CERN) and the European Synchrotron Radiation Facility (ESRF) are the examples of these institutions. They are mainly focus on the advancement of their research, and strengthening the exchange between scientists. They are seen as successful examples of transnational collaborations that they "prove to be functional and successful if grouped around large infrastructures" (German Research Foundation, 2010, p.97). According to EIROforum's Response to the Green Paper "The European Research Area: New Perspectives" (2007),

> In order to reach the ambitious Lisbon goals for knowledge-based European society of the 21st century, the EU should make optimal use of the vast expertise and experience of the EIROs. Enhancing the cooperation between the European Commission and the EIROs, and exploiting the synergies between the EU Framework programmes and the activities of the EIROs are keys to the success of the ERA. (p. 4)

Accordingly, with the "top notch research infrastructures and worthwhile instruments for transnational networking and collaboration", these intergovernmental research institutions have an important role to play in helping establishment of the ERA (Commission of European Communities, 2007, p.39). They are, together with the universities, national research organizations and professional organizations, institutions where scientific knowledge is produced, preserved, accessed, and disseminated, indispensable actors for the establishment of 'a large and active research community with substantial output of successful research'.

### 2.4.Institutionalization of ERA through its Institutionalized Initiatives

As I stated above, the main objective of ERA is the creation of a common scientific zone at European level where (1) knowledge, researchers and technology move and circulate freely, (2) national, international and European research organizations and activities collaborate, and (3) all aspects of research and technology are regulated and

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the European research scene, including the EIROs which are outside the EU legal remit, and that one of the main goals of the ERA is to position European scientific research and technological development at the forefront." (EIROforum, 2007, pp.4-5)

rearranged through various implementations. This objective is the basis on which various implementations have been undertaken.

Accordingly, with the aim of creating a single European research area, and thus ensuring the defragmentation of European scientific and technological activities, European Commission established Sixth & Seventh Framework Programmes (ran respectively from 2002 to 2006 and from 2007 to 2013). What makes these Programmes different from others -which are initiated and proceeded before the establishment of ERA- is the changing emphasis of Commission from mere funding activities of research projects to a more inclusive research policy that aims the removal of the "fragmentation, isolation and compartmentalization of national research efforts and the disparity of regulating and administrative systems" through "investing on infrastructures, strengthening relations between existing organization and programmes, improving conditions for political consultation, establishing a common system of scientific and technical reference and promoting greater mobility of researchers" (Breschi & Cusmano, 2004, p.750) more systematically.

With the aim of creation of ERA, an area in which researcher activities at national and EU levels are well integrated and coordinated, Commission, within Sixth & Seventh Framework Programmes, began to institutionalize its initiatives in order to ensure their continuity. In other word, with the sets of habits, routines, rules and laws, Commission's initiatives necessarily turn into institutionalized agencies; thus this, in turn, creates an institutionalized European research area. In order to make secure the production, exchange, communication, and dissemination of knowledge and researchers at national and European level this institutionalized character of ERA is not a mere consequence of this research policy; but the necessary character of modern science.

In other words, European Research Area is a scientific community which is established by and in turn, establishes modern sciences. It is necessarily institutionalized because the maintenance and enhancement of modern sciences as research depends on its assurance in scientific community. Its results communicate,

and also are disseminated, and exploited by further scientific activities only in a common area where knowledge and researchers freely move. Moreover, this area should be secured through several legal, normative and administrative arrangements. It is for this reason I will specifically investigate the institutionalized initiatives of ERA because they are founded on some legal, normative and administrative basis and this basis makes secure and provide the continuation of this European scientific zone.

Correspondingly, I now focus on European Research Council (ERC), ERA-Networks, Initiatives based on Article 185 TFEU, Joint Technological Initiatives (JTIs), Marie Curie Actions and European Strategy Forum on Research Infrastructure (ESFRI) which are all institutionalized with the aim of realizing main objectives of ERA. However, one should keep in mind that these are not the only initiatives that have institutional characteristics: Commission's all initiatives should be and is essentially institutionalized; but I will cover only these agencies because they have representative characteristics that other initiatives, with same objectives and actions, plan to create a common European zone of research activities. In other words, I establish these initiatives in this chapter as the representatives of all initiatives of ERA because they have same structural and logical features with the initiatives of respective areas. For example, European Strategy Forum for Research Infrastructure (ESFRI), with the same logic and structural character, is the representative of all other initiatives launched with the aim of integrating research infrastructures at European level. The other initiatives emphasized in this thesis, like ESFRI, are chosen also because of their representative characters.

### 2.4.1. European Research Council (ERC)

The European Research Council (ERC), the first independent research funding agency at European level, was formally establish in 2007, within the Specific Programme "Ideas"[12] of the European Union's Seventh Research Framework

[12] Council Decision 2006/972/EC of 19 December 2006 concerning the specific programme Ideas implementing the Seventh Framework Programme of the European Community for research,

Programme. This was the first step to its institutionalization that ERC was officially brought into existence by Decision of the Commission[13] (in accordance with the Decision of Council and Parliament on the Seventh Framework Programme[14], and Rules for Participation), and the Decision of the Council on the Specific Programme "Ideas".

Different from previous research funding programmes, which focus solely on cooperation in and finance specific research field and industry-oriented research projects, ERC, with the aim of raising 'the level of excellence of research in Europe' finance investigator-driven research in all fields of science. "Regardless of disciplinary limits and geographical boundaries"[15] ERC is center aspect of European Research Area (ERA), a project introduced by the Commission in order to create prosperous European research community by improving communication between stakeholders and constructing common area for research activities at EU level (Commission of European Communities, 2000). With the words of Commission in the document *ERC Work Programme 2016*:

> The fundamental activity of the ERC is to provide attractive, long-term funding to support excellent investigators and their research teams to pursue ground-breaking, high-gain/high-risk research. Research funded by the ERC is expected to lead to advances at the frontiers of knowledge and to set a clear and inspirational target for frontier research across Europe. (2015a, p. 8)

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technological development and demonstration activities (2007-13) [Official Journal L 54 of 22.2.2007].

This Framework Programme had four specific programmes: 'Ideas', 'Cooperation', 'People', and 'Capacities'. The projects are evaluated and funded under these four specific programmes.

[13] Decision No 2006/972/EC

[14] Decision No 1982/2006/EC of The European Parliament and of The Council of 18 December 2006 concerning the Seventh Framework Programme of the European Community for research, technological development and demonstration activities (2007-2013)

[15] It is extracted from same decision (Decision No 2006/972/EC) "*Specific Programme: Ideas"* Electronic access available at: http://eur-lex.europa.eu/legal-content/EN/LSU/?uri=celex:32006D0972

Thus, the field of ERC is characterized as frontier research[16] and its aim is, as ERC states, to stimulate scientific excellence by supporting and encouraging scientist, scholars and engineers from all research fields to create new knowledge and to establish new understanding. With its three types of grants -The Starting Grants for researchers with 2-7 years of experience after their doctoral degree, Consolidator for researcher with 7-10 years of experience after their doctoral degree, and Advanced Grants for research leaders, having significant achievements in the last 10 year[17]-, all researchers of any age, nation, career and scientific disciplines who look to "set up or consolidate their own independent research team and programme" are provided funding by ERC (European Commission, 2015a, p. 8)

Accordingly, The ERC has a dual structure that while its scientific policy is set independently by Scientific Council, its administrative tasks are performed by ERC Executive Agency.

The Scientific Council is formally established by the Commission Decision; and ERC Secretary General is appointed independently by this Scientific Council, to "the position of Special Advisor to the Commission" (Commission of the European Communities, 2008, p.3)

The Scientific Council is an independent agency, "representing European research community and composing of 22 scientists, scholars and engineers from different fields" responsible for the arrangements that provide the production and

[16] "Frontier research" according to The HLEG 2005 Report "stands at the forefront of creating new knowledge and developing new understanding. Those involved are responsible for fundamental discoveries and advances in theoretical and empirical understanding, and even achieving the occasional revolutionary breakthrough that completely changes our knowledge of the world" (p.18) Electronic version available at: https://ec.europa.eu/research/future/pdf/hleg_fullreport_frontier_research_april2005.pdf

[17] "The Starting Grants are designed to support excellent Principal Investigators at the career stage at which they are starting their own independent research team or programme" while "the Consolidator Grants are designed to support excellent Principal Investigators at the career stage at which they may still be consolidating their own independent research team or programme". On the other hand, "Excellent Principal Investigators at the career stage at which they are already established research leaders with a recognized track record of research achievements" are the targets of the Advance Grants. (European Commission, 2015a, pp. 21-25)

advancement of scientific knowledge production. As stated in the Report prepared by the Commission (2008), the Scientific Council

> […] has full authority over decisions on the type of research to be funded and acts as guarantor of the quality of the activity from the scientific perspective. Its tasks cover, in particular, the establishment of the annual work programme and necessary modifications, including calls for proposals; the methods and procedures for peer review and proposal evaluation, monitoring and quality control of the programme's implementation from the scientific perspective; and communication (p.3).

On the other hand, administrative tasks of ERC assigned to the ERC Executive Agency also demonstrate its institutionalized character. Executive Agency established in order to manage specially the Idea Programme consists of a Director and a Steering Committee, determined by the commission. They are responsible for the administrative tasks, e.g. 'management of the evaluation procedure and the conclusion of grant agreements'. The Commission supervises the executive agencies because most of them are representatives of the Commission (only one of them is also member of Scientific Council and Secretary General is admitted as observer), and; moreover, because EU budget is under the responsibility of the Commission this supervision is considered as necessary (Groß and Karaalp, 2015, p.182)

On this base of legislative and organization structure of ERC, the application and evaluation processes of ERC grants are regulated also by some established rules and routines. First of all, the evaluation starts with the eligibility check carried out eligibility review committee of Executive Agency. This check concerns with formal requirements: submission before the single submission deadline, complete, readable and printable proposal, content's relatedness to the objectives of the ERC call (as defined in the ERC Work Programme), etc.

After this eligibility check, the process of evaluation and assessment of proposals are ensured by independent experts. "An independent expert", in the words of Commission "is an expert who is external to the ERC and the Commission, is working in a personal capacity and, in performing his/her work, does not represent

any organization or scientific community" (2015a, p.8) The Scientific Council is responsible in the determination of these independent experts for the evaluation of proposals and the implementations of these research projects. These independent experts are selected according to their skills and knowledge of relevant research field, high level of professional experience and their language skills required for the tasks carried out (European Commission, 2015a, p. 9)

Thus, ERC grant applications are evaluated in the peer review panels. These panels cover "the entire range of research disciplines and [is] organized in a framework of three main research domains –physical and engineering sciences, life sciences and social sciences and the humanities" (Commission of European Communities, 2008, p.5) Likewise, this process consists of two steps. In the first step, the extended synopsis and the Principal Investigator's track record and CV are assessed by panel members, selected by the Scientific Council, and consisting of scientists, scholars and engineers of the highest repute, from different parts of the world (both within Europe and beyond). Then, "proposals are retained for step two based on the outcome of the evaluation at step one and a budgetary cut-off level of three times the panel's indicative budget" (European Commission, 2015a, p. 30). Accordingly, at the second step, the complete version of retained proposals is assessed; and each expert's individual assessments about the quality of investigators and projects, in consist with the given scores, are received:

> Comments provided by the experts must be consistent with any scores awarded. The comments recorded must give sufficient and clear reasons for the scores and, if appropriate, any recommendations for modifications to the proposal, should the proposal be retained for grant preparation (European Commission, 2015a, p. 13)

Moreover, the detection of conflicts of interests is also rule of procedure: Applicants are disqualified in the case of applicants' evaluators' and referees' any kind of close ties and cooperation with each other. At the end, Executive Agency is authorized for the grant agreements with the institutions of accepted applicants, and also for

arrangement of budgets in terms of ranking list formed on the basis of review report (European Commission, 2015a, p.12)

Additionally, these granted projects are still realized and furthered in an institution of an EU Member State or Associated Country. The institution which engages in or hosts the Principal Investigator is awarded by ERC grants "with the explicit commitment that this institution offers appropriate conditions for the Principal Investigator to independently manage the ERC funded research" (European Commission, 2015a, p.10). Thus, applications of Principal Investigators hosted by public or private institutions, including universities, research organizations, and industrial laboratories, are all welcomed by the ERC.

Consequently, ERC constituted with the aim of reinforcing 'excellence, dynamism and creativity in European research' is the main European research funding body and essentially institutionalized in order to make secure the existence and persistence of knowledge production through providing communication and circulation of research results. It is an institution with a huge personal and budget, and firmly settled procedures and rules: established on the legal and organizational base and proceeded through rules of procedure followed in the evaluation process of applications.

In addition to ERC which provides grants for independent researcher, European Commission also focuses on the necessity of the integration of research funding programmes in the Member/Associated States. The importance of this coordination of national funding programmes, for the establishment of ERA, is clearly stated in a Communication declared by the Commission (2000) entitled *Towards a European Research Area*: Member states' funding should be arranged with joint purposes, criteria and procedures. This objective of ERA indicates the various kind of research funding organizations "coordinating national funding through joint call between agencies" (European Commission, 2013a, p.2). "Such arrangement entails the institutionalization of new hybrid research funding organizations" that connect them at European and the trans/international level (Pilniok, 2014, p.221).

Accordingly, I now plan to focus particularly on two different institutional funding systems: ERA-Networks and the initiatives based on Article 185 of the Treaty on the Functioning of the European Union (TFEU) which are organized and legalized in various ways; but share one basic principle: with the aim of creating networks between national research funding organizations on different scientific disciplines and research topics, they organize funding activities on the ground of competition.

### 2.4.2. ERA-Networks

The coordination of national research-funding programmes [organizations, agencies, council &ministers], as stated by Commission, is the main objective of this policy reform process, proceeded with the aim of creation of European Research Area. ERA-Net scheme, first announced by Sixth Framework Programme (2002), is an action of European research-funding policies, addressing, for the first time, the national research-funding organizations; and proceeded in the Seventh and Eighth Framework Programmes. Since 2002 there have been 102 networks of research-funding organizations with the specific research fields and subject matters, having been funded by EU[18] in order to ensure cross-border research and technology collaboration.

Institutionalized character of ERA-Net scheme firstly comes from the institutionalization of competition, which is the result of the unification of the ERA-Net scheme with the Framework Programme: EU's Financial Regulation[19] provides European grants with competitive process. As stated in Seventh Framework Programme's official website, European grants are distributed to the networks of national research-funding organizations

> [...] all over the Europe and beyond in order to co-finance research, technological development, and demonstration projects. Grants are

[18] It is extracted from European Commission's website: https://ec.europa.eu/research/fp7/index_en.cfm?pg=eranet-projects

[19] Regulation (EU, Euratom) No 966/2012 of the European Parliament and of the Council of 25 October 2012 on the financial rules applicable to the general budget of the Union and repealing Council Regulation (EC, Euratom) No 1605/2002, OJ 2012 L 298/1

> determined on the basis of calls for proposals and peer review process, which are highly competitive[20]

This design of governance on competitive basis is formed by European Commission, and the rules of procedure can differ according to respective Framework Programme, specially implementing work programme. The commission, in accordance with specific work programme, declares calls for applications. The relative Framework Programme specifies the topics, subjects and fields of research, even if it is claimed that calls are open to any field of science. There is also a lower limit of the number of applicants that at least three research funding agencies from different Member/Associated States should participate in applications. "The selection of applications", as Pilniok (2015) states, "is based, inter alia, on the creation of adequate internal governance structure by funding organizations as well as a long-term commitment to cooperation process" (p.223). This institutional form of competition between the consortia of participating member states' research-funding organizations activates new strategic relationalities and common platform where knowledge of funding agencies is shared.

Accordingly, through ERA-Net initiatives, there exist two kinds of 'governance structure': between the Commission and participating national/regional research-funding organizations and between participating research-funding organizations.

Firstly, governance structure between Commission and consortium is established by an agreement concluded by the Financial Regulation. This model agreement introduced by commission guides all kind of grants within Framework Programme. The working programme and EU's budgeting arrangement is adjusted by this agreement. This model agreement also constitutes the regulations for the distribution of financial resources, and also the rights concerning Commission's interests.

[20] It is cited from official website of European Commission: https://ec.europa.eu/research/fp7/index_en.cfm?pg=eranet-projects

On the other hand, governance structure between the participating research funding agencies is generally managed by a consortium agreement. “The internal decision-making structure and the distribution of work package within consortium” is arranged by this agreement. (Pilniok, 2014, p.223) Negotiation between, and equal participation of all funding agencies are the basis of this internal governance, institutionalized by the consortium agreement.

As a result, through these governance arrangements, ERA-Net scheme is necessarily institutionalized, in order to “provide support for the transnational networking and coordination of national research programme” (European Commission, 2014a, p.3). ERA-Net scheme is determined as an important initiative in order to create European Research Area by promoting practical initiatives to provide collaboration between national, regional and European research programmes on specific scientific disciplines and research objects and “to pool fragmented human and financial resources in order to improve both the efficiency and the effectiveness of Europe’s research efforts”(European Commission, 2014a, p.4) by sharing, using and reusing research results and furthering research activities.

### 2.4.3. Initiatives based on Article 185 TFEU

The European Union’s participation in research and development programmes which are carried out by Member/Associated States provided by Article 185 of Treaty on Functioning of the European Union (TFEU) is also an important initiative to establish a European research community:

> In implementing the multiannual framework programme, the Union may take provision, in agreement with the Member States, concerned, for participation in research and development programmes undertaken by several Member States, including participation in the structures created for the execution of those programmes. (Article 185 TFEU).

Under the title XIX entitled *Research and Technology Development and Space*, it is stated that, in order to strengthen “its scientific and technological base by achieving a European Research Area in which researchers, scientific knowledge and technology

circulate freely" (Article 179), "the union and the member shall coordinate their research and technology development activities so as to ensure that national policies and Union policy are mutually consistent" (Article 181, TFEU)

Moreover, in order to ensure this close cooperation with Member States, Article 181 TFEU paves the way for some initiatives conducted and enforced by Commission: "particular initiatives aiming at the establishment of guidelines and indicators, the organization of exchange of best practices, and the preparation of the necessary elements for periodic monitoring and evaluation" (Article 181 TFEU). As explicitly pointed out in these Articles, European Research Area's some parts of constitutional norms are established in the Treaty. Accordingly, The Sixth Framework Programme is the first example that the measures are done on the basis of Article 185 TFEU: "the presupposition and the problem of the integration of national and European research funding" are disclosed in this Programme (Pilniok, 2015, p.224)

Thus, in order to institutionalize five initiatives based on Article 185 TFEU, this legal ground is used, and followed through the Horizon 2020 framework programme.[21] This legal ground provides European Union to participate in the respective programmes. They are institutionalized and thus ensured through this law.

[21] Decision No. 1209/2003/EC of the European Parliament and of the Council of 16 June 2003 on Community participation in a research and development programme aimed at developing new clinical interventions to combat HIV/AIDS, malaria and tuberculosis through a long-term partnership between Europe and developing countries, undertaken by several member states, OJ 2003 L 169/1;

Decision No. 742/2008/EC of the European Parliament and of the Council of 9 July 2008 on the Community's participation in a research and development programme undertaken by several Member States aimed at enhancing the quality of life of older people through the use of new information and communication technologies, OJ 2008 L 201/49;

Decision No. 743/2008/EC of the European Parliament and the Council of 9 July 2008 on the Community's participation in a research and development programme undertaken by several Member States aimed at supporting research and development performing small and medium-sized enterprises, OJ 2008 L 201/25;

Decision No. 912/2009/EC of the European Parliament and of the Council on the participation by the Community in a European metrology research and development programme undertaken by several Member States, OJ 2009 L 257/12;

Article 185 TFEU aims the integration of Union with several Member States, and for this purpose establishes the instrument of variable geometry[22]. Thus, this integration bases on the voluntarily participations of Member States. This means that all Member States do not have to attend this integration process. However, incorporation with significant numbers of Member States must be on the agenda of the Union because, as it is stated, maximum effect can be provided only in this way.

The main objective of relatives of this Article is the EU's integration of the research funding programmes. Thus, the scope of integration is limited to existing funding programmes: "programmes already underway or programmes for which preparation are well advanced" (Commission of the European Communities, 2001a, p.5)

In the communication, declared by Commission of the European Communities (2001a), these research-funding programmes are defined by Commission, as "clearly defined activities or measures (whether or not formally called "Programmes") on a specific theme or in a specific area, with an earmarked budget and implemented over a set period following clear procedures" ( Commission of the European Communities, 2001a, p.5) Likewise, they are and have to be publicly financed either by the Member States or Member States' research-funding agencies which are financed publicly.

The Union's participation to these research-funding programmes is enabled by this Article 185 TFEU which also assigns the establishment of common organizational structures between the European Union and participating member states. This common structure creates relationality between the Union and participating Member

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Decision No. 862/2010/EU of the European Parliament and of the Council of 22 September 2010 on the participation of the Union in a Joint Baltic Sea Research Programme undertaken by several Member States, OJ 2010 L 256/1.

[22] Variable geometry is defied, in the official website of ERA, as "voluntary and flexible cooperation of different network members (e.g. countries/regions) in an undertaking to achieve common goals, e.g. to implement transnational call". From https://www.era-learn.eu/service/glossary/variable-geometry

States based on the necessary consent of these member states and the requirements constituted in the Framework Programme. However, European Commission has, in this process, strong position in determining initiatives according to its previous experiences of collaborating with Member/Associated States in particular areas of research funding.

Accordingly, on this legal and normative base, the decision on Union's participation in joint funding programmes is included to the Framework Programme. While common criteria for participation are established by Framework Programme, Specific Programmes implementing Framework Programme determine specific fields of scientific research. It is on these scientific fields that a joint Programme [of several Member States] is conducted and the Union financially participates in this joint research-funding programme.

Accordingly, the decisions taken under this joint programme are institutionalized by "dedicated implementation structures" which are established by participating Member States in order to manage funds, and "complemented with general and yearly agreements between the Commission and these dedicated implementation structures" (Pilniok, 2015, p.225)

The relationship between Commission and these dedicated implementation structures is generally constructed on financial issues. The Union's financial contributions and their conditions are determined by decisions taken by this relationality. Through these decisions, the Union aims to protect its financial interests (that is, the Union and Member States should contribute same amount to the joint programme).

On the other hand, the dedicated implementation structures are established, by participating member states, in order to administer the funds. The dedicated implementation structure centralizes the selection procedures: scientific excellence is determined as sole criterion and independent experts are employed in order to review

submitted proposals for research project. At the end of review process, the dedicated implementation structure establishes a ranking list of proposal which will be funded in terms of allocation of funding from both Union's contribution and participating member states' budgets assigned to the respective joint programme.

Overall, within these legal and organizational forms of initiatives based on Article 185 TFEU, similar with those other institutionalized funding bodies, the coordination between the Union and Member/Associated States and also between national research-funding agencies are developed in order to ensure and further research activities. With the different levels of collaboration [of researchers in universities, public laboratories and firms], the integration and communication between different stakeholders of ERA at European level is aimed to be ensured with the purpose of the creation of a single European research area.

### 2.4.4. Joint Technology Initiatives

Joint Technology Initiatives are long-term public-private partnership and are maintained within dedicated structures based on Article 187 TFEU. According to this Article;

> The Union may set up joint undertakings or any other structure necessary for the efficient execution of Union research, technological development and demonstration programmes.

Thus, the Commission, in 2007, accepted first proposals for Joint Technology Initiatives: It is the public-private partnership, involving research community, public authorities and industry; which were introduced at European level to follow common research objectives. European Commission, in its official website, defines JTIs as followed:

> JTIs are (1) led by industry and backed by the private sector; (2) bringing together diverse industrial, academic, research and institutional partners

> creating stronger links between demonstration projects; and (3) fundamental and applied research projects, accelerating the pace of development.[23]

Accordingly, the concept of JTIs is first introduced in the Commission's proposal for Seventh Framework Programme, as a new way of realizing public-private partnerships at European level. These initiatives are activities well-structured at European level and aiming to contribute to the achievement of the European Research Area. These initiatives are defined and implemented through European Technology Platforms which provide a framework for addressing major technological challenges. Each platform has particular origins and approaches and also its own way of working. However, as common to all platforms, they follow three-stage process:

In the first stage, stakeholders come together through the initiating role of industry. A strategic vision document is delivered with the aim of expanding the importance of the activity that leads consensus, and also giving "an outline of desired medium and long term development objectives of respective platform". This document also explains the reason why this action should proceed at European Level. The main principle to the governance of the platform is also founded at this stage (Commission of European Communities, 2005, p.5).

In the second stage, the Strategic Research Agenda is established and; its definition is adjusted by an advisory council which includes "representatives from a wide range of stakeholders" (Commission of European Communities, 2005, p.5). This Strategic Research Agenda "should set out research and technological development priorities for the medium and long term, including measures for enhancing networking and clustering of the research and technology development capacity and resources in Europe" (Commission of European Communities, 2005, p.5)

[23] It is cited from http://ec.europa.eu/research/transport/funding/joint_technology/index_en.htm

In the last stage, this agenda which is identified by European Technology Platforms is implemented. However, one should remember that these Strategic Research Agendas get great supports from a range of sources, including Framework Programme, national/regional research funding programmes, other EU funding and industry funding.

Correspondingly, for example in Seventh Framework Programme, six initiatives, defined under the Specific Programme "Cooperation"[24], are ensured and institutionalized on the base of Article 187 TFEU: "Innovative Medicines Initiative (IMI)" - Health research theme, "Aeronautics and Air Transport (Clean Sky)" - Transport research theme, "Hydrogen and Fuel Cells Initiative (FCH)" - Energy research theme, "Embedded Computing Systems (ARTEMIS)" - ICT research theme, "Nanoelectronics Technologies 2020 (ENIAC)" - ICT research theme, "Global Monitoring for Environment and Security (GMES)" - Space research theme.[25]

As a result, Joint Technology Initiatives are also institutionalized through the Article 187 TFEU in order to raise the scale and influence of research investment, advance the coordination in Europe and increase technological content of industrial activity.

### 2.4.5. Marie Sklodowska-Curie Actions

Mobility and training of researchers, among other objectives of ERA that aim to contribute to the progress of knowledge and technology, have also a key role. Thus, Marie Curie Actions which was first launch in 1996, is "a mobility programme dedicated to the developments of researcher's career throughout Europe" and officially included to the process of the creation of an European research area, as its one of initiatives, for the first time in Sixth Framework Programme; and it is still

[24] Decision 2006/971/EC of 19 December 2006 concerning the Specific Programme "Cooperation" implementing the Seventh Framework Programme of the European Community for research, technological development and demonstration activities (2007 to 2013).

[25] It is extracted from http://ec.europa.eu/research/jti/index_en.cfm?pg=about

leading actor in framework programmes (so it was in seventh one, and it is also active now in Eight Framework Programme 'Horizon2020'.) European Commission (2012d), in its official document entitled *Marie Curie Actions: Where innovative science becomes success,* identifies its idea behind these actions as stated below:

> The researchers should have a stable career, with decent employment conditions; they should have access to the necessary training and information for increasing the level of professionalism and giving them more power in a highly competitive and demanding world. (p.7)

Accordingly, these actions support researchers in different stage of their career as well as institutions as hosts for these researchers. They are broadly divided into host-driven actions, individual-driven actions and 'excellence promotion and recognition' instruments (European Commission, 2004a, p.31)

Within host-driven actions, research organizations and enterprises are supported "for the provision of either transnational training or for knowledge transfer and mobility of individuals" (European Commission, 2002a, p. 14) Applications are made by these host institutions to the Commission as a response to a call for proposals.

On the other hand, individual driven actions aim to support individual researchers in order to encourage transnational mobility and enhance individual competencies. "Applications to the European Commission are made jointly by the fellow and liaison with the host organization" (European Commission, 2002a, p. 18)

Lastly, Actions under the heading 'excellence promotion and recognition' focus on promoting and recognizing excellence in European research, and thus increasing its visibility and attractiveness. It is aimed to be succeeded through the creation and development of research team (composed of best researchers all over the world) for leading research activities.

Accordingly, these well-established actions are grouped into, and sub-institutionalized under various specific actions: Innovative Training Networks (ITN), Individual fellowships (IF) Research and Innovation Staff Exchanges (RISE), Co-funding of Regional, National, and International Programmes (COFUND), European Researchers' Night (NIGHT)[26].

As a results, Marie Curie Actions, with its well established institutional character, both lead and institutionalize the various initiatives of ERA by meeting "the training, mobility, and career development needs of researchers".[27]

### 2.4.6. European Strategy Forum for Research Infrastructures (ESFRI)

Research infrastructures are, "as facilities, platforms, resources and related services used by the scientific community to conduct research" (European Scientific Foundation, 2013, p. 7), also in the agenda of European Commission, in the process of creating a European Research Area. The member states and the Commission, as stated in the conclusion of the Lisbon European Council, should ensure the national and European support for better integrated and coordinated research infrastructures. Thus, to facilitate this integration and cooperation, the Commission created a new institution in 2002, and set up the European Strategy Forum for Research Infrastructures (ESFRI), as formal expert group of the Commission[28]. ESFRI's members represent research ministers of member states and the Directorate-General for Research of the Commission. With Pilniok's words:

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[26] It is cited from European Commission's official website: http://ec.europa.eu/research/mariecurieactions/

[27] It is exacted from: Council Decision 2006/973/EC of 19 December 2006 concerning the specific programme People implementing the Seventh Framework Programme of the European Community for research, technological development and demonstration activities (2007 to 2013) [Official Journal L 400 of 30.12.06].

[28] The Commission expert group's registration is available at: http://ec.europa.eu/transparency/regexpert/index.cfm?Lang=EN

> The ESFRI has developed complex organizational structure, with a number of working groups under its umbrella. The activities of the ESFRI are connected with the funding conducted via the Framework Programme's funding line for research infrastructures: the competition for European funding from the Framework Programme is predominantly restricted to those research infrastructure projects chosen by ESFRI. (2016, P.297)

Moreover, new legislation on research infrastructures is forced by these activities. These infrastructures establish a specific framework for legal entities constructed by several member states for 'the joint operations of research infrastructures'.[29]

Consequently, ESFRI, with the needs for pan-European research infrastructures, focuses on the efficient utilization of these existing infrastructures, quality standards for individual research infrastructures, and coordination and integration of these national and regional infrastructures at European level through its institutionalization by specific normative, legal and administrative regulations.

At the end, these initiatives are crucial because their legal, normative and administrative bases provide the establishment of European Research Area on a strong ground. Moreover, each of them, because regulating and rearranging some components of knowledge-production process -its infrastructures, funding agencies, researchers etc.- is necessary to establish and further this common scientific community.

Consequently, in this chapter, I investigated European policies on knowledge production and European Research Area especially with the aim of looking for whether institutional character of modern sciences is preserved in these policies or not. I scrutinized this aspect because, according to Heidegger, science in modern age is necessarily ensured and promoted in scientific community. This institutionalized

[29] Council Regulation (EC) No 723/2009 of 25 June 2009 on the Community legal framework for a European Research Infrastructure Consortium, OJ L 206/1.

character of sciences is necessary as it provides the preservation, communication, dissemination, use and reuse of scientific knowledge.

To this end, I first addressed the institutions which are components and stakeholders of ERA and places where knowledge production in ERA is prolonged. I focused on these institutions because both researchers and knowledge can be visible in ERA only as long as they are produced and reproduced in these institutions. Researchers can be a member of this area on the precondition of being socialized in a scientific community. Second, I investigated Commission's initiatives which are institutionalized through various sets of habits, routines, rules and laws, and in turn, create ERA as a scientific community where the free circulation and exploitation of researchers and knowledge is aimed.

At the end, within the Heideggerian conception of modern science, I understand European Research Area as an institution of sciences which is established by their drive to secure their existence through interaction of their results and using them for further research activities. Only in this way, modern science as research preserves its maintenance and advancement.

# CHAPTER III

# SPECIALIZED CHARACTER OF MODERN SCIENCES IN ERA

## 3.1.Modern Science and its Specialized Character

Modern science, as research in modern age, essentially has specialized character. It is necessarily individualized because it is founded upon the projection of a restricted object-area. Modern science must and does fragment into specialized disciplines "in the development of its projected plan by means of its methodology" (Heidegger, 1977a, p.123). However, this individualizing is not simply tedious concomitant of growing incalculability of research results. It is rather fundamentally required by modern science as research. Thus, it is inaccurate to recognize this particularization as mere consequence because it is "the foundation of the progress of all research" (Heidegger, 1977a, p. 123).

In more detailed way, modern science experiment, according to Heidegger, is different from "the observation of things themselves, their qualities and modifications under changing conditions and consequently the knowledge of the way in which things as a rule behave" (Heidegger, 1977a, p. 121). The modern experiment necessitates a predetermined rule and a conditioned law which are set as a basis. The meaning of the arrangement of an experiment is, then, "to represent or conceive the condition under which a specific series of motion can be susceptible of being followed in its necessary progression, i.e., of being controlled in advance by calculation" (Heidegger, 1977a, 121). However, this founding of a law is achieved in respect to projected ground plan of the realm of object; and this ground plan provides a criterion for and limits possible results. Experiment, arising from the initial ground plan of nature and designed in respect to this plan, as Heidegger puts it, "is that

methodology which, in its planning and execution, is supported and guided on the basis of the fundamental law laid down, in order to adduce the facts that either verify and confirm the law or deny it confirmation" (Heidegger, 1977a, p. 122).

Accordingly, this projection of constrained realm of objects, as the basis of modern science as research, necessarily establishes its essential character: its specialized character. Modern science's projection of specific realm of objects is fundamental in order to both constitute itself as research and also differentiate itself from other fields. Thus, individualized character of modern science is not mere consequence but needed by all research to be able to progress.

The foundational character of modern science as research, is this projection-plan essentially of specific fields of investigations developed and demarcated by the means of respective methodology. Consequently, each modern science, in order to secure its object-spheres, must circumscribe, confine these spheres, that is, compartmentalize them. Modern science is, then, essentially 'departmentalized science'. With the words of Heidegger (1977a):

> Investigation of an object-area must, in the course of its work, agree with the particular form and modification possessed at any given time by the objects belonging to that area. Such agreement with the particular transforms the procedure of a branch of science into specialized research. Specialization, therefore, is in no way either a deterioration due to some blindness or a manifestation of the decline of modern science. Specialization is also not merely an unavoidable evil. It is a necessary consequence, and indeed the positive consequence, of the coming to presence of modern science. The delimiting of object-areas, the compartmentalizing of these into special provinces, does not split the sciences off from one another, but rather it first yields a border traffic between them by means of which boundary areas are marked out. Those areas are the source of a special impetus that produces new formulations of questions that are often decisive. We know this fact. The reason for it remains enigmatic, as enigmatic as the entire essence of modern science. (pp. 170-71)

Correspondingly, this brings along the other foundational feature of modern science: ongoing activity. It means that, as I mentioned previous chapter, particularization does not continue arbitrarily; and also the methodology of this individual science

through which these particular object-spheres are 'conquered' does not merely pile up results. On the contrary, the methodology, through its results, prepares and furthers itself for new procedures. This also constitutes other essential feature of modern science: its institutionalized feature that I mentioned previously in detail. What is crucial for this chapter is that, because science is essentially institutionalized, there is always possible danger that this ongoing activity becomes 'mere busyness'[30]. It becomes mere busyness at any time, in the following of its methodology, when it does not hold itself "open and free by continually and creatively activating and renewing its original projection" (Kockelmans, 1985, p. 158) but only keeps that plan as a given without any further questioning, confirming and verifying "its own self-accumulating results and the calculation of them […] and simply chase after such results and calculation" (Heidegger, 1977a, p.138). Heidegger insists that modern science must and does continually fight against this mere busyness because of research's intrinsic feature: ongoing activity. This clearly means that each modern science, with the aim of progressing itself through its own results, should be critical about its own contributing results and calculations. To do otherwise, for Heidegger, means the denial of the research's essential character and go after the 'serene erudition' which is against the nature of modern science and does not exist in modern age.

Accordingly, the system of modern science is formed by 'a solidarity of procedure and attitude' as long as the interest is the objectification of the beings: a solidarity which is established on the basis of projected plan of demarcated object-spheres and ensured by proceeding itself by using its results for further researches. Thus, the new questions emerged from these results facilitate and enable the emergence and development of new disciplines. In Kockelmans' words (1985):

> […] the systematization of the sciences does not consist in a contrived and fixed unity, which depends on an inner relationship between their subject matters and contents, but rather in the greatest possible, free, but also

[30] For further explanation, see 4. footnote in this thesis.

> regulated, flexibility as far as the change of existing or the introduction of new forms of research are concerned, in light of the tasks which at each time in a society appear to be dominant. Each modern science has systematically to follow its own research course and to engage in further specialization and further branching out wherever these appear to be necessary or desirable, if it wishes to remain what, according to its essence, it genuinely is (pp. 160-161)

Correspondingly, this 'further specialization' and 'further branching out' is directly linked to, what is today being used very popularly by scientific community, the multi and interdisciplinarity. I will focus on this issue in the following sections especially in the context of European Research Area. However, before the analysis of this multi and interdisciplinarity, I now investigate the specialized character of modern sciences in ERA and in its institutionalized initiatives and propose that modern science as research, in ERA, is and must be essentially made and proceeded by particularizing itself into specific fields of investigation.

### 3.2. The Specialized Character of Modern Science in ERA and in its Initiatives

In this part, I particularly investigate whether this individualized feature of modern science as research is observed in European policies on knowledge production, in European Research Area through looking into, first, Commission's policy recommendations, and second, its initiatives. As I stated previous chapter, ERA, because of the essential character of modern science, is established as an institution where production, dissemination and communication of scientific knowledge is ensured at European level through various arrangements- developing research policies to the integration of research infrastructures, the enhancement of mobility of researcher, and the collaboration of research activities at European level: as an European level institution where scientific research is made and its result is used and reused for new researches.

It is in this institution where researchers realize and maintain their research activities in specific fields, through specific means of methodology. ERA, through institutionalized funding programmes within multiannual framework programmes,

provides the maintenance of scientific knowledge production in specific object-spheres. Each research project under these funding programmes covers specific fields of investigation. Even if traditional disciplines still have key role in these projects, the multi- and interdisciplinarity have become popular phenomenon in the discourse and research programmes of ERA.

Accordingly, in the next three parts, I will first focus on the objectives and policy recommendations about this issue. Then, I will especially emphasize on the multi and interdisciplinarity in the official documents of ERA, and lastly I will give some examples of research projects under different institutionalized initiatives in order to show the individualized character of modern science as research in ERA.

### 3.2.1. Internal and Networked Specialization

The main obstacle to the creation of European Research Area is, as I mentioned previous chapter, 'the fragmentation, isolation and compartmentalization of national research efforts and systems'. In Green Paper, Commission declares the need of the new research policy and continues (2007):

> […] much ground work remains to be done to build ERA, particularly to overcome the fragmentation which remains a prevailing characteristic of the European public research base. Fragmentation prevents Europe from fulfilling its research and innovation potential, at a huge cost to Europeans as taxpayers, consumers, and citizens (p. 7).

The most important reason behind this fragmentation, as Commission declares, is the financing and governing research activities by national systems. These activities differentiate in terms of scale and quality of its multi-centered and multi-leveled governance. In the Green Paper, Commission (2007) talks about four negative consequences of this fragmentation: (1) the prevention of the mobility of researchers, (2) difficulty of the establishment of cross-border partnership between academia-industry, (3) the lack of the coordination of national/regional research funding programmes leading to "dispersion of resources, excessive duplication, unrealised benefits from potential spillovers, and failure to play the global role that Europe's R&D capability would otherwise allow, notably in addressing major global

challenges", and (4) the inadequacy of transnational coherence and European perspective on reforms realized at national level (p.6-7).

Commission sees all these consequences as a system-level failure caused by the lack of the selection mechanisms, effectiveness and efficiency of research activities and development of learning capacities. This implies the failure of research efforts because of the deficiencies at administrative level and the lack of coordination and cooperation between research (support) institutions. These institutions consist of research funding agencies and also institutions who provide resources and take decisions about the organizing and structuring research.

In such a case, the important question asked by the Commission is whether fragmentation exists at micro-scale or not. And a new question follows immediately afterwards: the question of sub-criticality. More clearly, in Green Paper, Commission points out that even if there are great number of researcher in Europe, the reason behind the failure of research efforts and systems is that researchers work at sub-critical units, and that the efforts and resources that they need to reach world-leading position are not gathered in an efficient way. And Commission asks: Can this failure be the explanation of institutions', research groups' and other research bodies' poor research performances at world-level?

Accordingly, the ERA Expert Group, in a report entitled *Challenging Europe's Research: Rationales for the European Research Area* (2008) defines sub-critical as "the effort in a particular field or subfield lacks resources, equipment or a sufficient number of researchers to achieve a desired goal", and the reverse of this sub-critical is determined as critical mass which is "an analogy that implies that there is a threshold size as which working becomes effective" (p.15). The meaning of this sub-criticality is, at the level of research group, is the inability to compensate the needed equipment, to achieve or establish the essential structure to gain the standards of good research, or to meet the required resources. The reason of this sub-criticality can also be the lack of researchers with the necessary and adequate quality for the advancement of research studies, or the "actual shortage of suitably qualified

researchers available to hire" (European Commission, 2008, p. 15). Likewise, the insufficient support of local government can also be the reason of this sub-criticality.

Correspondingly, European Commission asks the question: "what is the role of European Research Area in such an environment?" (2008, p.18), and in Green Paper, declares the necessity of specialization to deal with the lack of critical mass in two ways: internal and network specialization. With the words of Commission (2012e):

> Specialization can be achieved in two distinct ways, so that we can speak of internal or networked specialization. The former is achieved by refocusing the activities and reallocating resources within the boundaries of organizations, the latter is achieved by establishing stable and strategic relations with other actors in order to achieve joint specialization (p.15).

Therefore, Commission stresses the importance of specialization of research actors-universities and public research organizations. Increasing competition obliges these actors to make decision about "whether to pursue excellence across all scientific areas, or rather articulate the arenas at different levels" (European Commission, 2012e, p.15). Then it states the impossibility to compete internationally across all research fields, and thus the necessity of reorientation of research actors towards more specialization. As Commission states (2007):

> Most European research institutions lack critical mass and, within the confines of sub-optimal national systems, have difficulties meeting expectations with the resources available to them. While the average quality of European public research is good, in many institutions it is not up to leading world standards. Therefore, some concentration and specialization is necessary to permit the emergence of both European centres of excellence competitive on the global scale and a rich network of universities and public research organisations across the entire EU which excel in addressing research and training needs at national, regional and sectoral levels (p.14).

This exactly means what Heidegger asserts in *The Age of the World Picture*: it is because of the essence of modern science as research that "the more exclusively science individualizes itself with a view to the total carrying on and mastering of its work process, and the more realistically these ongoing activities are shifted into separate research institutes and professional schools" (1977a, p. 126). Thus

Commission also recommends the specialization of research institutions "particularly in highly dynamic scientific fields" (European Commission, 2012e, p. 16). By removing 'serene erudition', these modern sciences, according to their ability to adapt itself to its own results, and to use these results as the means and ways of advancing itself is the necessity of research's feature as ongoing activity. Thus, the maintenance and advancement of individualized sciences depend on its ability to create further research problems which should be useful and necessary for various stakeholders. Actually, modern sciences should be productive that they should consistently produce knowledge that enables efficient answers and possible research problems in order to make secure and further itself. If we analyze the relationality between traditional disciplines and their research problems, specific sciences, according to their specific fields of investigations, establish research problems and through their means of methodology answer these problems. However, the most important thing here is their results that whether enable the further research problems and enhance the relative disciplines or causes them to disappear because of inefficient research results, 'serene erudition'.

Accordingly, I read these policies prepared and implied by European Union as an attempt to erase and get rid of sediments of erudition which belongs to previous ages very different from the one Heidegger talks about. Thus, the more 'serene erudition' disappears in the modern age, the more the sciences become 'productive' and 'efficient' and the more they will be specialized.

Likewise, Commission, with the aim of both efficient specialization and also in order to achieve this at European level, offers two different arrangements about specialization: internal specialization and networked specialization:

> Following the internal specialization process, research actors may undertake reorientation of activities and resources, for example by linking internal policies of recruitment of researchers to international visibility. Following the networked specialization process, research actors enter into long term and stable agreements with partners, trying to benefit from knowledge generated in other domains. This is particularly important in multidisciplinary research (European Commission, 2012e, p. 16)

The internal specialization means the rethinking on the internal arrangements of various research institutions about the process of knowledge production and researcher-training; and the rearrangement of these processes with the aim of placing itself to the international and European level. These rearrangements begin from the training of researchers (the introduction of the three cycle system [bachelor/master/doctorate], strengthened quality assurance, and easier recognition of qualifications at European level) and include their working conditions, the enhancement of research infrastructures, and the decision-making process about dis/continuation of laboratories and institutes according to their performances.

The network specialization, on the other hand, is a collaboration policy which is "first introduced in 2008 by an ERA expert group suggest[ing] that issues of sub-criticality in the ERA should be addressed by internationally linking research groups with complementary capabilities" (European Commission, 2012f, p. 6). With the development of the modern Information and Communication Technologies (ICTs), this 'inter-regional' contact and collaboration gains possibility. The one of the reason of the establishment of Framework Programme (FP), the major research policy instrument of the European Union is the decompartmentalization of research activities and the constitution of networked specialization: "The FP unites research teams from across Europe, promotes an international and interregional division of labour and facilitates the sharing of knowledge and capacity building" (European Commission, 2009, p.1). These networks are intrinsically specialized and institutionalized as larger and long-term scientific communities.

Moreover, the networked specialization is extensively implemented to the areas requiring larger infrastructures which are inseparable and cannot be met by single countries. These are generally "facilities which all researchers use on a temporary basis (e.g. beam sources or archives), or are staffed by international teams, and in all cases transnational governance arrangements are in place" (European Commission, 2008, p. 19).

Consequently, I read this network specialization as attempt to produce more efficient knowledge and make secure the productive specialized sciences at European level. These coordination and cooperation of complementary and neighboring disciplines, by advancing multi and interdisciplinary nature of research, enhance the field and provide research questions and results that ensure and further research activities through sharing "resources and the ability to configure expertise around problems" (European Commission, 2008, p. 20).

At that point, I want to focus on the multi and interdisciplinarity in ERA which is related with the networked specialization, but also deserves to be mentioned in a distinct section.

### 3.2.2. Multi and Interdisciplinarity in ERA

In the final report of European Union Research Advisory Board (EURAB) entitled *Interdisciplinarity in Research* (2004), EURAB clearly emphasizes on the importance of multi and interdisciplinary research activities. As the Board stresses, even if traditional disciplines still have great importance on both training researcher and performing research activities, the inadequacy of these present disciplines for "the solution to many of today's complex problems in areas such as globalisation, environment, health, defense and security" is felt more and more in each day; thus the multi and interdisciplinary[31] approaches are needed to handle with these complex problems (p.2)

The Research Innovation and Science Policy Experts (RISE) of European Commission, in a policy brief named as *Quests for Interdisciplinarity: A Challenge for ERA and Horizon 2020* claims that as a result of either "the internal dynamics of science, research and epistemic communities" or "growing public concerns with

[31] The Board defines these concepts at report's footnote and notes that they use interdisciplinarity in both meaning: "1) Multi-disciplinarity – different disciplines working together but not trying to synthesize cognitive structures. Intellectually, they go home to their own discipline after work. 2) Interdisciplinarity – different disciplines working together and trying to synthesize cognitive approaches. We see this particularly in areas such as bioinformatics. However, in this paper, we use interdisciplinarity to cover both approaches" (EURAB, 2004, p. 2)

innovation and with the role of research for economic and social development", "interdisciplinary specialties and many new ways in the production, dissemination, and use of scientific knowledge" proliferate enormously (European Commission, 2015b, p.4). In more detail, RISE divide interdisciplinarity in terms of two different objectives that it serves:

> One is to bring together different scientific approaches, competencies, methods and skills to pursue and solve complex real-life problems, to master a technical challenge, or to track down difficult multi-layered research puzzles. The punchline of this kind of problem-driven, engineered interdisciplinarity is that whatever is seen as helpful in solving or coping with the problem or question at stake will be enlisted. Ultimately, it is not about research excellence but about impact in the first place. The other approach to interdisciplinarity, by contrast, focuses on research, its objects, procedures, methods and perspectives. It is to help bring about new scientific discoveries, fields or research puzzles outside the pale of existing departments, academic tribes and epistemic communities. Here, interdisciplinarity is considered a tool, an incubator to inspire scientific breakthroughs via the exchange of unfamiliar ideas and encounters that might be irritating but nudging to challenge and change established research outlooks, routines, and paradigms (2015b, p.4)

Accordingly, the Board and RISE talk about the arrangements necessary to increase these multi and interdisciplinary research activities: avoiding the administrative implementations that prevents the development and the application of interdisciplinary research, enhancing interdisciplinary training, developing a policy for interdisciplinary research institutions, improving shared infrastructures and facilities and "funding and managing interdisciplinary research" (EURAB, 2004, P.1) Correspondingly, Programmes and projects funded by ERA show the best examples of these interdisciplinary researches and I will particularly mention some of them in the next section.

However, before moving on to the section where I specifically focus on some of these programmes and projects, I want to explain the meaning of multi and interdisciplinarity in my point of view.

Heidegger, in his analysis of modern science, as I stated previous section, stresses the necessity of its individualization. Modern science as research realizes and furthers itself only in this way. Through determining specific type of phenomena, advancing particular means of methodology for analyzing it, and then proceeding to extend these ways throughout the object-sphere. This formulation can easily be understood as the approaching specific research problems through traditional disciplines without questioning its projection-plan. However, Heidegger emphasizes the possibility of these disciplines being mere busyness if knowledge-production is proceeded with never again questioning its projection of plan and self-accumulating results and calculations. Thus, disciplines, instead of having sharp and strict boundaries, are flexible areas where research results and also the ways and means of methodology move and enhance freely. The extension of these ways and means of methodology continues throughout subject-area "until it is exhausted or runs up against the need for a new subject-area definition and method" (Frodeman and Mitcham and Sacks, 2001, p. 1). This is the essential character of modern science as research that it should adapt itself to the new research problems. As Glazebrook states, "the uncovering of new research problems brings with it further specialization of the sciences under their earlier account" (2000, p. 152)

Especially, in a world of complex relations and research fields, the idea of existence and continuation of strict and unchanging disciplines is explicitly against the essence of modern science. With the words of Frodeman and Mitcham and Sacks (2001):

> […] the problems characteristic of a crowded high-tech world require the exploration of interactions among complex phenomena and an understanding of the interstices of knowledge. Increasingly, science and society recognize that disciplinarity and interdisciplinarity are not mutually exclusive, but mutually reinforcing (p.2)

Accordingly, because of the necessary feature of modern sciences as ongoing activity, the communication between disciplines and also the establishment of new disciplines are the essential developments. The interwoven and hybridized scientific disciplines are fundamental consequences of modern science as research. For

example, new research problems, which have arisen through and after Second World War, brought out the need of coordinated interaction of different disciplines. "The research and development of radar, the atomic bomb, and other military projects" were undertaken by this coordinated work of different disciplines (Frodeman and Mitcham and Sacks, 2001, p.2). Afterwards, the global phenomenon and problems such as war, over-population, over-consumption, hunger, poverty, environmental degeneration, show the best examples of interdisciplinary research.

Moreover, humanities and social sciences, like physical sciences and engineering, have also followed their own forms of interdisciplinarity. Eurasian Studies, Asian Studies, Women's Studies, Media and Cultural Studies are only a few examples of these institutionalized interdisciplinary programs. These programs constituted through the interaction of traditional disciplines and with the need of new methods have essentially institutionalized character:

> […] just as in the physical sciences, the result has been the manifestation of new disciplinary formations from what start out as interdisciplinary exchanges. The various area studies programs have, for instance, become institutionalized in departments and degrees, which are complemented by their professional associations and scholarly journals (Frodeman and Mitcham and Sacks, 2001, p.3)

Furthermore, these multi and interdisciplinary efforts are popular, efficient and necessary for the mission-goals and projects that raise broader questions for society. In order to acquire maximum efficiency from these research activities, and find best answers and solutions, disciplines come together and work in various research projects. The main drive and aim of these projects and interactions is to obtain optimal outcome from these research projects. To create nuclear weapon or to improve sustainability is the best example of these efforts. Through and after these efforts, their continuation and advancement as institutionalized disciplines depends on their ability to construct and further their object-sphere and the means of methodology to make secure its endurance. In other words, they can ensure themselves as long as they create productive and useful results. Thus, disciplinarity

and multi and interdisciplinarity are not mutually exclusive; rather the latter is the current optimization of specialization.

Consequently, the ambition and need of multi and interdisciplinarity of European Research Area is the necessary consequence of modern science as research in order to preserve its existence and efficiency in the world of this complex relations and problems. In fact, it is the selection and also the creation of productive and efficient disciplines and the exclusion of inefficient ones, "serene erudition": in this regard, I read ERA and its policies about specialization as a step of the sciences for the accomplishing "the consummation of their modern essence" (Heidegger, 1977a, p. 126).

Now, I move into next section and show some examples of programmes and projects of ERA in order to show the individualized character of modern sciences which necessarily continues in the research activities of these programmes and projects.

### 3.3. Specialized Character of Research in ERA Initiatives

In this section, I plan to demonstrate the maintenance of individualized character of modern science as research in ERA by specifically focusing on three substantial examples of research projects of specific programmes. In other words, examples that I will address in this part will provide to understand ERA as an institution where production, circulation and communication of scientific knowledge and researcher; and where research activities should be and are only ensured and furthered within specific fields of investigation (by either traditional disciplines or multi or interdisciplinary programs). Correspondingly, I cover the projects through particularly concentrating on their institutionalized and individualized features.

As I told previous chapter, Framework Programmes which have been carried on since 1980s and which are multiannual research funding programmes, with the launching of ERA in 2000, have turn into the initiatives which aims the integration of research activities and bases at European level, rather than being mere funding

agencies as it was before. With this change, Framework Programmes (FPs) are still main instruments of European Commission in order to realize its objectives.

Respectively, Multiannual Framework Programme operates as an umbrella under which all initiatives are gathered and ensured. However, I should note that these initiatives and programmes under FPs are essentially institutionalized and specialized because of the very essential character of modern science. I will demonstrate modern sciences' these two fundamental characters by discussing some programmes and projects under these programmes. To this end, I will focus on one of ERC project entitled *Oecumene: Citizenship after Orientalism*, The AERTOs ERANET-project, and The European Metrology Research Programme (EMPR) based on Article 185 TFEU.

Firstly, I address ERC and its project because it provides grants for investor-driven researches without considering any disciplinary boundary and regional limits. It is proper example of interaction of different disciplines under a research project. It has representative character among ERC's other projects because all projects under this Council aim to conduct researches with the aim of creation of innovative and productive knowledge by gathering various disciplines and programmes together in a research project. All ERC projects, like *Oecumene: Citizenship after Orientalism*, are research activities intending to provide proper and common platform where various researchers with different specialties work together for optimal and maximum outcome.

Second, The AERTOs ERANET-project (Associated European Research and Technology Organizations) is a project initiated under the ERANET initiative, with the aim of providing international collaboration of national research funding organizations. I choose specifically this project because it is representative example of those projects which began as a project and transformed into a community because of its productive and useful character (Each project and programme under different initiatives of ERA -ERC, ERANET, Joint Technology Initiatives etc.-, even if different stakeholders and members, either prolongs until the pre-arranged deadline

and achieving the pre-determined goals, like the project *Oecumene: Citizenship after Orientalism*, or turns into a permanent community because of its efficient and promising feature). Moreover, this project, like all others of ERA, clearly demonstrates the importance of cooperation and integration of different disciplines and programmes to obtain maximum efficiency from these projects.

Lastly, I cover European Metrology Research Programme (EMPR) as a third example because it is critical to show the continuation of productive programmes through different framework programmes. In other words, some programmes, with many research projects and plentiful outcomes, also with the great number of members, further themselves within different FPs (EMPR is a research programme based on Article 185 and initiated within Seventh Framework Programme, and still continues under the Eighth FP Horizon2020, with the name of European Metrology Programme for Innovation and Research (EMPIR). Moreover, the studies on metrology and its popularity in ERA is not incidental because, from the point of Heidegger, modern science, in order to have complete control and mastery over nature, must pre-determine it as calculable, and this scientific discipline, through providing 'reliable and comparable measurement standards and appropriate validated measuring and test methods' serves to the practical needs of sciences to ensure exactitude.

At that point, let me emphasize these examples one by one.

### 3.3.1. ERC and "Oecumene: Citizenship after Orientalism"

Firstly, I will focus on European Research Council (ERC) which is launched in 2007 within the specific programme "Ideas" of Seventh Framework Programme, and its project named as "Oecumene: Citizenship after Orientalism". ERC, after its establishment in this FP, have been institutionalized and become main component of ERA. It is still main initiative of Framework Programmes.

ERC, different from other initiatives within which specific research areas are financed, without excluding any field, "covers all fields of sciences". All researchers

from different disciplines can apply for funding. The ERC's research grants which is used to support and encourage the innovative and fundamental frontier research, as Commission declares (2015a), "operate on a 'bottom-up' basis without predetermined priorities" (p.8).

ERC which particularly focuses on frontier of science, scholarship and engineering, Commission states in ERC Work Programme 2016, provides grants for investigator-driven research without considering disciplinary limits and geographical borders. It aims to enhance "proposals of an interdisciplinary nature which cross the boundaries between different fields of research, pioneering proposals addressing new and emerging fields of research or proposals introducing unconventional, innovative approaches and scientific inventions" (European Commission, 2015a, p8).

However, what is common and important in both cases (in both disciplinary and interdisciplinary studies) is the presuppositions and necessity of different scientific disciplines and fields. As Heidegger states, this individualized character of modern sciences is necessary for and foundation of this process of research activities. Thus the emergence of new disciplines or the collaboration of some specialized sciences, with respect to the newly emergent research problems, is inherent to modern sciences.

Accordingly, these 'all fields of sciences' are expressed in all annual ERC Work Programmes, at the beginning; and the planning and operation of evaluation of ERC grant proposals by panels are performed with respect to the panel structure which is formed according to these different disciplines. These fields are assigned to three major domains and covered in ERC 25 panels: Physical Sciences and Engineering (10 Panels, PE1–PE10), Life Sciences (9 Panels, LS1–LS9), and Social Sciences and Humanities (6 Panels, SH1–SH6):

> <u>Physical Sciences and Engineering</u>
>
> PE1 Mathematics: All areas of mathematics, pure and applied, plus mathematical foundations of computer science, mathematical physics and statistics.

PE2 Fundamental Constituents of Matter: Particle, nuclear, plasma, atomic, molecular, gas, and optical physics.

PE3 Condensed Matter Physics: Structure, electronic properties, fluids, nanosciences, biophysics.

PE4 Physical and Analytical Chemical Sciences: Analytical chemistry, chemical theory, physical chemistry/chemical physics.

PE5 Synthetic Chemistry and Materials: Materials synthesis, structure-properties relations, functional and advanced materials, molecular architecture, organic chemistry.

PE6 Computer Science and Informatics: Informatics and information systems, computer science, scientific computing, intelligent systems.

PE7 Systems and Communication Engineering: Electrical, electronic, communication, optical and systems engineering.

PE8 Products and Processes Engineering: Product design, process design and control, construction methods, civil engineering, energy processes, material engineering.

PE9 Universe Sciences: Astro-physics/chemistry/biology; solar system; stellar, galactic and extragalactic astronomy, planetary systems, cosmology, space science, instrumentation.

PE10 Earth System Science: Physical geography, geology, geophysics, atmospheric sciences, oceanography, climatology, cryology, ecology, global environmental change, biogeochemical cycles, natural resources management.

Life Sciences

LS1 Molecular and Structural Biology and Biochemistry: Molecular synthesis, modification and interaction, biochemistry, biophysics, structural biology, metabolism, signal transduction.

LS2 Genetics, Genomics, Bioinformatics and Systems Biology: Molecular and population genetics, genomics, transcriptomics, proteomics, metabolomics, bioinformatics, computational biology, biostatistics, biological modelling and simulation, systems biology, genetic epidemiology.

LS3 Cellular and Developmental Biology: Cell biology, cell physiology, signal transduction, organogenesis, developmental genetics, pattern formation in plants and animals, stem cell biology.

LS4 Physiology, Pathophysiology and Endocrinology: Organ physiology, pathophysiology, endocrinology, metabolism, ageing, tumorigenesis, cardiovascular disease, metabolic syndrome.

LS5 Neurosciences and Neural Disorders: Neurobiology, neuroanatomy, neurophysiology, neurochemistry, neuropharmacology, neuroimaging, systems neuroscience, neurological and psychiatric disorders.

LS6 Immunity and Infection: The immune system and related disorders, infectious agents and diseases, prevention and treatment of infection.

LS7 Diagnostic Tools, Therapies and Public Health: Aetiology, diagnosis and treatment of disease, public health, epidemiology, pharmacology, clinical medicine, regenerative medicine, medical ethics.

LS8 Evolutionary, Population and Environmental Biology: Evolution, ecology, animal behaviour, population biology, biodiversity, biogeography, marine biology, eco-toxicology, microbial ecology.

LS9 Applied Life Sciences and Non-Medical Biotechnology: Applied plant and animal sciences, food sciences, forestry, industrial, environmental and non-medical biotechnologies, bioengineering, synthetic and chemical biology, biomimetics, bioremediation.

Social Sciences & Humanities

SH1 Individuals, Markets and Organisations: Economics, finance and management.

SH2 Institutions, Values, Environment and Space: Political science, law, sustainability science, geography, regional studies and planning.

SH3 The Social World, Diversity, Population: Sociology, social psychology, demography, education, communication.

SH4 The Human Mind and Its Complexity: Cognitive science, psychology, linguistics, philosophy of mind.

SH5 Cultures and Cultural Production: Literature, philology, cultural studies, anthropology, study of the arts, philosophy.

SH6 The Study of the Human Past: Archaeology and history.

(European Commission, 2015a, p. 51-53)[32]

As clearly seen, ERC, with the aim of "creating new knowledge and developing new understanding", supports the investigator-driven frontier research across all fields. Instead of funding specific scientific disciplines or objects, it provides grant for researchers from any field of research. Multi and inter-disciplinary studies (on global change, food safety, learning, ageing, etc.) are also supported because of their

[32] This part directly extracted from a table used in *ERC Work Programme*, an official document of European Commission, published in 2015.

possibility to establish unconventional, innovative approaches and scientific inventions. However, in both cases, as stated above, the specialized character of research is essentially preserved. Specialization of these scientific fields is not mere consequences, but the ground of the progress in every form of research. At that point, I particularly emphasize one of its research project to demonstrate specialized character of research.

Accordingly, "since 2007", as stated on the official webpage of ERC, "more than 6,500 projects have been selected to receive ERC funding throughout the EU Member States, and associated countries"[33]. One of these project is "*Oecumene: Citizenship after Orientalism"* which ran from 2010 to 2015 and digs into "how the concept of citizenship is being refigured and renewed around the globe"[34].

Project team declare their emphasis as "the tension between two different institutions: citizenship, the process by which political subjectivity is recognized and enacted, and orientalism, the process by which Europe is considered the birthplace of 'universal ideas' such as democracy, secularism, rights and capitalism"[35]. They establish the connection between citizenship and orientalism on the ground of an understanding which conceptualized citizenship as an entirely "European institution contrasted against non-European societies"[36]. This project aims to discuss the citizenship practices which cannot be seen or heard by non-Europe; and to investigate "the possibility of a renewed and expanded understanding of European citizenship itself"[37].

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[33] It is extracted from official webpage of ERC: https://erc.europa.eu/projects-and-results/erc-funded-projects

[34] It cited from official website of *Oecumene*: http://www.oecumene.eu/about.html

[35] Ibid.

[36] Ibid.

[37] Ibid.

In short, project team, by questioning existing Western perception of democracy and citizenship, categories of "West", "East", "North" and "South" and also by problematizing nationalism, orientalism and European colonialism, through various studies by different researchers from different disciplines, "intend to offer new ways of understanding citizenship across the world"[38].

Accordingly, project team consists of various researchers from different disciplines most of which has the interdisciplinary character (post-colonial and cultural studies, politics and international studies, women's studies, gender studies, sociology, sociology of law, social anthropology, philosophy, Islamic and Middle Eastern studies, migration and ethnic minority law, international relations, international law and criminology)[39]

Moreover, members of the project, under the common subject field "citizenship after orientalism", conduct many researches which cover the issue from different perspectives and by different disciplinary means of methodology: while one looks to "the tension between citizenship and orientalism from a psychoanalytical perspective" other explores "the origins, interpretations and mutations of the strategies, discourse and technologies for the construction of object immigrant identities"; or while one research investigates "how and under what conditions did British multiculturalism emerge as a strategy for managing difference"-genealogies of British multiculturalism-, other research, "while anthropologically reexamining the concept of state, citizenship, religion caste and Secularism", "focus on how people in South India exercise many forms of political subjectivity through" the religious institution the Matha "in the India with a guru (spiritual leader) at its head."[40]

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[38] Ibid.

[39] http://www.oecumene.eu/people.html

[40] http://www.oecumene.eu/research.html

After all, this project provides 77 publications including books, monograph, book chapter, journal articles, working papers[41] which are necessary because of the modern science's essential character as an ongoing activity which necessitates the dissemination and use of research results for other researches in order to make secure and further itself.

As a conclusion, ERC as an institution established in order to integrate and collaborate research activities, provides grants for many research project from all research fields regardless of any boundaries in order to enhance fundamental and innovative research. Here, the important point for my thesis is that the individualized character of modern sciences (both the maintenance of traditional disciplines and the emergence of new disciplines according to new research problems) is essentially ensured in these projects within the institution ERC.

### 3.3.2. The AERTOs ERANET-Project

Secondly, I want to talk about a community established as an ERA-NET project and essentially institutionalized. ERA-NET instrument, in a word, use grants to provide the international collaboration of national/regional research funding organizations, through supporting them "in their preparation, establishment of networking structures, design, implementation and coordination of joint activities" (European Commission, 2014b, p.3)

Accordingly, the AERTOs Community came into being from AERTOs ERANET-Project (Associated European Research and Technology Organizations) which was funded by European Commission under the Seventh Framework Programme.[42] The rationale of this ERA-NET project was to advance cooperation of Research and Technology Organizations (RTOs) within Europe. The key objectives were to "exploit synergies and avoid duplication, [provide] coordinated specialisation of knowledge production among RTOs in joint programmes, [and] achieve critical

[41] http://www.oecumene.eu/publications.html

[42] Grant agreement ref. 21934

mass, therefore greater efficiency of resource allocation" (AERTOs Community Board, 2013, p.2)

AERTOs project was run from 2008 to 2012 and officially completed on March 31th, 2012. The outcomes of project, according to AERTOs Community surpassed the objectives officially determined in the project proposal, and showed its success particularly in advancing "strategic collaboration between the partners"[43]

As a result, a new collaboration, the AERTOs community is established to support and ensure the lasted 'strategic dialogue'. "The AERTOs project was officially transformed into the AERTOs Community from April 1st, 2012, and the cooperation governed by signing of Terms of Reference."[44] As it is clearly seen, it is institutionalized and ensured because it operates efficiently and productively.

The AERTOs Community, today, consist of a group of RTOs - Fraunhofer-Gesellschaft (FhG), Germany; French Atomic Energy Commission (CEA), France; Technical Research Centre of Finland (VTT), Finland; Netherlands Organization for Applied Scientific Research (TNO), The Netherlands; The Foundation for Scientific and Industrial Research (SINTEF), Norway; Tecnalia Technology Corporation, Spain; SP Technical Research Institute of Sweden, Sweden –and 45.000 professionals are represented by these RTOs. This Community defines its responsibility at European level as following:

> (1) Identify critical themes and, using its critical mass, foster multi-disciplinary, sustainable solutions and innovations to boost the competitiveness of enterprises in Europe (2) address the grant challenges in support of societal well-being, (3) participating actively in the ongoing discussions on research and innovation.[45]

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[43] It is extracted from official web site of AERTOs community: http://www.aertos.eu/en/about/Sidor/default.aspx

[44] Ibid.

[45] Ibid.

Accordingly, these RTOs, through various workshops, identify the fields of joint interest and expected synergies. Most RTOs puts 'Grand Challenges' such as climate change, energy, and raw materials challenges, and safety and security of global food chain on their strategic research and development agendas. The AERTOs community partners, after a series of thematic workshop, determines specific areas to use "their funding in support of complementary activities" in these areas." (ERANET AERTOs consortium, 2011, p.3)

So far, four specific programmes have been launched: AERTOs programme on off-shore Wind Energy (2010-2011), Energy Efficient Buildings (2010-2011), Value from Waste Initiative (2012-2013), and Bio-based Economy Initiative (2014-2016)[46] These programmes promote networking and perform research activities to construct new fields of expertise in support of sustainable development.

The first programme, *Energy Sufficient Buildings,* mainly aims to develop research activities in the field of construction and renovation of buildings with aim of finding "the most cost-efficient opportunities to reduce $CO_2$-emission" (ERA-NET AERTOs consortium, 2011, p.4); and initiates two joint projects.[47] On the other hand, four specific joint projects[48] were undertaken within AERTOs programme on *Off-shore Wind Energy* whose main initiative is the transition of energy supply – relying on renewable sources- to off-shore wind energy ( as a complementary to on-shore one) (ERA-NET AERTOs consortium, 2011, p.5) The impact of these six projects, according to community, "have been successful applications for industrial, national

[46] It is cited from: http://www.aertos.eu/en/activities/Sidor/default.aspx

[47] "Towards Energy Efficient City Systems (TEECS) by Tecnalia, Fraunhofer, SINTEF, VTT and TNO" and "Prefabricated Multifunctional Façade Systems for Building Renovation (Prefab) by SP, Tecnalia, Fraunhofer and SINTEF", (ERA-NET AERTOs consortium, 2011, p.5)

[48]""Operation and Maintenance (Monitoring) of Off-shore Wind Parks", by VTT, TNO and Fraunhofer; "Low Cost Corrosion Protection for Off-shore Wind Turbines and Structures", by TNO, SINTEF and Fraunhofer; "Grid Integration of Off-shore Wind Farms", by VTT, SINTEF and Fraunhofer; "Breaking the Ice", by VTT and Fraunhofer"" (ERA-NET AERTOs consortium, 2011, p.7)

and European projects, common publications and oral conferences, exchange of researchers in one project and applications in progress under H2020"[49].

Moreover, *Value from Waste Initiative* primarily targets the advancement of "waste handling capacity and regulations in Europe", and requires solutions on different levels: "multi-disciplinary and advanced technology (chemistry, physics, materials, ICT), and research related to logistics and value chains in the society." (ERA-NET AERTOs consortium, 2011, p.7) The first results of this initiative are, the AERTOs Community declares, promising: "21 common publications and 25 presentations, the launch of 4 large new projects and many other project initiatives are initiated."[50]

Likewise, *Bio-based Economy Initiative* was launched chiefly with the aim of "introducing biofuels in Europe as a means of diversifying the fuel mix, ensuring security of supply and at the same time mitigating greenhouse gas emissions" (ERA-NET AERTOs consortium, 2011, p.8). With its know-how and infrastructures in these specific research fields, the AERTOs Community purposes to advance expertise and specialization and remove the obstacles to create "innovative and profitable methods for recycling scare materials"[51].

In short, as clearly seen, these four programmes and projects under these programmes require great specialization and expertise about relative research areas. The AERTOs Community, as an institution composed of several RTOs, produces research activities and supports technological development mainly about the sustainability of life. Various specific areas about this global problem are determined and studied multi-disciplinarily by numerous professionals from different disciplines.

[49] From: http://www.aertos.eu/en/activities/Sidor/default.aspx

[50] Ibid.

[51] From: https://www.sintef.no/en/projects/aerto-value-from-waste-and-critical-materials/

### 3.3.3. The European Metrology Research Programme (EMRP) and European Metrology Programme for Innovation and Research (EMPIR)

Lastly, I will focus on The European Metrology Research Programme (EMRP) which is the initiative based on Article 185 TFEU, a European programme of coordinated research and development on metrology. It is initiated with the aim of facilitation of scientific, financial and management integration of national research programmes on metrology. The European Commission and the participating countries within the European Association of National Metrology institutes (EURAMET)[52] jointly finance and support the EMRP. Thus, the EMRP is a long term programme for joint research and development among "the metrology community in Europe". The main objectives of EMRP are, European Commission states, to provide cooperation between National Measurement Institutes, decrease duplication, rise impact and above all develop "reliable and comparable measurement standards, and appropriate validated measuring and test methods [which] underpin the process of scientific advancement and technological innovation and thus have a significant impaction on the economy and quality of life within Europe." (2012g, p.2)

This specialized community mainly creates joint research projects of metrology which are undertaken and investigated by researchers from different perspectives and disciplines. Moreover, while its projects still continue, because of its great success, European Metrology Programme for Innovation and Research (EMPIR), an initiative co-funded by the European Union's Horizon 2020 research and innovation programme and the EMPIR participating, "the main programme for European research and metrology", is established. With the participation of 37 EUROMET member countries, it seeks to coordinate research projects to undertake grand

[52] Belgium, the Czech Republic, Denmark, Germany, Estonia, Spain, France, Italy, Hungary, the Netherlands, Austria, Poland, Portugal, Romania, Slovenia, Slovakia, Finland, Sweden, and the United Kingdom as well as Norway, Switzerland and Turkey.

challenge –health, energy, climate, secure societies, etc. - while supporting and promoting the SI (International System of Units) system of measurement units.

Consequently, throughout these two programmes, more than 100 joint research projects are stressed, by researchers from different disciplines undertaken different dimensions of metrology (for example "3D chemical measurement", "microwave measurements for high-frequency microchips", "temperature measurements capability in high-value manufacture, etc."[53])

After all, these two initiatives, like others, are essentially institutionalized; and they demand and encourage multi- and inter-disciplinary research activities. Likewise, the areas determined in these initiatives show the need of great specialization and expertise on relative fields.

Examples of these initiatives and projects conducted under them can be increased. Actually, all initiatives should necessarily be institutionalized to be able to provide the production, dissemination and communication of research results, and also the use and reuse of these results for further researchers (all these only depend on this characteristic of research). Likewise, all projects undertaken within specific programmes of ERA should and do have specialized character because they are fundamentally and necessarily focus on specific fields. (ERA on Aging, Environmental and Health Research Programmes, Industrial Bio-technology, Europe against Cancer, Sustainable Tourism, Nanomedicine, Migration in Europe, Wood Material Science and Engineering in the Forest-Based Value Chains, ICT and Robotics in Agriculture and related Environmental Issues, environmentally-friendly technologies in all segments of civil air transport, innovative medicine initiatives, computing systems, nano-electronics, etc.[54]) Each researcher deals with some aspects of research field, and constructs and analyzes this field within the projection–plan of their circumscribed objects-sphere. Furthermore, Grand Challenges which are major concerns of European Union require both multi- and inter-disciplinary efforts and

[53] All research projects are reachable at: http://www.euramet.org/research-innovation/search-research-projects/

[54] These are extracted from official websites of relative programmes and projects.

also further specialization and expertise because of the complexity and broader-scope of research areas.

In a conclusion, this chapter covers Commission's policy recommendations and initiatives about knowledge production on the purpose of investigating the specialized feature of research in this European zone. At the end, I conclude as following: European Research Area, through numerous funding programmes under multiannual framework programmes, maintain and advance scientific knowledge production in specific object-spheres. Each research project under these funding programmes deals with specific research problems of particular fields. To this end, European Commission, in order to ensure and further the production of efficient and innovative knowledge and assure the knowledge flow, knowledge diffusion and researchers' mobility at European level, offers two kinds of specialization: while internal specialization offers the rearrangement of specific areas and disciplines of national institutions with the aim of placing them to the international and European level, the network specialization is a collaboration policy aiming to link research groups from different regions and sectors and with complementary capabilities.

Moreover, European Commission stresses the importance of multi and interdisciplinary research activities. In order to provide solutions to today's complex problems and in accordance with the outcome-driven structure of modern sciences, the ambition and need of Commission for multi and interdisciplinarity is understandable and essential because the main drive of research activities, for Heidegger, is their efficiency and productivity; and optimal outcome can be gained only through this collaboration and integration of various disciplines and programmes in research projects. Thus, with the Heideggerian conception of modern sciences, I understand ERA and its policies as an attempt to provide a common scientific community where research activities are performed on the basis of maximum efficiency; thus research projects about specific problems are aimed to be studied with the great integration of numerous researchers with different specialties.

Overall, European Research Area, as an umbrella institution, includes many research programmes and projects which are also necessarily institutionalized and have

specialized character. These initiatives, depending on their efficiency and utility, are either institutionalized or disappear.

# CHAPTER IV

# RESEARCHERS IN EUROPEAN RESEARCH AREA

## 4.1.Modern Science and Its Researcher

The last essential and distinctive character of modern science as research is its researcher. Researchers are constituted by and, in turn, constitute modern sciences. They, as the thinkers of modern age, act in accordance with the institutional research agendas, produce results to use them in further researches, and present great industriousness and mobility grounded on the busyness of meetings and congresses. They produce and gather information at the meetings and conferences, and revise this information in favor of the demands of publishers and research support (funding) institutions. With the words of Heidegger:

> [...] the decisive development of the modern character of science as ongoing activity also forms men of a different stamp. The scholar disappears. He is succeeded by the research man who is engaged in research projects. These, rather than cultivating of erudition, lend to his work its atmosphere of incisiveness. The research man no longer needs a library at home. Moreover, he is constantly on the move. He negotiates at meetings and collects information at congresses. He contracts for commissions with publishers. The latter now determine along with him which books must be written. (1977a, p125)

This paragraph cited from *The Age of the World Picture* is almost all about what Heidegger explicitly writes about researcher. However, with the strong conceptualization of modern science, he paves the way for successful and systematic analysis of modern scientist in compliance with other two fundamental characters of modern science as specialized and ongoing activity.

Accordingly, we can describe researcher, as the member of a particular scientific community, who "work upon carefully sketched out, defined and represented objects and their phenomena according to the methods, tools and techniques deemed appropriate by the field's founding Grundrisse"[55] (Day, 2001, p.97)

Thus, researcher exist only as long as s/he is the part of a scientific community which means diverse network of communicating scientists and consists of various "sub-communities" covering particular scientific fields within specific institutions. Being the member of a scientific community is essential in order to make possible the communication of scientific knowledge and thus make secure and further modern sciences. That is why researcher does not need a library or solitude to produce knowledge. On the contrary, s/he should now necessarily be interaction with other members of the community, work with them in research projects and disseminate and gather research results through constantly and actively participating in meetings and conferences. Thus, socialization is, according to Bland and Shmitz, "fundamental in predicting scientific productivity",

> Socialization is the process by which a newcomer to academe learns the norms, expectations, and sanctions of a faculty career. This is critical knowledge because common knowledge, bond a group into a profession and allow the members to work together effectively. Given a common understanding and common view of the world, it is easy for the group to agree on goals and means. The importance of professional values should not be underestimated; in highly developed professions these values undergird nearly every action. Thus, knowing the underlying values allows faculty members to understand why persons in their profession behave as they do, to predict a colleague's behavior, and to behave in accordance with others in that profession. (1986, p.23)

Thus, the productive and efficient researcher is necessarily socialized to the academic profession. Then, what is the meaning of this "academic profession"? What does the professionalization of research & researcher imply?

[55] Day uses Grundrisse in the meaning of "projected-plan"

First of all, professionalization necessarily begins with specialization. Professionals franticly accumulate specialist knowledge through "agreed and controllable methods for gathering and evaluating knowledge" as specialization is the ground for expertise and "for the power to control the territory defined as the specialist discipline" (Steiner, 1999, p.6)

> Because the main purpose of modern science is to reach exactitude and to improve the research for the purpose of controlling both the world and the human beings, the most effective way to enhance the efficiency of research is to narrow the field of study down and to increase the members of knowledge-producers who can conduct and further research activities cooperatively. Besides the accepted rules and laws of the respective discipline, this working professionals together with each other essentially prerequires "the uniform thinking and conformist behavior" (Steiner, 1999, p.5-6). With the words of Steiner:
>
> The aim of objectivity in "scientific" research is to enable the efficient production of generalizable knowledge by eliminating the most unreliable variable, the "subject position". In science, knowledge can only be sanctioned if it can be replicated by anyone, anywhere, using the same sanctioned methods. The individual scientist is irrelevant and immaterial to the knowledge produced. (1999, p.7-8)

Accordingly, professionalism necessitates the directing one's focus to a specialized sphere and prescribing the way of thinking and behaving common to respective discipline. Thus researcher becomes open only to the experiences delimited by the boundaries predetermined by their research disciplines. Thus, specialization of modern sciences also causes the specialization of researcher. In other words, researchers now reduce themselves to "a discipline-defined professional identity". They "are prepared to surrender their will and judgement to a collective will or judgement" (Steiner, 1999, p.10)

This preparation of professionals first begins with education. Training of researchers is essential because it socializes and prepares students for specific scientific community. By teaching skills, techniques and values, students transform into professionals. Researchers, because of the specialized character of modern sciences, require "to study for a higher degree (typically a doctorate) under the guidence of a

supervisor" (Meadows, 1998, p.21). So, education for research profession is necessarily specialized. It is fragmented into many distinctive disciplines and departments; each is ensured by the relevant academic experts.

Moreover, for Cahan, in additional to the "advanced well-defined educational credentials; and research and publishing standards", "full-time devotion to and pay for scientific work [also] … lay at the heart of professionalization" (Cahan, 2003, p.293). The development of modern sciences as vocations is fundamental to provide its maintenance and progression.

This vocational character of modern sciences is critical because, besides the other essential consequences of research as ongoing activity -training of researchers, evaluation mechanism, publishing and research standards etc.– it also determines the areas of objectives and actions of European Research Area. The research career, recruitment procedures, social security issues, the mobility of researchers, doctoral training are all the necessary consequences of modern science to further and make secure itself as ongoing activity; and they are also decisive for the policy and initiatives of European Commission, of ERA.

### 4.2.ERA's Conceptualization of and Objectives and Actions about Researcher

As I stated previous chapter, a Communication adopted in January 2000 by European Commission proposes the creation of European Research Area. The main aim of this communication is to enhance the integrity of research activities and policies all over the Europe for the purpose of advancing the impact of European research.

The strategic importance of scientific knowledge base of Europe is the main focus of both the European Union and Member States to enhance global competitiveness of Europe and to ensure its future prosperity. Respectively, the researchers and the institutions where they carry out research, accordingly to Commission, are the main agents of production, transfer and exploitation of knowledge and constitute "the necessary knowledge base for economic growth" (2014c, p.12). Thus, Commission puts great emphasis on the significance of "a full understanding of research

profession in its complexity" and, in turn, undertakes 'most appropriate" policy and various implementations about this issue (2014c, p.12)

In order to improve the efficiency and effectiveness of European public research system, and strengthen Europe's position in the global research landscape, the collaboration of the Member-States/Associated Countries, stakeholder organizations and the Commission and "the removal of barriers to research mobility, training and attractive career" are declares as necessary and significant. (2014c, p.12) With the words of Commission:

> [….] the availability of highly skilled scientists, engineers and researchers constitute a strategic core factor for the science, technology, innovation and diffusion system at all different levels (regional, sub-national, national, continental) and can act as a driver for innovation, growth and job creation. Researchers and knowledge workers in Europe, as prime carriers and conveyors of knowledge (both codified and tacit), represent a critical element for facing the challenge of increasing global competition in the era of growing globalization and the rise of knowledge economy (2012e, p.37)

Correspondingly, Commission sees the success in "the creation and use of new knowledge related to products, process, organizational schemes, business model and markets" as closely linked with the existence and creation of adequate amount of "highly skilled and competent researchers and high-quality research groups" (2012e, p.37)

As clearly seen above, in ERA, there are many concepts -training of researchers, their mobility, research profession and career, human resources etc. – about this issue, and each should be investigated and clarified in a systematic way in order to better understand the researcher of ERA. To put it in more detailed way, in this chapter, with the aim of analyzing researchers in ERA, I will firstly scrutinize and disclose how researcher is conceptualized and defined in the official documents and discourse of European Commission. Then, I will focus on the European Commission's objectives and actions determined and developed under this conceptualization of researcher. Thus, the objectives and actions of European Commission -the improvement of women's participation to research profession,

enhancement of recruitment procedures and working conditions, augmentation of the attractiveness of doctoral training, and advancement of inward, outward and inter-sectoral mobility- are all constituted with the purpose of increasing the stock of highly qualified researchers in ERA. While the desire to have sufficient human resources is the main drive for these objectives, the establishment of researchers as professionals determines the areas of policies about researchers in ERA.

### 4.2.1. Researchers as Human Resources in ERA

In the *Age of the World Picture*, Heidegger defines modern subjectivism as modern attempt to secure human being's "unlimited power for the calculating, planning and molding of all things" (1977a, p.135); an ongoing attempt of humanity to gain "mastery over that which is as a whole through measuring, ordering and executing the world" (1977a, p.132). Accordingly, subjectivism points out human being's global search for the accomplishment of complete control over every element and point of its objective reality and for the establishment of itself as the subject "who gives the measure and draws up the guidelines for everything that is" (Heidegger, 1977a, p.134)

Correspondingly, the modern, particularly post-Cartesian thought, according to Heidegger, discloses and evaluates "whatever is, in its entirety, from the standpoint of men and in relation to man" (1977a, p.133) and all other things are disclosed as and reduced to "the object" of the subject. In this post-Cartesian world, entities are revealed as objects which stand opposite to human being as subject, and which is external to subjective realm and represented in the mind of thinking subject in a clear and distinct way.

Thus, from the point of view of this modern tradition, "the subject/object dichotomy seems obvious […] since Descartes famously argued that the subject's access to its own thinking possesses an indubitable immediacy not shared by objects, which must thus be conceived of as external to subjectivity" (Thomson, 2011, p.53)

However, Heidegger also emphasizes and understands that this alleged superiority and mastery of man, typical feature of modern thought, indeed, illusionary. It is the failure of modern philosophy to recognize and vindicate the essential entanglement of the self and the world which is the key to our experience-based exploration of our environment that which causes the splitting the subject from objects and also from other subjects.

Heidegger notes that even if human being is ostensibly promoted to the position of mastery over the world, the principal and essential result of these fundamentally modern modes and ways of thoughts and practices, of modern sciences, is to set what presences – nature, man, history, language; [both human beings and the world] – forth as the real in its objectness. In other words, Heidegger, unlike the modern and post-Cartesian thinkers who recognize the position and the mastery of human beings (as subject) as the constitutive of this age, puts emphasis on the objectiveness of the entities, that is, object-subject relation, and conceptualizes this relationality as the decisive of the modern age.

Modern science, as the theory of the real, the constitutional understanding of what and how beings are in the modern age, "reduces both man and the world to the status of object with an essentially means/ends, instrumental, or technocratic world-view" (Carauș and Paris, 2015, p.37). With the word of Heidegger:

> Science sets upon the real. It orders it into place to the end that at any given time the real will exhibit itself as an interacting network, i.e., in surveyable series of related causes. The real thus becomes surveyable and capable of being followed out in its sequences. The real becomes secured in its objectiveness. From this there results spheres or areas of objects that scientific observation can entrap after its fashion. Entrapping representation, which secures everything in that objectness which is thus capable of being followed out, is the fundamental characteristic of the representing through which modern science corresponds to the real. (1977a, p.167-168)

However, Heidegger does not put an end to his analysis at this point, and furthers it: when modern science objectifies also human beings – that is, when human being as subject, looking for mastering and controlling "all aspects of its objective reality,

turns that modern impulse into control the world of objects back on itself" (Thomson, 2011, p.58) – the object also vanishes itself and the object-subject relation surpasses and gains superiority over the object and the subject which consequently and essentially change into the standing-reserve. This "objectification of the subject dissolves the very subject/object division that initially drove the subject's relentless efforts to master the objective world standing over against it." (Thomson, 2011, p.58) As Heidegger states:

> The subject-object relation thus reaches, for the first time, its pure "relational", i.e., ordering character in which both the subject and the object are sucked up as standing-reserves. That does not mean that the subject-object relation vanishes, but rather the opposite it now attains to its most extreme dominance […] It becomes a standing-reserve to be commanded and set in order. (1977a, p.173)

"Standing-reserve" is in a close relation with "instrumentality". Instrumentality as a foundational orientation to the world causes the transformation of both nature and human beings into "standing-reserve". In such a world, things do not have any value i*n themselves*. Rather, they are *good and exist only for* something. Because of the precedence of the subject-object relation over the subject and the object, i.e. transformation of everything including human beings as subject, into objects, modern subject spontaneously and increasingly turns into standing-reserve, just another resource essentially deprived of any meaning and "standing by for efficient and flexible optimization" (Thomson, 2011, p.57). Now, human beings turn into resources, raw materials, like river, coal or petroleum, extracted and stored, and ready to be utilized, and used for various purposes.

> No longer as conscious subjects standing over against an objective […], but merely as one more intrinsically meaningless resource to be optimized, ordered and enhanced with maximal efficiency, whether cosmetically, psychopharmacologically, genetically, or even cybernetically (Thomson, 2005, p.56)

Then, what does this analysis of human beings have to do with our analysis of researcher in European Research Area? How can we relate this conceptualization of

human beings as resources with ERA's researchers? How can researcher be understood and disclosed by this conceptualization?

Correspondingly, in the official documents and discourse of European Research Area, in compliance with Heidegger's analysis of human beings as human resources, researchers are conceptualized as human resources. In all communications, resolutions and conferences of European Commission about researchers, the development of and the advanced investment in human resources are declared as essential to obtain research excellence, and thus to stimulate European growth and competitiveness. The sufficient stock of "well-trained, creative and dynamic researchers" as standing ready to be used and consumed in research activities is the main focus of ERA because, as Commission asserts, it plays key role in Europe to meet research and development intensity of 3 % GDP (Commission of European Communities, 2003, p.3).

European Commission always emphasizes upon the necessity of "generating a sufficient large pool of skilled human resources for research and innovation" (2014c, p.17). In order to remain competitive, it is essential to have "the appropriate number of researchers, of the appropriate quality, and within the appropriate skills to sustain and develop current and ground-breaking new aspects of science, engineering and technology" (European Commission, 2002b, p.16) Parallel with Heidegger's conceptualization of human beings as resources, the objectives and actions of ERA about researchers are determined with the aim of increasing the number of researchers 'optimized, ordered and enhanced with maximal efficiency'. With the relative arrangements and implementations, European Commission intends to have adequate amount of researcher with the most efficient and productive skills and qualifications to ensure and further scientific knowledge, with its words, to produce innovative knowledge which promotes technological developments.

In this process of determining actions and initiatives of ERA on the ground of this main drive of European Commission as the production of sufficient number of researcher with the most efficient qualities, with the motto "one fits all", as the

quantification of all qualities “like the mystic touch of King Midas” (Thomson, 2005, p.149), the development and description of researchers in ERA as “professionals engaged in the conception or creation of new knowledge, products, processes, methods and systems, and in the management of the projects concerned” (Commission of European Communities, 2003, p.6), establishes the areas of ERA’s policies about researchers.

They are, in ERA, in compliance with and because of the very essential character of research that I explained in the first part of this chapter, legitimated and recognized as professionals in a given discipline, and become a member of a specific community, through particular and very specialized training. Moreover, researchers are also research workers and research is necessarily a vocation because the existence and full and ongoing devotion of researcher to research activities is fundamental for the continuation and improvement of modern sciences as research. This definition is important because the domains of policy and implementations are established by this essential character of modern sciences.

Consequently, the recognition of researchers as human resources and the desire to increase their numbers is the main drive of objectives and actions of European Union, while the establishment of researchers as professionals according to research’s two constitutive characters founds the areas of EU’s policies about researcher. To this end, in the next parts, I will emphasize on the objectives and initiatives of ERA established with the aim of ensuring sufficient number of researchers in Europe. These objectives are the improvement of women’s participation into research career, enhancement of recruitment procedures and working conditions, augmentation of the attractiveness of doctoral training, and the advancement of international and inter-sectoral mobility.

### 4.2.2. Women in Research Profession

The gender imbalance in research profession, for European Commission, is one of the main obstacles to have “an adequately stocked, mobile human resource base” (2014c, p.30). Commission sees gender equality in research, women’s participation

in science and technology as essential to achieve the required number of researchers in Europe. As it puts, "the under-representation of women in R&D must be tackled if optimal use is to be made of human resources devoted to research" (Commission of European Communities, 2003, p.12). Because the expansion of the stock of talented researchers are thought as crucial for Europe to reach the 3 % objective, this low representation of women in science is, for Commission, "an unacceptable and unaffordable waste of human resource" (Commission of European Communities, 2001b, p.3). As it is said in the official webpage of European Institute for Gender Equality (EIGE), an autonomous body of European Union:

> The reality reflects an inefficient use of highly skilled women in the EU, which is a considerable loss of talent. The annual increase in women researchers is less than half the annual number of women PhD graduates. This indicates that, on an annual basis, fewer than half of the women completing PhDs are becoming professional researchers.[56]

Furthermore, European Commission's She figures 2012[57] shows that, in 2009, female researchers formed only 33 % of European researchers. In 2011, women in Europe still constituted just 33 % of researchers in both public and private sectors. These all demonstrate the persistence of the under-representation of women in this profession. Moreover, women are low represented also in "top-level and decision making positions in European research"[58]

Accordingly, in its Communication entitled *Researchers in the European Research Area: One Profession, Multiple Career* (2003), Commission mentions various reasons for such gender imbalance in research profession. These reasons are multifaceted, depending on different complex factors.

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[56] It is cited from: http://eige.europa.eu/gender-mainstreaming/sectoral-areas/research

[57] "She Figure 2012 is the fourth publication of a key set of indicators that are essential to understand the situation of women in science and research" (European Commission, 2013b, p.5)

[58] It is cited from: http://eige.europa.eu/gender-mainstreaming/sectoral-areas/research

The first reason for this gender imbalance is, according to EIGE, gender segregation in research. Gender segregation is accepted as one of the main reasons for different choices made by women and men about the field of their studies in research. According to She figures 2012, while men constitute the majority of researcher candidates at master and PhD level in natural science, engineering and technology subjects, women generally choose the medicine and health sciences. This research reveals that "gender segregation in research driven by the same root causes as gender segregation in the labour market as a whole: gender stereotypes, choice of study field, gender division of labour, and time constraints, and covert barriers and biases in organizational practices"[59]

Moreover, gender-related career challenges are also accepted as an important reason for under-representation of women in research career. Unattractive working conditions and unfair and non-transparent recruitment procedures supporting men's priority over female researchers in universities, research organizations, academies and private corporations is decisive in the low representation of women in this profession.

> Recruiting, retaining and promoting women in research require innovative practices in terms of performance evaluation and rewarding systems. In order to be attractive to women researchers, careers in R&D should cease to appear as being in conflict that continues to apply almost exclusively to women. Similarly, women need to be put under excessive pressure to outperform male colleagues. Networking and monitoring are also important mechanisms to support women researchers in their careers. Business enterprises and research organizations should promote good practices, such as flexible working time, dual track careers, "girls' days" etc. (Commission of European Communities, 2003, p.18)

Accordingly, the adjustments about gender imbalance fundamental to provide favorable circumstance for women in research profession are essential for the creation of European Research Area. European Union and Member States should make some structural change in order to eliminate the gender imbalance. They

[59] Ibid.

should even implement positive discriminations, that they should stop being gender-blind and protect women's participation in research. Women must also be encouraged and supported for top-level and decision-making positions.

### 4.2.3. Open, Transparent and Merit-based Recruitments and Working Conditions in the Research Profession

European Commission identifies open, transparent and merit-based recruitments procedures in both public and private research institutions across Europe as a necessary condition for the creation of ERA. They are a prerequisite of productive and efficient research performances and teaching excellence by assuring "optimal allocation of human resources based on merit and academic excellence" (European Commission, 2014c, p.44). Moreover, with the open recruitment procedures, researchers from all stages of research career gain equal opportunities to fair access to "competition-based research posts". Fair access to these research posts is important because it provides, in turn, the increase in the interests to research career. Thus, researchers are attracted by those fair and transparent recruitment procedures and encouraged to choose science as their profession. In turn, the stock of human resources in research profession is intended to increase at the end of this process.

To this end, Commission establishes European Charter for Researchers and a Code of Conduct for the Recruitment for Researchers. It is "a set of general principles and requirements which specifies the roles, responsibilities, and entitlements of researchers as well as of employers and/or funders of researchers"[60]. Charter and Code stresses the importance of the relationship between researchers and employers or funders to successfully perform in creating, transferring, communicating, sharing and disseminating scientific knowledge and technological development and to favorably develop the researchers' career; and for this purpose, establishes " a framework for researchers, employers and funders which invites them to act responsibly and as professionals within their working environment, and to recognize

[60] It is extracted from the official webpage of European Commission: http://ec.europa.eu/index_en.htm

each other as such".[61] This charter and code also facilitates the mobility of researchers at European level because it addresses all researchers in European Union at all level of their career and covers all areas of research in both public and private sectors, without regarding the character of employment or assignment, "the legal status of their employer or the type of organization or establishment in which the work is carried out".[62]

Thus, for Commission, this open and transparent recruitment policies and procedures established in Charter and Code in all European Countries create great potential to promote mobility of researchers by pairing "supply and demand for the best-suited research positions across Europe" (2014c, p.45)

In addition to Charter and Code, European Commission, in 2003, initiated the European Researcher's Mobility Portal "to provide researchers with up-to-date information about jobs and funding opportunities" and this portal, in 2008, become a part of EURAXESS – Researchers in Motion which presents "practical information on job vacancies and fellowship programmes" (European Commission, 2014c, p.46)

EURAXESS jobs portal provides proper and common platform for advertisement of research posts, and information on the number of positions related with research posted by employers. Thus, Commission sees "a positive correlation between the numbers of job postings on international job platforms, such as EURAXESS jobs and the openness of a recruitment system" (2014c, p.46). Consequently, European Commission demonstrates the importance of transparent and fair recruitment procedures for providing equal opportunities in all levels of research career as the precondition to innovation and excellence in research (innovative and excellent knowledge). Through the expansion of talent pool of human resources in Europe by improving recruitment process, Commission aims to create excellent scientific community.

[61] Ibid.

[62] Ibid.

Employment and working conditions, for Commission, are also fundamental factors determining the attractiveness of research career. The attractive working conditions and career expectations are a precondition to attract and retain the highly qualified researchers in Europe and assure the creation of the ERA. They are determined as key determinant to attract and encourage young people to proceed along a research career and to provide top-level quality of research results in both public and private research institutes in Europe.

The level of attractiveness, according to Commission, depends on "clear career prospects with attractive employment opportunities (permanent position), competitive salaries, sufficient social security benefits (including statutory pension rights, healthcare and unemployment benefits), and the possibility of balancing work and personal life" (2014, p.69-70). These arrangements about working conditions of researches, through the improvement of attractiveness of research profession, provide the maintenance and advancement of scientific research. In turn, the expansion of the stock of human resources in this profession ensures the scientific and technological development and safeguards the Europe's competitiveness worldwide.

### 4.2.4. Education and Training

In 2010, Commission has estimated that, in order to achieve Europe's R&D targets of 3% of GDP and protect its competitiveness, "Europe needs at least an additional one million researchers by 2020" (European Commission, 2014c, p.54). Accordingly, the success of Europe in ensuring an adequate pool of skilled and talented researchers depends on the development of sufficient research training and the improvement of its attractiveness. Governments and institutions must assure the establishment of their research systems "by attracting sufficient numbers of young people into taking science to an advanced (doctoral) level and thus pursuing a research career" (European Commission, 2014c, p.54). Thus, because the failure of recruitment of talented and qualified teachers for science and technology education and the ageing population of EU pose threat for the future of human capital for research and technology developments, member states and institutions should adopt a

policy for the improvement of the attractiveness of doctoral research education and research career.

Moreover, the quality of European education systems must be ensured by the international standards with the aim of attracting and retaining the most qualified researchers in Europe. To this end, European Commission prepares and puts into action a common policy. There-cycle-of higher education, Diploma Supplement, Quality assurance, European Credit Transfer and Accumulation System (ECTS) etc. are all implemented in order to create international area for higher education.

Researchers' access to the most qualified doctoral training around the Europe is also essential to be perfectly prepared to proceed along and advance their career in Europe. Appropriately, member states and institutions are offered to upgrade the quality of their doctoral training in line with the Principles for Innovative Doctoral Training.[63] These principles include research excellence, attractive institutional environment, interdisciplinary research options, exposure to industry and other relevant employment sectors, international networking and transferable skills training. (European Commission, 2011, p.1-2)

Moreover, Commission talks about the current demands of "non-academic" markets made on academic world, and their developing strong relationship on the ground of business sector's need to attract and absorb more researchers with the aim of "establishing an "environment of open innovation", where research results are brought to market and ideas are effectively exploited" (2014c, p.54). This prevailing situation requires the training and preparation of postgraduates for a research profession for various types of contexts. This means the production of researchers for

[63] It is "[e]xtract from "Report of Mapping Exercise on Doctoral Training in Europe "Towards a common approach" of 27 June 2011(final), adopted by the ERA Steering Group on Human Resources and Mobility. The Principles were defined with the help of experts from university associations; industry and funding organisations. They reflect the Salzburg Principles of EUA, good practice in Member States and the Marie Curie experience. The Principles have been endorsed in the Council conclusions on the modernisation of higher education, Brussels, 28 and 29 November 2011." (European Commission, 2011, p.1)

flexible uses: their preparation for the utilization wherever (both in public and private sector) they are needed. With the words of the Commission:

> It could imply more involvement of the research apprentice in collaborative projects with "non-academic" partners and also more direct involvement of "non-academic" partners in the training of researchers (for example, they could be involved in the design and/or management of some university second or third degree programmes, certainly in more applied areas) (2004b, p.49)

Thus, with the reconciliation of academic world with business sector, European educational system needs some changes in order to protect an adequate supply of highly talented and flexibly produced researchers for both public and private sectors, to promote innovative and technological knowledge.

As a result, European countries and institutions should implement "various measures to attract people to a research career". These measures contain "mentoring programmes, science communication action plans and financial support programmes for students (scholarship) and measures to upgrade the quality of doctoral training" and "post-doctoral career paths (e.g. in-company training programmes, professional development provision and tenure tracks)" (European Commission, 2014c, p.61). Moreover, they must develop "measure to encourage academia-industry partnership (e.g. via research traineeship in companies and inter-sectoral mobility programmes)" (European Commission, 2014c, p.61). These measures are essential in order to develop necessary policies to attract and encourage people to choose research profession and in turn, to increase the members of human resources in this profession.

### 4.2.5. International and Intersectoral Mobility

As I partially stated previously in this chapter, mobility is necessary for Europe to meet its essential need for human resources and in turn, to have leading position in global economic relations. Thus, Commission talks about various kinds of mobility which are fundamental for the realization of ERA. First, physical mobility which is experienced from one place to another is mobility's most common type. It covers

inward mobility (from abroad) and outward mobility (to abroad), and also inter-sectoral mobility (between public and private sectors). There are also long-term and short-term mobility. While former endures for several mounts or years, the latter is just visits or project-based activities. Moreover, mobility means "moving to another country to change jobs or being mobile with the same employer for short- and long-term" (European Commission, 2014c, p.88). Commission also talks about new forms of mobility "such as combined part-time positions, interdisciplinary mobility and virtual mobility"(2014c, p.88)

To this end, Commission talks about the many determinants influencing each researcher's motivation and the possibility, duration and period of becoming mobile. Researchers' (international and inter-sectoral) mobility generally depends on "combination of: open, transparent and merit-based recruitment, portability of publicly funded grants, transparent transfer conditions, clear immigration rules and procedures, attractive employment and working conditions – including career prospects with long-term employment opportunities, competitive salaries, sufficient social security benefits (including statutory pension rights, health care and unemployment benefits), and the possibility of balancing personal private life" (European Commission, 2014c, p.88)

In order to ensure mobility at its highest level, and improve the attractiveness of Europe, European Commission and member states have launched several initiatives in the last two decades. The adoption of EURAXESS job portals, Scientific Visa Directive, The Charter for Researchers and the Code of Conduct for the Recruitment of Researchers in Europe; also the improvement of rights of researchers across Europe as well as Marie Sklodowska-Curie Actions, all are initiated in order to remove obstacles to mobility of researchers.

At the end, with the ultimate goal of European Union as the ensuring the sufficient number of human resources, European Commission determines the areas of its policy about researchers. The main drive behind all objectives and actions of Commission is the production and dissemination of adequate amount of human resources standing

by and ready to be used and exploited when it is need. For this purpose, as stated though this chapter, Commission initiates, several actions to provide equal participation of women in research profession; improve transparent, open and fair recruitment procedures, and favorable working condition, ensure attractive doctoral training and enhance both international and inter-sectoral mobility. These objectives and arrangements are necessary in order to ensure the existence of researchers, and in turn, provide the maintenance and advancement of modern science as research.

# CONCLUSION

Heidegger, in 1933, works especially on the fragmentation of knowledge and the specialization of modern sciences, and emphasizes upon the necessity of unification of these sciences under the university with the common goal which would "tie them together meaningfully" in order to prevent its appropriation by any specific dominant group (i.e. Nazi appropriation) because "he sees the university as the locus for a turning to reflection on being that would retrieve for knowledge a meaningfulness", rather than as in the service of a specific group or nation (Glazebrook, 2000, p.146). Accordingly, he recognized his duty as the rector of Freiburg University to retrieve knowledge from its specialization under a superficial, 'technical organization-institutional pseudo-unity'. In *The Self-Assertion of Germany University*, he highlights the importance of *questioning* which is understood as the highest form of knowing, and which

> shatters the division of the sciences into rigidly separated specialties, carriers them back from their endless and aimless dispersal into isolated fields and corners, and exposes science once again to the fertility and the blessing bestowed by all the world-shaping powers of human-historical being. (Heidegger, 1985, p.474)

This is why, according to Glazebrook, Heidegger became rector: in order "to achieve a meaningful unity of the knowledge" (2000, p.146). However, this hope was not realized. The speech "had been spoken into the wind and was forgotten the day after the inaugural celebration" (Heidegger, 1985, p.494). Instead of discussing this issue with Heidegger, the university more and more became splitted into professional schools (Heidegger, 1985, p.494)

With this failure of the retrieval of knowledge under the university, he leaves the ideological concerns and concentrates on the philosophical *questioning* about science: then, what is the essence of modern sciences that prevents their meaningful unity? Yet, he started to feel this essence only in the 1940s: the overcoming of the

fragmentation of knowledge in university through asking what is valuable to know and finding a unifying answer is impossible because the moderns science is already determined and established on the basis of a valuation: the essence of modern science lies in and is determined by the essence of technology: “enframing”.

Enframing is a complex and intense subject which deserves to be studied in detail and is beyond this thesis. However, I feel the need to mention this phenomenon at least in relation to modern science and my study. Thus, as I understood from Heidegger’s works about this issue, the essence of both modern science and technology is necessarily enframing (Ge-stell): the projective revealing of beings. This means that both modern science and technology reveals entities structurally in the same way. However, while modern science discloses entities as objects, technology discloses them as standing-reserve.

In other words, science establishes a thing as an object; and it is this object that appears in representational thinking. And this representational thinking, that is scientific objectivity, determines the technology as a way of revealing. Heidegger claims that only the means of this scientific objectivity make technology possible: “only by such objectivity do [beings] become available to the ideas and propositions in the proposing of nature by which we constantly take inventory of the energies we can wrest from nature” (Heidegger, 1968, p.234). The point here is the relationality of object and subject, that is, the objectness of things. The decisive moment is realized when subject seeks to master also itself, that is, this representational thinking turns into the subject. When the subject is also objectified, the human beings immediately transform into just another object and the illusionary position of human beings as subject, master of the world is seen clearly.

> For, the subjectivist impulse to master reality redoubles itself in enframing, even as enframing’s objectification of the subject dissolves the very subject/object division that initially drove the subject’s relentless efforts to master the objective world standing over against it (Thomson, 2011, p.58)

Together with this objectification of everything, these objects spontaneously turn into resources which are always on call, ready to be utilized whenever needed. Heidegger

names “this way of ordering everything to stand in preparation for being utilized: relating to objects as “standing reserve”” (Gordon, 2000, p.20)

It is the ordering of all objects, also of human beings, as standing-reserves what Heidegger calls enframing. Enframing is “a kind of setting-in-order which set upon nature” and which attempts to “entrap nature as a calculable coherence of forces” (Heidegger, 1977a, p.19). Then, what does this mean for the contemporary situation of modern sciences and especially for a scientist in ERA?

In the following, I provide an answer to this question especially by mentioning a declaration released by the members of the one of the most loyal followers of ERA, and also by focusing a particularly the solutions offered by the critical thinkers to European Research Area.

Accordingly, in the summer of 2012, Mathematics, Physics, Chemistry, and Biology Departments of Middle East Technical University had released a declaration named *Basic Sciences in Industrial and Information-Based Society*.[64] The reason behind this declaration has been stated as to inform the society and to eliminate the people’s confusion about basic sciences. However, it was actually an attempt to gain back its prestige and position which have been lost to the practical sciences. In recent years, as a result of the lack of student participations to these departments, and the increasing interest in the technical and practical sciences, these programs in many universities have been in danger of being shut down.[65] This declaration has been issued because of this decrease in participation to and interest in these programs. In the declaration, Ersan Akyıldız, the dean of the faculty, by mentioning particularly all basic sciences in the faculty, has emphasized the importance of these sciences for

[64] It is still available in the website of METU- Science and Literature Faculty: http://fef.metu.edu.tr/node/163

[65] Moreover, Yekta Saraç, the head of Council of Higher Education (Yüksek Öğretim Kurumu – YÖK), has issued a press release about this issue in April 2015. In his announcement, he emphasizes the lack of interest to basic sciences and that is why quota is not going to be opened to these programs in many universities: biology program in 22 universities, physics in 31 universities, and chemistry in 36 universities, and mathematics in 7 universities cannot get students for university education in 2015. News source: http://www.radikal.com.tr/turkiye/yok-bilime-ilgi-yok-kapatiyoruz-1344410/

the society's development in general and for the industrial and technological development in particular. In our age, he states, the problems and the needs of a community can be solved only by the motto "produce basic science in order to develop". Thus he opposes to the domination of applied sciences our basic sciences and states the danger of the disappearance of these sciences grounded on curiosity which already bringing with it innovations and developments.

Secondly, critical approaches to Bologna Process and especially to ERA, as I mentioned before, argue that through evaluation mechanisms and procedures, academics and their activities are subjected to strict control in ERA and this causes academics to lose their autonomy and turn into human resources: when universities are rearranged, according to the market relations in ERA, they say, scholars also transform to the human resources, "brain powers", and are included in the knowledge production process as a cog in this production machine, with definite processes to follow and tasks to do. Thus, they offer that the control over academics should be abolished and they immediately retrieve their autonomy in order to produce knowledge according to their intellectual interests and judgments. In order to have well-qualified and objective knowledge which is produced for the sake of knowledge and which was the situation of knowledge before the establishment of ERA, they emphasize the necessity of production of knowledge by free scientists.

First of all, specialization, as Heidegger also realized later, is the necessary character of modern science. It is the condition for representational thinking, for modern science as research.

> For sciences, investigate beings, and cannot get started without a prior determination of their object. The delimitation of a sphere of objects is a necessary condition for a science to be able to proceed. (Glazebrook, 2000, p.217)

Moreover, Heidegger also defines the disciplines as flexible areas where research results and the means of methodology move and promote freely. The extension of these ways and means of methodology endures through object-domain "until it is exhausted or run up against the need for a new subject-area definition and method"

(Frodeman and Miteham and Sacks, 2001, p.1). This is the essential for modern science to further itself and make secure the efficiency and productivity of research. It is this essential character of modern science as research that causes the disappearance of some "un-productive" and "useless" disciplines which are not needed anymore while also enabling the emergence of new disciplines, the inter-disciplinarity and, also, what is used popularly in these days, the hyper-specialization.

Accordingly, the decline of "basic" sciences seems possible if they are not productive and utilizable anymore. So the deterioration of these sciences is not because of the reconfiguration of the knowledge production and in terms of market relations; but, rather it is because of the very essential character of modern knowledge production.

Lastly, an important question arises from these three cases: Why do these thinkers – Heidegger, Scientists of Mathematics, Physics, Chemistry and Biology Departments of Middle East Technical University, and those critical thinkers to ERA – feel disturbed from and react against this contemporary situation of modern sciences? If modern sciences ensure and further itself in the pursuant of its essence, and if researchers are established according to the essential characters of modern science as research, why do these scientists feel uneasy about this situation?

From the point of view I hold in this thesis, all these reactions result from these scientists' tendency to position themselves still as the subjects standing against the nature and to reduce everything to its object with the aim of ensuring its mastery over everything; however, at the same time, with the unwilling awareness of the deterioration of its control over ordering nature, these scientists oppose to this situation. It is the subject's egocentric objection to losing its position as subject.

However, as I stated above, when scientist's relentless drive to master nature turns backs to itself, s/he also transforms into an object, and the objectness of things – the object-subject relation dominates and dissolve the subject-object dichotomy.

Moreover, this ordering of nature and human beings into scientific object "prepares the way for its further ordering into standing-reserve" (Glazebrook, 2000, p.245) Thus, scientists are now essentially expected to be human resources established according to pre-defined and specialized characteristics which is necessary to ensure and further modern science as ongoing and specialized activity and standing by, ready to be utilized when they are needed.

Furthermore, Heidegger, in his essay *The Traditional Language and Technological Language* (1998) furthers his thesis: the essence of technology "which challenges human forth i.e. sets them up, into making natural energy available and securing it, come into effect also and precisely in the transformation of language [only which enables humans to be those living beings which they are as humans] into mere information" (Heidegger, 1998, p.139)

In other words, Heidegger states that because modern science and technology dominate and determine the modern age, technological language also attacks what is peculiar to language; and in this way, it also threatens "the human being's ownmost essence":

> With the unconditional reign of modern technology, there is an increase in the power – the demand as well as the performance – of the technological language that was devised for the widest possible spread of information. Because this [power] is scattered in systems of formalized reports and signals, the technological language is the severest and most menacing attack on what is peculiar to language: *saying* as showing and as the letting-appear of what is present and what is absent, of reality in the widest sense. (Heidegger, 1998, p. 141)

This reducing of what is peculiar to language to the mere transmission, the reporting, of signals easily implies the possibility of canceling of human beings as a scientist, researcher or even as human resources from the process of knowledge production. It exactly means the maintenance of modern sciences by machines without any need for human beings.

It, for now, sounds like science-fiction. However, this possibility lies at the very heart of modern technology because its soul drive is to reduce all entities to programmable, bivalent information. Moreover, with the motto of “maximum output from minimum input”, the elimination of human beings from the knowledge production seems efficient according to the essence of technology because it reduces the workforce cost.

As a result, in this thesis, within the Heideggerian understanding of modern science, ERA is understood as a scientific community where modern sciences as research make secure and promote themselves. This is, in this thesis, shown and understood by investigating research’s three foundational characters: its specialized and institutional activity and its researcher. At the end, it is important to note that the possible scenario about human being I discuss above, does not endanger the essential character of modern science –its researcher. There will be still researcher but it won’t be a human being.

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## APPENDIX B: Turkish Summary / Türkçe Özet

Bu tez, Avrupa Araştırma Alanı'nı Heidegger'in modern bilim anlayışı temelinde analiz eder. Avrupa Komisyonu'nun resmi belgelerinin analizine dayanan bu çalışma, Avrupa Birliği'nin bilgi ve bilgi üretimi üzerine olan bu politikalarını, baskın ekonomik ilişkilere göre bilgi üretim sürecini dönüştürmeyi hedefleyen neoliberal bir girişim olarak okumak yerine, daha geniş, özgün ve bütünleşik bir çağ üzerinden tartışır.

Avrupa Araştırma Alanı, 2000 yılında, bilimsel kaynakların Avrupa seviyesinde bütünleştirilmesi amacıyla kurulan bir bilimsel cemaattir. Bu süreç, bilimsel bilginin üretimi, iletişimi ve yayılımının ortak bir platformda sürdürülüp; araştırmacıların işbirliği ve hareketliliğinin sağlanması için başlatılmıştır.

Avrupa'nın 21. yüzyılı bilim ve teknoloji çağı olarak görmesi ve araştırma ve teknolojik gelişmelere yatırımı gelecek vadeden bir girişim olarak kabul etmesi, Avrupa'nın bu konudaki politikalarında belirleyici olmuştur. Komisyon'un araştırma üzerine olan bu politika ve uygulamalarının arkasındaki temel motivasyon, Komisyon'un deyişiyle, bilgiye dayalı toplumlarda, bilginin önemli ve belirleyici olmasıdır: Bilgi üretiminin, ayrıca onu elde edip kullanmanın ekonomik ve toplumsal gelişmeler için gerekliliği.

Avrupa Araştırma Alanı, işte bu yüzden, yani Avrupa'nın dünyadaki yerini koruması ve devamlı ilerleme sağlaması için kurulmuştur: (1) araştırmacıların, teknolojilerin ve bilginin serbestçe dolaştığı, (2) ülkelerin ve ulusal araştırma kuruluşlarının Avrupa ve uluslararası seviyelerde koordinasyonunun sağlandığı ve (3) ihtiyacı karşılayacak ve bu sürecin devamlılığını sağlayacak gerekli araştırmaya ilişkin altyapıların anında finanse edilip iyileştirildiği ortak bir alan. Araştırma faaliyetlerinin olabildiğince verimli ve yenilikçi olabilmesi ve Avrupa'yı araştırmacılar için çekici bir yer haline getirmek için, bu faaliyetlerin, hem ulusal

düzeyde hem de Avrupa Birliği seviyesinde en iyi şekilde birleştirilip, ortak bir şekilde yürütüldüğü bir alan.

Buna bağlı olarak, son 15 yıldır, Bologna süreci ve özellikle Avrupa Araştırma Alanı, devlet politikaları, araştırmacılar ve paydaşlar üzerindeki muazzam etkilerinden ötürü birçok akademik çalışmanın konusu olmuştur. Süreç, uygulamaları, beklenen ve gerçekleşmiş sonuçları birçok disiplin ve farklı perspektif tarafından ele alınmıştır. Ancak bu yaklaşımlar esasen iki grupta ele alınabilir: neoliberal yaklaşımlar ve bu neoliberal politikalara eleştirel yaklaşımlar.

Öncelikle neoliberal perspektif, baskın piyasa ilişkilerinin devlet politikalarının kararlaştırılması sürecinde belirleyici olması gerektiğini savunur. Bu amaçla, devlet de market çıkarlarına göre yeniden şekillendirilmelidir. Bu yaklaşıma göre, devletin bu yeniden yapılandırılması, küreselleşmiş piyasa ilişkilerinde ve bilginin ülkelerin ekonomik büyüme, gelişme ve rekabet gücünü belirlediği bilgi toplumlarında daha da önem kazanmıştır. Dolayısıyla, Avrupa Araştırma Alanı'nın kurulmasının amacı, araştırma ve yenilik faaliyetlerinin ve de araştırmacıların Avrupa seviyesinde işbirliği ve entegrasyonunu sağlayarak, uygulamalı ve temel bilimlerin geliştirilmesi ve araştırmanın niteliğinin artırılması olmalıdır.

Öte yandan, bu neoliberal politikalara eleştirel yaklaşımlar, bu sürecin bilgiyi ve bilginin üretimini 1970'lerden sonra egemen olmaya başlayan piyasa ilişkileri ve terimlerine göre yeniden düzenlendiği konusunda hem fikirdirler. Bu bakış açısına göre bilgi üretimi, bu süreçle birlikte, azami verimlilik ve performası amaçlayan kapitalist bir üretime dönüşürken, bilgi ise bilim ve teknolojinin bir çıktısına, aynı zamanda, kapitalist üretim sürecinde kullanılmak üzere hazır bekleyen bir girdi haline dönüşür. Avrupa Araştırma Alanı, üniversitelerin de büyük bir dönüşüm yaşamasına ve kâr odaklı bir şirket gibi işlemesine yol açar. Ayrıca, bu eleştirel düşünürler, pazar odaklı bir süreç olan Bologna Süreci'nin akademisyenlerin durumunu da etkilediğini iddia eder: akademik özgürlüklerini kaybeden bilim insanı, önceden belirlenmiş niteliklere göre üretilip sömürülmek üzere hazır bekletilen bir insan kaynağı, beyin gücü haline gelir.

Bu iki yaklaşım birbirine karşı gibi görünse de ikisinde de ortak olan bir nokta vardır: o da ikisinin de bir dönüşümden bahsediyor olmasıdır. Daha detaylı söylemek gerekirse, neoliberal yaklaşım devletin bilgi ve bilgi üretimi üzerine olan politikalarının, kapitalist ekonomik ilişkilere göre yeniden şekillendirilmesi gerektiğini savunurken; bu politikalara eleştirel yaklaşan düşünürler ise, Avrupa Birliği'nin bu politikalarının, baskın piyasa ilişkileri tarafından belirlendiğini ve böylece bilginin, bilgi üretiminin ve bilim insanının olumsuz bir dönüşüm yaşadığını iddia eder.

Ancak, bu tez, Avrupa Birliği'nin bilgi ve bilgi üretimi üzerine olan bu politikalarını ve Avrupa Araştırma Alanı'nı, bahsedilen bu yaklaşımlardan farklı olarak, Heidegger'in modern bilim anlayışı ışığında analiz eder. Yani, bu alanı, 1970'lerden sonra hakim olmaya başlayan neoliberal politikaların bir sonucu olarak okumak yerine, Descartes'ın özneyi dış dünyadan ayırıp, onu özne-nesne ilişkilerinin merkezine koymasıyla başlayan, özgün ve bütünleşik bir çağ olarak, modern çağ bağlamında inceler. Sonuç olarak, Avrupa'nın araştırma ve bilgi üzerine politikalarının sonucu olan Avrupa Araştırma Alanı'nı, modern çağda şeylerin ne ve nasıl olduğunu belirleyen bir anlayış olarak modern bilimin doğal bir sonucu olarak okur. Avrupa Araştırma Alanı, modern bilimin gerekli bir sonucu, onun uzmanlaşmış özelliğinin ve araştırmacısını varlığını sürdürdüğü bilimsel bir cemaattir.

Öyleyse, bu tezde asıl mesele, Avrupa Birliği'nin bilgi ve bilgi üretimi üzerine politikaları ışığında kurulan Avrupa Araştırma Alanı'nın, Heideggerci modern bilim anlayışıyla uyum içinde olup olmadığıdır. Yani, modern çağda şeylerin ne ve nasıl olduğunu belirleyen modern bilim, bu alanda, diğer yaklaşımların iddia ettiği gibi bir değişime uğradı mı? Yoksa bu politikalar, modern bilimin doğal bir sonucu olarak mı ortaya çıkmaktadır? Bu soruyu cevaplandırabilmek için bu tezde, Avrupa Araştıma Alanı, modern bilimin üç gerekli özelliği üzerinden incelenecek: modern bilimin (1) kurumsallaşmış ve (2) uzmanlaşmış olması ve de (3) onun araştırmacısı.

Daha ayrıntılı bahsetmek gerekirse, ben, bu tezde, Avrupa Araştırma Alanı'nda bilgi üretiminin durumunu, Heidegger'in modern bilim kavramsallaştırması vasıtasıyla

anlamaya çalışacağım. Yani, Avrupa Komisyon'un resmi dökümanlarının analizine dayanan bu çalışmada, Komisyonu'nun resmi belgelerini Heideggerci modern bilim anlayışıyla incelemeyi planlıyorum.

Heidegger'e göre modern bilim, modern çağda şeylerin ne ve nasıl olduğunu belirleyen bir anlayıştır ve metafiziğin uzun tarihinde modern çağı ifade eder. Ancak, Heidegger metafiziği sadece akademik bir disiplin olarak anlamaktan ziyade, şeyleri anlamamızı ve yorumlamamızı ve ayrıca onların varolmasını sağlayan bir temel olarak görür. O, şeylerin neliğini kuracağımız ve onları anlamlı hale getirebileceğimiz bir zemin inşa eder. Batı insanlığının bütün her şeye, hatta kendisine karşı davranışları bile bu metafizik tarafında yönlendirilir ve sürdürülür.

Buna uygun olarak modern bilim, bizim, şeylerin neliğini ve nasıllığını kavrayışımızın modern şeklidir. Modern çağda, şeylerin varolması ve anlaşılabilirlikleri modern bilim tarafından belirlenir. O zaman, bu her şeye anlam veren ve modern çağda varolabilmelerini sağlayan modern bilim nedir? Modern çağda şeyler nasıl anlaşılmaktadır?

Heidegger bu çağı dünya resimleri çağı olarak adlandırır ve bunun sebebinin de bu çağda temsili düşünmenin belirleyici olması olarak açıklar. Yani bu bir özne (subiectum) olarak insanın dünyayı, onun için bağlayıcı olduğu şekli ile, bütünlüğünde anlaması ve kurması demektir. Burada belirleyici olan özne olarak insandır ve dünya insanla ilişkiselliğine göre, onun nesnesi olarak varolur. Heidegger'in değişiyle:

> Resimde olma anlatımından şunlar sezilir: Bir şeyden haberdar olma, ona hazır olma, onun için donanımlı olma. Dünyanın resme dönüştüğü yerde, bütünde varolan, insanın hazır olduğu, buna göre de onu kendi önüne getirmeye niyetlendiği, kendi önünde tuttuğu, sonuç olarak bir anlamda, kendi önünde tuttuğu, sonuç olarak bir anlamda, kendi önünde bir yere koymaya niyetli olduğu bir şeydir. (Heidegger, 2001, p.77-78)

Yani, dünya artık, bir özne tarafında göz önüne getirilip, ortaya koyulduğu ölçüde varolabilir. Modern bilim de, modern çağda, işte bu belirgin ortaya koyma, şeylerin ne ve nasıl olduğunu belirleme biçimidir. İşte bu yüzden, Heidegger'in ontolojik

modern bilim anlayışı, bilimin, şeyleri önyargısız ve tarafsızca anladığı fikrine karşı çıkar. Aksine bilim, şeylerin kendilerini belirli ve sınırlanmış, yani nesne şeklinde göstermeleri için onlara yönelir.

Bilim, doğayı nesnesi olarak göstererek ona yönelir, onu kapana kıstırır, kontrolü altına alıp, onun üzerinde hakimiyet kurar. Dolayısıyla, bu kontrolün sürdürülüp devamlı olarak artıtılması için, doğanın kesin olarak bilinmesi, dolayısıyla hesaplanabilir olması gerekir. Yani, bu önüne koyma, temsil etme, önüne geleni nesneleştirme; insanı özne, doğayı da onun nesnesi olarak korumak, devamlılıklarını sağlamak için kesinliğe ihtiyaç duyar.

Bu bağlamda, bilimin modern çağdaki egemen ve belirleyici formu araştırmadır. Çünkü, araştırma, kendini önceden belirlenip sınırlanmış alanda izlenecek yol, bir prosedür olarak kurmuştur. Bu süreçte, böyle bir alanın açılması, modern bilimin temel özelliğidir. Bu önceden belirlenen alan ve aynı zamanda bu alana bağlanma yolu, tasarısı modern bilimin işlemesi için önkoşullardır. Bu önceden açılan alan ve ona bağlanma, onunla ilişkilenme şekli, şeylerin modern çağda nesne olarak görünür olmasını sağlar ve bilginin nesnesiyle ilişkiselliğini belirler. Buna bağlı olarak, bu tasarlanmış plan, araştırmanın üzerinde işlediği temel; ve bu planın korunmasıyla birlikte araştırmanın iki gerekli özelliği olarak, ilkin metodolojide gözlemlenir. Modern bilimin belirleyici metodolojisi olarak deney, prosedürün kesinliğini kurar. Deney, *a priori* kavramların doğaya yansıtılıp, doğanın bu yolla gözlemlenmesidir. O zaman deney, zaten bir kural veya kanunun temel olarak belirlenmesiyle başlar. Bir deney kurmak, şeyleri önceden belirlenmiş koşullar altında gözlemlemek demektir.

> [...] Greklerde, Orta çağ'da, gözlemler, sayı, ölçü aracılığıyla yapıldığında; gözlemi belirleyen özel düzeneklerin, araç gerecin yardımı alındığında da, gözlem, araştırma deneyinden farklı olmayı sürdürür, çünkü, bunların tümünde, genel olarak, deneyin kesinliği eksiktir. Deneyin kesinliği, bir yasanın temele koyulmasıyla başlar. Bir deney yapmak; Bir dizi devinim bağlamını, onun kendi akışının zorunluluğunda izlenebileceği bir koşulu göz önüne getirme; açıkçası bu devinim bağlamı dizisini, daha önceden hesaplayarak egemen olunabilir duruma getirme demektir. Ne var ki, yasanın temellendirilmesi, nesne alanının temel planından yola çıkarak

> uygulamaya koyulur. Nesne alanının planı ölçüt verir, koşulların daha önceden göz önüne getirilmesine sınır koyar. (Heidegger, 2001, p. 70)

Kısacası, araştırma olarak modern bilim, önceden belirlenmiş alanda ve önceden tasarlanmış temel üzerinde şeylerin gözlemlenmesidir. Modern bilimin şeyleri nesnel, dolayısıyla hesaplanabilir ve kontrol edilebilir halde tutabilmek için böyle işlemesi gerekir.

Heidegger'in bu analizine göre, modern bilimin üç kurucu özelliği vardır ve bu özellikler bilimin araştırma olarak sürdürülmesi için gereklidir. Modern bilimin (1) kurumsallaşmış olması, (2) uzmanlaşmış olması ve (3) onun araştırmacısı. İşte bu üç özellik, benim Avrupa Araştırma Alanı analizimi üzerine kurduğum temelim olacak. Avrupa'nın bilgi ve bilgi üretimi üzerine olan politikalarını bu üç özellik üzerinden inceleyeceğim.

İlk olarak, modern bilim, doğa üzerindeki kontrolünü ve egemenliğini artırma güdüsüyle, gerekli olarak kurumsallaşmıştır. Modern bilimler, elde ettikleri cevaplarla yeni araştırma soruları yaratıp, kendini devam eden bir faaliyet olarak, her zaman ilerletmeyi amaçlar. "Tek tek nesne alanlarını ele geçirmemize aracılık eden yöntem, sonuçları toplamakla yetinmez; sonuçların yardımı ile her durumda kendini yeni bir sürece de uydurur" (Heidegger, 2001, p. 73). O halde, modern bilimlerin bu kurumsallaşmış özelliğinin sağlamlaştırılması ve pekiştirilmesi demek, o bilimlerin varlığının ve ilerlemesinin garanti altına alınması demektir.

Daha sosyolojik terimlerle ifade etmek gerekirse, modern bilimlerin devamının ve gelişimlerinin sağlanması için araştırmacıların ve bilimsel bilginin iletişimi ve dolaşımının; aynı zamanda, araştırma sonuçlarının ileriki araştırmalar için kullanımının garantiye alınacağı bilimsel bir cemaatin içinde gerçekleşmesi önemli ve gereklidir. Araştırma faaliyetlerinin devamı ve bilimsel bilgilerin saklanması ve iletişimi, ancak bilimin bir toplulukta sürdürülmesiyle mümkündür. Bu bilimsel toplulukta araştırmacılar devamlı etkileşim içinde olmalı ve çeşitli araştırma projelerinde birlikte çalışmalıdırlar. Ayrıca, konferans ve toplantılarda, sahip oldukları bilgileri diğer araştırmacılarla paylaşmalıdırlar. Yani, kısacası, modern

çağda bilimsel kurumlar modern bilim tarafından kurulmuştur ve araştırmacılar bu kurumlarda bilim yapmak ve onu ilerletmek için bu kurumlar tarafından eğitilmektedirler.

Bu bilimsel kurumların en köklü ve bilindik örneği üniversitedir. Heidegger, üniversiteyi uzmanlaşmış ve disiplinlere ayrılmış bilimleri bir arada tutan teknik bir kurum olarak tanımlar. Ancak, üniversite bu bilimsel kurumların sadece bir tanesidir. Bunun yanında, araştırma organizasyonları, meslek birlikleri, özel şirketlerin araştırma ve geliştirme bölümleri bu kurumlara birkaç örnektir.

Bu teorik bağlamda, Avrupa Araştırma Alanı'nı, modern bilimin kurumsallaşmış olması temelinde inceledim. Bu alanda, bilimin kurumsallaşmış özelliğinin devam edip etmediğini araştırmak bu bölümdeki asıl hedefim oldu. Bu amaçla, ilk olarak Avrupa Araştırma Alanı'nın bileşen ve paydaşlarını ele aldım. Bu bileşenler, olması gerektiği gibi, bilimsel topluluklardır ve Avrupa Araştırma Alanı'nda bilim hâlâ bu kurumlarda gerçekleşmektedir. Üniversiteler, ulusal araştırma organizasyonları, meslek birlikleri ve uluslararası araştırma kuruluşları, bu alanın paydaşları olarak, bu süreci sürdüren kurumlardır. Bu paydaşlardan bahsetmemin sebebi şu göstermek içindir: Avrupa Araştırma Alanı'nda varolabilmenin ve görünür olmanın önkoşulu, hâlen bir kurum olarak faaliyet göstermek ya da bir kurumun üyesi olmaktır. Yani bilimsel cemaatin bir üyesi olmak Avrupa Araştırma Alanı'da varolabilmek için önşarttır.

Bu bölümün ikinci kısmında, Avrupa Komisyonu'nun birçok girişimine odaklandım. Bunu yapmamın sebebi, Avrupa Araştırma Alanı'nın daimi bir bilimsel alan olarak kurulup sürdürülebilmesi için varolan kimi rutinleri, kural ve kanunları incelemekti. Yani, Avrupa Araştırma Alanı, çeşitli kurumsallaşmış girişimlerle bilimsel bilginin ve araştırmacıların üretildiği, yayıldığı ve iletişimlerinin sağlandığı bilimsel bir cemaat olarak kurulmuştur. Aynı zamanda bu alan, tam da modern bilimin kurumsallaşmış özelliğinden ötürü bu şekilde kurulmuştur. Avrupa Araştırma Konseyi, ERA-Nets, 185. maddeye bağlı girişimler, Ortak Teknoloji Girişimleri,

Marie Curie Hareketi, Araştırma Altyapıları için Avrupa Strateji Forumu bu amaçla incelediğim girişimlerdir.

Analizin ikinci bölümünde, Avrupa Araştırma Alanı'nı, modern bilimlerin uzmanlaşmış özelliğini baz alarak ele aldım. Heidegger'e göre, bilimler, modern çağda gerekli olarak uzmanlaşmıştır. Çünkü modern bilimin, doğanın üzerindeki kontrölünü devam ettirip, onu nesnesi olarak koruması için, nesne alanını sınırlaması gerekir. Bu alanın, daha en baştan sınırlandırılması ve öznenin bu alanla ve nesnesiyle ilişkisinin önceden belirlenmiş olması modern bilimin araştırma olarak devam etmesi için gereklidir.

Özgün ve sınırlandırılmış nesne alanıyla nitelenen modern bilim, ilgili metodolojinin çeşitli araçlarıyla kurulur ve sınırlandırılır. Dolayısıyla, modern çağda bilim nesne alanını korumak ve ilerletmek için gerekli olarak sınırlanıdırılmalıdır.

> Her bilim, araştırma olarak, sınırlı bir nesne alanının tasarımında temellendirilmiştir, bundan ötürü de zorunlu olarak tek (bireyleşmiş) bir bilimdir. Üstelik, her tek bilim, tasarımın gelişiminde, yöntemi aracılığıyla araştırmanın belli bir alanında özelleşir. Ama bu uzmanlaşma, hiç bir zaman, yalnızca, araştırma sonucunun, giderek artan kabul edilmiş kestirilemezliğinin istenmeyen bir yan olgusu değildir. O zorunlu bir olumsuzluk değil, araştırma olarak bilimin özünün gereğidir. Uzmanlık bir sonuç değil, her araştırmanın yürütülmesinin temelidir. (Heidegger, 2001, p. 72)

Ayrıca Heidegger, bilimlerin üretken ve verimli olabilmeleri için kendi sonuçlarını devamlı sorgulayıp, durgun bilginlikten kaçınmaları gerektiğini iddia eder. Her bilimin, ilerleyebilmesi için, sonuçları ve hesaplamaları konusunda devamlı eleştirel olmaları gerekmektedir. Dolayısıyla üretkenliğini kaybetmiş ve durgunlaşmış olan bilimlerin yok olması ve yine aynı şekilde yeni çıkan araştırma sorularına göre yeni disiplinlerin ortaya çıkması modern bilimin doğasından ötürüdür.

Bu bağlamda, analizimin ikinci kısmında, Avrupa Araştırma Alanı'nda modern bilimin uzmanlaşmış olma özelliğini incelemek için, bu alanın dahili (internal) ve şebekeleşmiş (networked) uzmanlaşma kavramlarına odaklandım. Ayrıca, bu alandaki disiplinlerarasılık ve çok disiplinlilik söylemlerine de yoğunlaştım.

Avrupa Araştırma Alanı'nında devam etmekte olan bütün fonlama programlarının altında sürdürülen her araştırma projesinin, belirli alanların araştırma soruları ile ilgilenmesi gerekir. Her proje, gerekli olarak, sınırlı alanlar üzerinde çalışır ve bu alan içerisinde kalır. Avrupa Araştırma Alanı'nda, verimli ve üretken bilgi üretimini sürdürebilmek ve bilimsel bilginin serbestçe dolaşımını, iletişimini ve etkileşimini sağlamak için, Komisyon dahili (internal) ve şebekeleşmiş (networked) uzmanlaşmadan bahseder. Dahili uzmanlaşma ulusal araştırma kurumlarının disiplinlerinin ve bazı alanlarının, Avrupa düzeyine ve uluslararası seviyeye yükseltmek amacıyla yeniden düzenlenmesini önerirken; şebekeleşmiş uzmanlaşma, bir entegrasyon politikası olarak, birbirini tamamlayıcı nitelikteki komşu disiplinlerin, sektör ve bölge ayrımı gözetmeksizin bağlanmasını ve birlikte çalışmasını amaç edinir. Dahili uzmanlaşmayla ilgili, araştırmacıların işe alınma ve çalışma koşullarını iyileştirme, araştırma altyapılarını düzenleme, fayda getirmeyen ve üretken olmayan enstitü, laboratuar ve disiplinlerin kapatılması gibi birçok uygulama ve düzenlemelerden bahsedilir. Öte yandan, şebekeleşmiş uzmanlaşma, çok büyük altyapı, araştırmacı sayısı ve deneyim isteyen araştırma faaliyetlerinin ve projelerinin birbirini tamamlayan birçok disiplinin birlikte çalışmasıyla sürdürülmesi gerektiğini savunur. Bu durum, disiplinlerarası ve çok disiplinli araştırmaların önem kazanmasına sebep olur.

Avrupa Araştırma Alanı, çok disiplinlilik ve disiplinlerarasılığın öneminden bahsederek, çağımızın karmaşık problemlerine çözüm getirebilmek amacıyla bir çok disiplinin birlikte çalışmasının ve bu disiplinlerinin birbiriyle devamlı etkileşim halinde olmalarının gerekli olduğunu vurgular. Heidegger'le de uygun olarak, bilimsel disiplinler, modern çağda üretken olabilmek için, devamlı olarak kendi sonuçlarını sorgulamalı ve sınırları esnek olmalıdır. Ayrıca, kendini daha üretken ve yararlı yapacak her türlü değişime açık olmalıdır. İşte bu amaçla, Avrupa Araştırma Alanı klasik bilimlerin katılığından çok, birçok bilimsel disiplin ve programın bir arada ve esnek bir şekilde çalışmalarını destekler.

Modern bilimin sonuç odaklı yapısına uygun olarak, Komisyon'un bu disiplinler arası ve çok disiplinli araştırma projeleri ortaya çıkarma arzusu ve çabaları, bu projelerden en iyi ve en verimli sonucu alabilmeleri için gerekli görülmektedir. En iyi ve en yararlı sonuç ancak bir çok disiplinin bir arada çalışması sonucu elde edilebilecektir. Bu yüzden, Avrupa Araştırma Alanı, araştırma projelerinden azami verimliliğin ve faydanın alınması amacıyla kurulmuş olan bilimsel bir cemaattir ve en çok fayda ancak bir çok disiplinin bu amaçla yeniden düzenlenmesi ve araştırma projelerinde bir araya getirilmesi yoluyla birlikte çalışmaya tevşik edilmesi koşuluyla başarılır.

Modern bilimin son özelliği, onun araştırmacısıdır. Araştırmacılar, modern çağda, modern bilimin sürdürülmesi için, onun tarafından yetiştirilmişlerdir. Modern çağın düşünürleri olarak araştırmacılar, araştırma kurumlarının gündemlerine göre hareket eder, araştırma projelerinde diğer araştırmacılarla birlikte çalışırlar ve seminer, toplantı ve konferanslarda bilgilerini paylaşarak, bilimsel bilginin yayılmasını ve ilerlemesini sağlar. Heidegger'in sözleriyle:

> [...] bilim yeni çağa özgü süren etkinliğin niteliğinin kritik gelişimi, farklı bir insan kalıbı da oluşturur. Bilgin ortalarda yoktur. Araştırma tasarılarına kendini kaptıran araştırmacı, bilim insanını ortadan kaldırmıştır. Araştırmacılar okuyup bilgilenmeyi bir yana bırakıp çalışmalarında kesinliğin havasına kapılırlar. Artık araştırmacı evinde bir kütüphaneye gerek duymaz, sürekli yoldadır. Kurultaylarda tartışmalar yapar, kongrelerde bilgi edinir. Yayıncılarla komisyonlara katılır. Hangi kitabın yazılacağını, yayıncılarla birlikte bu kurallar belirlemektedir. (Heidegger, 2001, p. 74)

Heidegger'in araştırmacılardan açıkça bahsettiği kısım sadece bu alıntı kadar olsa da, yaptığı kapsamlı ve sağlam modern bilim kavramsallaştırması, araştırmacı ile ilgili birçok şey söyleme imkanı sunar. Bilimin kurumsallaşmış ve uzmanlaşmış özelliklerine bağlı olarak bu çağda araştırmacı da belirlenir.

İlk olarak araştırmacı sadece bilimsel bir cemaatin üyesi olduğu sürece varolabilir. Çünkü bilimsel bir topluluğun üyesi olmak, bilimsel bilgilerin iletişimi, saklanması ve ilerletilip, geliştirilmesi için gereklidir. Bu yüzden araştırmacı evinde bir

kütüphaneye ya da çalışmak için yalnız kalmaya ihtiyaç duymaz. Tam tersine, kendisi gibi olan, diğer araştırmacılarla devamlı iletişim ve etkileşim halinde olmalıdır. Yani bilimsel etkinliğin ve üretkenliğin korunması için araştırmacıların sosyalleşmesi çok önemlidir.

Ayrıca araştırmacılar, modern çağda, uzman olarak yetişir ve çalışırlar. Bu Heidegger'in anlayışında şu anlama gelmektedir: bilimin uzmanlaşmış karakteri, gerekli olarak, araştırmacıları da uzmanlara dönüştürür. Yani, belirli bir disiplinle ilgili belirli ve özel bir eğitim sonucu, uzman olarak bilimsel bir cemaatin üyesi haline gelinir. Ayrıca bilimin devam edebilmesi, sürdürülebilirliğinin garantiye alınması ve de ilerlemesi için, araştırma faaliyeti bir iş, araştırmacılar da bu işi yapan işçiler olmalıdırlar.

Heidegger'in modern bilim analizinden çıkan bu araştırma ve araştırmacı tanımları Avrupa Araştırma Alanı'ndaki araştırmacıları da tam olarak tanımlamaktadır. Araştırmada azami verimi ve faydayı alabilmek için, belirli bir dalda, özel olarak eğitim alıp yetiştirilmiş uzmanlara gereksinim vardır ve araştırmacının, bahsedilen özellikleri, bu alan için önemli ve hatta vazgeçilmezdir. Çünkü Komisyon ve üye ülkeler politikalarını ve uygulamalarını bu tanıma ve anlayışa göre tespit etmektedirler.

Esas güdüsü, araştırma faaliyetlerinden en çok faydayı ve en iyi sonucu alabilmek için yeterli sayıda ve nitelikteki araştırmacıya sahip olmak olan Avrupa Birliği, bu amaçla bir çok politika geliştirmiştir. Bunlar, kadınların araştırma mesleğine dahil edilmesi; açık, şeffaf ve liyakat temelli işe alma prosedürlerinin geliştirilmesi; iş ve çalışma koşullarının iyileştirilmesi; potansiyel araştırmacıların iyi bir eğitimden geçirilmesi; ve bu mesleğe ilginin artması için eğitim koşullarının çekici hale getirilmesi ve uluslararası ve sektörlerarası hareketliliğin artırılması gibi politika girişimleridir.

Sonuç olarak, bu tezde, Avrupa Araştırma Alanı'nı, 1970'lerden sonra baskın hale gelmeye başlayan neoliberal politikaların bir sonucu olarak, bilginin ve bilgi üretim

sürecinin durumunu, egemen piyasa ve pazar ilişkilerine göre yeniden düzenlemek amacıyla kurulduğunu savunmak yerine, Heidegger'in modern bilim anlayışını teorik bir temel olarak benimseyerek, bu alanı modern bilimin doğal ve gerekli bir sonucu olarak ele aldım. Yani Avrupa Araştırma Alanı, modern çağda şeylerin ne ve nasıl olduklarını belirleyen bir anlaşılabilirlik temeli olarak modern bilimin üç esas özelliğini -kurumsallaşmış ve uzmanlaşmış olması ve modern bilimin araştırmacısı- koruyup sürdürdüğü için, bu bilimin doğal ve gerekli bir sonucudur.

## APPENDIX C: Tez Fotokopisi İzin Formu

**ENSTİTÜ**

Fen Bilimleri Enstitüsü [ ]

Sosyal Bilimler Enstitüsü [x]

Uygulamalı Matematik Enstitüsü [ ]

Enformatik Enstitüsü [ ]

Deniz Bilimleri Enstitüsü [ ]

**YAZARIN**

Soyadı : Altınkaya
Adı : Tuba
Bölümü : Sosyoloji

**TEZİN ADI** (İngilizce) : HEIDEGERRIAN UNDERSTANDING OF MODERN SCIENCE: THE CASE OF EUROPEAN RESEARCH AREA

**TEZİN TÜRÜ** : Yüksek Lisans [x] Doktora [ ]

1. Tezimin tamamından kaynak gösterilmek şartıyla fotokopi alınabilir. [x]
2. Tezimin içindekiler sayfası, özet, indeks sayfalarından ve/veya bir bölümünden kaynak gösterilmek şartıyla fotokopi alınabilir. [ ]
3. Tezimden bir (1) yıl süreyle fotokopi alınamaz. [x]

**TEZİN KÜTÜPHANEYE TESLİM TARİHİ**: