



EU's Open Science: an Impetus for Turkey's Innovation Potential

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Abstract

The concept of open science includes the development of studies by researchers around the world and serves open access to the scientific world. These studies contribute greatly to researchers, institutions, and thus to the progress of science. The contribution of the European Union to open science gives great support to the R & D and innovation projects offered worldwide, and the project calls for the European Union Project Program by the European Commission are among the major actors in this field. Turkey's EU efforts to integrate research and innovation potential is increasing in the last 5 years. These studies indicate that Turkey's accession to the European Union Project is ongoing with the announcement of the program, including the academies and scientific perspective through national spots. European Union Project programs; HORIZON2020, ERA-NET, EUREKA show a great contribution rate of significant importance worldwide. This article confronts us relatively unrecognized value of the research findings with Turkey 2019 data is taken into account statistics of Turkey's contribution by 27.5% to research programs and joint international number of scientific publications by 5.2%. Only 33.5% of these academic publications are cited in foreign publications. Moreover, the fact that 24.1% of doctoral students and less than 17% of private sector are foreigners provide insufficiency of the innovative contribution of these statistics to the open science of the European Union. Following these data, the success rate from the EU project programs to H2020 shows a limited number of national applications made with the statistics obtained; By the end of 2019, 781 institutions across Turkey, with a total number of 588 projects deemed worthy to receive a grant in the amount of EUR 167.6 million has already received grants. This ratio is mostly composed of private sector and universities. This statistical ratio indicates that Turkey's EU contribution to the study of innovation Artilleria greatly needed. Increasing the employment of experts and foreign languages who will be offered as a solution and close monitoring of eu project programs can be listed among the target solutions.

Keywords: European Union, open science, innovation, research, project program

AB'nin Açık Bilimi: Türkiye'nin İnovasyon Potansiyeli İçin Yükselen Bir Güç

Öz

Açık bilim kavramı dünya çapındaki araştırmacıların ortaya koyduğu çalışmaların geliştirilmesine ve erişimi açık halde bilim dünyasına sunulmasıdır. Bu çalışmalar, araştırmacılara, kurumlara ve dolayısıyla bilimin ilerlemesine büyük ölçüde katkı sağlamaktadır. Avrupa Birliği'nin açık bilime olan katkısı dünya çapında sunulan arge ve inovasyon projelerine büyük destek vermekte olup Avrupa Birliği Komisyonu tarafından oluşturulan Avrupa Birliği Proje Program çağrıları bu alanda rol alan en büyük aktörlerdendir. Türkiye'nin AB araştırma ve inovasyon potansiyeline entegre olma çalışmaları son yıllarda büyük artış göstermektedir. Bu çalışmalar Türkiye'nin de dahil olduğu Avrupa Birliği Proje Programlarına katılımlarının ulusal noktalar sayesinde duyurulması ve akademinin bilimsel bakış açısı ile süregelmektedir. Avrupa Birliği Proje programlarından; UFUK2020, ERA-NET, EUREKA adındaki proje programları, Avrupa'nın inovasyon programları olarak geçmekte ve katılımı dünya çapında büyük önem taşımaktadır. Bu derlemede yer alan ve 2019 verilerinin göz önünde bulundurulduğu istatistikler Türkiye'nin araştırma programlarına % 27,5 oranında katılımını ve %5,2 oranında ortak uluslararası bilimsel yayın sayısı ile nispeten Türkiye'den araştırma bulgularının tanınmayan değerini karşımıza çıkarmaktadır. Bu akademik yayınlardan sadece% 33,5'i yabancı yayınlarda referans gösterilmektedir. Ayrıca doktora öğrencilerinin % 24,1'nin, özel sektörün ise % 17'sinden azının yabancı olması bu istatistiklerin Avrupa Birliği'nin açık bilimine olan inovatif katkısının yetersizliğini sunmaktadır. Bu verilere takiben AB proje programlarından UFUK2020'ye başarı oranı edinilen istatistikler ile sınırlı sayıda yapılan ulusal başvuruyu göstermektedir; 2019 yılının sonuna kadar Türkiye çapında 781 kurum, 588 adet hibe almaya değer görülen proje sayısı ile toplam 167,6 Milyon Avro miktarında hibe almış bulunmaktadır. Bu oranı çoğunlukla özel sektör ve üniversiteler

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oluşturmaktadır. Bu istatistiki oranlar Türkiye'nin AB inovasyon arařtırmalarına olan katkısının büyük ölçüde artırılması gerektiđi göstermektedir.

Anahtar Kelimeler: Avrupa birliđi, açık bilim, inovasyon, arařtırma, proje programı

1. Introduction

A common value of the cross-sectorial, inter-disciplinary and international co-operation among diverse actors in venture building (universities, research organisations, for-profit entities), Open Science is further defined by synergies among those actors: the heterogeneity of these mutual exchanges (ad-hoc interactions concurrent with intended trajectories of sharing) is a salient characteristic. The plurality is signified particularly in the European Union (EU), a case studied herein, where universities are restrained in contributing to Open Science. While the economic dimension of innovation and research is decided at the Union level, academic centers in the EU and partner countries are normatively kept at the (inter-) governmental axis of cooperation in research and science [1]. An early adopter of the EU's Open Science policy, Turkey faces a unique momentum of beneficial immersion and contribution in the diffused exchange of scientific findings that would ultimately increase its global competitiveness and foster innovation potential's advancement across multiple areas. In this complex settings of power distribution enforced by sub- and supra-national pull and push factors of convergence to the so-called Innovation Union, private and public research organisations have all facilities to cooperate with each other, across the 'formal' borders of national bureaucracies and thus to engage in transboundary venture building [2]. Crowd-sourced research and innovation has its roots in Europe in inter-university cooperation and acceptance of common standards (so called Bologna Process named after the oldest university in Europe, in the city of Bologna, Italy). The mutual exchange of data and the borrowing of products of each scientific excellence is due to the freedom given to universities to capitalise on their intellectual property (co-)created within the process of venture-building, especially by interacting with other innovation stakeholders such as private entities (enterprises) and even start-ups.

The European Commission has been playing a critical role in open access to academically knowledge and research data's. As a policymaker, it has issued a recommendation on access to scientific information to EU member states, advising them to develop open access policies and strategies that are compatible with the EC's strategy. In order to intensify the innovation impact of this joint work, the EU has set a framework entitled 'Open Science 2.0' in which innovation stakeholders are encouraged with funding and other 'carrots' to participate in the European Open Science Cloud for Research [3]. This related Cloud, being the latest development (in effect since 2016), enables universities and R&D companies to combine their e-infrastructures in one single digital platform where researchers pool together vast amounts of data. As a continuation of the EU open data portal, the Cloud is deemed to build on the results of over thousands of projects, all of them being international and based on cross-sectorial cooperation initiated. Contributing to the Cloud is profitable for universities as well as enterprises: participating in venture-building beyond boundaries (of states, disciplines, socio-economic sectors) is incentivised with EU grants of a total share of 80 billion euro within the Horizon 2020 programme (2014-2020) and over 100 billion euro in the upcoming Horizon Europe programme (2021-2027). A uniform rule for a project to be eligible for funding worth several millions of euro would require the universities and companies to cooperate with partners with complementary capacities, ensure cross-proliferation of ideas and potentials within the scope of project participants and across each of the domains in which they are operating [4]. Horizon 2020 is a Framework Project Programme for Research and Development of the European Union and has a budget of around 80 billion Euro. TÜBİTAK from Turkey is taking actions in order to enable Turkey to benefit from Horizon 2020 and researchers are supported for the writing process of the H2020 proposals. With the support of Horizon 2020, Turkey has the potential of disrupting European and global markets with science-based innovation that is open for others to adopt or co-create and therefore, unleashing the country's full potential to contribute to the Open Science 2.0 model. Interdisciplinary and cross-sectorial partnerships centred around the research-industry axis of the H2020 consortium places Turkey at the core of intensifying, deepening and widening the integration process in the domain of open science. While within the Framework Programme 7 (Horizon 2020) Turkish R&D partnerships succeeded in just as low as 20% of all submitted project proposals, there is huge potential to domesticate EU's open science and internationalise Turkey's innovation [5]. In addition to Horizon 2020, Eureka and ERA NET project programs that align Turkey's national R&D priorities with the EU's Open Science agenda. While their administrative procedures are more detailed and longer, the success rates for Turkish university-industry consortia are far higher than under Horizon 2020 project program. Project partnering in Eureka and ERA NET projects indicate a big innovation in a wide range of fields and sectors, Turkish applicants would then have increased their capacity to join and eventually lead Horizon 2020 projects whose excellence and impact has to be at the European and global level.

Turkey has been engaged in information exchange on open access, relating to the H2020 framework program and policy alignment through national and international networks – for example, the Knowledge Exchange – as well as through participation in EU-funded open access projects. The involvement of H2020 participating countries in European networks means a co-work as where information is shared about the H2020 open access policy, where best practices and shared problems are discussed. This information consists of advocacy materials that are disseminated, policy development and alignment. The way of promoting the open access policy alignment in H2020 project program, participating countries are in a more systematic way that the development of a network distinct national stakeholders in promoting policy development and alignment.

2. Material and Method

The approach taken in this article is based on the European Commission’s platform on Small Enterprises Industry Innovation Monitoring Scoreboard. The European innovation scoreboard provides a comparative analysis of innovation performance of European countries, associated European countries and regional neighbours. This EU Platform has also the ability of assesses the relative strengths and weaknesses of countries’ innovation systems and helps countries to identify areas that need to be addressed. The European innovation scoreboard of the year 2019, was released on 17 June 2019 and the latest edition was this two-yearly report.

3. Results

The 2019s’ version of the scoreboard indicates that the EU’s innovation performance continues to increase. According to year of 2018, EUs’ innovation performance improved in 24 EU countries and the growth rate of lower-performing countries compared to higher-performing countries has accelerated. Since 2011, the EU’s average innovation performance has increased by 8.8 percentage points. The 2019 version shows the methodology of the 2018 edition. However, results should not be compared across editions due to data. Time series using the most recent data allow performance to be tracked over time.

Despite all of these incentives that encourage Turkish universities/academic centres and R&D performing companies to engage in Open Science and cooperation with European peer organisations, the European Innovation Scoreboard still places the country in the group of moderate innovators, behind Serbia that is a minor economy as compared to Turkey.

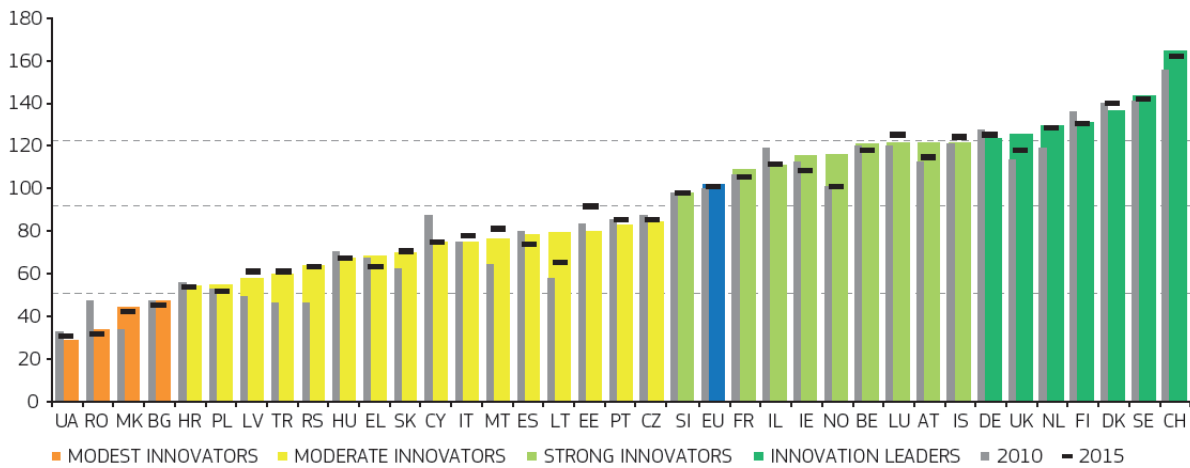


Figure 1: Ranking of innovators (European Innovation Scoreboard 2019)

Findings of 2019s’ edition of the European Innovation Scoreboard place Turkey in the group of countries with unattractive research systems (27,5% on a scale of 100%), extremely limited volume of joint international scientific publications (5,2%) and relatively unrecognized value of the research findings (only 33,5% get referenced in foreign publications). The opportunity for penetration of new ideas in high education are limited (only 24,1% of doctorate students are foreign) and the private sector faces with similar challenges (less than 17% of R&D staff is foreign staff). Moreover, the success rate of Turkey from the EU project programs to H2020 shows a limited number of international applications made with the statistics obtained; By the end of 2019, 781 institutions across Turkey, with a total number of 588 projects deemed worthy to receive a grant in the amount of EUR 167.6 million has already received grants. This ratio is mostly composed of private sector and universities. [Figure 2.]

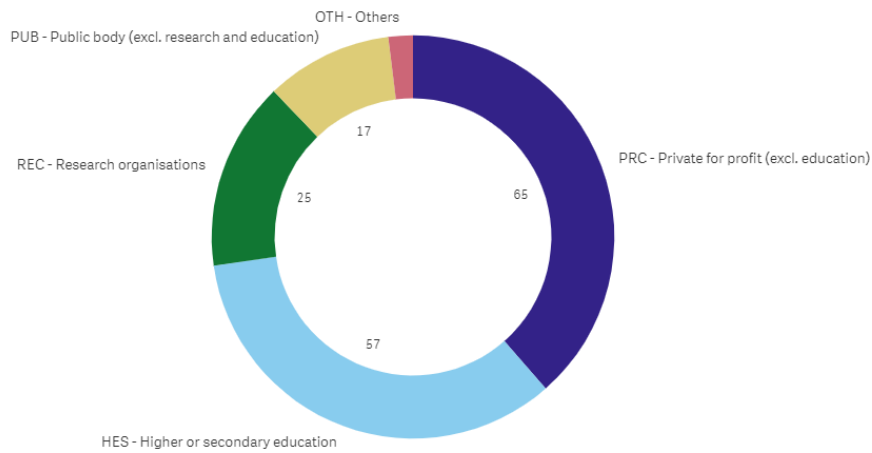


Figure 2. EU Contribution by Type of Organisation (Mil Euro)

The institutional Open Access policies mentioned as a support for authors seeking other publishing avenues. In Turkey there are no actual funders of Open Access policies. Overall, a number of Turkish stakeholders are engaged in promoting the introduction of Open Access legislation as well as in supporting the increase of institutional Open Access policies and encouraging the existing ones to be strengthened. Figure 3 summarizes the facts of the Turkish Institutional Open Access policies (72 in total) that are also related with the H2020 Project Programs' Open Access.

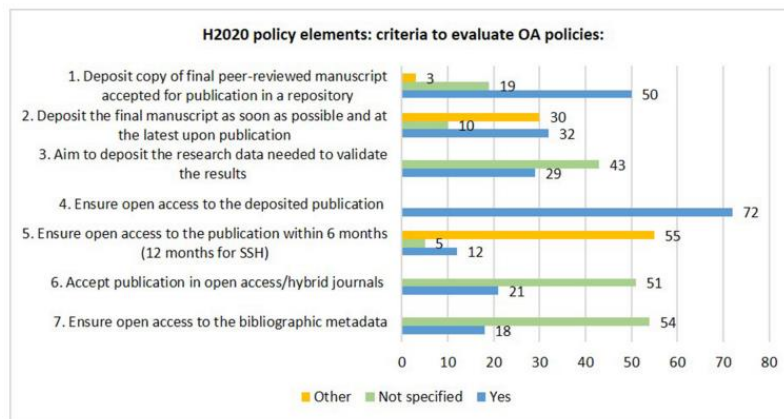


Figure 3. The elements of the Turkish institutional OA policies

Turkey's performance has increased in 2018 and almost entirely explained by improved performance on the indicators using CIS data. Turkey performs relatively effective on Non-R&D innovation expenditures, SMEs innovating in-house, and SMEs with marketing or organisational innovations. Small and medium-sized enterprises (SMEs) are the backbone of Europe's economy and show 99% ratio of all businesses in the EU. In the past five years, they have created around 85% of new job areas and provided contribution to private sector employments in the EU. The European Commission considers SMEs and entrepreneurship as key to ensuring economic growth, innovation, job creation, and social integration in the EU.

Academically assets are the weakest innovation dimensions in Turkey. Turkey's lowest indicator scores are industrial applications and scientific co-publications (figure 4 in below). Average annual GDP growth, enterprise births, and total entrepreneurial activity are well above the EU average. The employment shares in high and medium high-tech manufacturing, the employment share in knowledge-intensive services, FDI net inflows, and top R&D spending enterprises per 10 million populations are well below the EU average.

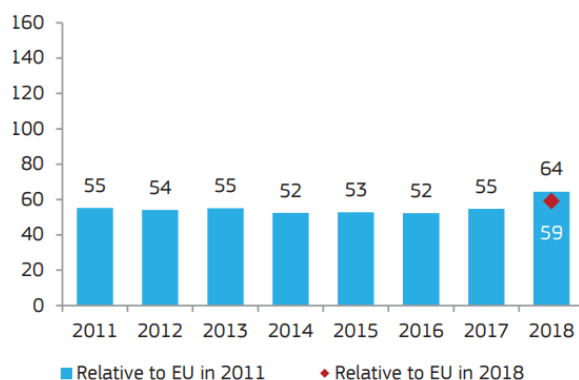


Figure 4. Turkey's contribution on European Innovation Scoreboard 2019

4. Conclusions and Recommendations

This article shows a relatively critical value of the research findings on Turkey in the year of 2019. Data is taken into account current ratios of Turkey's contribution by 27.5% to research programs and joint international number of scientific publications by 5.2%. It is also mentioned that only 33.5% of these academic publications are cited in foreign academic publications. Moreover, the fact that 24.1% of doctoral students and less than 17% of private sector are foreigners provide insufficiency of the innovative contribution of these statistics to the open science of the European Union. Following these data's, the success rate from the EU project programs to H2020 shows a limited number of international applications made with these statistics obtained. By the end of 2019, 781 institutions from Turkey, with a total number of 588 projects deemed worthy to receive a grant in the amount of EUR 167.6 million and has already received grants. This ratio is mostly composed of private sector and universities. This statistical ratio indicates that Turkey's EU contribution to the study of innovation is importantly needed. Increasing the employment of experts who speaks foreign languages will be offered as a solution and close monitoring of EU project programs can be listed among the target solutions.

Turkey performs on Non-R&D innovation expenditures, SMEs innovating in-house, and SMEs with marketing or organisational innovations but the academically assets, are Turkey's weakest innovation dimensions. Turkey's lowest indicator scores are on design and trademark technologies and international scientific publications (shown in the figure 4). Average annual GDP growth, enterprise births and total entrepreneurial activity are also above the EU average. The employment shares in high and medium high-tech manufacturing, the employment share in knowledge-intensive services, FDI net inflows, and top R&D spending enterprises per 10 million populations are well below the EU average.

However, there are still some critical and important challenges for Turkey to cope with. These challenges are relatively; developing and implementing a Smart Specialisation Strategy, knowledge transfers from academia to industry, supporting scientific excellence, international scientific co-publications in high impact factor journals, constant monitoring of the EU projects and impact assessments of EU project programmes that will allow to enhance economic growth and international cooperation on industrial areas in Turkey [6].

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