The Impact of International Networks on Grants, R&D, Knowledge and Technology Transfer - Case of COST Network and KTU

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ABSTRACT

It is essential that researchers collaborate with international colleagues and adhere to international standards to facilitate the transfer of technology resulting from their research. In order to participate in these projects, it is essential for researchers to have a broad international network and reliable collaborators to form international consortia. This study examines the strategy adopted by Karadeniz Technical University (KTU) in its pursuit of the COST (European Cooperation in Science and Technology) Programme and the subsequent results that enabled its researchers to engage in prestigious international consortia and access international funding sources. To increase the number of Karadeniz Technical University (KTU) members in the Management Committee (MC) and Working Group (WG) of COST Actions, which have limited slots, each Action was carefully reviewed, and individual meetings were held with researchers. Technical and administrative support was provided to facilitate researchers' participation in the Actions. A statistical analysis was conducted for researchers who participated in COST Actions over the past five years. The status of countries involved in the COST program from 2019 to 2023 was examined. Additionally, Türkiye's performance during this period was analyzed to assess the effectiveness of the developed strategy. As a result of these analyses, in COST Actions in which a limited number of KTU researchers were involved at the beginning of 2019, 252 researchers were involved in 528 actions by the end of 2023, becoming the first university in Türkiye in this context. Thanks to the researchers and activation included in the COST Programme, a 92.3% increase in the number of international project applications and a 366% increase in the number of project acceptances were observed between 2019 and 2023. The findings indicated that these exemplary practices could serve as an effective approach for the internationalisation of higher education institutions.

KEYWORDS

Technology Transfer, R&D, Internationalisation, COST

1 INTRODUCTION

The involvement of researchers in internationally funded projects presents a duality of opportunities and challenges. One of the most significant challenges encountered during this process is the formation of international consortia. Effective communication between researchers from different countries and disciplines is of great importance, as consortia require such a diverse group to come together [1]. Furthermore, operational challenges, including the sourcing of funding, the optimal utilisation of resources and the effective management of projects, represent significant obstacles in the context of such projects [2]. Nevertheless, the intricacy of these procedures and the presence of bureaucratic impediments can act as a deterrent for numerous researchers [3]. The existing literature frequently emphasises that participation in international projects has positive effects on researchers' career development, knowledge sharing and innovation [4]. In particular, the formation of international consortia hinges on the existence of reliable networks and cooperative networks, which are pivotal for the success of the projects. In this context, the effective utilisation of international cooperation networks facilitates the efficiency and sustainability of projects. Due to the inability of KTU researchers to engage in sufficient international cooperation, it was observed that the university was quantitatively and qualitatively insufficient in international projects, resulting in limited scientific output and weakened competitiveness at the global level. This deficiency prevented the university from fully exploiting its potential, especially in areas such as access to international funding, exchange of knowledge and experience, and development of innovative solutions. This study presents the internationalisation strategy of Karadeniz Technical University, which enables researchers to participate in qualified international consortia and access international funding sources, as exemplified by the COST programme.

The COST (European Cooperation in Science and Technology) programme was established in 1971 with the objective of promoting scientific and technological research in Europe. The objective of COST is to facilitate the exchange of knowledge and encourage innovation among researchers by fostering interdisciplinary networks. The principal objective of the programme is to facilitate international collaboration and enable researchers to collectively address global challenges. While COST does not provide direct support for research and development, it plays a significant role in facilitating the formation of international consortia, which allow researchers to collaborate on the advancement of their projects. Researchers may participate in the Actions in either the capacity of a member of the Management Committee (MC) or a member of a Working Group (WG). In these roles, they are afforded the opportunity to engage in in-depth strategic planning, project management, and the exploration of specific research topics. Those engaged in COST Actions enjoy significant advantages, including access to information and resources, opportunities for career development and the strengthening of leadership skills as part of an internationally recognised network. Such opportunities permit researchers to make significant progress in their careers and to become more prominent figures within the international scientific community. COST Actions facilitate the formation of new collaborative relationships and the expansion of existing networks, thereby enhancing the probability of securing additional funding and support for research projects. Furthermore, meetings, workshops and conferences organised by COST provide invaluable opportunities for researchers to disseminate their knowledge and experience [5].

2 METHODOLGY

In accordance with the internationalisation strategy for KTU to become more effective in the international arena, activities are being undertaken with the objective of enhancing international collaboration and increasing the quantity and calibre of project proposals submitted to international funding programmes. Given the crucial role that a broad international network plays in securing participation in internationally funded projects, concerted efforts have been made to direct students towards the COST Programme since late 2019, with ongoing initiatives still in place.

In this context, awareness-raising activities, which commenced with information events held at various locations across the university and its constituent departments, have yielded tangible outcomes through one-to-one interviews with academics. In this regard, the strategy pursued by KTU Technology Transfer Application and Research Center experts to enhance the involvement of researchers in COST Actions is outlined below.

- **Organisation of information events:**
- **Analysing current COST actions:** Existing COST actions are analysed and listed with details covering objectives, research areas, participation requirements, duration, etc.
- **Identification of researchers:** Researchers with fields of study compatible with COST actions are identified by analysing their academic profiles (research areas, project experiences, etc.).
-**Establishing contact with researchers:** The identified researchers are contacted and one-to-one interviews (telephone, e-mail or desk interviews) are conducted about the opportunities and benefits of participation in COST actions. It is assessed whether the researchers are suitable for the identified actions.
-**Providing technical support services:** Technical support is provided to researchers during the application process for COST actions (filling out the application form, preparation of necessary documents, follow-up of the application process, etc.) and the application evaluation process is followed.
-**Guidance to other COST-related support:** Researchers are provided with the opportunity to benefit not only from MC/WG assignments in actions, but also from other COST-related support such as Short-Term Scientific Visit (STSM) and ITC Conference Support. In addition, referrals were made to the COST 2515 Programme supported by TUBITAK, the COST National Coordinator in Türkiye, to provide R&D support to researchers.

The country-based data used in the study were obtained from the COST Annual Reports and the researcher-based data were obtained from the COST website.

In order to assess the status of the developed strategy, a mini survey with open-ended questions was conducted with KTU researchers participating in COST Actions. In the survey, the benefits of the participated actions for the academics were evaluated with questions such as to what extent they benefited from the action, what kind of effects it had at the academic level, what kind of activities they participated in.

3 RESULTS

The COST programme facilitates extensive involvement from a diverse array of countries, encompassing 41 member countries and cooperation countries. In addition to Europe's leading countries in science and research, such as Germany, France, Italy, Spain and the United Kingdom, Türkiye, Israel and some Western Balkan countries are also actively involved in this

programme. Table 1 presents detailed data illustrating the status of active participation in the COST programme between 2019 and 2023 [6-10].

Table 1: Status of Countries in COST Programme

Indicator	2019	2020	2021	2022	2023
Runnig COST Action	294	291	289	302	269
New COST action launched	80	45	40	70	70
Average number of COST Members per Action	30	30.8	31	33	33
Average number of non-COST countries per Action	-	4.3	6	5	6
Articles	479	921	1501	1253	-
Percentage of spin-off H2020* proposals approved	37%	39%	32%	-	-
Average value of spin-off projects per Action (€)	6M	5.8M	3.9M	9.5M	5.2M

*Horizon 2020 was the EU's research and innovation funding programme from 2014-2020

Türkiye plays a significant role as an active participant in the COST programme. Türkiye's involvement in COST Actions between 2019 and 2023, along with a comprehensive account of its contributions and accomplishments, is presented in Table 2 [11-15].

Table 2: Türkiye's Position in COST Programme

Indicator	2019	2020	2021	2022	2023
Individual participation in all action activities	1075	-	20	1113	1849
Training school/hosted	1	12	0	4	10
Short-term scientific missions/hosted	14	103	8	12	23
Short-term scientific missions/participant	72	380	43	90	158
Trainess/participant	197	1001	33	219	310
Trainers/participant	7	58	1	23	48
Budget received (€)	0.9M	4.9M	0.3M	1.5M	2.3M

Türkiye demonstrates a notable level of involvement in the COST programme, exhibiting a discernible increase in participation on an annual basis. The number of individual participants increased from 1,649 in 2019 to 103 short-term scientific missions in 2020, with 380 participants being sent to these missions. Furthermore, 12 training schools were conducted in 2020, with 1,001 individuals undergoing training at these institutions. In 2021, participation declined as a consequence of the impact of the pandemic. However, in 2022, there was a revival in participation and a success was achieved as in 2020. This success continued to increase in the following years. As evidenced by the participation statistics provided by the COST Organisation, Türkiye achieved notable success in 2022 and 2023. In 2022, Türkiye achieved the distinction of becoming the third most participating country, with a participation rate of 99% in all active actions. Additionally, the country reached a notable number of members, with 3,084 individuals participating in Working Groups. In the same year, Türkiye was the fifth most successful country in terms of individual participation in COST network activities, with 1,113 participants, and the fourth country with the highest budget allocation of approximately EUR 1.5 million. Türkiye was the leading country in terms of participation by young researchers, with a rate of 52.8%. In 2023, Türkiye sustained its efficacy by participating in 99% of all actions, thereby attaining the distinction of being the country with the highest number of working group members, with 7,096 working group members. Türkiye was the third most successful country in terms of individual participation in COST network activities, with 1,849 participants, and the third most budgeted country, with approximately EUR 2.27 million.

As a consequence of the activities conducted throughout this process, there has been an enhancement in the awareness of researchers, as well as an increase in the number of researchers who have submitted applications on an individual basis. Moreover, the support provided by COST was not confined to KTU but was also extended to TTO units and researchers at other universities, thereby contributing to an increase in Türkiye's participation in the COST Programme.

As the number of researchers engaged in the COST Programme and active in its actions has grown, the graph below illustrates the change in the number of international project applications and acceptances submitted by KTU between 2019 and 2023 (Fig. 1).

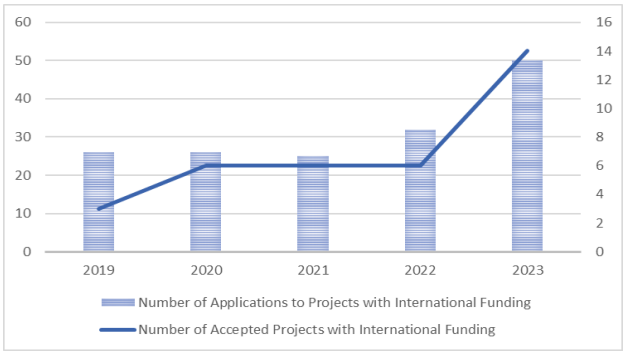

Figure 1. Statistics of KTU projects with international funding (2019-2023)

4 DISCUSSION AND CONCLUSION

The formation of international networks plays a pivotal role in the establishment of dependable and collaborative international project consortia. This is achieved by the creation of scientific networks comprising researchers and institutions, which subsequently leads to an increase in the number of international project applications and acceptances.

This study examines the strategy employed in the process by which KTU researchers were directed to the COST Programme, an international organisation with the objective of uniting scientists who are experts in their respective fields throughout Europe in scientific networks. This strategy facilitates the

integration of scientists engaged in national research projects into the international scientific community.

The strategy pursued has yielded notable results. At the inception of 2019, a modest number of KTU researchers were engaged in COST actions. By the conclusion of 2023, this number had grown to 252 researchers participating in 528 actions. With regard to the ongoing COST actions, KTU has been the most successful university in Türkiye, with 29 active members of the Management Committee. In the context of the ongoing actions, Türkiye is playing a pioneering role, with 252 researchers engaged in diverse academic pursuits. KTU has become a prominent hub for interdisciplinary studies, having participated in approximately 61% of the 305 actions initiated during its five-year internationalisation strategy.

The COST programme has been instrumental in facilitating a significant increase in the number of international project applications, with a 92.3% rise observed between 2019 and 2023. Additionally, there has been a notable surge in project acceptances, with a 366% increase during the same period.

Participation in COST Actions was not only associated with an increase in the number of project applications and acceptances, but also with the administration of surveys to KTU researchers who took part in the actions in 2021 and 2023. The objective was to ascertain the additional benefits that researchers derive from the COST Programme. The results of the surveys indicated that the researchers had participated in numerous training programmes, workshops and conferences, and had developed a network of contacts. They had also published more international collaborative papers, worked on multidisciplinary projects with researchers from other countries, and had access to research and laboratory facilities that would not otherwise have been available to them in their home countries. Furthermore, they had disseminated their work more widely.

The findings of this study demonstrate that the strategy employed by KTU has led to an increase in participation in COST actions. This, in turn, has resulted in KTU researchers establishing more robust international networks, which has directly influenced the number of international project applications and acceptances. In conclusion, the findings indicate that these exemplary practices may serve as an effective approach for the internationalisation of higher education institutions.

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