

Morocco's International Scientific Cooperation: Participation and Positioning in European Research and Innovation Programmes (Horizon 2020 and Horizon Europe)

Nihale EL AZZOUZI

Laboratoire de Recherche en Finance, Comptabilité,
Gestion et Systèmes d'Information d'Aide à la
Décision (LEFCG-SIAD) -Ecole Nationale de
Commerce et de Gestion -
Université Hassan Premier –Settat - Maroc

ORCID 0009-0004-8051-5414
n.elazzouzi@uhp.ac.ma

Mohamed MAKHROUTE

Laboratoire de Recherche en Finance, Comptabilité,
Gestion et Systèmes d'Information d'Aide à la
Décision (LEFCG-SIAD) -Ecole Nationale de
Commerce et de Gestion -
Université Hassan Premier –Settat - Maroc

mohamed.makhroute@uhp.ac.ma

Abstract

International scientific cooperation has become a strategic lever for strengthening the capacity of emerging countries to integrate into the global knowledge and innovation economy. In this context, Morocco has positioned itself as a strategic partner in the Euro-Mediterranean region in the field of research and innovation, particularly through its active participation in the European Union's framework research programmes.

Against this background, the research question of this study is formulated as follows: How does Morocco's participation in European research and innovation programmes reflect its international scientific positioning, and what are the main contributions and challenges for the development of the national research and innovation system?

To address this question, this paper analyses Morocco's scientific positioning within this framework of cooperation, focusing on three main dimensions. First, it examines the level of participation of Moroccan institutions in EU-funded projects in terms of volume, targeted scientific fields, and established partnerships. Second, it explores the strengths and opportunities offered by this

I. Introduction

Scientific research has become a central driver of economic development, innovation, and international visibility. In a context marked by increasing scientific and technological competition, emerging countries are encouraged to strengthen their integration into international knowledge production networks in order to enhance their visibility, consolidate their scientific

cooperation, particularly in terms of capacity building, scientific visibility, and integration into European research networks. Third, it identifies the persistent limitations and challenges related to institutional constraints, governance of the national research system, and the valorisation of research results produced through these collaborations.

Through this analysis, the study aims to highlight the role of international scientific cooperation in Morocco's national strategy for higher education, research, and innovation, while also questioning the country's ability to position itself as a competitive and sustainable actor within the European Research Area (ERA).

This contribution is part of a broader reflection on science diplomacy, considering Morocco's participation in Horizon 2020 and Horizon Europe not only as a lever for academic development, but also as an instrument for international integration and scientific visibility.

Keywords: *scientific cooperation; European research programmes; Euro-Mediterranean partnerships; Moroccan research system.*

capacities, and position themselves sustainably within the global knowledge economy.

For Morocco, this dynamic reflects a dual strategic challenge. On the one hand, it involves strengthening internal capacities in research and innovation; on the other hand, it concerns the affirmation of a scientific position within the Euro-Mediterranean space. The country's growing participation in European framework programmes for research and innovation, notably Horizon 2020 and Horizon Europe, illustrates

this orientation towards greater openness and progressive integration into European scientific networks.

Beyond access to financial resources, these programmes constitute structuring instruments of scientific cooperation. They provide Moroccan stakeholders with opportunities for organisational learning, development of institutional partnerships, capacity building, and alignment with international research standards. In this regard, participation in European programmes appears as a lever for scientific visibility and integration into networks of excellence, reflecting a political willingness to open up and converge with Euro-Mediterranean dynamics.

However, while Morocco's participation in international research and innovation programmes has increased over the past decade, the nature and scope of this scientific positioning remain insufficiently analysed from an empirical perspective. The ability to transform participation into sustainable benefits for the national research and innovation system depends on multiple institutional, organisational, and human factors, whose effects remain unevenly documented in the literature.

In this context, this study aims to analyse Morocco's scientific positioning through its participation in Horizon 2020 and Horizon Europe. It is based on a dual approach: first, a review of the literature on international scientific cooperation, science diplomacy, and the internationalisation of research systems; second, a descriptive and comparative analysis of Morocco's participation data in European programmes, in order to characterise cooperation dynamics, key scientific fields, and established partnerships.

By combining these two dimensions, the objective is to better understand the internationalisation dynamics of the Moroccan research and innovation system and to shed light on the place Morocco occupies within Euro-Mediterranean, African, and international scientific networks.

II. Literature Review

A. *International scientific cooperation as a vector of scientific positioning*

International scientific cooperation has emerged as a structuring dynamic of national research and innovation systems, in a context where knowledge production, circulation, and valorisation are key determinants of competitiveness and development. The knowledge economy relies not only on the accumulation of scientific capital, but also on the ability of actors to interact within transnational

networks, access shared infrastructures and skills, and adopt common standards (David & Foray, 2002; Foray, 2004). This progressive internationalisation of research is reflected in the continuous growth of co-publications, inter-institutional collaborations, and the structuring of epistemic communities at the global level (Dong et al., 2017; Wagner et al., 2015).

Beyond access to financial resources, scientific cooperation plays an organisational and institutional role. It contributes to collective learning, the diffusion of research management practices, the adoption of quality and research ethics standards, and the integration of researchers into reputation networks—dimensions commonly associated with scientific visibility and international credibility (OECD, 2013; Tijssen et al., 2012). In an environment increasingly shaped by global challenges such as climate change, health, food security, and energy transitions, transnational cooperation also acts as a driver of interdisciplinarity and innovation by fostering complementarities between heterogeneous scientific systems (UNCTAD, 2024).

In contemporary debates, the OECD highlights that international scientific cooperation is currently being reshaped by geopolitical tensions, concerns related to technological sovereignty, and issues of security and resilience. This context reinforces the importance of empirical analyses aimed at understanding how emerging countries integrate into international scientific networks (OECD, 2025a).

International scientific cooperation can therefore be analysed as both a space of opportunity and constraint, within which non-central countries seek to consolidate their position through strategies of thematic alignment, partnership development, and institutional capacity building.

From this perspective, a country's international scientific positioning can be assessed through empirical indicators such as participation intensity in competitive programmes, diversity and stability of partnerships, thematic specialisation, capacity to engage in excellence-based consortia, and, more broadly, relative position within international research networks. This approach makes it possible to analyse dynamics of integration and visibility without assuming a direct causal impact on the overall performance of the national system.

B. *European research and innovation programmes as structuring instruments of cooperation*

European framework programmes for research and innovation represent one of the most structured forms of transnational scientific cooperation, combining

competitive funding, quality requirements, multi-actor partnerships, and thematic priorities aligned with major societal challenges. Horizon 2020 (2014–2020), followed by Horizon Europe (2021–2027), were designed as key instruments to strengthen scientific excellence, stimulate innovation, and structure large-scale collaboration networks (European Commission, 2025a).

These programmes are embedded within the broader objective of deepening the European Research Area (ERA), which aims to promote the free circulation of researchers, knowledge, and technologies, and to improve the alignment of research policies across Europe (European Commission, 2024). The implementation of the ERA Policy Agenda 2022–2024 illustrates this dynamic by proposing voluntary actions to enhance the effectiveness and coherence of research and innovation systems (European Commission, 2024).

From the perspective of third countries, Horizon Europe promotes an “open to the world” approach, combined with differentiated eligibility and funding modalities depending on country status (associated countries, low- and middle-income countries, etc.). These arrangements directly influence the ability of non-European institutions to participate, coordinate projects, and derive sustainable benefits from their engagement (European Commission, 2024).

For partner countries in the Southern Neighbourhood, these mechanisms offer both opportunities for integration into international consortia and an institutional learning framework related to complex project management, administrative and financial compliance, and scientific quality standards.

The literature on collaboration networks shows that competitive programmes tend to structure “ecosystems” in which reputation, experience, and relational density play a crucial role in accessing consortia and maintaining regular participation (Wagner et al., 2015). In this context, analysing a country’s participation in Horizon 2020 and Horizon Europe amounts to empirically observing its integration trajectories within a highly regulated space, as well as its thematic priorities and dominant partnerships elements fully consistent with the descriptive and comparative approach adopted in this study.

C. Science diplomacy and international cooperation: an analytical framework

The internationalisation of research is increasingly interpreted through the lens of science diplomacy, understood as the use of science, research collaboration, and scientific networks to support

foreign policy objectives, cooperation, influence, and the management of global public goods. The typology proposed by the Royal Society and the American Association for the Advancement of Science (AAAS) distinguishes three complementary dimensions: science in diplomacy, diplomacy for science, and science for diplomacy (Royal Society & AAAS, 2010).

Within this framework, participation in transnational programmes such as Horizon may reflect diplomacy for science, when diplomatic frameworks facilitate cooperation, as well as science for diplomacy, when scientific collaboration contributes to trust-building, projection of scientific competence, and non-coercive international positioning (Flink & Schreiterer, 2010). Research on soft power further highlights that scientific reputation and the ability to contribute to global agendas constitute important vectors of influence, particularly for countries seeking to consolidate their position within international networks (Nye, 2004).

More recently, the Royal Society has emphasised that science diplomacy operates in an “era of disruption”, characterised by geopolitical polarisation, technological security concerns, competition for talent, and access to research infrastructures. In this context, science diplomacy functions both as a tool for cooperation and as a space of tension, reinforcing the relevance of empirical approaches that document partnership configurations, relational dependencies, and institutional capacities (Royal Society, 2023).

Similarly, Gluckman and colleagues stress the pragmatic dimension of science diplomacy, shaped by practices, intermediary institutions, and incentives embedded in major research programmes (Gluckman et al., 2017; Gluckman, 2022).

From this perspective, analysing a country’s positioning through Horizon 2020 and Horizon Europe contributes to understanding science diplomacy “in practice”, by showing how cooperation materialises through networks, thematic priorities, and partnerships, rather than remaining at a purely conceptual or normative level.

D. Morocco and Euro-Mediterranean scientific cooperation: state of the literature and research gaps

The literature on Morocco’s national research and innovation system highlights efforts towards structuring and internationalisation, while also underlining persistent challenges related to governance, funding, valorisation, and linkages between academic research and the productive sector (Hamidi, 2013; Elkhadri, 2021). Within this trajectory, Morocco’s integration into international

cooperation frameworks represents a strategic axis, particularly in the Euro-Mediterranean space, where the European Union plays a central role as a scientific, financial, and institutional partner.

From the perspective of European policies, the European Commission presents Morocco as a bilateral cooperation partner in research and innovation and emphasises that Horizon Europe is “open to the world”, with mechanisms allowing the funding of entities established in Morocco under specific conditions (European Commission, 2025b).

This institutional architecture reinforces the relevance of empirical analyses of Moroccan participation, not only to document volumes and thematic areas, but also to characterise Morocco’s position within Euro-Mediterranean networks and the evolution of its partnerships.

However, despite valuable contributions on Morocco’s innovation system, the literature remains relatively limited in terms of comparative, data-driven analyses of Morocco’s scientific positioning through its participation in European framework programmes over a period covering both Horizon 2020 and Horizon Europe. Existing studies often rely on general approaches (reforms, governance, institutional diagnostics), while detailed analyses of collaboration networks, profiles of participating actors, and thematic specialisation linked to Horizon programmes remain underdeveloped.

It is precisely within this gap that the present study is situated. By exploiting official data from the Horizon Dashboard (European Commission, 2026) and combining a descriptive, comparative, and network-oriented analysis, the study empirically documents: (i) the scale of Moroccan participation; (ii) key scientific fields; (iii) institutional profiles of participating actors; (iv) the geographical and relational structure of partnerships; and (v) Morocco’s relative position among Southern Neighbourhood, African, and international partner countries. In doing so, it contributes to the literature by offering an empirically grounded analysis of scientific positioning, anchored in theoretical frameworks of scientific cooperation and science diplomacy.

III. Research Objectives and Questions

A. Research interest

International scientific cooperation now occupies a central place in national research and innovation strategies, particularly for emerging countries engaged in the internationalisation of their scientific systems. Beyond access to funding, participation in major international research programmes represents a key

vector of scientific visibility, institutional structuring, and integration into global knowledge production networks.

In this context, European framework programmes for research and innovation—especially Horizon 2020 and Horizon Europe—constitute strategic instruments of Euro-Mediterranean scientific cooperation. For Southern Neighbourhood partner countries, and Morocco in particular, these programmes offer multiple opportunities: participation in excellence-based consortia, learning international research management standards, strengthening institutional capacities, and integration into the European Research Area (ERA).

The scientific interest of this study lies in analyzing Morocco’s effective positioning within these programmes through an empirical reading based on participation, funding, thematic focus, and partnership data. While several studies address international scientific cooperation from conceptual or institutional perspectives, few provide a structured and comparative analysis of Morocco’s role in European research programmes over an extended period covering both Horizon 2020 and Horizon Europe.

Empirically, this research contributes to documenting Morocco’s scientific integration dynamics at Euro-Mediterranean, African, and international levels. It also informs debates on science diplomacy by showing how participation in European programmes functions as an instrument of visibility and international positioning beyond strict financial returns.

B. Research problem

Despite Morocco’s increasing participation in European research and innovation programmes over the past decade, the nature and scope of its international scientific positioning remain insufficiently analysed from an empirical perspective. While available data indicate sustained Moroccan involvement in several strategic scientific fields, they also raise questions regarding the structure of participation, sectoral distribution, and the country’s capacity to secure long-term integration into international research networks.

Accordingly, the research problem does not aim to establish a direct causal relationship between participation in European programmes and the overall performance of the national research system. Rather, it seeks to analyse and characterise Morocco’s scientific positioning through its participation in Horizon 2020 and Horizon Europe.

The central research question is formulated as follows:

How is Morocco's participation in Horizon 2020 and Horizon Europe characterised, and what does it reveal about its scientific positioning within Euro-Mediterranean, African, and international cooperation networks?

This problem involves a simultaneous examination of:

- the scale and evolution of Moroccan participation;
- key scientific fields;
- institutional profiles of participating actors;
- partnership dynamics;
- and Morocco's relative position compared to other partner countries.

C. Research questions

To address the central research problem, the study is structured around the following research questions:

- What is the level and evolution of Morocco's participation in Horizon 2020 and Horizon Europe in terms of number of projects, institutional participations, and mobilized funding?
- Which scientific and technological fields show the strongest Moroccan involvement, and how do these fields evolve between the two programmes?
- Which types of institutional actors (universities, research centers, public bodies, private sector) structure Moroccan participation?
- How does Morocco position itself comparatively vis-à-vis Southern Mediterranean, African, and other international partner countries?
- What scientific partnership dynamics emerge from collaboration networks established through European projects?

IV. Methodology

This study adopts a descriptive and comparative approach based on the use of quantitative and documentary secondary data, with the aim of analysing Morocco's scientific positioning in European research and innovation programmes.

A. Data sources

The data used in this study are mainly drawn from:

- the official European Commission platform (Horizon Dashboard: <https://dashboard.tech.ec.europa.eu/>), which provides detailed information on projects, participations, funding, thematic areas, and collaboration networks ;
- institutional reports of the European Commission related to Horizon 2020 and Horizon Europe;
- national data from the National Centre for Scientific and Technical Research (CNRS) and the Ministry of Higher Education, Scientific Research and Innovation (MESRSI);
- academic and institutional sources (OECD, Union for the Mediterranean, PRIMA) used to contextualise the results.

B. Analytical approach

The analysis is based on three complementary levels:

- Descriptive analysis, aimed at quantifying Moroccan participation in terms of projects, institutional participations, and funding obtained, as well as analysing its temporal evolution.
- Thematic analysis, used to identify dominant scientific and technological fields and to observe continuities and shifts between Horizon 2020 and Horizon Europe.
- Comparative and network analysis, employed to position Morocco relative to other partner countries (Southern Mediterranean, Africa, global level) and to analyse scientific partnership dynamics through collaboration networks.

C. Methodological limitations

It should be noted that this study does not aim to measure the causal impact of participation in European programmes on the overall performance of the national research and innovation system. The results should be interpreted as an analysis of scientific positioning and cooperation dynamics, rather than as a comprehensive evaluation of long-term socio-economic or institutional impacts.

V. Results

The analysis presented in this section aims to highlight the main dynamics of Morocco's participation in the European framework programmes for research and innovation, namely Horizon 2020 (2014–2020) and Horizon Europe (2021–2027). These programmes are the European Union's flagship instruments to support

scientific excellence, foster international cooperation, stimulate innovation, and strengthen technological competitiveness at the global level. For Southern Neighbourhood partner countries, and for Morocco in particular, they represent a strategic opportunity to integrate into the European Research Area (ERA), access expert networks, develop capacities, and enhance the valorisation of scientific results.

Examining data from these programmes makes it possible to capture several dimensions of this cooperation. It sheds light not only on the scale of Morocco’s engagement (in terms of number of projects, funding volumes, and profiles of participating institutions), but also on the thematic diversity of intervention areas, Morocco’s relative position in the Euro-Mediterranean and African spaces, and the scientific partnership dynamics developed with European countries.

The purpose of this section is therefore to provide an analytical and structured reading of the available results, in order to identify major trends, assess progress achieved, and evaluate the strategic scope of Euro-Moroccan scientific cooperation. The analysis draws on quantitative data from the European Commission’s dashboards (Horizon Dashboard), complemented by qualitative elements that help to better understand the effects of this participation on the structuring and visibility of Morocco’s national research and innovation system.

A. Morocco’s participation in Horizon 2020 and Horizon Europe

i. Number of projects and funding

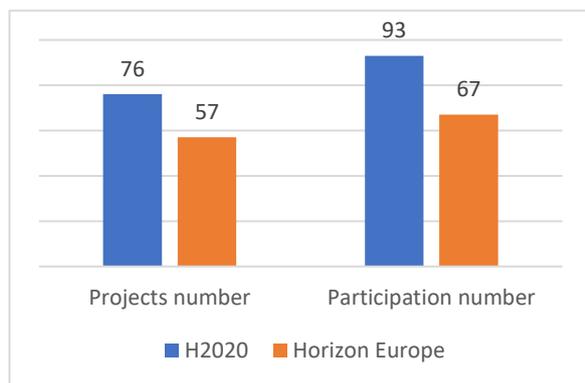


Fig.1: Number of projects and Moroccan participations

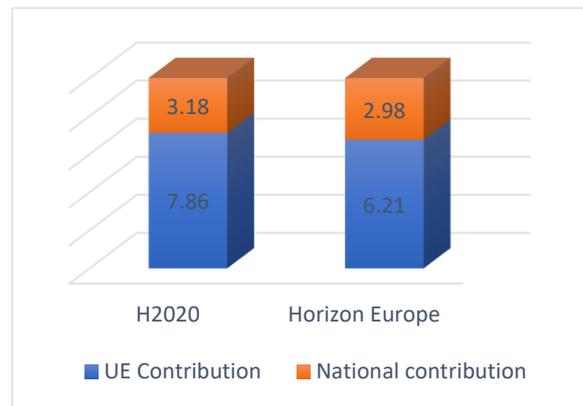


Fig.2: Allocated budget (EUR million)

An examination of the number of projects and Moroccan participations in European research and innovation programmes shows sustained and structurally significant engagement in Euro-Mediterranean scientific cooperation. During Horizon 2020 (2014–2020), Morocco was involved in 76 projects, accounting for a total of 93 participations. Under Horizon Europe (2021–2027), it already records 57 projects and 67 participations. Although the overall number of projects is slightly lower under Horizon Europe at this stage, this trend should be interpreted since the programme is still ongoing, suggesting a continued increase in Moroccan engagement by the end of the period.

These results confirm the growing ability of Moroccan institutions—including universities, research centers, private actors, and NGOs—to join competitive international consortia and meet the technical and scientific requirements of European calls for proposals. The difference between the number of projects and the number of participations also reflects a diversification of partnerships, with some institutions involved in several projects simultaneously.

In terms of funding, the data show that Morocco received a European contribution of EUR 7.86 million under Horizon 2020, complemented by a national contribution of EUR 3.18 million. Under Horizon Europe, the EU contribution reaches EUR 6.21 million, accompanied by national funding of EUR 2.98 million. This evolution indicates sustained financial engagement from both partners and reflects the increasing maturity of Moroccan proposals as well as their alignment with European research and innovation priorities.

Overall, these two indicators suggest Morocco’s lasting anchoring within the European Research Area. The growth in institutional participation, combined with the mobilisation of significant European and national funding, confirms the strategic role of

scientific cooperation as a lever for capacity building, technology transfer, and international visibility.

ii. Participant profiles and evolution of Moroccan involvement

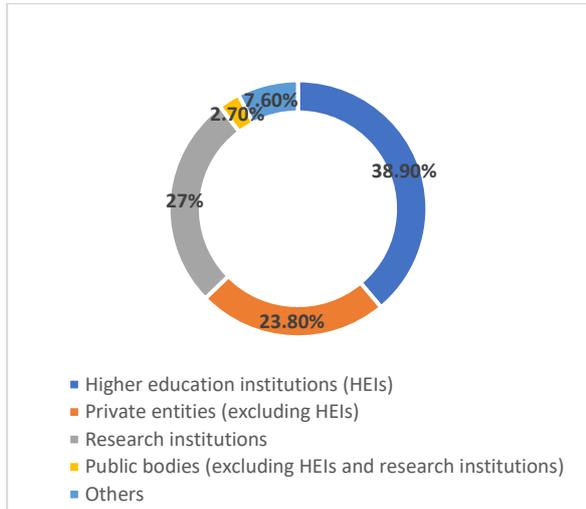


Fig.3: Profile of Moroccan institutions participating in Horizon 2020

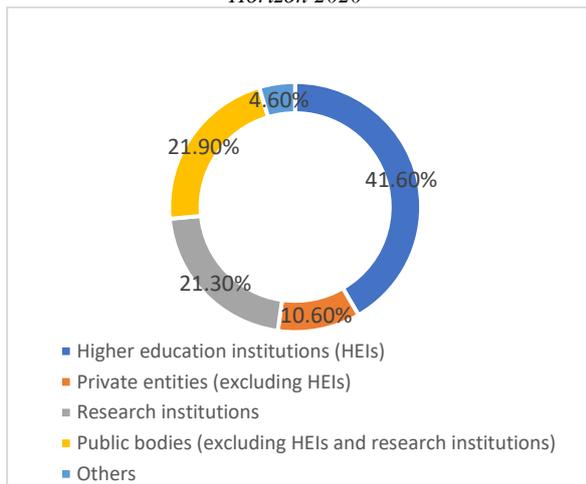


Fig.4: Profile of Moroccan institutions participating in Horizon Europe

An analysis of the profile of Moroccan institutions involved in European research programmes highlights the strong presence of the academic sector in international scientific cooperation. Under Horizon 2020, higher education institutions represent the largest share of participants (38.9%), followed by research institutions (27%) and private entities (23.8%). Participation by public bodies outside universities and research centers remains marginal (2.7%), as does the “other” category (7.6%).

Under Horizon Europe, this trend continues while showing a slight diversification of participating actors. Universities further strengthen their leading role with 41.6% of participation, while research institutions and public bodies record a notable increase (21.3% and 21.9%, respectively). In contrast, private-sector

participation falls to 10.6%, reflecting the still limited involvement of Morocco’s entrepreneurial sector in European research projects. This evolution highlights both the central role of academia in cooperation dynamics and the need to strengthen bridges with the productive sector, particularly to support innovation and the valorization of research results.

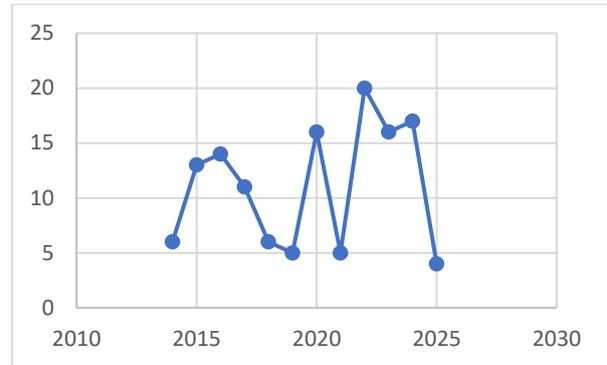


Fig.5: Annual evolution of Moroccan participation in projects

The annual evolution of the number of projects shows significant fluctuations in Moroccan engagement since 2014. After notable growth between 2014 and 2016, participation declines between 2017 and 2019, possibly linked to institutional constraints and specific call cycles. Participation then increases again from 2020, with peaks in 2022 and 2023, reflecting growing maturity among Moroccan actors and better mastery of project preparation and submission procedures. These variations also reflect the emergence of new partner institutions and Morocco’s gradual integration into more complex and strategic consortia.

Overall, these results confirm that Moroccan participation remains largely driven by universities and research centres, which are the main vectors of scientific cooperation. However, recent trends suggest a gradual broadening of actor profiles—particularly public institutions—and underline the still under-exploited potential of private actors within the national innovation system. Strengthening the link between academic research and socio-economic needs therefore appears as a strategic challenge for the next phase of participation.

iii. Thematic distribution

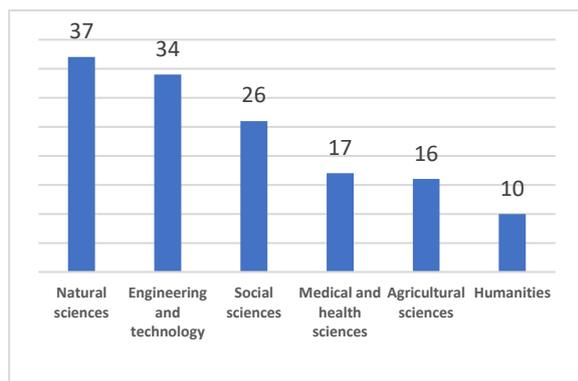


Fig.6: Thematic distribution of projects involving Morocco in Horizon 2020

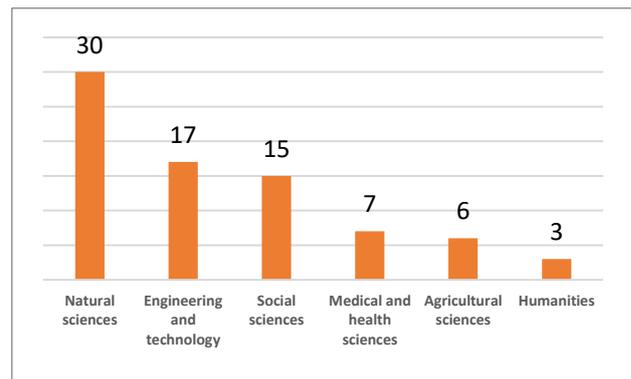


Fig.8: Thematic distribution of projects involving Morocco in Horizon Europe



Fig.7: Concept map of keywords (Horizon 2020) by EuroSciVoc

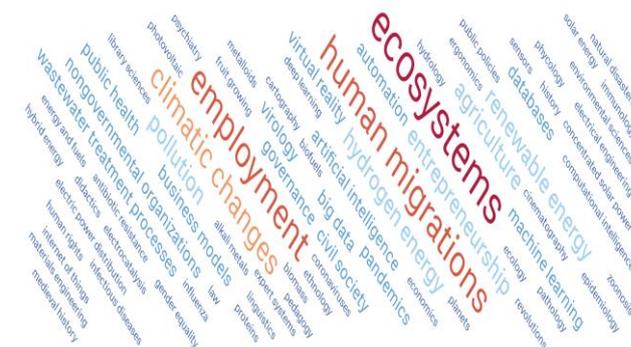


Fig.9: Concept map of keywords (Horizon Europe) by EuroSciVoc

The thematic distribution of Moroccan projects under Horizon 2020 shows a strong predominance of natural sciences (37 projects) and engineering and technology sciences (34 projects), followed by social sciences (26 projects). Medical and health sciences (17 projects), agricultural sciences (16 projects), and humanities (10 projects) are less represented, yet they still indicate a multidisciplinary participation.

The conceptual map (Euroscivoc) confirms this pattern, showing a strong concentration around agriculture, water management, irrigation, nutrition, and ecosystems. Cross-cutting themes such as governance, civil society, energy transition, and food security are also present. This structure reflects Morocco’s alignment with Euro-Mediterranean strategic priorities, particularly in sustainability, climate, and natural resource management.

Under Horizon Europe, the main disciplinary areas remain broadly consistent, while emerging themes become more prominent. Natural sciences and engineering remain central, but the conceptual map shows a rise of new issues such as climate change, ecosystems, human migration, employment, and public health.

Dominant concepts also highlight a growing focus on future-oriented themes: renewable energies (including hydrogen), big data, artificial intelligence, circular economy, health and pandemics, as well as governance and entrepreneurship. This evolution reflects Morocco’s gradual integration into the European Union’s global priorities, particularly those linked to the green and digital transitions.

A comparison between Horizon 2020 and Horizon Europe leads to two key findings:

- strong continuity around structuring themes such as agriculture, water, ecosystems, and energy—shared priorities between Morocco and the EU;
- notable diversification under Horizon Europe, marked by the emergence of transversal societal issues (migration, employment, governance, artificial intelligence), reflecting

Morocco's adaptation to evolving international scientific agendas.

Overall, this thematic distribution illustrates Morocco's ability to align with European priorities while leveraging its scientific strengths in agriculture, water, and climate-related fields. This dual dynamic contributes to strengthening the country's visibility and its role as a regional pivot in Euro-Mediterranean cooperation.

B. Morocco's comparative positioning in European programmes

i. Comparison with Southern Mediterranean countries

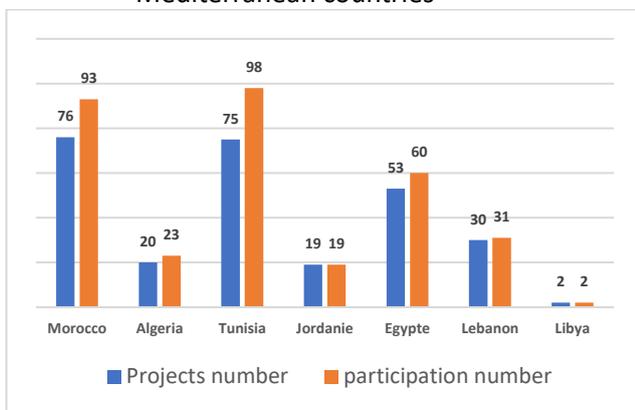


Fig.10: Comparison with Southern Mediterranean countries in Horizon 2020

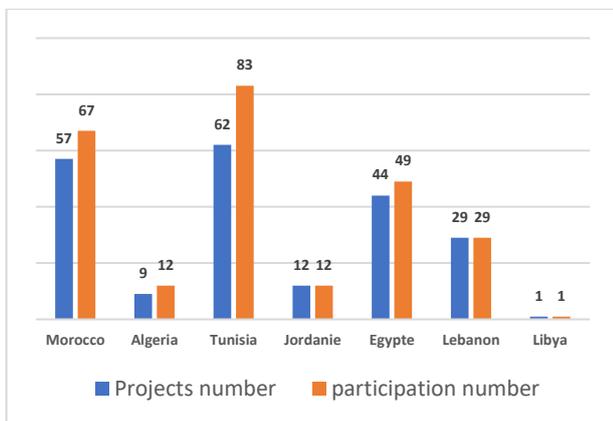


Fig.11: Comparison with Southern Mediterranean countries in Horizon Europe

Comparative analysis highlights Morocco's leading position among Southern Mediterranean partner countries in both Horizon 2020 and Horizon Europe. Under Horizon 2020, Morocco ranks among the top three most involved countries, with 76 projects and 93 participations, slightly behind Tunisia (75 projects, 98 participations) and ahead of Egypt (53 projects, 60 participations). Algeria, Lebanon, Jordan, and Libya show significantly lower levels of engagement.

Under Horizon Europe, a similar pattern is observed. Morocco records 57 projects and 67 participations, consolidating its position among the leading countries alongside Tunisia (62 projects, 83 participations) and Egypt (44 projects, 49 participations). These figures confirm the ability of Moroccan institutions to maintain a high and regular level of involvement and reflect institutional and organisational maturity in managing European projects.

This performance also illustrates Morocco's growing recognition as a strategic partner for Euro-Mediterranean research, able to mobilise competitive consortia and align with EU scientific priorities. It also reflects the effectiveness of national policies supporting research internationalisation, particularly within the ESRI 2030 framework.

ii. Comparison with African countries

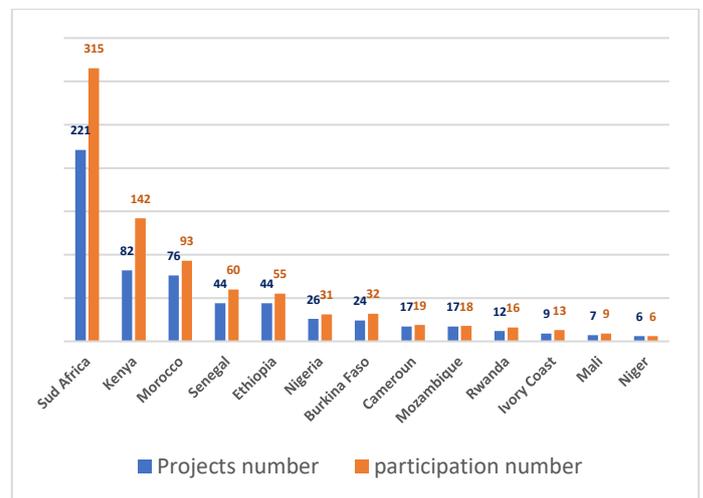


Fig.12: Comparison with African countries in Horizon 2020

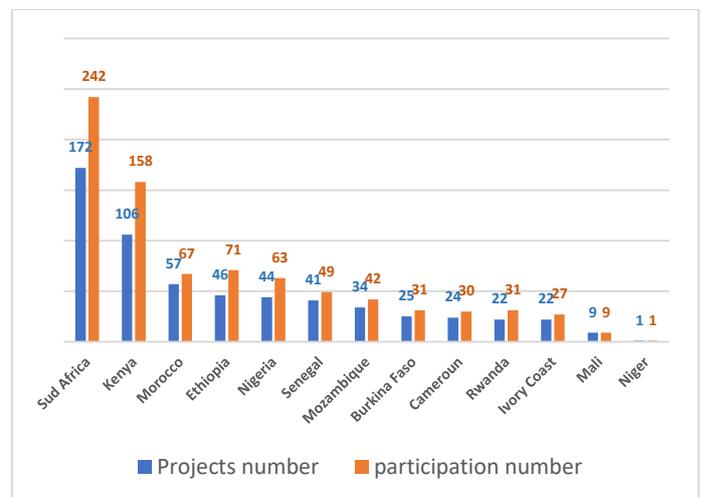


Fig.13: Comparison with African countries in Horizon Europe

At the African level, Morocco ranks among the most active countries in European programmes, although it remains behind two clear leaders: South Africa and Kenya. Under Horizon 2020, Morocco holds the third position in Africa, behind South Africa (221 projects, 315 participations) and Kenya (82 projects, 142 participations), with a total of 76 projects and 93 participations. This position is significant given the country’s size, R&D resources, and the relatively recent development of its scientific system compared to the two leading countries.

Under Horizon Europe, Morocco maintains its position among the top three, with 57 projects and 106 participations, behind South Africa (172 projects, 242 participations) and Kenya (106 projects, 158 participations). The gap remains substantial, but it underlines Morocco’s potential for progress, particularly by expanding its partnership network and increasing participation in projects with high technological value added.

This positioning strengthens Morocco’s role as a regional scientific hub in North Africa and across the continent, acting as an interface between Europe and Sub-Saharan Africa. It also reflects recognition of its institutional capacities, scientific expertise, and strategic alignment with both African and European R&I priorities.

iii. Morocco’s positioning at the global level

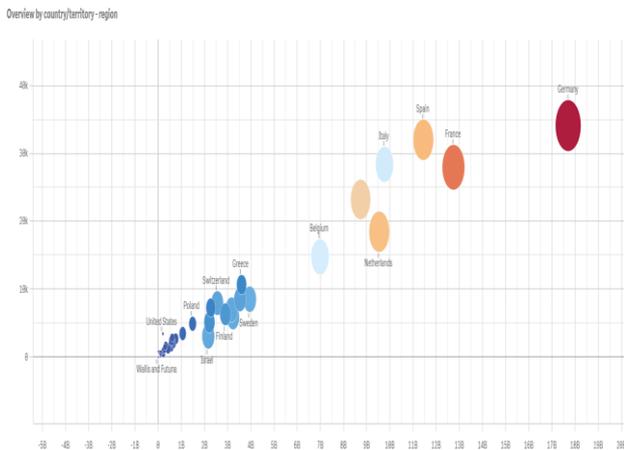


Fig.14: Overview of global participation in Horizon 2020 and Horizon Europe

The global overview of participation in Horizon 2020 and Horizon Europe shows a strong concentration of scientific output and access to funding among industrialised European countries. Major EU Member States, especially Germany, France, Italy, Spain, and the Netherlands, dominate in terms of coordinated projects and allocated budgets. Germany, for instance, stands out with funding above EUR 17 billion,

followed by France (around EUR 13 billion) and Spain (nearly EUR 11 billion).

At an intermediate level, several associated or strategic partner countries such as Switzerland, Israel, Poland, and Greece mobilize substantial budgets and participate in many consortia. This hierarchy reflects the maturity of scientific ecosystems, the density of research networks, and the institutional capacity of these countries to design and coordinate complex projects.



Fig.15: Concept map of major global themes by EuroSciVoc

The analysis of dominant scientific concepts in funded projects highlights the diversification of research priorities globally. The most represented themes relate to ecosystems, climate change, economic models, artificial intelligence, machine learning, renewable energies, and the circular economy.

Emerging topics such as sensor technologies, proteins and enzymes, molecular biology, robotics, the Internet of Things, and precision medicine also occupy a significant place. This thematic distribution reflects evolving priorities towards multidimensional global challenges, where environmental, technological, economic, and health issues are interconnected. It also underlines the growing importance of interdisciplinary approaches in international research policies.

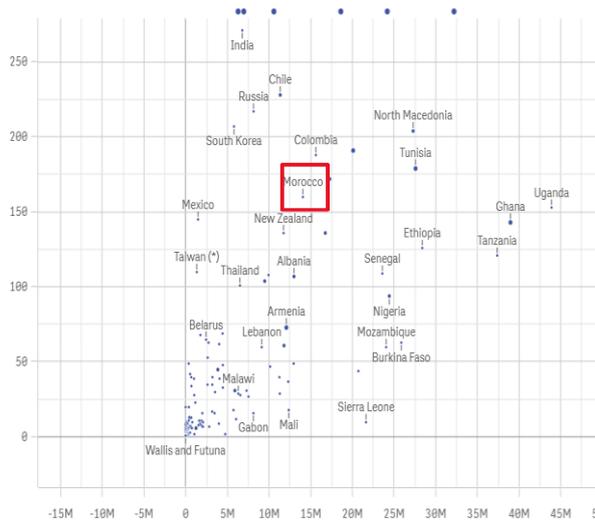


Fig.16: Morocco's positioning in relation to the rest of the world

The third graph illustrates Morocco's position among third countries and international partners participating in European programmes. While Morocco remains far behind global leaders in terms of project numbers and funding obtained, it falls within an intermediate group of emerging countries, alongside Tunisia, Colombia, Mexico, and New Zealand.

With more than 150 cumulative participations across Horizon 2020 and Horizon Europe, Morocco stands out as one of the most dynamic African and Mediterranean countries in international scientific cooperation. This position reflects a growing potential for collaborative research and an enhanced ability to integrate into competitive international consortia. However, the significant gap with major scientific powers highlights the need to continue strengthening the national research system, particularly regarding funding levels, valorisation mechanisms, and private-sector involvement.

Overall, these data confirm that Morocco is increasingly recognised as a credible scientific actor internationally, even though it has not yet reached the performance levels of major research countries. Its intermediate position reflects an upward trajectory and substantial growth potential, especially if it succeeds in strengthening institutional capacities, widening strategic partnerships, and investing further in R&D.

This dynamic opens promising perspectives: in the medium term, Morocco could become a regional scientific hub, acting as a bridge between Europe, Africa, and the Arab world, and contributing actively to major global challenges such as the energy transition, food security, environmental sustainability, and technological innovation.

Although the United States, China, Japan, and South Korea are among the world leaders in research and development, their presence remains marginal in Horizon participation rankings. This situation can be explained by several complementary factors:

- Non-associated status: these countries are not officially associated with Horizon 2020 or Horizon Europe. They may participate in certain projects but are generally not eligible for direct European Commission funding, which limits their number of participations.
- Targeted and bilateral partnerships: their contribution often takes place through bilateral cooperation projects or thematic joint initiatives (e.g., energy, health, artificial intelligence), rather than broad participation across all European calls.
- Priority given to national programmes: these countries have powerful national research programmes, such as the National Science Foundation (NSF) and the NIH in the United States, the National Natural Science Foundation of China (NSFC), and the Japan Science and Technology Agency (JST), which concentrate most funding and collaborations.
- Indicators focused on associated and strategic partners: European reporting mainly highlights EU Member States, associated countries, and priority partners within EU research and innovation policy.

Therefore, their low visibility in the graphs does not reflect weak scientific performance, but rather a different cooperation model that is less institutionalised within Horizon Europe. This highlights the specificity of the European programme, which primarily aims to strengthen the European Research Area while remaining open to targeted strategic partners.

C. Morocco's international scientific collaboration dynamics

i. Collaboration links in Horizon 2020

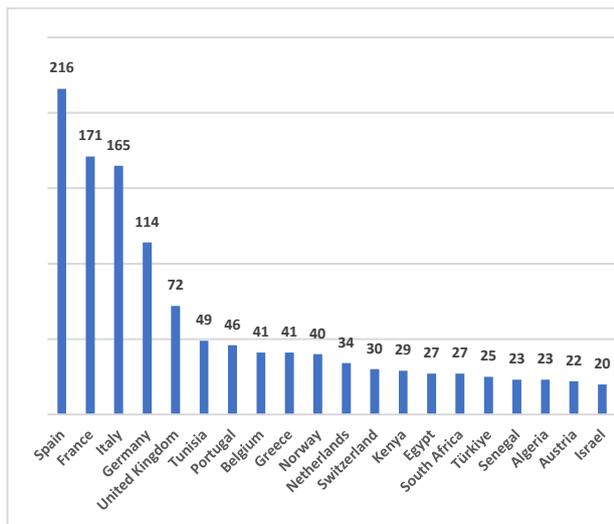


Fig.17: Top partner countries for Morocco in Horizon 2020

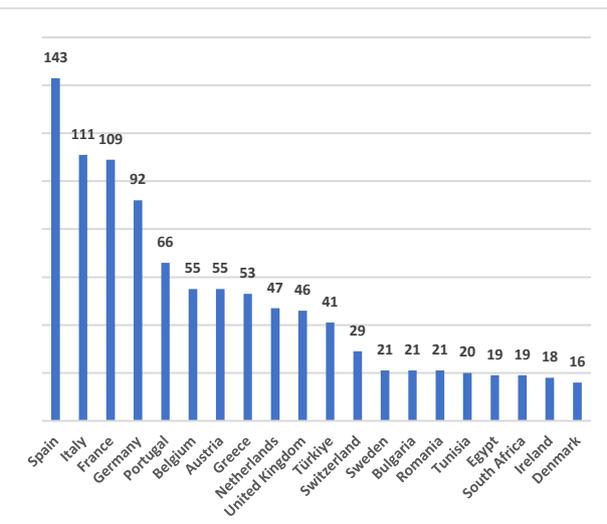


Fig.19: Top partner countries for Morocco in Horizon Europe

Fig.18: Collaboration map in Horizon 2020

The analysis of collaboration links established by Moroccan institutions under Horizon 2020 reveals a strong concentration of partnerships with European countries, confirming the central role of the European Union in driving international scientific cooperation. The data show that Morocco’s main partners are Spain (216 collaborations), France (171), Italy (165), and Germany (114). These four countries, among the most active in the programme, account for more than half of Morocco’s collaborations, reflecting solid historical, linguistic, and scientific ties.

A significant presence is also observed for other Member States such as the United Kingdom, Portugal, Belgium, and Greece, which actively contribute to joint projects. The presence of Southern partners particularly Tunisia, Egypt, Kenya, and South Africa, indicates an emerging South–South dynamic, especially in areas related to agriculture, water management, and environmental sustainability.

The collaboration map confirms Morocco’s geographical and strategic centrality within these networks. The country appears as a connection node linking Europe to Africa and, to a lesser extent, other regions of the world. This intermediary position reflects not only the ability of Moroccan institutions to integrate into competitive international consortia, but also their growing role in building triangular partnerships between Europe, the Mediterranean, and Africa.

ii. Collaboration links in Horizon Europe

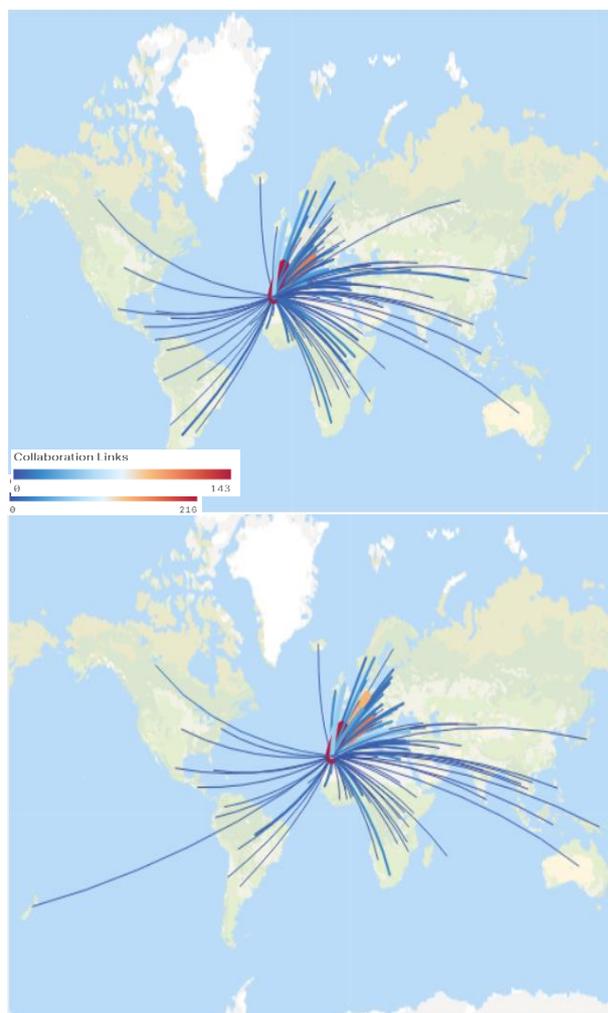


Fig.20: Collaboration map in Horizon Europe

Under Horizon Europe, partnership structures remain broadly stable, although some notable changes can be observed. Spain remains Morocco’s main partner (143 collaborations), followed by Italy (111), France (109),

and Germany (92). These four countries continue to form the pillars of the Euro-Moroccan scientific network, reflecting continuity in academic relationships developed over the previous decade.

However, the circle of partners is gradually expanding, with increased involvement of countries such as Austria, Turkey, the Netherlands, and Greece. This diversification reflects openness towards new thematic networks, particularly in the areas of digital transition, artificial intelligence, and sustainable technologies. It also illustrates the growing prominence of multi-party consortia including public, private, and academic partners.

The mapping of collaboration links in Horizon Europe reinforces these observations. Morocco increasingly emerges as a pivotal actor in knowledge flows, consolidating its position in the Euro-Mediterranean space while strengthening connections with Sub-Saharan Africa, Latin America, and parts of Asia. This geographical expansion of partnerships opens new opportunities for collaborative research and supports the internationalisation of the national research and innovation system.

Overall, the data show that Morocco's scientific cooperation remains strongly anchored in Europe, with a clear predominance of partnerships with Southern and Western European countries. This concentration reflects strong historical, cultural, and institutional ties, as well as a deliberate strategy of integration into the European Research Area.

At the same time, the broadening of partnerships beyond the European core, especially towards African, Mediterranean, and extra-European countries, illustrates an evolving Moroccan science diplomacy that is more open and strategic. This dynamic positions Morocco as a scientific connector across several geographical and thematic spaces, acting as a bridge between Europe, Africa, and the Arab world. To further strengthen this position, it will be essential to increase private-sector involvement in collaborations, enhance the valorisation of joint research results, and sustain strategic partnerships beyond the duration of funded projects.

VI. Conclusion

This study analysed Morocco's scientific positioning through its participation in the European research and innovation programmes Horizon 2020 and Horizon Europe, using a descriptive and comparative approach based on secondary data from official European Commission sources. The objective was not to measure the causal impact of these programmes on the overall performance of the national research system, but rather to characterise the participation dynamics,

partnership patterns, and thematic specialisation that structure Morocco's international integration.

The results show that Morocco's participation in European programmes follows a trajectory of progressive and structured integration into the European Research Area. This integration is reflected in regular involvement in collaborative projects, a concentration on strategic scientific fields aligned with both European priorities and national sustainable development challenges, and a solid anchoring in Euro-Mediterranean cooperation networks. Morocco therefore emerges as a credible regional scientific actor, able to mobilise long-term partnerships and participate in competitive international consortia.

Comparative analysis also indicates that Morocco occupies a leading position among Southern Mediterranean countries and ranks among the most active African participants in European research and innovation programmes. This relative positioning strengthens its role as a scientific bridge between Europe, Africa, and the Arab world, and reflects a certain level of institutional maturity in managing international research projects. However, the gap that remains with major global scientific powers highlights structural limitations of the national system, particularly in terms of research funding, valorisation of results, and private-sector involvement.

Beyond quantitative indicators, this participation can be interpreted as an instrument of science diplomacy. By embedding itself sustainably within European research networks, Morocco mobilises scientific cooperation as a lever for international visibility, institutional recognition, and scientific soft power. This dimension gives Horizon programmes a strategic scope that goes beyond academic research, contributing to Morocco's international positioning in a context of increasing competition for resources, talent, and knowledge networks.

Nevertheless, the sustainability of this trajectory will depend on the capacity of the national research and innovation system to consolidate its achievements. Strengthening linkages between academic research and innovation, expanding private-sector participation, diversifying partnerships beyond the European core, and establishing effective valorisation mechanisms appear as key conditions for turning international scientific cooperation into a long-term development lever.

Ultimately, Morocco's participation in Horizon 2020 and Horizon Europe reflects an ongoing process of openness and consolidation of international scientific positioning. While this trajectory demonstrates strong potential, it calls for deeper strategic reflection on public research and innovation policies in order to

strengthen the structural impact of scientific cooperation and position Morocco sustainably among emerging scientific actors on the international stage.

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