



# The role of experience and diversity on research consortia' performance: an exploratory approach

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**Abstract** In the realm of academic engagement, this study directs its focus toward a policy instrument that has received surprisingly scant attention within the literature, despite its substantial investment: European Union-funded research projects. These projects are designed to foster collaboration and establish a framework that supports and fortifies the creation and dissemination of exceptional knowledge and cutting-edge technologies. These endeavors are anticipated to fuel economic growth, spur social development, and address global challenges. Within this study, we delve into the impact of team experience and diversity on the research performance of consortia — groups of organizations — that have been successfully awarded funding within the FP7 and H2020 funding schemes. In order to dissect the influence of learning, our analysis is confined to consortia that have collaborated on multiple occasions. Drawing from data sourced

from Community Research and Development Information Service, our findings unveil that beyond the monetary allocation, an array of team attributes and environmental factors play a role in augmenting team performance.

**Plain English Summary** The European Union (EU) invests millions of euros annually in research projects, aiming to foster collaboration among European institutions and countries. These initiatives seek to generate and share advanced knowledge and technologies, fostering economic growth, social development, and global problem solving. Consortia, formed by various organizations, apply for and often secure funding across multiple program cycles. Our study explores the factors that contribute to the successful collaboration of these consortia, leading to positive outcomes like increased learning, improved coordination, and a higher number of scientific publications. The findings indicate that a range of team qualities and environmental factors play a role in improving team performance.

**Keywords** Academic engagement · EU-funded research projects · Learning · Team composition · Experience · Diversity

**JEL Classification** H50 · I28 · L26 · O38

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## 1 Introduction

Research in the field of academic engagement has garnered considerable attention over the past two decades, particularly in relation to the need for comprehending the precursors of interactions between academia and industry collaborations (Grimpe et al., 2022; Perkmann et al., 2013, 2021). These synergies elucidate the emergence of commercial opportunities through novel market applications, such as new drugs, biotechnologies, software development, or innovative technologies (Oliver et al., 2020), as they offer a potent perspective for comprehending subsequent commercial dynamics.

The European Union (EU) Framework Programmes for Research and Innovation, also referred to as Framework Programmes (FPs),<sup>1</sup> constitutes an archetypal example of innovation programs involving research consortia formed by multiple organizations, including universities, research institutes, public agencies, and private businesses such as small- and medium-sized enterprises (SMEs) (Grimpe et al., 2022; Olsen et al., 2016). For SMEs, incentives to participate in these collaboration programs come from the potential commercialization and exploitation of the resulting products and technologies (Audretsch & Link, 2011). Collaboration arguably stimulates knowledge generation and transfer across different scientific fields and across industries; however, for SMEs taking part in publicly funded collaboration

projects the coordination of project goals, priorities and working tasks with consortium members is a challenge they are not used to deal with (Grimpe et al., 2022).

Empirical work shows that team composition influences knowledge generation and transfer processes (Argote et al., 2021), and this literature is inclusive about the effects of team composition, in this case in terms of number of consortium members and diversity, on research consortia's performance. While prior work emphasizes that team diversity supports a more comprehensive analysis of complex problems by enabling multidisciplinary search processes that might result in novel solutions (Grimpe et al., 2022; Nepelski & Piroli, 2018), other studies suggest that team diversity may lead to coordination problems that materialize in unclear decision-making, poor task execution, and low-profile agreements among team members that might represent a fraction of the originally set goals (Olsen et al., 2016).

The nature of these relationships leads to further discussions regarding the mechanisms of team formation dynamics, which have traditionally been investigated across multiple disciplines, including human resource management (Salas et al., 2015; Stevens & Campion, 1994), organizational studies (Hindmarsh & Pilnick, 2007), strategy (Deichmann & Jensen, 2018), and entrepreneurship (Lafuente-González & Leiva, 2022; Lazar et al., 2020).

Although the literature has extensively attended to organizational learning mechanisms (Argote et al., 2021; Fiol & Lyles, 1985; Levitt & March, 1988; Schulz, 2017), the question of how diverse research teams optimize their resources and the manner in which they derive insights from their complementary skill sets remains largely unexplored, particularly from an organizational perspective. This is of significance as learning processes involve endeavors in knowledge exchange that ultimately impact future performance (Amore et al., 2021; Argote, 2013).

Learning encompasses the ways in which organizations absorb knowledge from direct experiences, learn from others, and interpret that acquired knowledge (Levitt & March, 1988). The capacity to capture effective team learning processes includes involvement in experimental projects and engagement in group problem-solving (Edmondson, 1999). Our contribution to this discourse involves an analysis of the evolution of research consortia teams. Specifically,

<sup>1</sup> At the beginning of the 1980s the European Union launched a series of initiatives and policies aimed at fighting the relative decline in the international competitiveness of high-technology sectors. The first FP came in 1984 as a response to a situation where individual R&D activities were uncoordinated (Georghiou, 2001). The FP continues to the present day. An advisory group assists the European Commission in setting the strategy to be followed and the thematic priorities. Therefore, the specific objectives and actions may vary between funding periods. Also, as society advanced, so did the program, exploring new directions, particularly with the creation of the European Research Area, which led to a strong shift in the objectives and structure. The FP became the financial tool to boost excellent research and support transnational collaborative R&D activities in Europe. As a result, the number of public-public and public-private partnerships widened and FPs increased their complexity, requiring the creation of executive agencies and other institutional bodies to manage the calls and the funds. Horizon 2020 (H2020) was the eighth FP which was succeeded by Horizon Europe in 2021.

we evaluate how learning originates internally within the consortium (via knowledge creation or transfer) or is imported from external sources (a situation that entails search processes for comparing the performance of a focal team with an external one), and its subsequent impact on team outcomes, as reflected in the number of academic publications.

Numerous studies underscore the significance of knowledge-related interactions between academic scientists and external (private and multisectoral) entities (Perkmann et al., 2013, 2021). Such processes encompass activities such as collaborative research with industry, contract research, consulting, and informal connections (Perkmann et al., 2021). Our focus is on the role of research projects, which we consider particularly pertinent for investigating learning processes. Specifically, we delve into both the theoretical and empirical aspects of how research projects provide an optimal environment for fostering collaboration and generating additional knowledge (Kosztayán et al., 2022). In contrast to other forms of organizational collaborations, a research project involves the formalization of a consortium and entails collective comprehension of a given domain (i.e., subject area) and its analysis (i.e., complementary skills and knowledge). In this study we argue that EU Framework Programmes for Research and Innovation serve as a clear illustration of research projects (Nepelski & Piroli, 2018; Rodríguez et al., 2013). These programs, established by the European Commission to facilitate and nurture research within the European Research Area, offer an exceptional context for investigating distinctive collaborative team learning dynamics as they are integral to organizational development (Kaiser et al., 2015).

To investigate collaborative team dynamics and the implications of organizational learning on research performance, we collected data from EU-funded research projects. Academic engagement was gauged through (joint) publications,<sup>2</sup> the sole type of academic engagement output available in our dataset.<sup>3</sup> FPs, H2020, and Horizon Europe materialize as research projects awarded to organizations or

consortia (teams of organizations) through a competitive process. Each entity or consortium submits a project proposal, which, upon positive evaluation, secures EU funding. Alongside proposal quality and researchers' project execution capabilities, the EU also values elements that reinforce collaboration, talent growth, and learning, such as the inclusion of diverse organizations and countries within a single consortium.

Restricting our analysis to consortia that have collaborated on multiple occasions from the pool of all FPs and H2020 projects granted by the EU, our longitudinal approach facilitates the exploration of learning effects via ongoing interaction among consortium members. Empirically, we delve into this exploratory perspective through the estimation of two panel data models. Initially, we examine the *within* model, accounting for variations within consortium members, followed by a *between* model that juxtaposes a consortium's performance against others.

Drawing on insights from the academic engagement literature (Perkmann et al., 2013, 2021), our findings illuminate that research team diversity and experience, within the context of major EU-funded project initiatives, enhance research performance. To elaborate, *within* the model, the leading partner organization within a consortium plays a pivotal role. Conversely, maintaining the same coordinator for successive projects in a consortium correlates with heightened research performance, as evidenced by the average annual publication count. Additionally, the *between* model uncovers the underlying attributes of research team composition that stimulate research output creation. Notably, the effect of prior experience-related variables appears to diminish.

Thus far, only a handful of papers have tapped into the EU research project database, often focusing on specific domains like health (García-Holgado et al., 2019) or innovation outcomes (Grimpe et al., 2022; Nepelski & Piroli, 2018), or providing descriptive analyses only (Podhora et al., 2013). Our study's novelty lies in its comprehensive exploration of team collaborations within the context of EU projects.

Our findings advance existing knowledge in three key dimensions. Primarily, we extend the analysis of learning literature to the realm of EU research project collaborations, highlighting the influence of team experience and diversity on research performance. Second, our approach innovatively employs

<sup>2</sup> Including books, books chapter, conference papers, peer-reviewed articles, non-peer-reviewed articles, other documents, and thesis linked to the projects under analysis.

<sup>3</sup> See Perkmann et al. (2021) for a comprehensive analysis of additional types of academic engagement outcomes.

the consortium as an analytical unit, shedding light on the impact of consortium composition and partners' attributes, yielding insights for both research and policy stakeholders. Here, a consortium denotes a collective of entities, encompassing higher education institutions, public research organizations, civic bodies, SMEs, larger corporations, non-profit entities, regulators, industry associations, and other eligible stakeholders, united in a shared research project<sup>4</sup> pursuit. Finally, our study holds pertinent practical implications for policymakers and governments aiming to grasp the mechanics of learning dynamics within the context of EU research projects, aiding in the formulation of more effective policies and resource allocation strategies to predict research performance stemming from public funding.

The ensuing section outlines the theoretical underpinnings, while Section 3 details the data and methodological approach for analysis. Section 4 furnishes empirical findings, and subsequent sections engage in discussion and concluding remarks in Sections. 5 and 6, respectively.

## 2 Theoretical background

### 2.1 Research team experience

Numerous studies within the academic engagement literature have underscored the pivotal role of research team experience as a primary precursor to industry-university collaboration (Bercovitz & Feldman, 2011; Fini et al., 2019; Kotha et al., 2013; Olaya-Escobar et al., 2021). These precursors have been examined through the lens of demographic attributes, prior career history, research publication records, and motivational factors that drive academic engagement (Perkmann et al., 2021). Moreover, alternate research has explored how teams navigate and subsequently perform under the influence of coordination costs (Kotha et al., 2013), innovation capacity (Jain, 2013), and mobility patterns (Franzoni

et al., 2018). Specifically, the significance of experience lies in its influence over the team's adeptness in bridging industry and science connections (Boehm & Hogan, 2014), accessing diverse networks, and effectively conveying essential messages and collaborative endeavors (Bercovitz & Feldman, 2011).

Experience is also intricately tied to the chronology of certain professional activities preceding others. For instance, Ding and Choi (2011) propose that academics are more inclined to serve as initial founders of companies rather than advisors. Opportunities for learning and accruing experience are also modulated by international mobility boundaries (Scelato et al., 2015). Particularly, according to Libaers (2014), academics within the USA are more likely to be approached by firms for consultancy roles compared to their international counterparts. Previous career experience (e.g., commercialization and work outside academia) is also anticipated to positively impact future industry-university collaborations, as it tends to lower barriers to such collaborations (Tartari et al., 2012). Research activities like publications are recognized as substantial sources of experience (Perkmann et al., 2021), aligning with a greater likelihood of engaging in additional collaborations (D'Este et al., 2019; Tartari et al., 2014). Other investigations suggest that academics transitioning to entrepreneurs influence scientific research toward multidisciplinary orientations and novel knowledge domains (Fini et al., 2022). Finally, motivational factors related to research funding serve as another pivotal consideration in the context of experience accumulation and the impetus for academics to engage with industry (Iorio et al., 2017; Tartari & Breschi, 2012).

Within the scope of our study, we direct our attention to research consortia. It is important to reiterate that a team is a collective assembly of individual responsibilities, united by a shared objective to collaboratively work toward an outcome (Bercovitz & Feldman, 2011). In this context, prior studies that have examined the influence of team experience on performance have largely overlooked the analysis of EU-funded research projects and the experiential opportunities that arise from such collaborative contexts, particularly at the consortium level (comprising multiple participating organizations). This oversight is somewhat surprising given the distinctive international milieu offered by EU-funded research projects, coupled with the emphasis on fostering global

<sup>4</sup> Note that for the purpose of this paper, we will consider the entity that is leading the consortium as the project coordinator or coordinating organization. Available data do not provide information at the individual level but at the organizational level; therefore, we cannot talk in terms of principal investigator (PI).

collaborations across research institutions and private entities (Nepelski & Piroli, 2018).

There are several approaches to accounting for the experience of a consortium of organizations, and this hinges on the amalgamation of diverse expertise contributed by each participating entity within the specific consortium. In our study, we quantify team experience based on the frequency of consortium collaborations, the experience of the group leader (coordinating organization), and the category of institution to which the coordinating organization belongs.

Beginning with the first factor, in line with Kotha et al. (2013), the coordination costs among member organizations within a consortium diminish as the frequency of interactions increases. This “number of interactions” pertains to multiple successive participations of the same consortium across various EU research calls. In keeping with this, we expect that a higher frequency of collaborations will correspond to greater outcomes (reflected in the number of publications).

Experience as a team leader is amassed by the coordinating organization. Once a project secures funding, the coordinator's primary role encompasses overseeing processes, including executing the grant agreement with the European Commission and among partners. After formalizing these agreements, the project enters its execution phase. Here, the coordinator collaborates with other consortium members to organize work procedures. In addition to the scientific tasks assigned to the coordinator, this role entails ensuring proper implementation, acting as a liaison between the consortium and the granting authority, submitting deliverables and reports to the granting authority, and handling financial distributions. From the above, it is evident that appointing a project coordinator necessitates strategic planning to optimize project resources. In summary, when the coordinating organization has previously held this position in other projects, the learning accrued from such experience is anticipated to positively influence research performance.

Furthermore, the performance of the research consortium is influenced by the type of organization leading it. For instance, if the consortium is helmed by a private entity, such as a small company, collaborative efforts are likely to be closely linked to product development and technology patents (Polt et al., 2008). Conversely, larger companies may prioritize

knowledge acquisition and forming new alliances (Hernan et al., 2003). Public institutions, like universities, are more inclined to lead the consortium in a manner that places research activities and collaborations (Carayol, 2003) at the forefront; thus, aligned with their commitment to their research agenda (Link & Scott, 2005) and considering the prevailing “publish or perish” paradigm within academia, outcomes are more likely to manifest as publications. Therefore, the leading institution's type within the consortium serves as a valuable predictor of subsequent research outcomes, as it brings diverse expertise and, consequently, different avenues of action.

## 2.2 Research team diversity

Diversity is a pivotal construct for comprehending the multifaceted composition of participating entities within a team (Bercovitz & Feldman, 2011). While diversity within teams can sometimes lead to challenges in terms of effective communication, work coordination, and overall task performance, heterogeneous collaborations offer the advantage of strategically harnessing the expertise of each team partner to access a wider array of information. Ultimately, this promotes innovative projects, creative processes, and overall team performance (Cohen & Levinthal, 1990; Dahlin et al., 2005). In our analytical context, team diversity is gauged by the number of participating organizations, the variation in knowledge expertise (i.e., the proportion of higher education institutions, research centers, public institutions, private organizations, or others within the consortium), and the cultural differences among them.

The scale of a collaborative team (number of participating organizations) significantly influences diversity. As the team expands to include more partner organizations, opportunities to diversify expertise beyond the leading organization's subject area increase (Chesbrough, 2003), leading to greater potential for a variety of talents and capabilities (Nepelski & Piroli, 2018). Effective coordination among diverse entities necessitates dynamic and active interactions. In line with this, opportunities for learning and adaptation thrive in an environment of talent and skill divergence (Amason et al., 2006). While it is acknowledged that diversity based on team size might come with coordination challenges (Nepelski & Piroli, 2018), the benefits of collaborative



heterogeneity outweigh these costs (Ancona & Caldwell, 1992; Kotha et al., 2013). On this basis, we explore the relationship between consortium size and research performance.

The configuration of the research team varies based on the combined backgrounds of each participating entity (Bercovitz & Feldman, 2011). In homogenous teams, procedures and decision-making largely align with the focal entity (Henderson, 1995). In contrast, collaborations among heterogeneous organizations with varying sizes and backgrounds within the consortium can bring about divergence in interests and procedures (Nepelski & Piroli, 2018). However, expanding the array of knowledge domains within the team also fosters creativity and enhances organizational learning (March, 1991). Distinctions across the team become more pronounced if participating organizations possess different backgrounds or expertise, potentially leading to asymmetric incentive structures or performance objectives (Nepelski & Piroli, 2018). Despite the potential impact of science-industry collaboration on innovative commercial opportunities (Oliver et al., 2020) and heightened research performance in terms of publications (Bikard et al., 2019), the examination of team composition characteristics within the context of EU-funded research projects has been notably lacking.

Ultimately, a substantial body of research has directed its focus toward examining the correlation between cultural diversity and potential team outcomes (Joshi & Knight, 2015; Joshi & Roh, 2009; Milliken & Martins, 1996; Minbaeva et al., 2021; Stahl et al., 2010). Often, diversity is depicted as a “double-edged sword” within contemporary organizational and international business theories (Minbaeva et al., 2021; Stahl et al., 2010), as it can function as both a source of conflict and friction, as well as dynamism and learning (Stahl et al., 2010). Culture represents a social construct encapsulating shared beliefs and values held by a specific group, shaping their interactions within society (Hofstede, 1984; House et al., 2004; Lane et al., 2009), and providing a source of identity and distinctiveness for its members (Stahl et al., 2010). Distinct types of demographic diversity will affect team outcomes in varied manners (Horwitz & Horwitz, 2007). Cultural divergence between institutions based in different countries may introduce innovative perspectives on seizing opportunities through complementary interpretations of external

environmental cues or reciprocal feedback (Choi et al., 1999; Hofstede, 1984). Moreover, entities participating in multicultural teams tend to be attuned to cultural disparities, influencing their interaction dynamics while addressing organizational disparities (Stahl & Maznevski, 2021). Nevertheless, this cultural distance could also pose challenges in terms of in-group communication (Dahlin et al., 2005). Organizations sharing the same cultural foundation share fundamental values and beliefs, fostering deeper connections (Triandis, 1959, 1960). In essence, cultural distance significantly matters, as it intricately relates to the team identity of participating organizations. Consequently, aligned with these notions, our anticipation is that entities within the consortium sharing the same nationality will be more inclined to foster robust intra-team connections (Dahlin et al., 2005), potentially leading to heightened research performance.

### 3 Data and method

#### 3.1 Dataset

The data utilized in this study originate from the Community Research and Development Information Service (CORDIS), a comprehensive public repository of the European Commission that systematically and uniformly presents information on research projects and networks linked to the EU’s major policy initiatives for research and innovation. Precisely, it encompasses detailed insights into projects granted under the seventh framework program — FP7 (spanning from 2007 to 2013) and Horizon 2020 (covering the period from 2014 to 2020), implying that proposals that were not successful—i.e., those that did not secure funding—are excluded. For each project, fundamental details are accessible (e.g., record control number, project ID, title, research objectives description, funding scheme, total costs, total funding, start and end dates, contract type, call-related information, and key achievements).<sup>5</sup> Additionally, at

<sup>5</sup> For Horizon 2020 ERC-funded projects, the principal investigator information is also available. Because we are covering a broader spectrum of funded research projects and not just Horizon 2020 ERC ones (and therefore achieving a higher sample size), we cannot impose this boundary condition.

the organizational level, the repository provides specifics about the consortium (such as the coordinating organization's name, names of participating organizations, organization types, and geographical locations).

CORDIS undergoes monthly updates. For the purpose of this study, we obtained the data in January 2022. At that point, the initial dataset encompassed information on 61,134 projects. With the aim of examining the impacts of prior experience and diversity among group members on project outcomes, we retained only those consortia that met the following criteria: (1) included two or more participants (excluding single-organization consortia) and (2) had secured funding on at least two occasions. Implementing these criteria led to a reduction in observations to 1144 projects. Subsequently, an additional filter was applied to retain only projects with complete information, further reducing observations to 219 projects (75 from FP7 and 143 from H2020 calls) and 94 distinct consortia. However, due to the possibility that a consortium formed by the same entities could be granted an EU project more than once with different research teams, a risk emerged. To mitigate this, we exclusively considered consortia that participated multiple times and focused on research projects within the same domain and thematic field. By meticulously reviewing abstracts of each project application, we removed consortia that repeated across diverse disciplines. While we cannot guarantee the entirety of researchers remained identical, we possess confidence that most remained within the same knowledge domain, thus enabling the transmission of learning. The final sample consists of 159 projects and 88 unique consortia.

In this study, the consortium serves as the unit of analysis. When a consortium has been selected for funding in more than one call for projects (potentially with overlapping timelines), each project is treated as a distinct observation. For better visualization of the geographical distribution of consortia in our sample, Fig. 1 illustrates the locations of coordinating organizations for each project. On average, project duration ranges from 0.75 to 8 years, with an average duration of 4.60 years.

### 3.2 Variables

**Dependent variable** The research performance of consortia participating in EU-funded FP7 and H2020

programs constitutes our dependent variable. According to the EC, project results encompass tangible or intangible outputs generated during the project, capable of creating impact during and/or after funding. Among the most prevalent outputs are various forms of publications, widely used to codify new collaborative knowledge. CORDIS records various publication types, including books, book chapters, conference papers, peer-reviewed articles, non-peer-reviewed articles, other documents, and theses associated with each project. Considering the diverse target audiences (academic and non-academic) and the contribution to disseminating scientific evidence universally, we opted to use the total number of publications resulting from a project divided by its duration ( $Pub \times Year$ ) as a proxy for research performance. Values in our sample range between 0.16 and 36.28, averaging 4 publications per year with a median of 2.08. The instance of a project with 36.28 publications/year is exceptional, significantly surpassing other projects in productivity. This 7-year project in material sciences yielded 254 publications during its entire duration. Two experienced higher education institutions in the UK formed the consortium. Several projects within the sample remain ongoing; in these cases, the variable  $Pub \times year$  was computed by dividing the number of publications to date by the years the project has been active until January 2022.

**Previous experience** We have gathered various indicators of experience, encompassing the participating organizations' individual learning experiences within the consortium and the experience derived from repeated collaboration with the same partners in previous consortia. Regarding individual experience, we underscore the role of the coordinating organization. Its chief responsibilities include resource mobilization, consortium establishment, and provision of scientific leadership evident in the research project proposal. Therefore, it becomes imperative to acquire information about the coordinating organization and discern if its profile bears an impact on project outcomes. We posit that the nature of the leading consortium organization can influence group behavior (Fini et al., 2022), as each type of organization carries distinct missions, goals, and objectives that shape group dynamics and determine the course of action (Nepelski & Piroli, 2018). For instance, universities or research centers, familiar with the publication



**Fig. 1** Map on location of all project coordinating organizations

process unlike industry partners or public administrations, may exhibit a greater inclination to publish key findings in scientific journals when leading consortia. Conversely, non-profit entities might prioritize collaboration and community-building. Through classification according to the CORDIS database categories, we created a variable (*Type\_coordinator*) categorizing organizations into five main types: higher education institutions (HES), research centers (REC), public institutions (PUB), private organizations (PRC), and others (OTHER). This variable aids in comprehending each type's strengths and weaknesses when taking on a consortium leadership role and its subsequent performance patterns. Of the 281 organizations participating in project consortia funded within the analyzed schemes, HES (40.92%) followed by REC (36.29%) constitute the majority (refer to Table 1). This distribution also holds when considering the participating organization type acting as coordinator

in the 159 projects in our sample, with HES assuming this role in 44.65% of instances.

However, the coordinating organization's profile might not be the sole pertinent aspect; repetition of this role is also consequential. Hence, a second variable was computed (*Times\_as\_coordinator*), indicating how many times an organization has functioned as coordinator in any of the other EU projects present in the complete CORDIS database before the current project's commencement date.

Collaborative work within the consortium yields the second kind of experience. To encapsulate learning capabilities and synergies arising from prior collaborations, we established a variable (*Repetition*) indicating the number of times the same consortium has successfully secured funding for a project within any of the funding schemes covered in the CORDIS dataset up to that juncture. A logarithmic



**Table 1** Sample composition

Quantity	Type of organizations					Total
	HES	PRC	PUB	REC	OTHER	
Type of organization	115 (40.92%)	16 (5.69%)	9 (3.20%)	102 (36.29%)	39 (13.88%)	281 (100%)
Type of coordinator	71 (44.65%)	7 (4.40%)	3 (1.89%)	60 (37.74%)	18 (11.32%)	159 (100%)

*Notes:* Higher education institutions (*HES*), research centers (*REC*), public institutions (*PUB*), private organizations (*PRC*), and others (*OTHER*). The percentages in brackets correspond to the proportion of quantity by type of organization on the sample and the proportion of type of coordinator on the sample, respectively

transformation was applied to this variable to rectify any skewness.

**Diversity** Consortia comprising distinct partner profiles may display varying behaviors, necessitating an assessment of their heterogeneity (Bercovitz & Feldman, 2011). Three variables capture diversity within a consortium. The first, number of organizations (*Num\_org*), signifies the count of unique participating entities within a single consortium. To mitigate skewness, this variable is logged. On average, consortia consist of 3.26 participants, encompassing both small consortia with merely 2 organizations and larger ones comprising up to 40 organizations.

Our second variable, organizational mix (*Org\_mix*), entails an ordinal variable characterizing whether a consortium comprises various organization types (e.g., HES, REC, PUB, PRC, and OTHER), and if any type predominates. For each consortium, we initially differentiated between those with a solitary organization type (coded as 1) and those with multiple types (coded as 2). For the latter, the percentage of the most prevalent organization type was calculated. If this figure exceeded 50% (indicating a strong presence), the variable was assigned a value of 3. Otherwise, it retained a value of 2. This approach enables differentiation among consortia with unvaried organizational mixes (“homogeneous,” constituting 35.2% of cases in our database), consortia with diverse organization types yet none prevailing (“balanced,” accounting for 57.2% of cases), and consortia harboring at least two organization types, with one dominating (“biased,” representing 7.6% of cases).

Finally, European projects are distinct in that they facilitate collaboration among partners from various

countries. In such a context, studying the influence of work-related values associated with national cultural diversity becomes pertinent. To capture this impact, we drew on the work of Lonner et al. (1980) and Hofstede (1984). Although the initial research identified four cultural categories—power distance, collectivism vs. individualism, uncertainty avoidance, and femininity vs. masculinity—our study employs the extended version, encompassing two additional categories: short-term vs. long-term orientation and restraint vs. indulgence (Hofstede et al., 2010). Given that the original cultural distance indicators covered only 55 countries (Kogut & Singh, 1988), we utilized the Hofstede Insights webpage,<sup>6</sup> offering a cultural survey tool based on Hofstede’s dimensional constructs. Subsequently, to rectify skewness, the calculated distances were transformed using the  $\ln(1 + \text{distance})$  function, yielding the variable *Cultural\_distance*. Within our sample, 35.8% of observations exhibit cultural diversity, indicating consortia formed by at least two participating organizations from different countries.

**Control variables** Control variables were also incorporated to account for the effects of time, financial resources, and the R&D and innovation intensity of the coordinating organization’s territory. Discipline (*Discipline*) was controlled for as publication intensity and pace can substantially vary across fields of study. Utilizing the “European Science Vocabulary” (EuroSciVoc) taxonomy, we grouped fields into three categories: humanities and social sciences (HSS;

<sup>6</sup> Hofstede Insights calculator: <https://www.hofstede-insights.com/country-comparison-tool>

**Table 2** Descriptive statistics

Panel A: Continuous variables						
Variable	Average	Min	Max	Median	S.D	
Publications per year	4	0.16	36.28	2.09	5.20	
Times as coordinator	205	1.00	1205.00	62.00	316.16	
Number of repetitions per consortium	1.2	2.00	13.00	1.00	1.95	
Number of organizations	3.26	2.00	40.00	2.00	6.03	
Start year of projects	2016	2008	2020	2016	2.82	
Economic amount granted (in million €)	2.88	0.50	77.5	1.50	8.00	
R&D expenditure of the country of the coordinator as % of the GDP	2.06	0.55	4.93	2.19	0.7	
Global innovation index of the country of the coordinator	52.48	3.47	68.2	54.2	14.27	
Cultural distance	20.18	0.00	104.95	0.00	29.76	
Panel B: Categorical variables						
Variable	Category	%				
Type of coordinator	Higher education institutions	44.65				
	Research centers	37.74				
	Public institutions	1.89				
	Private organizations	4.40				
	Others	11.32				
Organizational mix	Homogeneous	35.22				
	Balanced	57.23				
	Biased	7.55				
Discipline	Humanities and social sciences	7.55				
	Science and engineering	71.07				
	Medical and health sciences	21.38				

*Note:* Panel A contains the continuous variables and their descriptive statistics. Categorical variables are displayed in panel B alongside the frequency of each category as a percentage of the total sample

constituting 7.5% of cases), science and engineering (SCIENG; accounting for 71.1% of cases), and medical and health sciences (MED; representing 21.4% of cases). This approach serves to cluster areas with akin publication patterns while retaining model degrees of freedom and ensuring accurate data representation. Start year (*Start\_year*) was introduced as another control variable, along with a variable accounting for the grant amount provided to the project, which was logged to rectify skewness (*grant*).

Additionally, two variables were employed to control for the R&D investment and innovation intensity of the coordinating organization's country. Specifically, we employed the World Bank's R&D expenditure as a percentage of the GDP of the region (*RD*) and the Global Innovation Index of the region (*GII*), a collaborative initiative involving Cornell University,

INSEAD Business School, and the World Intellectual Property Organization. This index gauges innovation ecosystem performance, consisting of two equally weighted sub-indices: the innovation input sub-index and the innovation output sub-index, offering a comprehensive overview of innovation. Descriptive statistics for all variables are available in panel A of Table 2, while panel B outlines the frequency of each categorical variable's categories as a percentage of the total sample.

### 3.3 Method

Given that our dataset comprises repeated consortia across time, the data's structure conforms to a panel format. In alignment with the foundational principles of this study, we opt for an unbalanced fixed effect panel data approach to estimate the influence of the

aforementioned variables, particularly prior experience and diversity, in forecasting research performance. Panel analysis stands as the optimal statistical technique for

dissecting data gathered longitudinally from identical entities, in this context, consortia. The model's formulation can be represented as illustrated in Eq. (1):

$$Pub \times Year = f(times\_as\_coordinator, repetition, type\_coordinator, num\_org, org\_mix, cultural\_distance, discipline, start\_year, grant, gii, rd) \quad (1)$$

Panel data analysis is a robust method frequently employed in econometrics and social sciences to examine data collected over time from multiple entities or units, such as individuals, firms, or countries. This method allows for the identification of relationships and patterns that might remain concealed by static cross-sectional or time-series analyses. In this study, our objective is to discern the sources of variation both within and between our observations, and we achieve this through two distinct panel data analysis approaches: within-entity and between-entity analyses (Bliese et al., 2020; Shaver, 2019).

Within-entity panel data analysis is also referred to as “fixed effects” or “time-series” analysis. This approach concentrates on studying variations within individual entities over time. It is often employed to control for unobservable entity-specific factors that remain constant over time, such as firm culture. By incorporating entity-specific fixed effects into the model, within-entity analysis addresses time-invariant individual disparities. This perspective allows researchers to explore how changes within entities over time (e.g., alterations in consortium composition) impact the outcome variable, thereby illuminating dynamic relationships within each entity. The within panel model examines the connection between outcome variables and explanatory variables, while controlling for the distinct consortia. The advantages of within-entity panel data analysis are noteworthy. It eliminates time-invariant heterogeneity by subtracting individual entity attributes from the data, thereby emphasizing temporal alterations. Additionally, it captures dynamic effects, facilitating an understanding of how changes within entities influence the dependent variable. The process involves calculating individual entity-specific averages or deviations for each variable, which then serve as the basis for analysis, rendering the data relative to the unique characteristics of each entity. Common estimators in within-entity panel data analysis include the Least Squares Dummy Variable estimator and the Fixed Effects

estimator, with the latter being particularly favored for its efficiency and consistent estimates under appropriate assumptions.

Between-entity panel data analysis is also known as “random effects” or “cross-sectional” analysis. This approach centers on variations between different entities at a specific time point. It is employed to analyze cross-sectional variations and identify factors differing between entities. A between-panel model regresses the averages of explanatory variables against the averages of outcome variables for each consortium. By concentrating on average disparities between entities, the between analysis empowers researchers to investigate how entities diverge from each other concerning the outcome variable. This is valuable for studying time-invariant attributes that fluctuate across entities, such as country characteristics influencing consortium outcomes. The method aids in exploring entity differences and understanding how the dependent variable varies among diverse entities at a given instance. Furthermore, it accounts for time-invariant heterogeneity by considering factors that remain constant over time, without subtracting entity-specific factors.

The choice between within-entity and between-entity panel data analysis hinges on the research question and the underlying assumptions. If the aim is to comprehend how changes within entities influence the outcome over time, within-entity analysis is the appropriate choice. Conversely, if the focus is on identifying discrepancies between entities at a specific time point, between-entity analysis is preferable. Given our intention to scrutinize how variables evolve over time within each consortium entity and how they differ between (among) consortia, while not overlooking potentially significant factors influencing the explanatory effects of our variables of interest, we employ both within and between approaches. On one hand, the within-panel model evaluates temporal variation within each specific consortium, allowing us to explore variables impacting publications per

year over time. In this context, variables constant over time and consortium, like *num\_org*, *org\_mix*, and *cultural\_distance*, will be omitted from the model. The *type\_coordinator* variable will be excluded when the consortium maintains the same type of coordinating organization in various iterations. On the other hand, the between-panel model examines temporal variation across consortia, enabling us to investigate variables influencing the dependent variable between different consortia. This involves comparing the performance and unique characteristics of all consortia within the sample.

#### 4 Results

This section presents the findings concerning the influence of prior experience and diversity in consortia that have successfully participated in European R&D-funded programs on research performance (Table 3). Model 1 illustrates the results for the within-model analysis, while Model 2 does the same for the between analysis.

Delving into the specifics of the *within*-model analysis, we discern the significance of the partner organization leading the consortium. Specifically, it becomes evident that maintaining the same coordinator for subsequent projects is linked to higher research performance, as indicated by the average number of publications per year. As mentioned earlier, leading a consortium entails not only scientific expertise but also resource allocation and close project monitoring to ensure goal attainment, skills that are refined over time. This aligns with the notion that once a partner assumes this role, continuity yields better results in leading collaborative endeavors (Bercovitz & Feldman, 2011).

Another significant finding pertains to the preferred profile of the coordinating organization. If the organization undertaking this role is a higher education institution or a research center, the likelihood of producing a greater number of publications per year substantially rises (Nepelski & Piroli, 2018). Notably, the categorical variable *type\_coordinator* encompassed four values (HES, PRC, REC, PUB, and OTH). The PUB category has been excluded from the model. This is due to the constancy of the coordinating organization within the same consortium for these cases, wherein the type of coordinator

**Table 3** Estimation results predicting publications per year by the consortium

Variables	Model (1)	Model (2)
	Within	Between
<i>Previous experience related variables</i>		
<i>Times_as_coordinator</i>	0.0088* (0.0037)	0.0073 <sup>†</sup> (0.0043)
<i>Repetition</i>	0.9876 (0.2170)	-6.1512 <sup>†</sup> (3.1438)
<i>Type_coordinator</i> (HES)	9.4119* (3.5405)	6.3696 (4.6768)
<i>Type_coordinator</i> (PUB)		14.2180* (6.3778)
<i>Type_coordinator</i> (PRC)	6.7903 (4.8944)	-0.8953 (5.5420)
<i>Type_coordinator</i> (REC)	5.7951 <sup>†</sup> (3.0572)	4.2592 (4.5748)
<i>Diversity-related variables</i>		
<i>Num_org</i>		0.0004 (3.6384)
<i>Org_mix</i> (BALANCED)		-1.5648 (1.2305)
<i>Org_mix</i> (BIASED)		6.2809* (2.771)
<i>Cultural_diversity</i>		-0.0404 (0.3259)
<i>Control variables</i>		
<i>Discipline</i> (MED)	-1.5374 (1.8752)	-1.0959 (2.5493)
<i>Discipline</i> (SCIENG)	-1.3326 (1.6860)	1.8971 (2.4269)
<i>Start_year</i>	-0.9445*** (0.1979)	-0.9544*** (0.2330)
<i>Grant</i>	1.4139 <sup>†</sup> (0.8044)	4.3131** (1.5915)
<i>GII</i>	-0.0466 (0.0442)	0.0221 (0.0515)
<i>RD</i>	0.6228 (1.5748)	-0.9749 (0.7689)
Intercept		1897.1000*** (470.0100)
<i>N</i> of observations	159	159
<i>F</i>	5.4284***	3.6491***
<i>R</i> <sup>2</sup>	0.4988	0.4513

Note: Robust standard errors in parentheses. <sup>†</sup><0.10, \**p*<0.05, \*\**p*<0.01, and \*\*\**p*<0.001; two-tailed significances. Baseline categories: OTH for the variable *type\_coordinator*, HOMOGENEOUS for the variable *org\_mix*, and HSS for the variable *discipline*

remains unchanged across various repetitions of the consortium. Conversely, other consortia feature consistent consortium members but varying coordinating organizations. For instance, let us consider a consortium consisting of organizations A and B, with A being an HES and B a non-profit entity (OTH). If B leads the consortium in the first project, while A takes the helm in the second and third projects, a transition from OTH to HES coordination is observed over time. Regarding the interpretation of the coefficient for the categorical variable, when an HES is the consortium's coordinator, the number of publications per year is, on average, 9.4 units higher than if an OTH organization is coordinating, within the same consortium. Similar patterns arise when the coordinating organization is a REC. This finding underscores the significance of HES and RES in maximizing dissemination through publications, given their familiarity with this outcome and organizational incentive structures that emphasize publication dissemination.

Within this model, the role of diversity holds importance as it involves assessing a given consortium's performance across different projects. By maintaining consistent partners across all consortium projects, variations in member diversity are eliminated. Furthermore, a closer examination of the results highlights the significance of two control variables *start\_year* and *grant*. The former suggests that earlier initiated projects tend to yield higher publication productivity compared to recent ones. This might be attributed to the time lag between study development and publication, especially for ongoing projects. Regarding the latter variable, increased funding amounts provide more opportunities for publications.

The *between*-model analysis contributes additional insights into the underlying composition of research teams that drive research output creation. In this context, the impact of prior experience-related variables appears to diminish, albeit with a marginal influence remaining. Specifically, it is observed that the more times a partner assumes the coordinator role, the more favorable the outcomes become. Within this model, PUB organizations appear to outperform those categorized as OTH. Another noteworthy discovery is that while the *within* model suggests repeating the same consortium (with consistent characteristics across projects) does not necessarily lead to superior publication performance, the *between* model unveils a significant and negative correlation. This implies that

projects formed by consortia with prior collaborative experience tend to generate fewer publications than projects led by new consortia.

Regarding the impact of diversity, we initially observe a significant role played by organizational mix. More precisely, consortia achieving higher research outputs are those that consist of at least two different types of organizations, with one type assuming a dominant role. This finding can be interpreted as evidence favoring partner diversity while still managing the consortium's heterogeneity. Organizations of the same type share a common language, interests, and expectations, facilitating decision-making. Second, the size of the consortium in terms of the number of organizations appears to have no direct correlation with research performance.

Turning to the control variables, similar to the within model, projects initiated earlier and those with larger budgets maintain a more advantageous position, resulting in higher publication rates per year. In other words, larger budgets grant access to resources that enable a more advanced approach to the discipline, yielding cutting-edge results that are appealing for dissemination through publications.

#### 4.1 Robustness checks

We conducted additional analyses to bolster the robustness of our findings. The first test aimed to validate our proposed research performance measure. Initially, we included the total number of publications per year, irrespective of publication type. However, as peer-reviewed articles are more esteemed in academia, they can serve as a proxy for scientific quality. We repeated the *within* and *between* models using peer-reviewed articles per year as the dependent variable, and the results preserved the interpretation of our findings. The high correlation (0.94) between the two proxies supports this outcome, as the majority of consortia in our dataset prioritize peer-reviewed articles.

The second robustness test involved introducing a variable capturing the market aspiration level (*lag\_market*), reflecting the average performance of other consortia in the database during the previous year of project initiation. This variable is valuable in signaling participants' expectations and functioning as a benchmark for future performance. The inclusion of this variable produced practically unchanged results,



implying that once a project is granted, external market pressures seem to have minimal influence on consortium performance.

The final robustness test questioned the variable capturing cultural distance among partners due to differing nationalities. We introduced a binary variable that equated to 0 if all partners were from the same country. For all other scenarios (at least two partners from different countries), the value was set to 1. This alteration did not lead to any changes in results, indicating that the choice between the two approaches is insignificant, as both yield similar outcomes. Detailed results of all robustness tests are available upon request.

## 5 Discussion and policy implications

Investing in research is a central objective on the developmental agenda of nations. Consequently, placing it at the core of the EU's blueprint is essential to foster smart, sustainable growth and job opportunities. EU-funded research projects serve as a unique platform to unite diverse stakeholders—spanning various profiles, sectors, and countries—in collaborative efforts that yield innovative solutions, charting a path toward a sustainable future. By intertwining research and innovation, both FP7 and H2020 programs have effectively advanced this goal, emphasizing exceptional science, industrial leadership, and addressing societal challenges.

Embedded within this context, our study presents fresh evidence on a specific form of academic engagement—EU-funded research projects in which SMEs participate—which, despite substantial investments and coordination, has received limited attention in the literature. Specifically, we investigated the effects of team experience and diversity on research performance. To achieve this, we examined impacts both within and between consortia. To the best of our knowledge, this study stands as one of the few to evaluate the effectiveness of such collaborations (e.g., Grimpe et al., 2022; Olsen et al., 2016). In doing so, we believe it opens avenues for deeper exploration of consortium behavior and the resultant learning outcomes, which in turn can inform future projects.

Our findings hold significant academic and policy implications. The *within* model enabled us to delve into the changes within a given consortium

that lead to improved research performance over time. First, our results provide robust evidence that the profile of the coordinating organization plays a pivotal role. Specifically, when keeping all other participants consistent within the consortium, having a higher education institution or a research center as the coordinator correlates with higher publication records. This can be explained by the incentive structures of these entities, where publications serve as a primary measure of performance. This alignment prompts them to allocate greater effort toward achieving this outcome. In essence, publication outcomes are the standard indicator used to evaluate researchers for promotional purposes. Other types of outputs might require different leadership profiles, necessitating varied organizational types. Another rationale for this effect is that higher education institutions and research centers are more adept with this policy instrument. EU-funded projects intentionally target these institutions to serve as intermediaries between science and society. In this role, they are expected to establish strategic partnerships, facilitate networking, and engage in collaborative research with various stakeholders, including private firms (both SMEs and large firms), research organizations, associations, NGOs, and government bodies.

Second, our findings substantiate our initial intuition that superior performance emerges when the coordinating partner has previous experience in this role (*times\_as\_coordinator*). This insight implies that changes associated with the coordinating organization within a consortium entail costs that may not be justified. As discussed in Section 2, leading a consortium requires the development of a range of managerial skills that take time to cultivate (Boehm & Hogan, 2014). While advocating for leadership rotation within a consortium might be perceived as a means to provide equal opportunities to participating entities and directly benefit the appointed leader, such a flexible approach adversely impacts team performance. It necessitates the establishment of new roles and dynamics, slowing the generation of learning dynamics and resulting in subpar team performance. Similarly, when establishing a new consortium, prior experience confers an advantage to the coordinating organization. This expertise facilitates connections among different parties (Boehm & Hogan, 2014) and

enhances access to potential partners (Bercovitz & Feldman, 2011), making the process more efficient.

Third, the *between* model suggests that consortia with a lengthier history of collaboration (measured by the variable *repetition*) tend to generate fewer publications. One possible interpretation is that initially, quantity may take precedence over quality, prompting each consortium member to work independently and publish segmented parts of the project's results. However, once a consortium matures, collaborative efforts (co-authorship among partners) and reduced coordination costs (Bercovitz & Feldman, 2011) may become the preferred approach, resulting in fewer yet more substantial contributions.

Lastly, we encountered unexpected results when controlling for the effect of time. Surprisingly, our findings indicate that consortia repeating in subsequent calls experience a decline in research performance over time. This finding contradicts the common assumption that learning effects strengthen through ongoing interaction (D'Este et al., 2019; Tartari et al., 2014). However, this result should be interpreted with caution. Firstly, it is crucial to note that some recently initiated projects are still ongoing, suggesting that their publication outputs are still developing or not yet included in the CORDIS dataset. Hence, the apparent lower productivity of recent projects might be attributed to publication time lags rather than a genuine decline in output. Second, a plausible explanation could be that high-impact journals have grown more selective, requiring extended research development and revisions, thus extending the publication process. Given the exploratory nature of this study, we call for scholarly discourse to deeply investigate this issue, potentially necessitating more detailed information collection for each consortium and their outputs.

Our findings also contribute to the literature on team diversity, which was explored by analyzing different consortia in the *between* model. Specifically, we noted that consortia categorized as "biased," characterized by a dominant participation of partners from a particular type (such as HES, REC, PUB, PRC, or OTHER), are favored. This suggests that while diversity is appreciated, the search for like-minded partners prevails, reducing diversity in perspectives and working approaches. This result appears to contradict studies advocating for group heterogeneity (for example, Nepelski & Piroli, 2018; Stahl & Maznevski,

2021). However, we recognize that diversity is multi-dimensional (Uriarte et al., 2007), and our measures may not fully capture its complexity. In this study, diversity encompasses not only the country of origin and type of organization but also individual-level characteristics (such as gender, career stage, specialization, viewpoints, interpersonal skills), which are known to significantly influence outcomes (Cheruvilil et al., 2014). Unfortunately, due to data limitations and our organizational-level focus, we could not include these individual-level factors in our analysis. Although EU-funded research projects aim to facilitate innovation and collaboration between public and private sectors, our findings indicate that consortia with organizational homogeneity tend to achieve better research outcomes. Despite ongoing debates in the literature about diversity in team members and outcomes (Stahl & Tung, 2015), our study proposes that adapting to different organizational forms hinders the learning curve for partners, ultimately slowing down the publication rate. While the European Commission seeks collaboration not only across member countries but also diverse institutions, it is concerning that diversity seems to affect academic output negatively. To avoid the conclusion that organizational diversity should be avoided, we urge policymakers to consider academic publications as one of several research project outcomes and to value other outputs that may be less tangible but equally beneficial. The mere collaboration of different organizations is a successful outcome in itself, fostering organizational learning. Another approach is to encourage outcomes aligned with the interests of consortium participants that are not higher education institutions. Private entities, public organizations, or research centers might not prioritize publishing technical academic papers due to their slow publication process. Promoting alternative outcomes, such as expediting the publication process or embracing open access, in line with the Open Research Europe initiative (<https://open-research-europe.ec.europa.eu/>) could provide support in this direction.

Contrary to our initial expectation, the number of organizations within a consortium yielded no significant effect. This lack of effect can be attributed to the fact that larger consortia, despite having more creative minds to generate new knowledge (Nepelski & Piroli, 2018), might face challenges in segmenting outputs into distinct sub-outcomes. Consequently, the

**Table 4** Type of output depending on money granted to the project

Consortia with...	Average number of...				
	Peer-reviewed articles	Thesis	Books and book chapters	Conferences	Other
Top 25% economic contribution	31.77	0.20	0.18	3.38	0.13
Mid 50% economic contribution	12.92	0.27	0.25	4.27	0.36
Bottom 25% economic contribution	2.82	0.02	0.15	1.12	1.32

resulting publication numbers may not significantly differ from those of smaller consortia (Link, 2015; Link & Siegel, 2005). Additionally, some partners in a consortium might prefer utilizing new knowledge in alternative formats, causing an uneven distribution of involvement in publications across the consortium. Managing coordination in larger consortia could also prove more challenging.

Finally, our results emphasize the importance of funding amounts (consistent in both models). Access to greater funding significantly correlates with higher research performance rates within a consortium. Additional descriptive analysis presented in Table 4 reveals that consortia receiving higher funding not only produce more publications but also exhibit higher quality. On average, more peer-reviewed articles are published, while the presence of theses, books, or conference presentations is lower in projects with limited economic resources.

On a related note, exploring whether teams in certain countries are more likely to receive larger grants is intriguing, as superior funding is linked to improved performance. Figure 2 visually depicts the average grant amount by the country of origin of the coordinating institution. For countries with a substantial number of instances (more than five) acting as project coordinators (BE, DE, ES, FR, IT, NL, and UK), we observe that The Netherlands obtains an average of 12 million € per project, whereas Spain's average is 0.697 million €.

## 6 Concluding remarks, limitations, and directions for future research

In this study, we propose that teams' previous experience and diversity are pivotal factors influencing the research performance of collaborative research agreements, materialized as funded research projects. This

type of academic engagement should be recognized as a potent tool for fostering learning and collaborations among diverse actors within the innovation ecosystem who might not otherwise have the opportunity to work and progress together.

However, our study also presents certain limitations that could be addressed in future research endeavors. First, while academic engagement encompasses various collaborations between academic institutions and external partners, including consulting, contract research, joint research, joint publications, conferences, and workshops (Kantis et al., 2023; Perkmann et al., 2021), we have predominantly measured research team outcomes using the number of publications due to data availability. For future researchers, we recommend employing a more comprehensive measure for project outcomes, potentially involving a portfolio of outcomes like research results, commercializable outputs (such as patents), consulting reports, and intangible metrics like member satisfaction and networking impact. Regrettably, this additional information was not accessible for the current study. Second, our analysis was restricted to consortia with an exact match in repeated collaborations, enabling comprehensive control over consortium characteristics. Nonetheless, this stringent condition led to a reduction in our sample size. An alternative, albeit more intricate approach, could involve examining consortia that are highly similar but not exact matches (e.g., with 80% of common partners). This approach would expand the sample size and facilitate research into pivotal versus less relevant partner changes. Third, our sample encompasses highly diverse projects, ranging from genetics to social sciences. While this diversity does not greatly impact *within* analysis, it could complicate comparisons between consortia due to differing publication processes and timelines across disciplines. Fourth, the CORDIS database provides information only at the organizational level, thus preventing



**Fig. 2** Money granted by country of the coordinating organization

us from disentangling characteristics of individual researchers in various types of funded research projects. Consequently, the experiential learning we capture is at the organizational level. Lastly, while we could not differentiate successful (granted) consortia from unsuccessful (non-granted) ones, we advocate for expanding the CORDIS database to incorporate this information. This enhancement could shed light on factors obstructing established consortia from securing subsequent grants.

Despite these limitations concerning sample size and additional information, we believe our study

contributes to the literature in multiple ways. First, while the EU allocates a substantial portion of its budget to research project financing, few studies investigate the learning generated by these projects and the attributes of consortia fostering positive outcomes. In this regard, our study paves the way for policymakers and researchers to delve deeper into this topic. Second, our exploration of experience and diversity as critical team characteristics impacting learning and collaboration offers unique insights within the specific context of EU-funded research projects.

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**Data availability** The data that support the findings of this study are available upon request from the corresponding author.

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