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University excellence initiatives in Spain, a possible strategy for optimising resources and improving local performance

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ABSTRACT

This article analyses Spain's Campus of International Excellence (CEI) Programme and its potential for raising the visibility of the country's universities, optimising resources and intensifying interaction with the local surrounds. The examples studied are the UAM–CSIC (Autonomous University of Madrid + National Research Council) and EUSKAMPUS (University of the Basque Country + Donostia International Physics Center) CEIs. The main characteristics, mission and aims of these initiatives are discussed. The results are analysed in terms of the papers published in journals listed in international databases (Web of Science). The analysis compares each university's individual output to the results obtained by these inter-institutional alliances. The improvement observed in all the indicators studied highlights the importance of joining forces to attain higher visibility.

1. Introduction

Education in general is presently undergoing considerable change worldwide. Higher education in particular is increasingly subject to the influence of market forces (Teixeira and Dill, 2011). Hazelkorn (2013) noted that the competition attendant upon globalisation is inducing a historic transformation in higher education the world over. With intensified national and international competitions among universities, international rankings have acquired a key role for policy makers and the public at large. The popularity of such tools has sparked an ongoing debate in most countries about the quality and performance of national higher education systems. World-class universities (a term coined by Altbach's (2004) paper), i.e., the ones at the top of the list, are becoming the model for institutions of higher education (HEIs) around the world.

Governments are consequently pursuing the attainment of world-class status for their national universities, primarily by funnelling resources to a few HEIs or by encouraging partnering among universities and other research institutions (Hinfelaar and O'Connell, 2013). Altbach and Salmi (2011a,b) described nine case studies set in different contexts to illustrate the difficulty involved in building a world-class research university.

In some European countries, such as France, Germany and Spain, whose universities are not in prominent positions, programmes have been implemented to further academic excellence. The aim of such initiatives is to strengthen the position of the better placed institutions by increasing their funding and fostering the acquisition of greater critical mass. Some universities in these countries have reacted to such policies with partnering strategies that are prompting substantial change in their institutional structures and governance and the higher education system as a whole (de la Torre García et al., 2014).

In light of the importance of these institutional alliance policies, the present paper reviews the situation in Spain with

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an analysis of a specific initiative: the Campus of International Excellence Programme (Spanish initials, CEI).

The premise that guided this study was that inter-institutional alliances can be instrumental when responding to needs (cooperation to optimise resources and attain higher international visibility), for they would improve local performance and generate the critical mass required to attain higher ranks in international listings.

To verify that premise, the following objectives were pursued:

- to analyse the potential in collaboration among institutions with a common geography and able to generate synergies
- to study the impact of the joint activities of two initiatives: the Autonomous University of Madrid and National Research Council (UAM–CSIC) CEI and EUSKAMPUS, a CEI headed by the University of the Basque Country in conjunction with the Donostia International Physics Center
- to focus on the visibility of the scientific papers signed by the institutions participating in the Campus of Excellence Programme
- to determine whether these institutions' initiatives constitute a trend to be followed by others with a view to driving the Spanish university system forward through alliances with research institutes and bodies located in their spheres of influence.

To that end, the case study is set into context with a brief description, in Section 2, of similar initiatives in other European countries. The sources and methodology used as well as the features of the Campus of International Excellence Programme are discussed below. Two specific CEIs were studied: UAM–CSIC (Autonomous University of Madrid + National Research Council) and EUSKAMPUS (University of the Basque Country + Donostia International Physics Center) (Section 3). The findings are set out in Section 4, highlighting the beneficial effect of the two universities' inter-institutional alliances on their visibility. Lastly, the scope and limitations of the CEI Programme are addressed (Section 5).

2. University strategies to improve quality

In the wake of globalisation, today's higher education landscape is characterised by growing internationalisation and competitive pressure. Huisman and Van der Wende (2004) noted that many higher education institutions around the world are implementing internationalisation strategies, as opposed to their former nationally-oriented focus.

Since the creation of the Academic Ranking of World Universities (ARWU) in 2003, university listings have come into widespread use by scientific policy managers as well as by students, professors and researchers seeking the institutions of greatest prestige in which to pursue their careers. The appearance of such rankings has favoured the development of a global market for higher education in which all countries' major research universities participate. According to a European University Association report published in 2011, international rankings are biased toward research universities, inasmuch as the indicators focus primarily on research. Research-heavy universities are therefore seen to stand "at the pinnacle of the world's academic systems" (Kearney and Lincoln, 2013). These institutions compete worldwide and are characterised by a high concentration of talent as well as a wealth of resources to provide a favourable environment for advanced research (Altbach and Balan, 2007; Salmi, 2009; Liu et al., 2011). The main implication of these developments, theoretically speaking, is a change in the model. Universities have moved from country-specific institutions to organisational actors expected to have goals and strategic plans for their implementation (Ramirez, 2010).

Visibility in the international listings of highest prestige has therefore become a matter of major consequence for educational institutions, for it enables them to attract resources more effectively. According to the European University Association (2011), however, one of the main objections to rankings is that they apply the same parameters to measure the activity of very diverse institutions (most such listings attach greater importance to research than to education), rendering many universities invisible. In light of such considerations, Jamil Salmi (2010) asks: "How many universities (in a country) can be in the top 500?". The answer, obviously, is that only the ones with a fully consolidated international and research profile, such as the major American and European institutions that head the list, are in a position to access the top spots (Altbach and Salmi, 2011a,b). For most universities in non-core countries, however, ranking among the world's top 100 is a tall order.

As prior studies showed, although the size of an institution is important, it is not sufficient to achieve a qualitative leap (De Filippo et al., 2012).

Further to the authors, small improvements in productivity and visibility do not suffice. The introduction of significant change would call for implementing a clear strategy to launch a group of the highest performing institutions on an international scale. Combining institutional strengths might be a promising option, encouraging cooperation between high quality universities (Deiaco et al., 2009). Not just any network, alliance or partnership is valid, however: relationships must be furthered between research-oriented institutions characterised by scientific excellence and dynamic and entrepreneurial managements.

In recent years, a number of excellence programmes have been implemented in European countries whose universities are not listed in the top positions in international rankings. Such initiatives are based on building institutional alliances to improve the quality, raise the competitiveness and enhance the international visibility of their major universities (Kehm, 2006).

The French example is illustrative of this approach. In 2007, the national legislation was amended to create 10 major "centres of excellence", a category that covers universities, research institutes and *grandes écoles*, and raise their visibility in international listings. Similarly, since 2005 Germany has been backing its "initiatives of excellence" or *Exzellenzinitiative* by creating a league of top universities (Hazelkorn and Ryan, 2013).

France launched its *Initiatives d'excellence* (IDEX) programme in the late 2010, endowing it with €7.7 billion to create five to ten institutions able to compete with the world's finest universities. The strategy entailed linking geographically aligned higher education and research institutions whose scientific and academic excellence was already acknowledged, with a view to raising their international visibility. These excellence initiatives are structured around particularly ambitious scientific projects in close partnership with the business community. An independent international jury selected eight

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IDEXs from among the *écoles*, universities and research institutions already characterised by considerable cooperation. The rationale behind the (geographically focused) selection was that their high research and academic potential would attract international attention. During the 4-year trial period, a certain share of the 7.7 billion euros earmarked for the programme will be allocated to each campus chosen to finance initial project implementation After that period, depending on the results of performance-based assessment, each campus will receive a capital endowment to fund future initiatives with the earnings. This endowment, which may reach a sum of up to one billion euros per IDEX, will supplement any private funding raised.

Germany's Excellence Initiative, sponsored by the Federal Ministry of Education and the German Research Foundation (GRF), in conjunction with the German Council of Science and Humanities (WR), aims to strengthen research in German universities and enhance their international visibility. To this end, the federal and state governments decided to award a total of 1.9 billion euros to this initiative over the course of five years.

The call for proposals covered three lines of funding. The first, Graduate Schools, targeting young researchers and PhD. students, covers around 40 projects, each funded with one million euros yearly. The second, Clusters of Excellence, aims to engage universities, research institutes and industries in scientific networking and collaboration, focusing on fields of particular relevance for the future, each funded with about eight million euros annually. Lastly, the ten projects comprising Institutional Strategies, funded with 13.5 million euros yearly each, target institutions with the potential to become top tier universities. To qualify, universities must have and implement an institutional strategy and host at least one graduate school and one cluster of excellence. In the first phase of the programme, 2006 to 2011, Germany invested €1.9 billion in the three lines. In June 2009, the federal and state governments agreed to continue the Excellence Initiative for five further years, from 2012 to 2017, and to up the funding to €2.7 billion.

In Spain, the university system has recently undergone a series of changes that Pérez-Salinas and Planchuelo (2011) summarise as follows:

- consolidation of professional management, planning and accountability systems
- implementation of new services designed to cover the university's three missions
- attainment of critical mass by many research teams
- higher budgets
- diversification and intensification of society's demands on the university
- acknowledgement of the universities' role in development.

As those authors note, at the same time, universities are being viewed not as water-tight compartments whose scientific activity begins and ends in each department, but rather as institutions that reach out to and benefit from other institutions and research centres located within their sphere of influence to widen the breadth of their research. The need to establish links with institutions in the environs has also led to the appearance of new conceits such as the "university sphere" (De Filippo et al., 2013). The potential benefits of such interaction with other nearby institutions prompted the Spanish Government to institute a Campus of International Excellence Programme (CEI) in 2008, based on the German and French experiences described above. Designed to modernise Spanish universities, that programme forms part of the "University 2015 Strategy" (Ministry of Education, Culture and Sport, 2013), created by the erstwhile Ministry of Science and Innovation and coordinated today by the Ministry of Education, Culture and Sport. One of the objectives of the CEI Programme is to generate "knowledge ecosystems" by furthering interaction among universities and local research centres, science estates, technological institutes, hospitals and businesses. Such ecosystems favour job creation, university-mediated R&D+I, knowledge transfer to the industrial fabric, social cohesion and sustainable economic development. Cooperation and clusters are becoming key issues to explain regional competitiveness (Ferreira et al., 2013), so the creation of this knowledge ecosystem is vital for the economical development of the country.

The idea is to rise to challenges such as attracting the best students and researchers and attaining the competence required to encourage scientific facilities and high added value companies to locate near university campuses (Ministry of Education, Culture and Sport, 2013).

In the medium term this initiative should drive the reorganisation of Spain's knowledge map and optimise the university system to contribute to its compliance with the three major priorities of the "University 2015 Strategy": the social dimension of higher education, excellence and internationalisation.

For those and the present authors, the notion of "excellence" covers more than academic quality, for in addition to the best results in teaching, research and innovation, it is meant to apply to the surrounding community, in areas such as urban planning, sustainability, accessibility and inclusion, employability, services and quality of life (Pérez-Salinas and Planchuelo, 2011). As they contend, the term "international", in turn, signifies the resolve to prioritise modernisation policies associated with the universities' international vision and repute, applied to their three missions. In teaching, internationalisation is measured as the rise in the number of foreign students and professors and the international talent and researchers attracted. Another aim is to increase the number of degrees delivered in foreign languages and improve the universities' standing in a globalised world (Pérez-Salinas and Planchuelo, 2011).

The CEI Programme encourages universities and other institutions to submit transformation projects. Their proposals are assessed and selected on the grounds of quality and feasibility and awarded CEI (global) or CEIR (regional European) status.

To date, three tenders have been called to select outstanding international and regional Campus of Excellence projects.

The proposals awarded Campus of International Excellence status are listed in Table 1.

Fig. 1 maps the location of campuses of excellence in Spain. Madrid and Catalonia, with four initiatives each, are the two regions with the largest number of CEIs.

3. Sources and methodology

The present study included an analysis of two CEIs: UAM + CSIC and the EUSKAMPUS: The following steps were developed

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Table 1
Projects awarded Campus of International Excellence status in the 2009, 2010 and 2011 tenders.Source: Authors' formulation based on data from Ministerio de Educación, Cultura y Deporte (2013), *Campus de Excelencia Internacional.*

2009 CEI tender	2010 CEI tender	2011 CEI tender
Barcelona Knowledge Campus.	Andalusia TECH	Horizon 2015, where talent and progress join forces. University of Navarre
Moncloa campus: The energy of diversity	Technical University of Catalonia Energy Campus. Energy for excellence.	CAMPUSHABITAT5U
Carlos III campus	CAMPUS IBERUS: Ebro Valley Campus of International Excellence	
Autonomous University of Barcelona CEI: Knowledge and Innovation	Pompeu Fabra University — Icària International	
Autonomous University of Madrid–National Research Council Campus of Excellence	Montegancedo I2Tech CEI	
	EUSKAMPUS. One university, one country, one campus	
	Health University of Barcelona Campus (HUBc)	
	VLC/Valencia Campus of International Excellence	

— describing the Campus of Excellence Programme
— consulting institutional information in both universities to acquire a thorough understanding of the specific characteristics of their CEI projects and activities proposed
— exploring the activities conducted in the framework of the CEI Programme in both institutions analysing the Web of Science scientific papers authored by the institutions participating in each campus.

Spain's Web of Science output was calculated by defining CU=SPAIN. The papers compiled were exported to a My SQL relational database to standardise the information. A web platform developed by Carlos III University of Madrid's Institute of Metric Information Studies was used to identify the papers authored by the institutions forming part of the universities' CEIs: UAM, CBM, IIBM, CIAL, IFT, ICMAT, CNB, IMM, ICMM, ICV, ICP, IIS Fundación Jiménez Diaz, IIS La Paz, IIS Puerta de Hierro, IIS Princess, EHU and DIPC.

Each institution's output was then found, taking into consideration the various versions of its signature. The following indicators were defined:

· yearly variation in the number of papers published by the Autonomous University of Madrid (UAM) and the University of the Basque Country (EHU)
· number of papers published in first quartile journals and in *Nature* or *Science*
· output indicators for institutions in the UAM's and EHU's spheres of influence.

The information for the decade studied was divided into two periods for analysis: 2004–2008 (before institution of the CEI) and 2009–2013 (during the CEI programmes).

The ARWU university ranking was also consulted to monitor the universities' positions. Information on competitiveness (number of projects awarded by the European Union's Framework Programme for Research) was likewise included, as were data from the IUNE Observatory (www.iune.es).

3.1. Principal characteristics of CEI

In the first CEI Programme tender, called in 2009, the UAM + CSIC project was awarded Campus of International Excellence status. The justification was the project's potential to attain international class excellence through implementation of the strategic plan to modernise the university submitted by the Autonomous University of Madrid in conjunction with the National Research Council.

In the second tender (2010), the EUSKAMPUS project, whose partners are the University of the Basque Country and the Donostia International Physics Center, in conjunction with TECNALIA (University of Bordeaux Technology Corporation), was awarded CEI status. The University of Bordeaux is also a major partner in this project for excellence and internationalisation under its IDex initiative, and activities are underway with this institution to build a cross-border, Euro-regional campus. EUSKAMPUS is a knowledge centre community that consolidates its project for excellence around the slogan “one university, one country, one campus”.

Table 2 lists the key features of the two programmes, namely the institutions involved, main objectives, strategic plans, financial aid awarded, strategic alliances, collaboration with business and the governance model.

The two partnering models differ substantially. In the UAM–National Research Council partnership, whose members include institutions located on campus, the challenge is to integrate different cultures and partners with different objectives and responsibilities. The EUSKAMPUS project, in contrast, has a more homogeneous culture and is mainstreamed into Basque regional government policy.

Initially, funding was to be awarded as a grant over and above the sums usually allocated to these institutions. Ultimately, however, most of the funds were provided as repayable loans to the universities rather than to the CEI per se. As investment in research is not generally recoverable with hypothetical, short-term income, such loans constitute a significant burden on the universities involved, particularly as they are solely liable for repayment, to the exclusion of the other partners. At the same time, the universities' public funding has been cut back in the wake of the crisis. As a result, participation in the CEI programme means that universities need to invest in research platforms unable to generate short-term revenue that could be used to repay the loans, just as they are facing severe constraints on their normal funding. The medium-term consequence for universities will be considerable financial imbalance.

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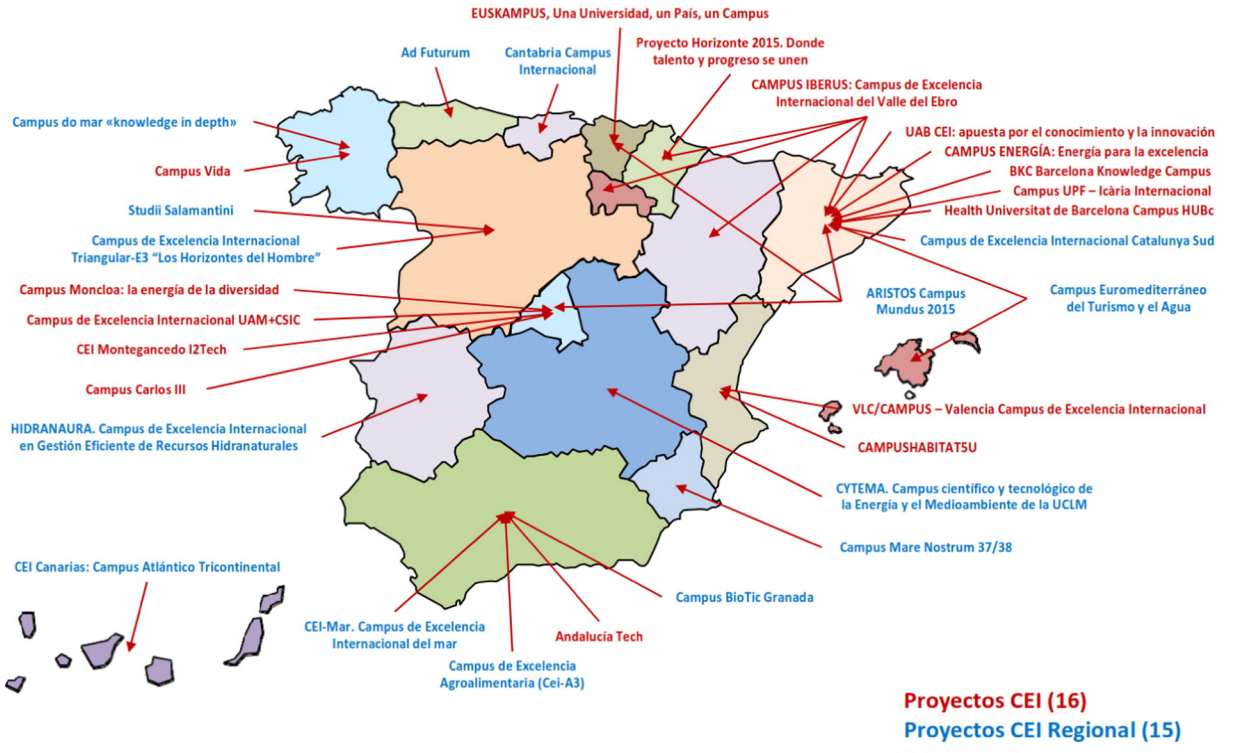

Fig. 1. International excellence campuses in Spain.
Source: Ministerio de Educación, Cultura y Deporte (2011), pp: 130.

In practice, although the international commission responsible for monitoring the programme delivered a favourable assessment of both projects' progress, their roll-out has been much slower than planned due to the lack of financial incentives and the culture of crisis permeating the business community.

4. Results. Scientific production in campuses of excellence

As noted, the objectives of the CEIs include inter-institutional collaboration and greater visibility. The characteristics of such collaboration were analysed in terms of the scientific papers published in journals indexed in the *Web of Science* database by each university individually and its respective CEI alliance.

The UAM's scientific output before and after implementation of the CEI programme is given in Table 3. Its productivity and quality (percentage of papers published in Q1 journals and in journals such as *Nature* and *Science*) indicators rose in the second period, as did those of its partner institutions. Moreover, partnering between the UAM and other institutions intensified in both absolute and relative terms, particularly as regards the CNIO and CNIC (the national oncological and cardiovascular research institutes, respectively), where the percentage of co-authored papers climbed from 9 to 17%. Another direct result of the strategy to join hospital and university research efforts was the creation of health research institutes, which have now published 1563 journal articles (one in *Nature*). Furthermore, in all the institutions involved, the percentage of first quartile papers rose to values upward of the mean for the Spanish university system as a whole, with the sole exception of the health research institutes, which only began to publish in the second period.

The upward trend in total output and in articles published in *Nature* and *Science* enhanced visibility in international rankings. While the UAM's position (153–201) in the 2014 Academic Ranking of World Universities (ARWU) remained steady throughout the decade studied, in the ARWU-Field classification it ranked among the top 100 in "Science" and the top 200 in "Life". It was also prominent in the ARWU-Subject class, especially in physics and mathematics, areas in which it has consolidated working relations with institutions such as the National Research Council's Theoretical Physics and Mathematics Institutes.

University of the Basque Country (EHU) output rose steeply in the second period. The total volume of DIPC papers also rose, as did the volume of papers co-authored with EHU. The percentage of university papers published in first quartile journals rose from 47 to 53, and of DIPC papers from 70 to 77. These values are especially significant given that the average for the Spanish university system was 47% in the first five years (2004–2008) and 50% in the second half of the period analysed (2009–2013) (Table 4).

Since EHU's first-time listing in the ARWU in 2012, its indicators have improved consistently. In the 2014 (latest) edition, it ranked in the 401–500 category and in the ARWU-Subject class, 101–150 in mathematics.

The number of projects awarded under the European Framework Programme is another competitiveness indicator. The yearly average for the public university system in the first 5 years was 4.6. Both universities studied scored a higher yearly mean than the system as a whole: 7.6 for the UAM and

Table 2
Key features of CEI UAM + CSIC and CEI EUSKAMPUS.Source: Authors' formulation based on university reports (http://campusexcelencia.uam-csic.es/ss/Satellite/CampusExcelenciaUAM/es/home.htm; http://euskampus.ehu.es/) and interviews with authorities such as the UAM Vice-Chancellor and Deputy Vice-Chancellors for Innovation and for Scientific Policy and Research Infrastructure.

Indicator	CEI UAM + CSIC	CEI EUSKAMPUS
Institution	Autonomous University of Madrid (UAM): was founded in 1968, is a Spanish public institution with 34,000 students, 2500 professors and an administrative and service staff of over 1000. National Research Council (CSIC): was created in 1940. The largest public research body in Spain, it operates under the aegis of the Ministry of Economy and Competitiveness's Secretary of State for Research, Development and Innovation. It has 15,000 employees and 136 centres distributed across the country. Both of the UAM's campuses, Cantoblanco and La Paz, participate in the UAM + CSIC CEI. In all they house seven faculties and a technical school, five UAM–CSIC mixed centres[a], four National Research Council[b] institutes and the Madrid Science Estate (PCM)[c], which participates in this project as a start-up incubator and enclave for furthering R&D+I. The Madrid Nanoscience and the Madrid Food Institutes, both IMDEAs (Madrid Institutes for Advanced Studies) also participate. Also involved are the hospitals with which the UAM has partnering agreements: Fundación Jiménez Díaz, Princess, La Paz, and Puerta de Hierro. In addition, since 2009 agreements have been concluded to create health research institutes, whose members include UAM and hospital researchers.	The University of the Basque Country (EHU): a public institution that draws its inspiration from the 1936 Basque University. The precedent for its establishment in 1980 was the former University of Bilbao. It has three campuses, one in each Basque province, which house a total of 31 faculties and schools. It presently has 4000 professors and an enrolment of 44,3200 students (Universidad del País Vasco, 2011). The Donostia International Physics Center (DIPC) was created in 1999 by the regional Departments of Education and Industry, the University of the Basque Country, the provincial government of Guipúzcoa, the municipal government of San Sebastián, and the Guipúzcoa and San Sebastián Credit Union. Its primary aim is to foster basic and oriented research in materials science.
Primary objectives	The mainstays of the CEI UAM + CSIC are its consolidated international repute in certain areas of research, clearly excellence-oriented training, and a firm commitment to its social, cultural and economic environs. It aims to be one of Spain's leading campuses, secure recognition as one of Europe's foremost universities, rank highly on international listings, and reinforce the Autonomous University's integration in its local surrounds to drive development in northern Madrid.	The three mainstays on which EUSKAMPUS rests are: specialisation and alliance, sustainable economic model, and comprehensive social model. These pillars are in turn supported by three over-arching policies. —Internationalisation to obtain international repute and visibility in teaching, research and innovation. —Attracting and keeping talent through the implementation of specific programmes in coordination with the Fundación IKERBASQUE and the regional government. —Creation of cross-border campuses: a joint initiative with the University of Bordeaux's *Pôle de Recherche et d'Enseignement Supérieur* (PRES). EUSKAMPUS prioritises as areas of specialisation: quality of life and healthy ageing, new materials and innovative processes, sustainable ecosystems and environmental technologies.
Strategic plan	The strategic plan revolves around the six strategic pillars. —Reinforcement of strategic areas of research (nanoscience and materials; biology, biomedicine and food science; pure physics and mathematics; and a broad interdisciplinary area covering social science, law and humanities) and international visibility. —Improvement in undergraduate and graduate teaching quality and adaptation to the European Higher Education Area (EHEA) —Attraction of international talent —Institution of knowledge transfer networking channelled through the research findings transfer bureaus (Spanish initials, OTRIs) and the Madrid Science Estate. —Conversion of the campus into a genuine university community combining academic and research excellence with social commitment, solidarity and sustainability. —Creation of a campus that drives local development in northern Madrid	The activities underway are geared to attaining the goals listed below. To improve the Basque R&D+I system: To this end, activities have been designed to pursue excellence in the research conducted. To meet society's demands and needs: This is to be achieved by adopting a cooperative and multi-disciplinary approach to build and consolidate a framework for partnering among all the actors participating in the CEI. To enhance industrial competitiveness and economic growth in the Basque Country To adapt to economic and social realities: This entails furthering creativity and an innovative spirit in academic and business endeavour. To maintain benchmark status in higher education, nationally and internationally: The aim is to attain teaching–learning excellence and be an educational as well as a scientific and technological benchmark in Europe's Atlantic strip.
Aid received	The CEI UAM + CSIC received a total of 26,634,003 euros, most in the form of 15-year repayable loans. In addition the project has received aid from the European Union under the European Regional Development Fund.	The EUSKAMPUS project has received a total of €5,657,254, a large percentage of which (€4,000,000) in the form of loans and the rest as subsidies.
Strategic alliance	The strategic alliance model hinges on the geographic and institutional integration of knowledge. Firstly, knowledge is integrated among the UAM's various departments and research institutes, on-campus CSIC and IMDEA institutes, and in the future possibly the National Oncological Research and Cardiovascular Research Centres, which presently form part of the post-graduate programmes. Secondly, knowledge is transferred through the Madrid Science Estate, business associations in northern Madrid such as AICA, ASEYACOVI, and ACENOMA and other 30 large corporations. Lastly, the UAM + CSIC CEI pursue geographic integration through alliances with the municipal governments of the North of Madrid and other institutions in the surrounds. Geographic alliances seek balance and urban sustainability in the campus environs through three broad lines of action: first is concerned with the area occupied by	One of the primary objectives of the CEI Programme is to further alliances between universities and other institutions to create "knowledge ecosystems" fully integrated into their social environs. In this geographic and social domain EUSKAMPUS has a dual mission: —To encourage citizens of the Basque Country, in particular youths, to view science, technology and innovation as values relevant to cultural, social and economic progress —To raise the local visibility of its partners and strengthen the region's international position. Its Euskampus Fundazioa was created to improve coordination among the various actors involved. The foundation focuses on integration with the surrounds and the popularisation of science in the media and business circles. Its activities include the following:

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Table 2 *(continued)*

Indicator	CEI UAM + CSIC	CEI EUSKAMPUS
	the campus and the reciprocal presence on campus of the social community, with programmes for residents, a cultural offering, shared services and sustainable connectivity. The second is based on extending the present teaching-research network to include new centres, and the third seeks to broaden the network of activities, associations and relationships stemming from knowledge transfer to encompass new partnering structures. The UAM's gradual integration in its geographic context entails sharing infrastructures and facilities with nearby cities to optimise investment and maintenance costs. This policy of local interaction is also applied to social commitment, with the institution of a series of educational activities and sensitisation to community needs.	—Communication of R&D+I findings through DIPC, Tecnalia and UPV —Popularisation of general scientific and technological knowledge. —Training course on publicising science and technology organised with the EHU Culture Department, for research staff. —Surveys on public awareness of R&D+I.
Cooperation with private business	The first step to institute cooperation with businesses in the area was the creation in March 2010 of the Association for the Furtherance of Innovation in Northern Madrid (InNorMadrid), whose members include the UAM and the major business associations in the northern part of the region: AICA, ASEYACOVI, ACENOMA and FEMAN. InNorMadrid's mission is to further and intensify the relations between research and business activity in the area, favour the transfer of the scientific community's findings and lend support to generate, define and fund solutions to companies' R&D+I needs. InNorMadrid forms part of the UAM + CSIC Campus of International Excellence (CEI) Chain of Knowledge Transfer, whose other members include the Research Findings Transfer Bureau (OTRI), the Autonomous University of Madrid Foundation, the Madrid Science Estate (PCM), the Centre for Entrepreneurial Initiatives (CIADE), the Centre for Lifelong Education and the National Research Council's (CSIC) Deputy Vice-Presidency for Knowledge Transfer.	The University–Society Departments are an instrument created to intensify the relationship between the university community and its surrounds. They have become a tool for formalising and publicising long-term partnering with companies, institutions or social organisations that sponsor the programme of activities, under a programme with broad-based educational, cultural and artistic, research, and technology and knowledge transfer objectives. Euskampus Fundazioa also builds sponsorship and patronage networks to convey society's interests to the university and channel the latter's relationship with companies and other organisations that seek to maintain stable ties. The intention is to launch projects, initiatives and instruments that contribute to Campus of International Excellence roll-out.
Governance model	The governance system established in the CEI addresses both the UAM's specific role and its cooperation with its partners in the implementation of the strategic plan. On the one hand, the UAM, which is solely responsible for the initiative's financial management and tendering, has entrusted programme management to the Deputy Vice-Chancellorship for Innovation, Transfer and Technology. The strategic plan is jointly implemented by all the institutions and bodies comprising the CEI through the Association for the Implementation of the UAM + CSIC CEI, constituted for that purpose. This association's key actors are the UAM, the CSIC and the Association for the Furtherance of Innovation in Northern Madrid. Its areas of action include the launch and follow-through of joint projects, the encouragement of new strategic research and knowledge transfer alliances, communication and national and international projection, and participation in other projects of similar characteristics that may arise during the implementation of the UAM + CSIC CEI strategic plan. It will also channel and structure new UAM + CSIC CEI alliances. Further to its by-laws, the main governing body is the association's General Meeting, whose membership comprises its founding partners. The by-laws also establish a Steering Committee, vested by the General Meeting with powers to foster and supervise the major areas of action. The Steering Committee, in turn, has constituted coordination and management commissions to handle ordinary business.	Euskampus Fundazioa, created as a foundation on 19 July 2011 (the legal structure best suited to attaining the Euskampus CEI objectives), is a public–private inter-institutional initiative. The EHU, DIPC and TECNALIA are its founding partners. The University of Bordeaux's *Pôle de Recherche et d'Enseignement Supérieur* (PRES Université de Bordeaux) is its European strategic partner. The Euskampus Fundazioa mission is to design, coordinate and implement actions in conjunction with the members of the alliance to strengthen and accelerate the modernisation of the university through the EUSKAMPUS CEI. The foundation aspires to become a benchmark in the Basque R&D+I system and a key actor in its invigoration and internationalisation. The foundation's governance rules guarantee its transparency. Membership is open to other partners and entities able to strengthen its ends and foundational objectives. The Euskampus Fundazioa board of trustees comprises executives from the three EUSKAMPUS founding institutions, as well as members of the Ormozabal Group and IKERBASQUE.

[a] Severo Ochoa Molecular Biology Centre (CBMSO), Pure Physics Institute, Alberto Sols Biomedical Research Institute, Centre for Food Research (CIAL), and a joint Autonomous University of Madrid, Carlos III University of Madrid and Complutense University of Madrid endeavour, the Mathematics Institute (ICMAT).
[b] National Biotechnology Centre, Catalysis and Petrochemical Institute, Madrid Institute for Materials Science and the Ceramic and Glass Institute.
[c] Not-for-profit foundation created in 2001 by the Autonomous and Complutense Universities of Madrid and supported by other national institutions, including the National Research Council.

6.6 for the EHU. The difference was even wider in the second period (Table 5).

The projects submitted for CEI funding were analysed by international experts to assess programme implementation and progress. As both the UAM + CSIC and EUSKAMPUS CEIs consistently obtained "good progress" scores and they were awarded category A status (Ministry of Education, 2014).

Using the CEI alliances as single units affects output, productivity and impact not only in absolute terms, but also with respect to all the universities in the Spanish system taken as a whole. The UAM is the sixth ranking university in the Spanish system by number of papers published, whereas if it were considered as part of the UAM–CSIC CEI, it would climb to third place. The EHU would rise less steeply, by only one place, although the volume of papers would be much greater.

In productivity, the UAM would climb three positions (from fifth to second) and the EHU four (from 34th to 30th).

5. Discussion and conclusions

Global rankings, an outcome of the increasing internationalisation of higher education, have led to the redesign of the ideal model for universities as research-intensive institutions. Such institutions are able to attract

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Table 3
Indicators for UAM and CEI alliance papers published in Web of Science journals.

Institution	Publications		% publications with UAM		% publications in Q1		Publications in *Nature* or *Science*	
	2004–2008	2009–2013	2004–2008	2009–2013	2004–2008	2009–2013	2004–2008	2009–2013
UAM	8720	12,411	100	100	53.00	57.00	22	24
UAM–CSIC	1804	3190	100	100	45.60	54.79	7	7
CSIC centers	2713	3661	11.0	11.2	67.80	71.40	12	14
Hospitals	5906	9229	20.0	21.3	47.78	53.14	1	3
Health res inst.	–	1563	–	100	–	45.81	–	1
OPIS	1068	2798	9	17	71.54	77.98	17	20

international talent and deploy other resources required to compete on the global higher education market. National universities therefore face a dual challenge when seeking to enhance their international reputation. On the one hand they need to strengthen their bonds with other institutions to optimise resources and capitalise on complementary capacities, and on the other they must raise their international visibility to attract resources and establish their standing in a worldwide scenario (De Filippo et al., 2013). The changing circumstances in which these institutions are immersed require new models for conducting and interpreting their scientific activity in which all the available resources and the results obtained within their international sphere of influence are taken into consideration.

In Spain, whose universities are not positioned in the upper ranks on international listings, strategies to raise the visibility of its institutions are being implemented more and more persistently (de la Torre García et al., 2014). To date, the results of the Campus of Excellence Programme show that this experience is beneficial, both because it fosters partnering among institutions and because it improves the visibility of the research conducted in each. An understanding of the characteristics of these programmes and a detailed analysis of the local and international impact of their activities therefore deliver valuable information.

From that perspective, in Spain the creation of campuses of excellence may be a wise strategy, for integrating universities and powerful research centres of repute may contribute to improving the quality and visibility of their research. While inter-institutional collaboration is expected to be beneficial for productivity and visibility. The present comparison of output, between the universities alone and their CEIs does not consist of simply summing different institutions' outputs, but of formally including the activities that in practice are being conducted jointly.

This approach improves more than just scientific output. The CEI Programme emphasises the creation of voluntary strategic alliances with actors in universities' local surrounds. As a result, the efforts of different public and private institutions are pooled and coordinated by the local university to contribute to economic and social development in the respective area. Alliance membership, as noted earlier, includes governments, research bodies (primarily CSIC-related centres and institutes) and technology transfer institutions (science and technology estates), which together build what in the CEI Programme are called knowledge and innovation ecosystems.

The interaction among the institutions partnering in campuses of excellence also fosters links with local companies, which in turn enhances interaction and knowledge transfer, and with them regional development. This is visible in the University of the Basque Country, for instance, where since EUSKAMPUS was created, the number of spin-offs has risen.

EHU was awarded 27 patents in the first period (2004–2008) and 54 in the second. A similar pattern was observed for the UAM, which had 29 patents accepted in 2004–2008 and 94 in 2009–2013 (Observatorio IUNE, 2013).

The results relating to internationalisation also merit mention, for since the CEI was created, the number of European projects coordinated from Spain has risen by 73% (Periódico DEIA, 2012). In the UAM + CSIC CEI, the marriage between the two institutions and the creation of InNorMadrid are knitting very close relations between research and local SMEs to capitalise on innovation.

The new governance formulas generated constitute a particularly significant development in the strengthening of these inter-institutional alliances. All the actors concerned participate in both decision-making and coordination of the activities conducted. The legal structures adopted are established by each project. The UAM + CSIC CEI, for instance, is an association, while EUSKAMPUS is a foundation, but both are instrumental in weaving the university's activities into the development of its geographic surrounds.

Although the participating ministries' investment in this programme is fairly modest and most of the funds are in the form of repayable loans rather than direct subsidies, the financing obtained has enabled the CEIs to invest in projects of high strategic value. Above all, it has enabled them to strengthen their commitment to economic and social development in their regions while improving the international standing of their research in their areas of specialisation.

Table 4
Indicators for EHU and EUSKAMPUS papers published in Web of Science journals.

Institution	Publications		% publications with UAM		% publications in Q1		Publications in *Nature* or *Science*	
	2004–2008	2009–2013	2004–2008	2009–2013	2004–2008	2009–2013	2004–2008	2009–2013
EHU	5432	9151	100	100	47.09	52.81	10	11
DIPC	653	1086	59.4	64.3	69.98	76.8	3	1

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Table 5
European projects awarded, yearly average.Source: IUNE (www.iune.es).

Institution	Yearly average 2004–08	Yearly average 2009–13
UAM	7.6	13.5
EHU	6.6	12.5
Public University System	4.6	6.15

Unlike the French and German excellence initiatives, however, the Spanish CEI programme has failed to meet the ambitious objectives defined at the outset. The programmes in all three countries were initially launched to channel resources to the most promising institutions with a view to enhancing their position in global rankings. While in France and Germany the excellence initiatives formed part of State policy, in Spain they have been broached as a mere ministerial programme.

In Spain, no performance-based hierarchy could be established as a preliminary step to building an elite class of universities able to compete globally. The reason lies in the small sums invested in the programme and the decision to distribute them among all the participants, rather than funnelling the scarce resources available to a smaller number of participants better prepared for international competition (Casani et al., 2014). In addition, the need to repay the loans could place the universities at financial risk in the medium term, preventing them from investing in the development of their research capabilities in the future.

In France, the IDEX programme has been regarded as more successful than the two programmes that preceded it, the *Recherche et d'enseignement supérieur* (PRES) and *Opération Campus*, for two main reasons. Firstly, the French Government was persuaded that substantial investment was vital to inducing the desired change in the university system. On the other, universities have been vested with the power to design their own strategies and choose the partners with which they would be implemented, contrary to the policy of centralised planning that has traditionally characterised the approach adopted by the Ministry of Higher Education.

The French university system has been typically informed by the republican value of equality, despite the existence of the highly selective *grandes écoles* for the technocratic elite and less selective universities (Cremonini et al., 2013). The excellence initiative attempts to build world-class universities through partnering between the various types of higher education institutions and research institutes by investing heavily in R&D in pursuit of long-term results. The many policies and programmes rolled out to provide funding for all participants have encouraged system specialisation and diversification.

In Germany, the excellence initiative consists of two phases, together spanning the years 2005–2017, with an investment of 2.7 billion euros. The agencies responsible believe it to be highly successful, as it has identified and funded higher performing universities, instead of affording all the institutions the same treatment, as was done in the past. "There is surely no other programme in previous decades that has changed the German university and science system so profoundly and so successfully as the Excellence Initiative" (Kleiner, 2011).

The programme's primary objectives were to further university research and enhance its international visibility. It has succeeded in changing the German university system by introducing performance-based assessment, prioritising research over teaching. The most successful universities have been shown to be the ones able to combine research excellence with strategic institutional management. Kehm (2013), however, contended that in its implementation an opportunity had been forfeited to apply a comprehensive policy to the structure and architecture of the system as a whole.

Despite the differences among the university excellence programmes in the three countries, they share some features, including selection conducted by an independent international jury and the acknowledgement of the need for new governance models in keeping with the strategic projects chosen. Although Spain's CEI programme is problem-prone, certain benefits can be identified, including the institution of a culture of strategic planning in universities and enhanced partnering among them, research institutes and industry. Since such partnering is still in its infancy, however, it is too early to analyse the difficulties that may arise, primarily as a result of the difference in organisational cultures and potential disputes over resource allocation among partners. Such factors, which may constitute an obstacle to the consolidation of these alliances, must be taken into consideration in further research.

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