

FOREIGN EXPERIENCE

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Universities in Transition: The 6i Model for Strategic Governance and Management



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Abstract. The 6i Model (Caro-Gonzalez, 2019) offers an archetype for research management to devise and implement integrative institutional strategies by combining six dimensions that start with ‘i’: internationalisation, interdisciplinarity, intersectorality, impact, innovation and inclusion. This innovative model focuses on the expanding critical role of universities as social innovators and proposes ways to shape performance through principles of collaboration (international, interdisciplinary, and intersectoral) and values-based rationales for action (impact, innovation, and inclusion). When adopted strategically, these dimensions can reconfigure universities’ multi-level fields of action, transforming their often slow and disconnected institutional changing processes. By analysing the case of the University of Deusto, Spain, and using a qualitative approach, this paper aims to critically examine whether this comprehensive model can be a powerful improvement methodology for the strategic governance and management

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system of university research. The research unveils the way the model performs in practice and unfolds its key performance features and critical success factors while addressing the fundamental challenges and barriers faced by universities nowadays. The research carried out suggests that a holistic view of research management can better inform research policy, support decision-making, and generate more focused and integrative implementation of the research strategy. Based on this research strategy framework at a specific university, further implementations and assessments of the model in other institutions and settings will contribute to further explore the potential of the 6i model as a comprehensive strategic design with which universities can steer their priorities, activities and role within local, regional and global ecosystems.

Keywords: research policy, research management, systems thinking, interdisciplinarity, research excellence, social impact, internationalisation.

1. Introduction

In recent decades, Higher Education institutions have been re-organising their resources and re-thinking their activities in order to generate dynamics to respond to new demands posed by a changing environment with rapidly evolving societal needs and Science, Technology and Innovation (STI) systems in transitions. Delivering quality impactful research has become a labour of managing “a complex web of relationships, institutional cultures, and political agendas that require that we open up the categories to see how they are conceived of by different actors” [1, p. 141]

Although universities have historically demonstrated the ability to adapt to their economic and political environment [2], according to Thoenig et al. [3], more than ever, strategic capacity is required because “massive changes continue to occur in the field of higher education and research”. The authors argue that “an organisation unable to be strategic becomes vulnerable and erratic” and that strategy equips local academic institutions with an action theory enabling them to anticipate societal dynamics and changes in steering bodies’ priorities, and therefore, in times when resources are scarce and competition tough, to define and implement distinctive policies

designed to produce outcomes that correspond to expected demands and service missions [3, p. 319].

In this direction, some Higher Education institutions have been creatively deploying research management strategies to address real-world problems, introducing more interdisciplinary and intersectoral approaches to research and innovation and breaking down some of the boundaries between disciplines, sectors and professions.

Nonetheless, there is still much left to learn about the emerging organisational contexts of Higher Education institutions compelled as they are to channel societal needs to research questions, delivering knowledge, innovation and research results to society. In a current policy vacuum, it is necessary to understand how universities have been dealing with a number of variables including the traditional Cartesian university structures, the still existing mentality which isolates research work as an attempt to protect it, the high competition for obtaining grants and the conflicting criteria applied by different funding sources.

2. An overview of the 6i model

The 6i model (4) is a university management system that combines simultaneously and strategically six transversal dimensions –

(1) internationalisation, (2) interdisciplinarity, (3) intersectorality, (4) innovation, (5) impact, and (6) inclusion – that, when implemented in an innovative and intertwined manner, contribute to positive institutional outcomes. It has been developed and applied at the University of Deusto in Bilbao, Spain since 2010 to manage and propel the research internationalisation strategy, being in continuous evolution and adaptation to the changing landscape and needs of the university ecosystem.

By employing a systems perspective, the 6i model offers a framework that can impel universities towards a proactive rather than a reactive position. It draws on top-down and bottom-up feedback pathways that allow flexible support structures and mechanisms to emerge, thus maximising its relevance and take-up for the institution involved.

The dimensions of the 6i model embody three principles of collaboration (international, interdisciplinary, and intersectoral), underpinned by three rationales for action (impactful, innovative, inclusive). When adopted simultaneously and strategically, these elements can advance universities' multi-level spheres of action and replace the often disjointed and slow process of institutional change evident in higher education.

The three collaborative i's – international, interdisciplinary, and intersectoral – are founded on the premise that there is value in working along the boundaries, or between traditional domains of action. In operational terms, a boundary may be defined as: ...a sociocultural difference leading to discontinuity in action or interaction. Boundaries simultaneously suggest a sameness and continuity in the sense that within discontinuity two or more sites are relevant to one another in a particular way [5, p. 133].

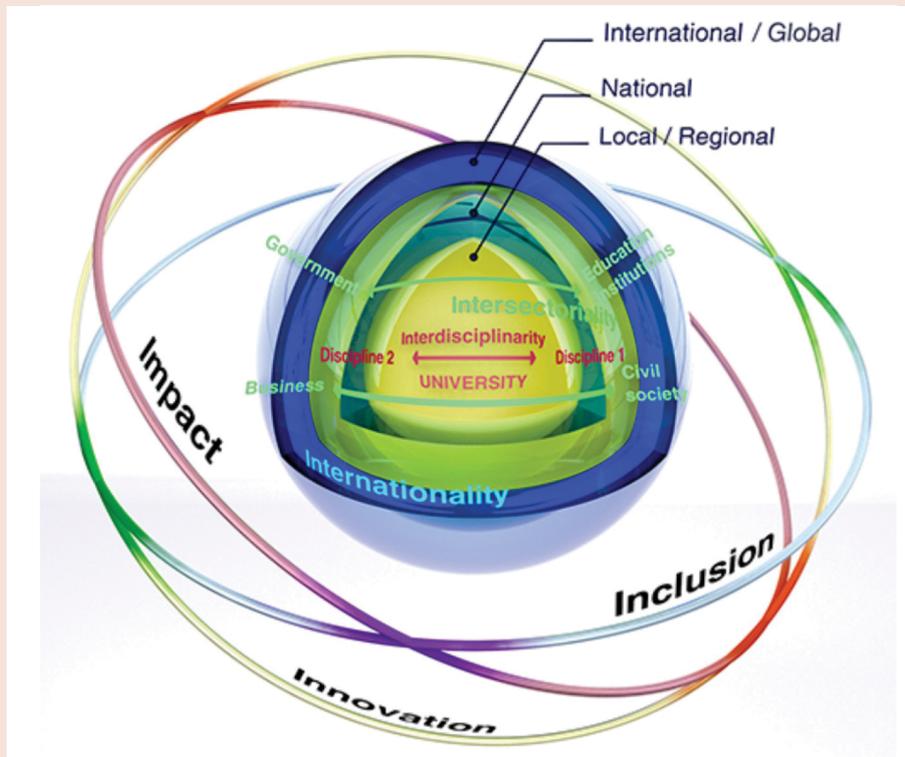
The three transversal and underlying principles – innovation, impact, and inclusion – are the i's that guide collaboration endeavours, acting as a compass with which universities can steer their institutional activities. The need to innovate is prompted by the evolving societal challenges and the need to generate real impact research and innovation. Creativity and ingenuity through a mix of collaboration and competition is thus paramount for universities to thrive excellence.

Taken as a whole, the 6i model serves as a tool for universities to develop robust internal and external ecosystems as they adapt to contemporary challenges. Based on the characteristics, culture, possibilities, resources and STI system of each institution, the model:

- a) approaches research articulating the six “I” presented dimensions involved in a university's research system into the implementation of an adaptive, integrative and system oriented institutional strategy;
- b) shapes different research operational management mechanisms;
- c) develops inclusive value chains that involve different cultural objectives, interests and results by proposing win-win interactions and a result-oriented approach;
- d) addresses the individual and institutional agency to overcome the obstacles that hinder the generation, use and expansion of knowledge, excellent science and innovation;
- e) combines bottom-up, top-down and well-round initiatives to develop innovative workflows and dynamics in university research management systems; and
- f) brings together different objectives, approaches, norms and logics in a never ending process of change.

This way, the 6i model acknowledges the robust learning space that exists along geographical, sectoral, and disciplinary

Figure 1. 6i model infographic



boundaries [6–8], thus making the international, intersectoral, and interdisciplinary dimensions vital parts in its proposal. It embodies promising elements that can be harnessed for universities to successfully manage their current and emerging contexts of operations.

3. Research purpose

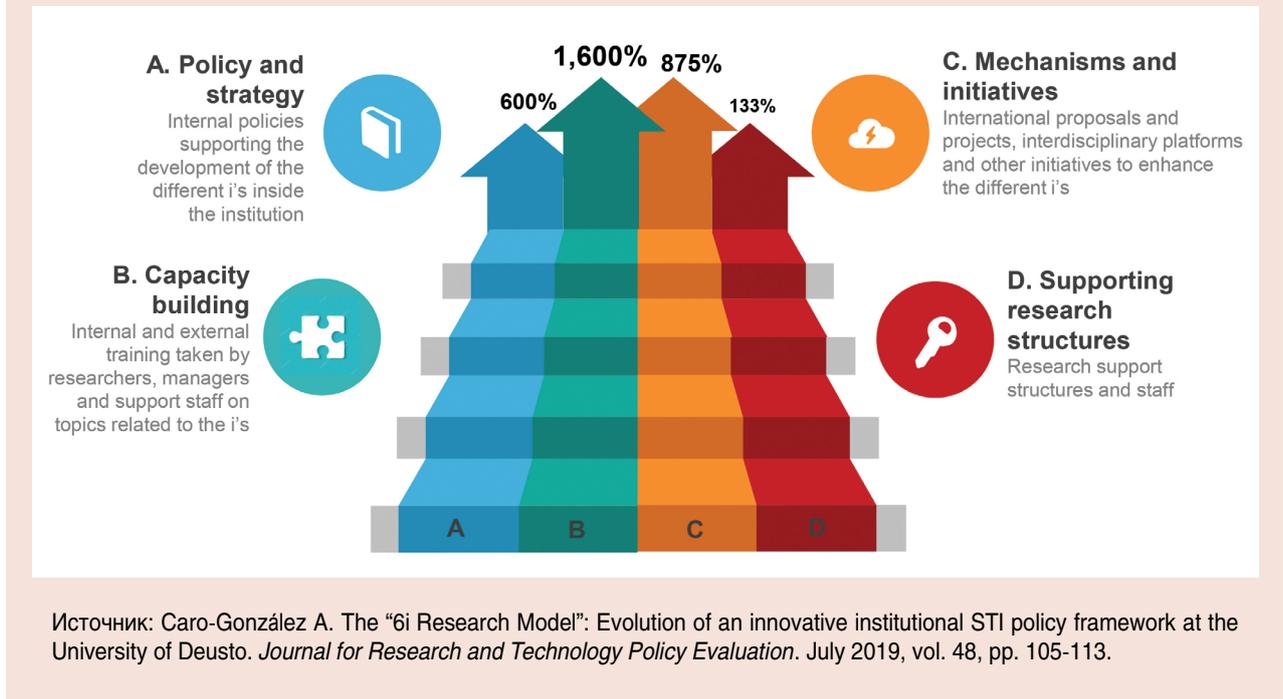
The aim of this paper is to understand how the 6i model integrates traditionally disconnected or even opposed elements (collaboration vs competition, disciplinary vs inter or multidisciplinary research) inside a given research system to respond to complex and urgent social issues. More specifically, we propose to explore how such model performs in practice at University of Deusto, a small-sized university in Spain which has been implementing the referred model to address the following four challenges that were identified by

the leader of the research internationalisation strategy in alignment with institutional priorities and contextual needs at the beginning of the 2010s: a) the high competition for international research funding; b) the silo rigid, in many cases, “feudal-like”, academic traditional organisation, c) the struggle to attract talent to carry out excellence research and d) the existing gap between academia and society and the quest for real societal impact of research results. In the sequence, we explain the research design adopted in this study.

4. Research design

This paper is part of a wider research endeavour which aims at understanding how hybrid and systemic organising is occurring within universities in the current STI landscapes described above. It builds on a previous work by Caro-González [4], which demonstrated that the development of the 6i Model in Deusto

Figure 2. Growth of Deusto's research system from 2010 to 2018



went hand-in-hand with a drastic increase in the number of different university's resources and indicators during the period examined (2010–2018) as seen in *figure 2*.

While the analysis of tangible and quantitative indicators in such study initially revealed some growth patterns, a qualitative and more in-depth investigation is now needed to capture how the different elements of the 6i Model combine at Deusto as well as to understand the feasibility of the model and its evolution over time.

We relied on two sources of information (*Tab. 1*). First, we conducted semi-structured interviews with key people involved in the evolution of the 6i model at University of Deusto. The interviews were carried out between October 2017 and January 2019 and were recorded and transcribed with the permission of interviewees. The objective of such interviews was to capture the evolution of the 6i model from the perspective of the ones who have not only participated in the process but also influenced its development.

Table 1. Summary of instruments used in the study

	Interviews	Questionnaires
Date/period	Interviews held in 2018 and 2019	September 2018
Participants/ source	A total of 7 interviewees, being: - 3 members of the rector team who have been or are still in charge of pursuing the institutional strategy for research since 2014; - 1 leading manager and ideator of the 6i model; - 1 former technician from the IRPO office responsible for the Ageing and Wellbeing Interdisciplinary Platform during the crucial years of its inception; - 2 senior researchers	100 researchers answered the questionnaires, from which 49% participated in the Interdisciplinary Research Platforms

A second instrument used in this study consisted of an online web-based questionnaire sent out to all university's research staff with the aim of collecting the overall perceptions from researchers at different hierarchical levels. The questionnaire was composed of open-ended questions, which focused on the interdisciplinary and intersectoral collaborations carried out by the university and, therefore, provided information about one key enabling element of the system: the Deusto Interdisciplinary Research Platforms. It dig on the current status, the barriers and the potential of these platforms as mechanisms to build trust and to channel international, interdisciplinary and intersectoral collaborations based on impact-driven research questions. From a total of 281 researchers on the list, 100 forms were filled up.

All the qualitative material collected (interview transcripts and answers to questionnaires' open-ended questions) was analysed with the use of Atlas.ti software. The texts were coded and categorized by each of the given challenges and through two sets of variables: *contextual elements*, which consist of internal (institutional trajectory and organisational culture) and external circumstantial aspects influencing decisions (e.g. local, regional or international policies); and *institutional arrangements*, which include enabling conditions (mechanisms which previously existed or were created by the institution to respond to the posed challenges) and functionings (different combinations of bottom-up, top-down and middle-round forces to address problematic issues).

5. Results and discussion

Our case focuses on the implementation and evolution of the 6i Model – our research object – within Deusto's research “subsystem”, (internationalisation strategy and management

structures). In order to investigate *how* such model performs in practice, we have analysed how this model has been evolving for nearly a decade. While the effectiveness of the 6i model at Deusto had been previously demonstrated by Caro-González [4], the case study at hand aims at identifying *how* these and other elements of Deusto's research system interconnect while the university addresses four of the most pressing challenges that universities have been facing in current days.

As anticipated in the introduction, the challenges addressed in this research are the ones that were defined by the leader of the research internationalisation strategy, in regular contrast with the succeeding Vice-Rectors for Research and Transfer, to reshape and adjust the targets aligned with Deusto's priorities and contextual needs: (1) the search for international funding, (2) the launching and sustainability of interdisciplinary collaborations, (3) the creation of an attractive research environment to boost excellence and (4) the delivery of social impact of their research and innovation, beyond scientific impact.

In *table 2*, we summarise the results to be presented in this section. We present and discuss results per challenge addressed, analysing the contextual elements (external and internal variables) and the arrangements (enabling conditions and functionings) that have driven the implementation while integrating the 6i elements of the model (collaborative endeavours and value-driven principles), with internationalisation as the inception, boost and main operator of the model development, and the design and execution of specific actions.

First, regarding the internationalisation of research, the analysis revealed that Deusto's purposeful efforts in this direction began in the 2000s, when its institutional mission perceived changing directions of international research

Table 2. The 6i Research Model inside Deusto's system

Challenge	Contextual elements		Arrangements		Related i's of the model
	External variables	Internal variables	Enabling conditions	Functionings	
1: to obtain international funds to carry out excellence research	<p><i>International:</i> new directions of international research agenda <i>National:</i> cuts in research funding in the aftermath of the economic crisis and; being a private university inside a system that favours public institutions <i>Regional:</i> local grants launched in alignment with international agenda</p>	<p>An internationalisation culture that had been previously built based on student mobility</p>	<p>A mobilisation of internal resources Local and national funding channelled to internationalisation</p>	<p><i>Top-down:</i> management support and allocation of budget to internationalisation <i>Middle-round:</i> the work of IRPO (International Research Projects Office) connecting European research funding with university's critical mass, and creating capacity building <i>Bottom-up:</i> researchers incorporating the proposed training into their career plans and engaging in international projects</p>	<p><i>Internationalisation</i> Interdisciplinarity</p>
2: to generate collaborative dynamics to overcome the "atomization" in university research	<p><i>International:</i> Funding agencies linking grants with interdisciplinary collaboration</p>	<p>Lack of time / teaching workload hindering interdisciplinarity</p>	<p>Interdisciplinary Research Platforms and core groups</p>	<p><i>Top-down:</i> inclusion in institutional policy and strategy <i>Middle-round:</i> flexibility, neutral-coordination, international research projects as boundary objects, reconciliation of interests, trust <i>Bottom-up:</i> freedom and autonomy</p>	<p><i>Interdisciplinarity</i> Internationalisation Intersectorality Impact</p>
3: to attract talent to boost excellence	<p><i>International, national and regional:</i> Though talent attraction and retention programmes are available at the national and regional levels, aids are still scarce</p>	<p>Institutional re-organisation of resources</p>	<p>DIRS-COFUND project for the attraction of highly talented researchers</p>	<p><i>Top-down:</i> support from vice-rector <i>Middle-round:</i> IRPO and Doctoral school finding a common ground to convince managers and supervisors about the need to re-think doctoral training to include the i's in order to meet the requirements from the European Commission <i>Bottom-up:</i> having supervisors and teams re-thinking doctoral training and to include i's</p>	<p><i>Interdisciplinarity</i> Internationalisation Intersectorality Impact</p>
4: to bring together university research, society and industry	<p><i>International, national and regional:</i> societal pressure to show applied research results <i>International, national and regional:</i> "impact agenda" generating conflicting evaluation criteria at different levels – misalignment between discourse and practice</p>	<p>Deusto's Jesuit mission and tradition in serving the society Internal resistance to deliver work in a more accessible language and to work on what does not count for bibliometric evaluation Different rhythms between researchers and stakeholders</p>	<p>Inclusion of social impact in strategic plan A number of initiatives to promote social impact Research projects fostering inclusion in STEAM careers and in research</p>	<p><i>Top-down:</i> inclusion of impact in strategy and budget allocated to impact initiatives and capacity building <i>Middle-round:</i> capacity building to prepare researchers in delivering impact research <i>Bottom-up:</i> a portfolio of previous collaborations with stakeholders to build upon and researchers' gradual engagement with social impact</p>	<p><i>Interdisciplinarity</i> Internationalisation Intersectorality Impact Innovation Inclusion</p>

policy towards meeting grand challenges. It is from Europe that the stimulus for innovation about the themes related to ageing come...and then the topic percolates from Brussels to the Basque Country, to Biscay...so, on one hand, there was a political pressure – funding for the topic – and, on the other hand, there were many groups in the university working on it.

Although different rationales are often used to justify the internationalisation of research [9], international research collaborations have been increasingly driven by economic and competitive motivations [10,11], with participation in international projects becoming an important means for obtaining research funding. In Spain, the aftermath of the economic crisis resulted in cuts in the budget of Science, Technology and Education, forcing institutions to turn to European funds to cover the costs of activities in such areas. In addition, the way the Spanish research funding system is designed posed a challenge to Deusto, as an interviewee explains: “Deusto has an important handicap, which is to be a private institution inside a system which was created to finance only public universities. It is like arriving at a party to which one was not invited”.

As enabling conditions and functionings, the mobilisations of internal resources as well as the work of the International Research Projects Office for the generation of collaborative and more focused research were perceived by interviewees: “I think that people were only able to bring their experience together because we had previously done the work of finding intersections between themes, so there was a labour of spreading information across different research teams in order to increase awareness about the importance of such theme to Europe”.

As for the **second challenge**, in the case of University of Deusto, interviews revealed the

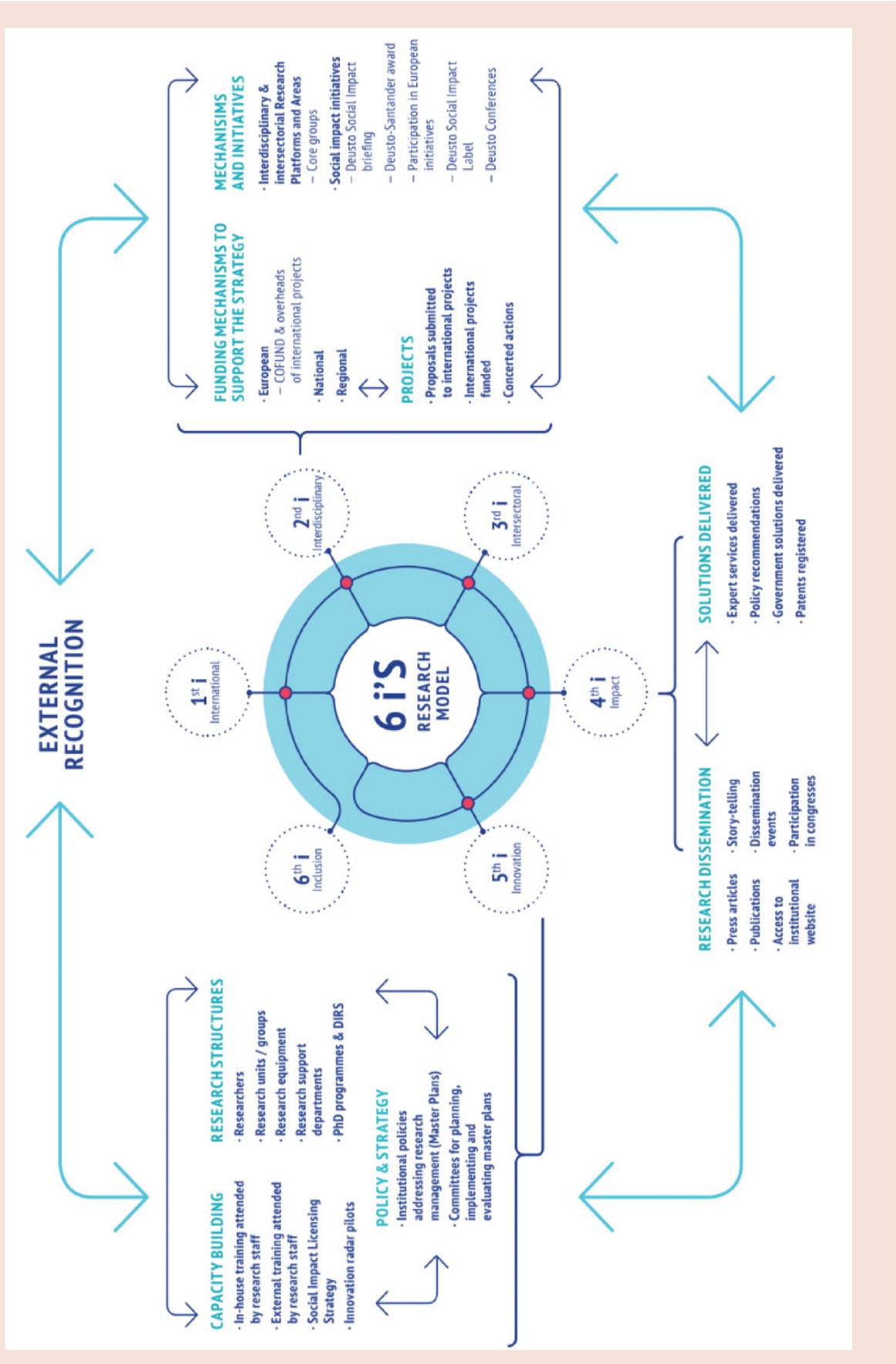
“insurgent character” of interdisciplinary research [12] and showed how this trend came up in the institution as a bottom-up response to the new international research priorities, evidencing connections between internationalisation and interdisciplinarity:

In 2010 there was an intuition, we were going to Brussels and, each day, it was getting clearer that interdisciplinarity was entering into research programmes. At that time, the European Commission was talking about generating European Innovation Partnerships. The first one was on Active and Healthy Ageing. This made us come back home and ask ourselves “what are doing in terms of ageing?”... and I started to make the first list on the plane back home and think...“let’s see, here we have people from psychology, here people from engineering...and then a map started to come up... but it was spread throughout different faculties and research groups”. And then we started to look for ways of having people sitting together and this was the beginning of the interdisciplinary platforms.

Results also evidenced how, at Deusto, international projects acted as boundary objects (*Fig. 3*) around which different parties involved connected and operated as a key mechanism for building sustainable grounded collaborations:

As a researcher, I witnessed a movement which went from research which was more individual and disconnected to seeing the university starting to connect other points through internationalisation. From my personal experience, I could move towards the other i’s, I mean, to move towards innovation, international funding, multidisciplinary, when I started to participate in European research projects...it was through European projects that my personal experience connected with more advanced aspects and especially with the challenges... that was when I started to see the

Figure 3. The 6i Model at Deusto's research system



gap, to see that I am not only researching about things that I think that they are important but about questions which are social and political challenges.

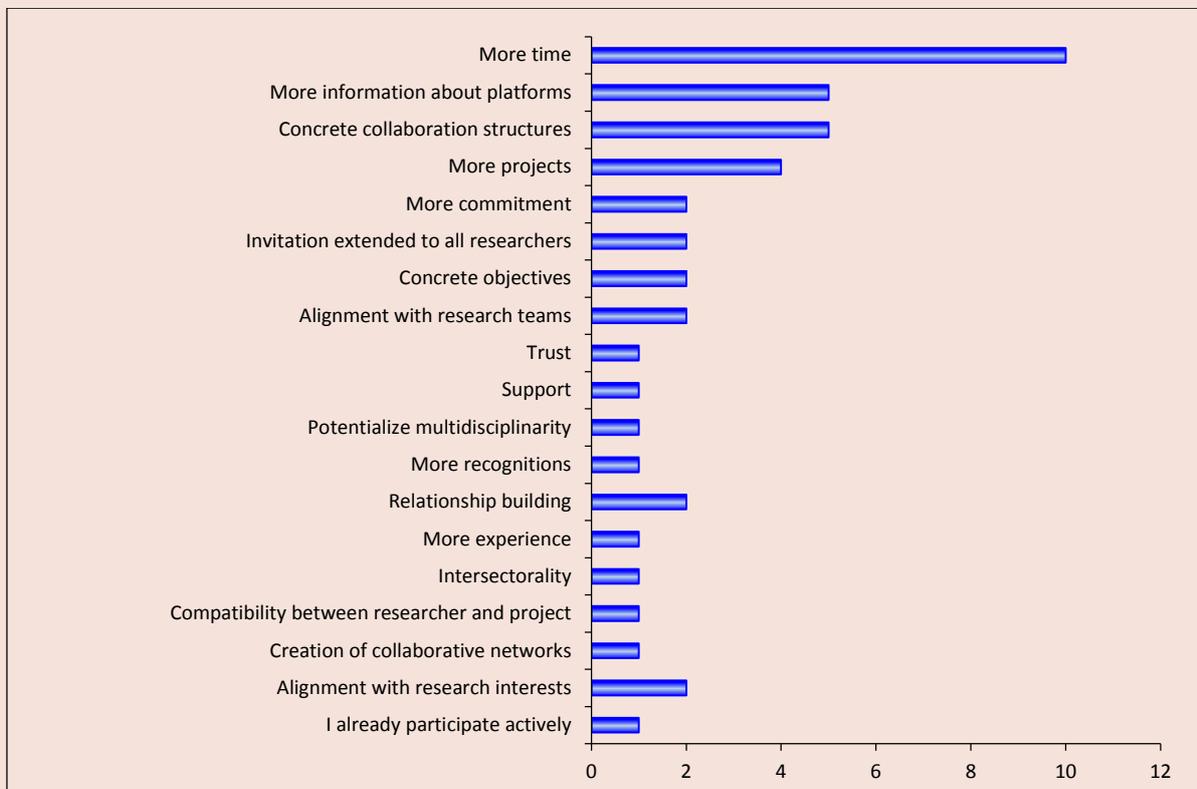
Other key functionings to the sustainability of Deusto Interdisciplinary Research Platforms were flexibility and conciliation of interests, meaning that, in order to be integrated into the organisation, platforms could not compete with already existing structures and the work that was done prior to their creation (e.g. existing collaborations with stakeholders, prior achievements, etc.) should be recognised as so:

There were things that had already been done and that had to do with a trajectory of many years based on relationships with stakeholders... and taking this work to the platforms had to be

done very carefully because there was a risk, something like “hey, I am taking my partner to the platform...” that is why the project level was more important and then the dissemination level, but always under permission.

The previous value of recognition and respect of prior achievements and structures, together with having a neutral coordinator for interdisciplinary collaborations – in Deusto’s case, the research support staff – revealed to be an important element for the mediation between interested parties: a dialogue with research teams, on a clear leadership and, above all, on transparency, that is, on the fact that none of us who coordinated the platforms had any academic theme or any other kind interests...this means that we were there showing what could be done. The fact that

Figure 4. Responses to questionnaires: issues that could help researchers to engage with interdisciplinary collaborations more actively



none of the coordinators took part in the actual research done by the platform somehow made our task more legitimate...we did not privilege anyone...it was something like “these are the themes, they are not our themes” ...I think this was positive.

In the meanwhile, data collected from the questionnaire reflects that the lack of time to dedicate to research still remains featured as the biggest barrier to the sustainability of interdisciplinarity at Deusto. When asked about what could help them to engage more actively with interdisciplinary collaboration, “more time” was the issue which was mostly mentioned by respondents (*Fig. 4*). This confirms findings from Kwiek [13], who demonstrated that top research performers are those who are much more research-oriented and are able to spend long overall working hours on research activities.

In spite of a “lack of widely acknowledged quality standards for research practice” (14, p. 595), there is a general agreement that delivering excellent and impactful research is key for enhancing innovation and, consequently, promoting economic competitiveness.

In what comes to the **third challenge** – talent attraction for raising research excellence – our study elucidated that Deusto’s key response to attract early-career talented researchers to the institution was the DIRS-COFUND project, funded under Horizon 2020 Marie Skłodowska-Curie COFUND Programme. The COFUND project allowed University of Deusto to recruit a sound body of highly talented international doctoral researchers since its first call in 2016 (eight researchers were hired in 2016, eight more in the second call in 2017 and nineteen new doctoral researchers are to be hired by the institution under the two calls to be launched in the new related project – 6i DIRS – in the upcoming years).

The process of elaboration of the H2020 MSC DIRS-COFUND project was a long and demanding collaborative effort led by the Vice-Rector for Research and Transfer, leader of the Deusto Research Strategy at the time, with the help of the director of the Deusto International Research School (DIRS) and the director of the International Research Projects Office (IRPO). The process crystallised the barriers and the inherent tensions within the institution (e.g. disciplinary vs. interdisciplinary, international standards for selection and recruitment vs. internal modes and national criteria, interdepartmental coordination, etc.). The leading inter-departmental team learnt-by-doing building trust, conciliating interests and integrating requirements, processes and mechanisms that had not been put in interaction until then (e.g. Marie-Sklodowska Curie programme, the expectations of PhD tutors, national law, etc.):

That was a big bomb because, like in many universities, people here were used to the “I have a master student who want to take the PhD” and suddenly we had (COFUND) themes that took us to further reflections that needed to go beyond disciplines and needed to be international...and many people were not prepared for it.

As an interviewee explains: “we needed to create something in-between for this thing to happen”, so “we opened an internal competition for the topics, and in these topics four “i’s” started to come up” and, consequently, Deusto needed to re-think many of its processes:

So this took us to reflect that an interdisciplinary thesis needs co-supervision, and there were also social agents as co-supervisors, and those could also be international, especially because the topic was linked to a European project...

This implied labour of sensitisation and capacity building for increasing the awareness of senior researchers about the requirements to attract such kind of talent. In the end, pieces were put together and the DIRS-COFUND project got the highest evaluation from the European Commission's selection board and, besides the interdisciplinary research platforms, it became a key mechanism through which the different "i's" of the 6i Model intertwine.

Finally, in regards to the fourth challenge addressed (the existing gap between academia and society and the quest for real societal impact of research results, beyond scientific impact), our analysis revealed the current misalignment between the discourse put forward by the so-called "impact agenda" and the objective requirements proposed by evaluation agencies at different levels. Interviews point out to the challenge of having, on one hand, to hold intersectoral, interdisciplinary research to meet social demands whereas, on the other hand, evaluation boards still apply indicators which put more value on individual disciplinary work:

...although political discourse is directed to collaboration and social impact, reality shows that people are always ahead and that there is reality on one side and then there is what can be written...so, for example, a call might be well thought but, if only members from groups accredited by the Basque Government can participate, others, who are participating in the project, but who are not members of such groups have to leave...and this weakens the work.

As Miettinen et al. [15] explains: "Indicators for this have been developed and methods of qualitative evaluation have been introduced, especially in the form of policy-oriented impact case studies. In this connection, serious doubts have been raised about the possibility

to successfully account for social impact of science by extensive systems of indicators and related case information".

Still, our case shows how Deusto has officially acknowledged its compromise with society, the values and principles driving its internal policies that have been creating initiatives to enhance and valorise the production of impactful research.

Conclusions

In an age of fluidity and uncertainty, with STI systems in transitions and a growing pressure placed on universities to deliver to society, it has become important, more than ever, for Higher Education institutions to adopt a long-term view and a strategic vision that holistically can tackle highly intertwined challenges.

A systems thinking approach helped us to unveil the multidirectional character of the dynamics which take place inside a research system. In the four challenges discussed, a combination of top-down, bottom-up and middle-round forces was necessary in order to make things happen. As one interviewee describe well: "What comes from bottom-up also has to be backed up by top-down; and what comes top-down needs to be legitimated by the bottom-up. There needs to be a clear integration...it is such a new concept, so potent, even disruptive, that it wouldn't stand for long if there was not a fit between the institution, the people and the resources".

Findings also evidenced the international research agenda acting as a driving force within the system analysed. They also evidence the role of international projects and of research support structures as elements which connect all parties involved (Figure 3). Flexibility, conciliation of interests and neutral coordination demonstrated to promote the sustainability of interdisciplinary collaborations, while lack

of time to dedicate to research was found to be the greatest barrier to it. Measures based on scientific impact were found to hinder interdisciplinarity and intersectorality in the case analysed and the struggle of small universities to attract talent was identified.

In the meanwhile, other sources defend that “the absence of an obvious simple score by which social impact might be judged should not discourage the concept. Instead, it should stimulate imaginative consideration among scientists and the public about the relationship between academia, science, journals, and society” [16]

Summing up, the analysis showed the way that the different i’s of the 6i model are closely tangled and evidenced the variables and mechanisms that work as points of contact between them. As so, we also see that barriers to and interventions in one “I” have unavoidable effects on the others. Such echoing effect has the potential to either exponentialise benefits or

to aggravate problems and may not apply only to the analysed case. Therefore, it should be considered both in the elaboration of research policies and in decision-making processes within a given research system.

The 6i model comprises promising elements that can be harnessed for universities to successfully manage their current and emerging contexts of operations. Despite its initial and limited application as a research strategy framework at a specific university, further implementations and assessments of the model in other institutions (ex. research intensive universities, research centres), settings (ex. regional systems) and beyond de R&I systems for which the 6i model was originally conceptualised, will contribute to further explore the potential of the 6i model as a comprehensive strategic design with which universities can steer their priorities, activities and role within local, regional and global ecosystems.

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