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Exploring Intrapreneurial Activities in the Context of the Entrepreneurial University: An analysis of five EU HEIs

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ABSTRACT

Higher Education Institutions (HEIs) are actively encouraged to strive toward *entrepreneurial university* status to enable them to deliver their third mission and create entrepreneurial graduates. To achieve these goals, HEIs engage in a wide range of entrepreneurial activities. In this paper, we posit that many of these activities could be categorized as *intrapreneurship* rather than *entrepreneurship*. We further posit that considerable benefit may be garnered by focusing on *intrapreneurial* activities if universities and HEIs are to progress and sustain their entrepreneurial university status. Our research focus is driven by assumption-challenging because, to date, scholarship has tended to attribute entrepreneurial university success solely to entrepreneurial activities, largely neglecting the intrapreneurial behaviours that drive them. Our core research question asks: What activities do HEIs engage in as part of their entrepreneurial university journey, and which of these could be categorized as *intrapreneurial* rather than *entrepreneurial*? We draw on a unique data set and adopt an in-depth, qualitative approach to critically examine the entrepreneurial activities of five HEIs in Finland, Germany, Ireland, Portugal, and Spain to highlight their intrapreneurial dimensions. Our findings make three important contributions: First, we enhance understanding of the nature and scope of the activities in which HEIs engage as part of their entrepreneurial university journey; second, we offer an analytical framework to highlight the *intrapreneurial* dimensions of activities traditionally deemed to be entrepreneurial; third, we signpost scholars toward promising avenues of future research in the context of intrapreneurship and the entrepreneurial university.

1. Introduction

The concept of the *entrepreneurial university* is now well established in academic literatures (Etzkowitz et al., 2000; Klofsten et al., 2019). The entrepreneurial university contributes to economic, technological, and social advancement by producing human, social and entrepreneurial capital (Etzkowitz et al., 2000). It has been likened to a second revolution in which enterprise - the "third mission" - is added to the university's traditional missions of teaching and research (Etzkowitz and Klofsten, 2005; as cited in Stolze and Sailer, 2021, p. 582). Accordingly, Higher Education Institutions (HEIs)[1] are actively encouraged to strive toward *entrepreneurial university* status to enable them to not only deliver their third mission, but also respond to the changing expectations of their students and stakeholders, cope with funding challenges, and ultimately deliver those crucial entrepreneurial graduates who can act as future change agents for society (Audretsch and Belitski, 2021; Etzkowitz et al., 2000; Klofsten et al., 2019).

To date, scholars have explored a range of topics in the context of the entrepreneurial university, including but not limited to technology transfer; science parks and incubators; spin offs; academic entrepreneurship; related organisational/managerial and strategic issues; resource-constrained environments; impact measurement, and digital

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[1] For the purposes of this paper, we use the term "Higher Education Institutions" (HEIs) to refer to academic educational institutions offering taught academic programmes, research, and related activities at third level. This includes universities.

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entrepreneurship (Guerrero et al., 2015, 2016, 2021; Bedő et al., 2020; Garcez et al., 2022). A substantive body of academic literature has been accumulated attesting the benefits of the entrepreneurial university approach (Etzkowitz et al., 2000; Foss and Gibson, 2015; Guerrero et al., 2015; Klofsten, 2013; Stolze and Sailer, 2021). However, less by way of concerted attention has been paid to exploring the specific activities HEIs engage in as part of this entrepreneurial university approach, or identifying the potential intrapreneurial dimensions of such activities (Shekhar et al., 2023). There is a dearth of knowledge about the constraining and enabling aspects of facilitating intrapreneurship in the academic context, and how academic intrapreneurial capabilities are developed (Bergman and McMullen, 2022; Klofsten et al., 2021; Shekhar et al., 2023). To address this gap in the literature, more research is needed to investigate the core entrepreneurial pathways that apply in a university context (Klofsten et al., 2019) and to examine how academic institutions work to support entrepreneurship and intrapreneurship processes through developing intrapreneurial capabilities (Klofsten et al., 2021; Shekhar et al., 2023). Gaining a deeper understanding of HEIs' entrepreneurial activities and highlighting their intrapreneurial dimensions could enhance effectiveness of third mission delivery and offer valuable insights for other academic institutions starting out on their entrepreneurial journey. Such insights could also help HEI leaders and department managers better understand how - by identifying and promoting intrapreneurial behaviour among staff - they can help staff exploit entrepreneurial opportunities from their academic work and create added value for the organisation (Shekhar et al., 2023; Youssef et al., 2021.

In this paper we posit that many of the "entrepreneurial" activities in which HEIs engage could be categorized as *intrapreneurship* rather than *entrepreneurship*. We further posit that considerable benefit may be garnered by focusing on *intrapreneurial* activities if HEIs are to progress and sustain their entrepreneurial university status. Currently, there is limited knowledge of how intrapreneurial processes and activities are facilitated and supported within academia (Shekhar et al., 2023; Valka et al., 2020). We acknowledge the significant gap in the literature in this regard, with little by way of substantive literature accumulated on intrapreneurship in universities.

Our research focus is driven by assumption-challenging rather than simply gap-spotting (Sandberg and Alvesson, 2011). This is because, to date, scholarship has tended to attribute entrepreneurial university success solely with entrepreneurial activities, largely neglecting the intrapreneurial behaviour that drives them. We follow Sandberg and Alvesson (2011:32) who, citing Foucault (1985:9), attest to "endeavouring to know how and to what extent it might be possible to think differently, instead of what is already known." Accordingly, our aim in this paper is to explore HEIs' self-reported entrepreneurial activities as part of their quest to become 'entrepreneurial universities.' Our research objective is to highlight the *intrapreneurial* dimensions of these activities with a view to proposing that some activities could be (re-)categorized as intrapreneurial rather than entrepreneurial. Addressing this research gap is important given perceptions in the literature that there is less risk associated with academic intrapreneurship compared to academic entrepreneurship due to the increased internal support structures and the scope for individuals to utilise their own competencies from the bottom up to take responsibility for developing new ideas (Audretsch et al., 2021; Klofsten et al., 2021; Neessen et al., 2018; Pinchot, 1985). This may specifically apply to entrepreneurship educators who play a crucial role in helping their organisation achieve entrepreneurial university status (Rossano-Rivero, 2019).

Our core research question asks: What activities do HEIs engage in on their entrepreneurial university journey, and which of these could be categorized as *intrapreneurial* rather than *entrepreneurial*? Addressing this question could help HEI managers better distinguish between the types of activities they engage in as part of their entrepreneurial university journey and determine which ones their staff might be more likely to get involved in.

We adopt an in-depth, qualitative approach and use the *HEInnovate* eight-dimensional framework (HEInnovate, 2023)[2] to critically examine the self-reported entrepreneurial activities of five HEIs in Finland, Germany, Ireland, Portugal, and Spain. Within our sample, these HEIs have actively engaged with the HEInnovate tool and identify themselves as 'entrepreneurial universities'. Our unique data set comprises a detailed questionnaire and a comprehensive multi-dimensional template completed by a team of academics, incubator and entrepreneurship support staff based at each of the HEIs to provide in-depth information on their entrepreneurial activities. These data are augmented by publicly available documentation/reports on the entrepreneurial activities of the selected HEIs. We draw on contemporary definitional literatures, including Cunningham et al.'s (2022) university entrepreneurial architecture framework, to examine and propose a possible (re-)categorization of these activities as entrepreneurial or intrapreneurial. In doing so, our paper makes three important contributions: First, we enhance understanding of the nature and scope of the activities in which HEIs engage as part of their entrepreneurial university journey; second, drawing on the literature, we develop an analytical framework to highlight the *intrapreneurial* dimension of activities typically deemed to be entrepreneurial; third, we formulate valuable future research questions worthy of further investigation in the context of intrapreneurship and the entrepreneurial university.

The remainder of the paper is structured as follows: The next two sections review the relevant literatures by way of providing the theoretical context for the study and outline our conceptual framework. We then detail our methodology, present our findings, and discuss these in the context of our conceptual framework. The final section draws conclusions and signposts scholars toward some promising research avenues worthy of future investigation.

2. Theoretical context

2.1. The entrepreneurial university

It has been acknowledged that HEIs are large, multi-level organisations, comprising a range of expertise across, potentially, many sub-organisations and cultures. This makes for a very complex internal environment, which can encourage or discourage entrepreneurship (Bienkowska and Klofsten, 2012; Munoz et al., 2018). Leadership, staff management and recruitment processes, funding, resource allocation, training, support, and reward structures are just some of the critical elements influencing HEIs' entrepreneurial activity.

The development of entrepreneurial universities is fostered by external and internal pressures. Universities play an important role in contributing to international competitiveness, economic growth and job creation via technology transfer and commercialization of research outcomes (Forliano, et al., 2021; Mascarenhas et al., 2017). In addition, there have been longstanding and increasing demands for universities to contribute to local economic and social development (Guerrero et al., 2016), and to educate students for a working life that is characterized by uncertainty and complexity (Gibb and Hannon, 2006).

In her review of scholars' approaches to conceptualising and operationalising the entrepreneurial university, Badzinska (2020) identifies several different models that have emerged over the past two decades. These include: five pathways to institutional transformation where academics are committed to the entrepreneurial concept (Clark, 1998); a formal process model of transformation with a specific focus revising the

[2] *HEInnovate* is a self-reflection tool for Higher Education Institutions who wish to explore their entrepreneurial potential. It guides users through a process of identification, prioritisation, and action planning in eight key areas. The self-assessment is available in all EU languages. *HEInnovate* is an initiative of the European Commission in partnership with the OECD. It is free, confidential, and open to everyone (HEInnovate, 2023).

organisation's existing tasks (Etzkowitz et al., 2000); guidelines for institutional renovation incorporating new hybrid organisational forms (Etzkowitz, 2004); an adaptive universities approach with a focus on organisational culture (Sporn, 1999); a framework of formal and informal strategic actions with a focus on the frequently neglected aspect of recognition and reward (Kirby, 2006), and a focus on the environmental dimension that pays attention to university attitudes toward entrepreneurship as well as academic reward systems (Guerrero et al., 2016).

A successful entrepreneurial university agenda depends on the transformation process from a focus on traditional capabilities (i.e., those related to the university's core missions of education and research) to a focus on dynamic organizational capabilities (i.e., those needed for the accomplishment of the university's entrepreneurship agenda) (Klofsten et al., 2019; Guerrero et al., 2021; Stolze and Sailer, 2021). In addition to individuals' dynamic capabilities, a change-embracing leadership culture, as well as clear roles and responsibilities are needed to achieve agreement on goals and to develop an entrepreneurial vision (Stolze and Sailer, 2021). Further, various organisational structures, such as university-industry centres, enable external stakeholders to collaborate with established specialists in a way that maximises the distinctive capabilities that exist in universities. Broadening the focus of these support units from intellectual property towards a broader range of entrepreneurial activities, including mutual learning opportunities and integration with teaching, can lead to broader complementarities between universities and companies (Perkmann et al., 2021).

Digitalization has also been shown to play an important role in the entrepreneurial university agenda, offering significant transformative opportunities for HEIs (Garcez, et al., 2022; Guerrero et al., 2021). The HEInnovate framework suggests that HEIs should enhance their digital technologies and recognise them as a key enabler of entrepreneurship both within and outside of the organisation (HEInnovate, 2023). Recent research has shown how digital technologies can promote new venture creation and grow entrepreneurial ecosystems, which are important goals within the entrepreneurial university agenda (Zahra, et al., 2023).

2.2. Entrepreneurship or intrapreneurship?

Entrepreneurship within HEIs has been associated traditionally with the commercialization of research results (Mascarenhas et al., 2017). Broader definitions of entrepreneurship in the literature conceptualise HEIs as providers of entrepreneurial capital (Audretsch, 2014); entrepreneurship education; student entrepreneurship; collaborative networks; accelerators and incubators (Gibb and Hannon, 2006; Siegel and Wright, 2015). In addition, HEI entrepreneurial activity has been conceptualised as any activity that occurs beyond the traditional tasks of education and research, is innovative, carries an element of risk and leads to financial rewards (Abreu and Grinevich, 2013; Klofsten et al., 2019).

In contrast, *intrapreneurship* occurs when an organisation "extends its competence and increases its opportunities by creating new organisations, new products/services or combines new resources" (Klofsten et al., 2021: 2). It is a process in which individuals within organisations act entrepreneurially in pursing new opportunities (Klofsten et al., 2021: 1). Put simply, and consistent with Pinchot (1985) and Antoncic and Hisrich (2001), among others, entrepreneurship is the act of developing a new venture *outside* of an existing organisation, while intrapreneurship is the process of developing a new venture *within* an existing organisation to exploit a new opportunity and create economic value (Parker, 2011).

However, the differentiation between entrepreneurship and intrapreneurship is not always clear cut (Kraus et al., 2019). For example, Baruah and Ward (2015) describe intrapreneurship as "the innovation practices within an organisation through which employees undertake activities and pursue different opportunities" (p.1). Traditionally the prerogative of very large firms, intrapreneurship has developed into a concept applicable to organisations of all sizes, sectors, and orientation. As Bosma et al. (2011) assert, it is "a special type of entrepreneurship," one that can be used to deal with organisational complexities. Accordingly, intrapreneurship may be viewed as a valuable, challenge-addressing, and problem-solving tool and, as such, should be a key strategic priority for all organisations. It has a particularly important role to play in well-established organisations which are no longer deemed to be entrepreneurial in nature. It may be that such organisations can be catalysed via a new spirit of intrapreneurship (Anu, 2007), potentially in the form of a "revolutionary within an existing organisation who fights for change and renewal from within the system" (Maier and Zenovia, 2011: 972). This individual staff-driven aspect of academic intrapreneurship has been highlighted as particularly important in the literature. For example, Burkholder et al. (2017) refer to the individual behaviours of staff who become involved in knowledge commercialization without having to leave academia. This behavioural approach is further reflected by Blanka (2019: 924) who draws on previous literature to categorize intrapreneurship as "an individual-level approach in existing organisations, supported by the definition of the intrapreneur as an employee who 'recognizes opportunities and develops innovations from within an existing hierarchy' (Camelo-Ordaz et al., 2012, p. 3)."

In a similar vein, Neessen et al. (2018) aptly capture the bottom-up, multilevel nature of intrapreneurship by proposing a definition that incorporates individual employee characteristics. Their comprehensive review covering a period of almost 30 years identified 73 definitions of intrapreneurship, from which they highlight innovativeness, proactiveness, risk-taking, opportunity recognition/exploitation and internal/external networking as important behavioural dimensions of intrapreneurship. This is because employees are increasingly being given more responsibility within their organisation; they are expected to be flexible, proactive, and innovative rather than adaptive passive recipients of knowledge and instruction. Employees are required to adapt to a more intrapreneurial way of working where they can leverage small changes to spark bigger ones. Accordingly, as Neessen et al. (2018) propose, any definition of intrapreneurship should include employees' perceptions of their own capabilities, skills, knowledge and experience because "Intrapreneurship is a process whereby employees recognise and exploit opportunities by being innovative, proactive and by taking risks, in order for the organisation to create new products and services, initiative self-renewal or venture new businesses to enhance the competitiveness and performance of the organisation" (p.551).

In this paper, consistent with Burkholder et al. (2017) and Blanka (2019, among others, we view the specific appeal of intrapreneurship as lying in its ability to allow individual academics to pursue creative ideas within a secure environment where there is both reduced risk and structured support. After all, developing, promoting and rewarding intrapreneurial capabilities will enhance an organisation's ability to react quickly and innovatively to internal and environmental changes, and to adapt to and shape new environments (Klofsten et al., 2021). While our view implicitly suggests that intrapreneurship has an internal rather than an external organizational orientation, we acknowledge that it can occur in several forms and is shaped by both internal and external factors (Audretsch et al., 2021). Further confusion may arise when terms such as *intrapreneurship*, *intrapreneuring*, *corporate entrepreneurship* and corporate venturing are used synonymously to conceptualise the creation of something new out of an existing organisation (Kraus et al., 2019). Thus, we acknowledge that an element of subjectivity is involved and that not all entrepreneurial activities that occur within university walls can be labelled intrapreneurship.

2.3. Operationalising the entrepreneurial university agenda

HEIs face challenges in their efforts to operationalise the entrepreneurial university concept (Kirby, 2006). Research demonstrates that intrapreneurship coexists with a HEI's entrepreneurial orientation (Guerrero et al., 2021). Whereas entrepreneurship is directly linked to

the ordinary capabilities needed to achieve a HEI's core strategies (e.g., teaching, research, administrative duties), intrapreneurial capabilities are needed to accomplish a HEI's broader entrepreneurial strategy (e.g., assuming risks, sensing opportunities, transforming routines to become more innovative and proactive) as well as the expected outcomes from combining these two strategies (e.g., enhanced reputation - prestige in teaching and research; attraction of international students; diversification in income structure) (Guerrero et al., 2021).

Klofsten et al. (2021) highlight intrapreneurial capabilities as critical to overcoming challenges effectively, defining them as: "the organisation's ability to react quickly and innovatively to internal/-environmental changes and have a significant implication for achieving an organisation's survival and success, especially during uncertain and turbulent environments" (p.6). Stolze and Sailer (2021) suggest that such capabilities play an important role in HEIs' third mission advancement, specifically in relation to sensing opportunities and monitoring initiatives. Intrapreneurial capabilities have both a direct and indirect mediating effect in transforming and improving ordinary routines into entrepreneurial actions, especially when addressing challenges of the digital economy (Guerrero, et al., 2021).

Human capital has, thus, emerged as a critical resource within the entrepreneurial university because it constitutes potential entrepreneurs. In this regard, the attitudes and behaviours of academics and students towards entrepreneurship are important factors in developing entrepreneurial universities (Guerrero and Urbano, 2012). According to Culkin (2008), individual university staff members already work as intrapreneurs because, consistent with Pinchot (1985) they "take responsibility for turning an idea into profitable finished products through assertive risk-taking and innovation" (p.75). In this paper, we posit that such 'ideas' may take the form of new entrepreneurship programmes and services that are developed internally, belong to the core Institution and are capable of generating revenues through student and client fees. Moreover, entrepreneurship educators, especially those who engage with external actors (e.g., with businesses), are essentially 'intrapreneurial actors' within their university (Rossano-Rivero, 2019). While such individuals may not exhibit a desire to leave their university to become business owners, they are willing to champion ideas and introduce novelties for the purposes of adding value. Therefore, it stands to reason that if HEIs wish to increase their entrepreneurial outputs, they need to encourage a broad range of intrapreneurial activities across the whole organisation. They also need to focus on removing internal barriers that are hindering individual activities (Philpott et al., 2011); provide more available resources for innovative ideas, reduce formal rules and procedures, and allow greater freedom in decision-making (Valka, et al., 2020).

Finally, the concept of entrepreneurial architecture is worthy of mention here as it has been identified as a useful lens through which a HEI's entrepreneurial (or "third") mission can be analysed and better understood (Nelles and Vorley, 2010). Entrepreneurial architecture refers to the collection of internal factors that interact to shape entrepreneurial agendas within universities. Cunningham et al.'s (2022) architectural framework categorizes the different formal organisational units and supports that entrepreneurial universities construct to support and operationalise their entrepreneurial activities. They identify eight organisational units and thirteen activities/supports used by entrepreneurial universities. These range from Entrepreneurship Centres, Incubators and Technology Transfer Offices to Entrepreneurship Education, Securing Seed/Angel Funding and Expanding Networks. Cunningham et al. (2022) argue that the challenge for the entrepreneurial university is to select the appropriate formal organisational architecture or structural unit to support the various stages of its entrepreneurial activities.

3. Conceptual framework

We developed an analytical framework to thematically categorize the *intrapreneurial* dimensions of the self-reported *entrepreneurial* activities of five European HEIs. First, we used the well-established *HEInnovate* framework (HEInnovate, 2023) to gather detailed data on the entrepreneurial activities of five European HEIs. Developed in conjunction with the OECD's Local Economic and Employment Development Programme, *HEInnovate* is an initiative of the European Commission's DG Education and Culture. It is a tool to help HEIs reflect on their entrepreneurial activities, assess their level of innovativeness, explore their future potential, and by extension, guide them on their journey toward entrepreneurial university status (Henry, 2015). The tool is structured across eight core dimensions identified in the literature as important to entrepreneurial and intrapreneurial activity: Leadership and Governance; Organizational Capacity; Entrepreneurial Teaching and Learning; Preparing and Supporting Entrepreneurs; Digital Information and Capabilities; Knowledge Exchange and Collaboration; The Internationalised Institution and Measuring Impact (HEInnovate, 2023). HEInnovate is widely utilised throughout Europe by HEIs who consider themselves to be entrepreneurial universities or to be pursuing an entrepreneurial university agenda. Its development was informed by the academic literature (see Fig. 1), as well as multiple consultations with the academic and practice communities (HEInnovate, 2018; European Commission, 2017; Etzkowitz et al., 2000; Etzkowitz and Klofsten, 2005; Gibb, 2013; Klofsten, 2013). Given its direct relevance to the entrepreneurial university concept, and its familiarity amongst those HEIs self-identifying as 'entrepreneurial universities' (including those within our sample group), *HEInnovate* presented as a logical framework for our study.

Second, as we explain in the next section, we identified recurring themes from our data analysis and used these to categorize and delve deeper into the nature of the HEIs' reported activities to highlight their *intrapreneurial* dimension. Third, we drew on the intrapreneurship/entrepreneurship definitional literature (Pinchot, 1985; Parker, 2011; Klofsten et al., 2021; Audretsch et al., 2021, among others) as well as Cunningham et al.'s (2022) architectural work, to determine which of the HEIs' self-reported *entrepreneurial* activities should be (re-)categorized as *intrapreneurial.* Fig. 1 illustrates the theoretical framework for this study. Our resulting framework was constructed by integrating the *HEInnovate* dimensions, entrepreneurship and intrapreneurship literatures and detecting the themes that connect them.

4. Methodology

4.1. Approach

We sought to obtain rich insights that would provide a depth of understanding, allowing us to highlight the potentially *intrapreneurial* nature of these activities. We adopted a qualitative, purposeful sampling approach. Purposeful sampling is regarded as suitable for identifying information rich research subjects who are especially knowledgeable about and experienced in the phenomenon under investigation, and who are both available and willing to participate in the study (Creswell and Plano Clark, 2011; Bernard, 2002). This approach also seemed suitable given that we were examining a relatively novel, contemporary, and context-embedded phenomenon within a sample of single settings (Eisenhardt, 1989; Yin, 1994, 2012).

We used a unique sample (see Table 1) comprising five European HEIs. Each HEI was a participant in an EU-funded project focusing on the HEInnovate framework in the context of the entrepreneurial university.[3] These HEIs were based in Finland, Germany, Ireland, Portugal and Spain, countries with different populations, resources, political structures, and economic environments. For example, in 2022, unemployment rates were much higher in Spain (12.9%) than in Germany

[3] The project was one of four funded under the EU's ERASMUS+ programme between 2019 and 2021.

HEInnovate Dimensions

- Leadership & governance (Clark, 1998; Foss & Gibson, 2015; Kirby, 2006)
- Organisational capacity (Clark, 1998; Foss & Gibson, 2015; Klofsten et al., 2019)
- Entrepreneurial teaching & learning (Gibb & Hannon, 2006; Siegel & Wright, 2015)
- Preparing and supporting entrepreneurs (Guerrero et al., 2016; Kirby, 2006; Klofsten et al., 2019)
- Digital information and capabilities (Guerrero et al., 2021; Garcez et al., 2022; Zahra et al., 2023)
- Knowledge exchange & collaboration (Bienkowska & Klofsten, 2012; Perkmann et al., 2021; Siegel & Wright, 2015)
- Internationalised institution (Guerrero et al., 2016)
- Measuring impact (Guerrero et al., 2015; Klofsten et al., 2019)

Thematic Categories (constructed by the authors)

- Collaboration (COL)
- Human Capital Development (HCD
- Creation of Structures & Units (CSU)
- Strategic Approach (SA)
- Digitalization (DIG)

Entrepreneurship/Intrapreneurship Definitional Literature

Entrepreneurship	***Intrapreneurship***
• New venture creation *outside* the organisation (Antoncic & Hisrich, 1985) • New product/service development (external) (Klofsten et al., 2021) • Commercialisation of research activity (Mascarenhas et al., 2017) • Innovative activities beyond education and research (Abreu & Grinevich, 2013)	• New venture creation *inside* the organisation (Pinchot, 1985; Parker, 2009) • New product/service development (internal) (Klofsten et al., 2021) • Intrapreneurial actors who champion new ideas or pursue new opportunities to add value (Rossano-Rivero, 2019; Klofsten et al., 2021) • Employee behaviours such as being innovative, proactive, risk-taking (Neesen et al., 2018) • Problem-solving or organisation renewal strategic tool (Bosma, 2010; Maier & Zenovia, 2011; Audretsch et al., 2021)

University Entrepreneurial Architectures
(Cunningham et al., 2022)

University/HEI activities	***University/HEI units***
• Entrepreneurship education • Orientation programmes • Market validation • Business model development • Financial planning • IP agreements • Securing seed/angel funding • Recruiting talent • Market testing • Brokerage • Secondary funding • Networking events • Expanding networks	• Entrepreneurship research centres • Entrepreneurship centres • Co-operative research centres • Proof of concept Centres • Incubators • Accelerators • Tech transfer centres • Science parks

Fig. 1. Entrepreneurship-intrapreneurship analytical framework.

Table 1a
Summary institutional profiles of the five HEIs.

	HEI #1	HEI#2	HEI#3	HEI#4	HEI#5
Country	Finland	Germany	Ireland	Portugal	Spain
Year established	1969	1971	1970	1973	2010
Number of students	5200	18,486	5000	14,000	3654
Number of staff	926	1818	543	1802	768
Main areas of academic teaching and research focus*	Engineering, Energy	Engineering, Economics	Engineering, Health	Science, Engineering	Economics, Health
Summary of key entrepreneurial activities	• E/pship education programmes • Teacher E/pship programmes • On-campus Incubator • Student E/pship society	• E/pship education programmes • E/pship start-up training • International e/p activities • Dedicated E/pship Centre	• E/pship education programmes • E/pship start-up training • E/pship Research Group • On-campus Incubator	• E/pship education programmes • E/pship start-up training • On-campus Incubator • Co-operation office • Science Park	• E/pship education programmes • E/pship start-up training • Incubator • Business Park • Technological Centres • Family Business focus

Notes: *All five HEIs also provided Business courses. Entrepreneurship is abbreviated to 'E/pship'.

Table 1b
Country profiles of the sample HEIs.

	Population	Main Industries	2022 Unemployment Level	OECD Growth Projection for 2023
Finland	5.54 million	Manufacturing, electronics, forestry	6.8%	0.0%
Germany	83.31 million	Manufacturing, automotive, mechanical, chemical, electrical	3.0%	0.0%
Ireland	5.06 million	Agriculture, fishing, tourism	4.5%	4.4%
Portugal	10.25 million	Textiles, aeronautical, food	6.0%	2.5%
Spain	47.52 million	Automotive, medical tech., tourism	12.9%	2.1%

Source: Compiled by the authors from the HEIs' websites, OECD and country specific Datareportal.com reports.

(3%), but economic growth projections for the subsequent year were more positive for Ireland (4.4%), Portugal (2.5%) and Spain (2.1%) compared to Finland (0.0%) and Germany (0.0%) (OECD, 2023a; OECD, 2023b). The HEIs have their own distinct internal governance structures and external entrepreneurial ecosystems, which undoubtedly influence their entrepreneurial university agendas. They also have different areas of academic teaching and research focus (see Table 1b). However, these five HEIs were chosen for the study because they also shared several commonalities. For example, they were all entrepreneurially focused and were perceived as 'entrepreneurial universities' amongst the academic community. Each HEI delivered business and entrepreneurship courses, student enterprise awards and incubator programmes. All five were experienced users of the HEInnovate tool and each had a dedicated HEInnovate expert on their team. They engaged in a wide range of entrepreneurial activities across faculties and presented as enthusiastic participants in the study. They were also based in countries with a strong supportive business start-up environment (OECD, 2023a).

4.2. Data collection

Data were collected by means of two survey instruments - a short profile questionnaire (Survey 1) and a comprehensive entrepreneurial activity template (Survey 2). It was agreed that the research team could go back to the five HEIs to seek clarification or request additional information, as required. Survey 1 sought background information relating to how long the HEI had been in operation, the size of the organisation (number of students and staff), its principle entrepreneurial activities and when it last conducted the HEInnovate assessment exercise within its organisation. This questionnaire was administered to the five HEIs in our sample by email during March 2020.

Survey 2 - a comprehensive entrepreneurial activity template – used the dimensions of the *HEInnovate* tool as an anchor framework to examine the specific entrepreneurial activities in which each HEI was engaging to deliver its entrepreneurial or third mission as part of its entrepreneurial university journey. Comprising question seven areas across the eight HEInnovate dimensions, it sought practical data relating to the precise nature, stage (whether introductory or advanced), timeframe (short, medium, or long term) and driver ('bottom up-' or 'top down-' driven) for each entrepreneurial activity in operation on the ground. This template was administered to the five HEIs during April 2020 by email. Our response rate for both instruments was 100%, meaning that we received a total of ten completed survey instruments (one questionnaire and one template from each of the five HEIs in the target sample). The two survey instruments are included in Appendix 1 and 2.

The data gathered from these instruments were augmented with publicly available documentary evidence. This evidence was drawn from the HEIs' institutional website (e.g., HEI history and events/achievements promoted on their websites); relevant independent reports in the public domain that reviewed and critiqued the HEIs' entrepreneurial status (e.g., OECD country/region reports); and news items from entrepreneurship and academic forums relating to notable awards or measures of esteem. Links to some of this evidence were provided in the completed templates. This process helped validate the self-reported 'entrepreneurial university' status of the five HEIs in the sample.

While one individual (lead respondent) from each HEI took responsibility for completing the short questionnaire for their respective HEI, completion of the template required the same individual to consult with a wide range of individuals and departments within their HEI. This wider consultation allowed for a range of staff perspectives to be captured and helped provide a degree of internal validity (Guba and Lincoln, 1994). The time frame allowed for completion of the questionnaire was two weeks. In view of the range and depth of the data required, the timeframe for completion of the template was four to six weeks. The time lag between administering each instrument was approximately four weeks.

4.3. Analysis

The data gathered from the questionnaire, template and augmenting public sources were collated into a single 'Master' Excel spreadsheet. Any queries were highlighted, and details were confirmed and/or clarified with the lead respondents. To facilitate comparative analysis, an

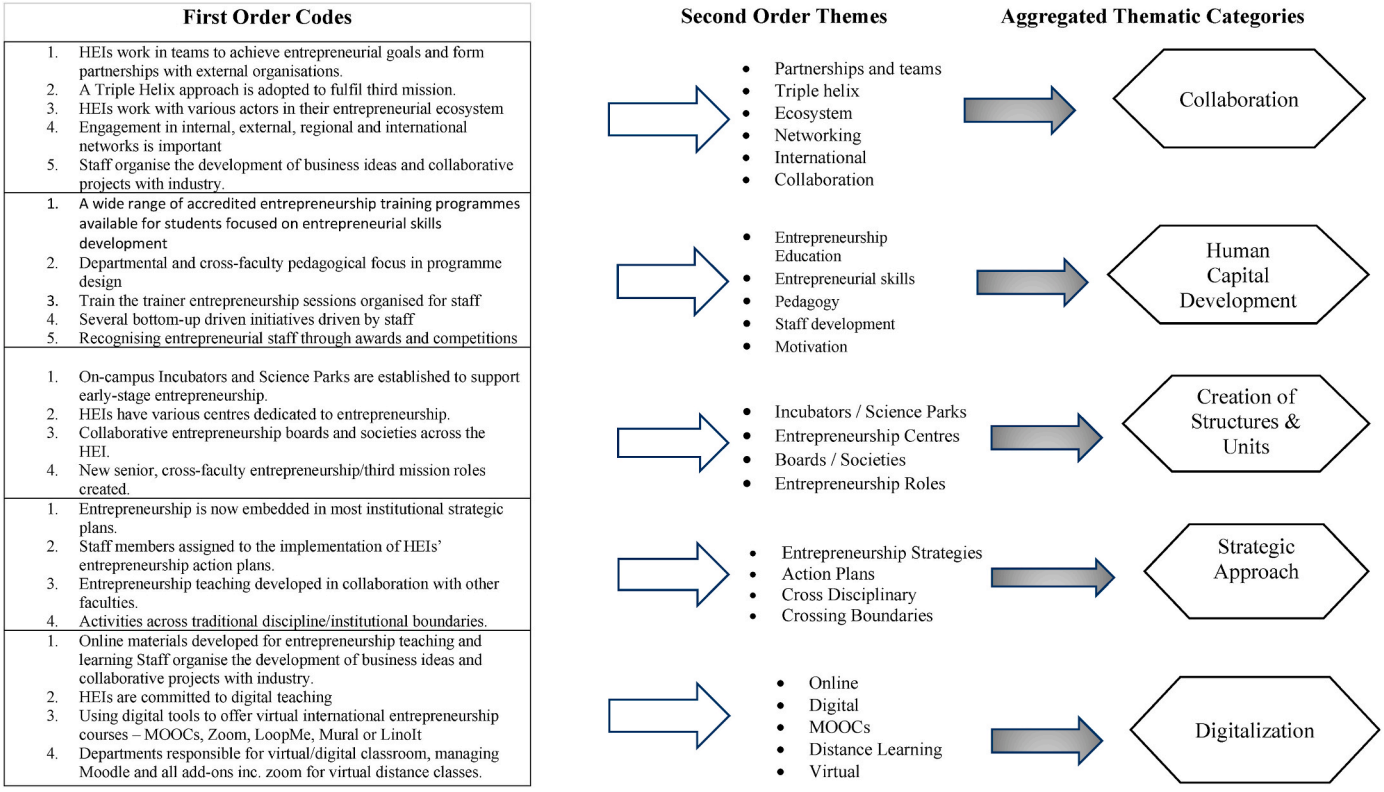

Fig. 2. Identification of codes, themes and aggregated thematic categories.

inductive, iterative approach to data analysis was adopted (Miles and Huberman, 1994). This involved reading and re-reading the data several times to allow key recurrent topics to emerge and be coded in relation to the characteristics of the HEIs' self-reported entrepreneurial activities. These topics were subsequently discussed among the team members and a consensus was reached. This process facilitated the development of first order codes to be created, with more focused second order themes and, subsequently, aggregated theoretical categories to be identified and refined (Phillips et al., 2013; Byrne, 2021; Clarke and Braun (2016).). This helped provide a structure for both the findings and discussion sections (see Fig. 2).

5. Findings

5.1. HEI profiles

As illustrated in Tables 1 and 1a, our sample represented considerable profile diversity in terms of geographic location; HEI age (between ten and 31 years), size (between 3654 and 18,486 students; between 543 and 1818 staff), teaching/research focus and economic contexts. This diversity proved valuable in that it revealed the strength and commonality of the entrepreneurial university agenda across different HEIs.

We found both commonality and diversity in terms of the principle entrepreneurial activities reported by the HEIs, with entrepreneurship education programmes and an incubator or dedicated entrepreneurship centre being available in all five HEIs. All five HEIs were familiar with the *HEInnovate* tool and regularly used it to reflect on and assess their level of entrepreneurialism and innovativeness, and to help them sustain and enhance their entrepreneurial university status. This was evidenced by the fact that all five HEIs had used the tool within the last three years, showing that they were committed to the entrepreneurial university agenda process.

5.2. Analysis of the HEIs' self-reported entrepreneurial activities – across the HEInnovate framework and the five thematic categories

For the purposes of consistency, we asked each HEI to report their entrepreneurial activities according to the eight dimensions of the HEInnovate tool. We did this because, as mentioned above, all five HEIs were familiar with the tool and were accustomed to developing and reporting on entrepreneurship activity within this framework. Table 2 provides some snippet samples from the narrative data collected, along with relevant frequencies.

A total of eighty-nine different activities were reported by the HEIs across the eight dimensions of the HEInnovate framework. Three of the HEIs in our sample were engaged in entrepreneurial activities across all eight dimensions, with some reporting several different activities within each dimension. One of the HEIs (Ireland) reported no entrepreneurial activity within the Measuring Impact dimension, which was surprising given their knowledge and experience of the *HEInnovate* tool. Another HEI (Spain) reported no activity in two dimensions - Organisational Capacity: Funding, People & Incentives and Digital Transformation & Capability. Again, this was surprising given the important role human capital plays in building the entrepreneurial university (Guerrero and Urbano, 2012), the significant transformational entrepreneurial opportunities that digitalization offers (Garcez, et al., 2022; Guerrero et al., 2021), and the rapid move to digital platforms at the onset of the Covid pandemic (Ratten, 2020; Liguori et al., 2021; Secundo et al., 2021). The quantity and range of entrepreneurial activities reported by the HEIs appear to be in keeping with their self-identification as entrepreneurial universities.

While the HEInnovate eight-dimensional framework provided a basic structure for our data gathering and analysis, to address our research question, we needed to delve deeper into the HEIs' entrepreneurial activities. Hence, we developed our own thematic categorization. Our iterative data analysis process, as detailed in Fig. 2, revealed five recurrent and overlapping aggregated thematic categories evident

Table 2
Snippet Samples from the Narrative Data Collected from the Templates: HEIs' *entrepreneurial* activities reported across the eight *HEInnovate* dimensions.

	Leadership & Governance (n=12)	Org. Capacity: funding, people & incentives (n=7)	Entrepreneurial Teaching & Learning (n=17)	Preparing & Supporting Entrepreneurs (n=14)	Digital Transformation & Capability (n=9)	Knowledge Exchange & Collaboration (n=13)	The Internationalised Institution (n=10)	Measuring Impact (n=7)
HEI #1 Finland	**(n=3)** **Strategy/Action plan for E/Pship** Sustainable business and e/pship were the focus of our Trailblazer 2020 strategy. E/pship was a cross-cutting theme in all activities. The Action plan for E/pship provided 13 key actions on the strategic management of e/pship, research commercialization, exploitation of experiential culture & versatile learning environments, interactive business co-operation & developing our community's e/pship skills.	**(n=1)** **Action plan for E/pship** Two staff members were nominated to lead the implementation of the university's Action Plan for E/pship.	**(n=3)** **Training sessions for staff & a module in pedagogy** Training sessions organised for faculty members. E/pship pedagogy was a compulsory part of pedagogical studies; participants could select elective modules.	**(n=3)** **Student E/pship Society** The non-profit, student-led E/pship Society arouses interest in e/pship, lowers the threshold for becoming an entrepreneur, and provides start-up businesses with comprehensive contacts.	**(n=1)** **Existing Institutional Digital Strategy** Digital aspects are connected to all University actions, not exclusively e/pship promotion.	**(n=3)** **Projects & Part-time jobs Fair** An event where companies can introduce suitable problems/challenges or incomplete tasks to students. Teachers discuss possible projects with company representatives. Students discuss temporary work assignments with companies.	**(n=0)** No specific initiative reported, just a statement saying that this is one of Finland's most international universities, therefore, international aspects are embedded in all actions not just in e/pship.	**(n=1)** **University Board sets performance indicators for e/pship** In addition to using the *HEInnovate* assessment tool, the university established performance & financial guidance indicators to create assessment and incentive criteria for e/pship activity. Graduate e/pship activity, impact, education, learning, information exchange, start-up support & e/pship strategy are monitored.
HEI #2 Germany	**(n=3)** **Vice President for Business** Assignment of E/pship to a dedicated member of the board (e.g. creation of the HEI VP position focusing on third mission initiatives (transfer, industry relationships, e/pship, etc); The university has written mission statement and a strategy to support e/pship at the university (that means the definition of concrete rules and standards as well as the formulation of goals, fields of action and concrete measures in the relevant area in the development plan of the University).	**(n=3)** **Shared Professorships** Creation of 50% Professorship positions in the different faculties in combination with a 50% leadership position at the e/pship center - bridging the activities and enabling Synergies.	**(n=4)** **Master & Doctoral Programmes** Development of degrees incorporating a strong research component - enabling collaboration with external industry partners or development of start-ups. Deep Dive Master and an International Doctor of Business Administration/ Innovation degrees are offered in cooperation with international Universities.	**(n=3)** **Incubation Programme** Structured incubation programme (6–12 months) offering workspace, individual coaching, and access to seed funding.	**(n=4)** **Deep-Dive MOOC** An introductory MOOC on e/pship and digital transformation.	**(n=3)** **MUniver City** Series of Quadruple Helix Living Labs in specific topics (e.g., Civil Safety, Health, Mobility) enabling collaboration between civil society, academy, local government, and local industry to support the sustainable development of our region. Living Labs for co-creation among industry and start-ups; DICA focuses on the DrinkTech; 3D Cluster on additive manufacturing; Freiraum is a Start-up LAB with a flexible service format for industries.	**(n=4)** **International Summer Schools** The university has established an International Summer School with international Partners in Mexico, China, South Africa, and our region.	**(n=)3** **Evaluation Survey** Additional to standard course evaluations conducted by the HEI, we use EPIC or develop an ASTEE-based evaluation to assess the progress of students' mindsets following delivery of their modules/courses.
HEI #3 Ireland	**(n=1)** **Establishment of Research Groups/Centres** The HEI's Research Office established a scheme to encourage and support the creation of themed research groups and centres. In	**(n=1)** **E/pship Educators CPD** Staff members from different schools are supported to attend various national and international E/pship Educators Programmes,	**(n=3)** **National Student Enterprise Competitions** Ireland's enterprise State Agency - Enterprise Ireland (EI) - organises an annual	**(n=3)** **Cocoon Programme for Students** A pilot programme to support advanced years Engineering, Science or Computing students to determine whether	**(n=1)** **Upskilling of educators & students in on-line teaching & learning** As a result of the Covid 19 crisis, a steep learning curve for staff	**(n=2)** **HEInnovate Expert Group** In 2017, a staff member became part of the 15 person HEinnovate Expert group. The benefit of this is regular	**(n=2)** **National Competition for International Programme Collaboration** The MBS in E/pship & Marketing has been awarded four Education	**(n=0)** N/A

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Table 2 (*continued*)

	Leadership & Governance (n=12)	Org. Capacity: funding, people & incentives (n=7)	Entrepreneurial Teaching & Learning (n=17)	Preparing & Supporting Entrepreneurs (n=14)	Digital Transformation & Capability (n=9)	Knowledge Exchange & Collaboration (n=13)	The Internationalised Institution (n=10)	Measuring Impact (n=7)
	2017, the Department of Business Studies established a research group dedicated to E/pship - EMERGE. The group conducts research and publishes papers on e/pship education and policy, as well as related topics. A major research project currently being led by EMERGE is the Global Women's E/pship Policy (WEP) Research Network - a group of scholars from 35+ countries who study e/pship policy from a gender perspective. Global WEP recently published a report with the OECD.	including a national e/pship educators' module at DCU, a programme in The Hague, and one in Boston at Babson College. The aim of these programmes was to work with other educators to design and deliver high impact E/pship Education as a catalyst for change in both business and society. Participation helped ensure consistency in e/pship education delivery across our different schools.	competition for e/pship students. The lecture team for our Enterprise Development Project (EDP) (a module within the Business & Management Degree programme) redesigned their module to match entry requirements for the competition. The team also collaborated with the incubation centre to create a local competition based on the EI criteria. This included a financial reward to encourage students across all faculties to enter the competition. This has resulted in some national winners for our HEI.	there is commercial opportunity in their technical projects. It involves cross border collaboration with a Higher Education Institute in Northern Ireland.	& students on online teaching was required. We established a Centre of Learning & Teaching (CELT) and quickly developed online courses, videos, and online resources. Management and staff helped devise alternative assessments to allow students to complete their studies as seamlessly as possible. New methodologies included Moodle quizzes, MS Teams, Zoom calls & virtual classes, etc.	meetings, conferences, and networking around e/pship with a cohort of other experts across Europe. Valuable friendships have been forged and visits to other HEIs across the EU have been organised for staff and student exchange.	Awards between 2019 and 2023, for Best International Collaboration Project and Best Academic Partnership. The one-year full-time MBS programme has been recognised for its innovative international partnership with Heilbronn University in Germany. The 'hands-on' postgraduate programme has been designed to enhance learners' understanding of e/pship and innovation in practice. In addition to its unique Irish-German collaborative teaching delivery, the MBS also includes an international strategy residential session, live industry-based student projects and student exchange opportunities.	
HEI #4 Portugal	**(n=4)** **Innovative Governance Model** A matrix model was established by the university to promote interaction among Organic Units (OU), facilitating the efficient use of resources and adaptation of university activities into new contexts. OUs operate as resource centres, organizing resources thematically according to scientific area, for use in core activities such as mission: teaching, research and cooperation with society. OUs combine university education (16 departments) & polytechnic education (four schools) across campuses.	**(n=2)** **Interdisciplinary University** The concept of an interdisciplinary university was established to intensify collaboration between research units to facilitate double affiliations in departments and/or research units. This strategy boosts collaboration with other research centres at national and international level, which has a positive impact on the quality of the resulting research. Two coordination units support this interdisciplinary research and innovation model, the Research Institute, and the Cooperation Institution, providing platforms to support research &	**(n=4)** **Pedagogical Innovation** Academic success and the integral development of students are critical objectives of the teaching and learning experience that we seek to provide to our students. A pedagogical training and updating programme is being developed, new mechanisms for sharing good practices are being created, new initiatives to support peers have been designed and mechanisms for valuing best practices are in place (e.g., pedagogical innovation award). The creation of innovative learning environments	**(n=4)** **Regional Company Incubator Network** The local Business Incubator (IERA) is a strategic challenge assumed by our region. It includes Municipalities, the Intermunicipal Community (CIRA), District Industrial Association (AIDA) and our university with the objective of economically boosting territorial strategies for the promotion and development of e/pship and social innovation through differentiating and qualifying actions, spaces (hubs) and support services for incubating business and company ideas. IERA	**(n=3)** **Distance Learning** The university is committed to digital teaching and learning practices which have become the 'lifeboat' for our teaching programmes during the Covid-19 pandemic. E-learning has been in place at our university since 2010 and has evolved sufficiently to allow us to transform to an exclusively online teaching institution in just over one week. E-learning is also prevalent in our life-long learning department. Additional training programmes were quickly introduced allowing all students, staff,	**(n=4)** **Creative Science Park** The university is working on benchmark projects with Portuguese and international companies, as well as promoting and encouraging the business eco-system in the region. The setup of the Parque de Ciência e Inovação (PCI) - Creative Science Park - is a result of this strategic approach. The PCI attracts and retains companies, supports the development of business ideas and new collaborative and co-creation projects in close liaison with the university.	**(n=3)** **Erasmus Policy Declaration (EPS)** In its EPS, the HEI demonstrates how it will continue its problem/project/challenge-based learning pedagogy by establishing joint structures with partners not only in education but also in research and society, such as innovation laboratories. The mobility of students will include more learners thanks to new combinations of physical and virtual mobility and improved conditions for semester mobility with the development of exchange packages and European minors. Our students and lifelong learners will also be able	**(n=2)** **Certification of Internal QA system (SIGQ) by the Agency for Assessment and Accreditation of Higher Education - A3ES** The evaluation and measuring of our e/pship agenda is embedded in the "central process" of "cooperation with society" within the context of our university's internal quality assurance process, which has been certified. This means we regularly assesses our e/pship capacity using certified methodologies. Impact measurement through Key Performance

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Table 2 (*continued*)

	Leadership & Governance (n=12)	Org. Capacity: funding, people & incentives (n=7)	Entrepreneurial Teaching & Learning (n=17)	Preparing & Supporting Entrepreneurs (n=14)	Digital Transformation & Capability (n=9)	Knowledge Exchange & Collaboration (n=13)	The Internationalised Institution (n=10)	Measuring Impact (n=7)
		innovation and to connect the university nationally and internationally.	in departments that allow teachers to explore new methodologies, alongside research initiatives that allow teachers to explore new methodologies, are being implemented progressively. We are also seeking to innovate in other learning spaces, e.g., spaces for extracurricular activities, and in virtual environments.	hubs benefit from a common strategy and an integrated supply of equipment and services, managed autonomously, and from the use of our university's scientific knowledge.	researchers, and entrepreneurs access to the technology and training they require to ensure minimum disruption to their work.		to collect micro-credentials on a competence passport in different EU countries by 2022. These initiatives will result in an increase in mobility with 50% of the students of the institution mobile by 2025. And through these initiatives, the HEI will be a champion of the Erasmus aims of automatic recognition and digital Erasmus while assuring the quality of its program.	Indicators is still in the planning phase.
HEI #5 Spain	**(n=1)** **Strategy** Following a HEInnovate workshop held at the university, several other meetings were organised to design a holistic e/pship strategy. The strategy included the design of an Institute of E/pship, running e/pship programs for student entrepreneurs, designing spaces to help students progress from idea to start-up. A consultancy study also helped us define the entrepreneurial strategy.	**(n=0)** N/A	**(n=3)** **Weekend Challenge** An annual hackathon is held during an intense weekend where students from different backgrounds and schools form teams to develop start-up ideas. Students are guided by mentors from industry, the municipality, and the university. The winning team receives pre-incubation space and mentoring support for one year to further develop their business ideas.	**(n=1)** **Creatic Prizes** Creatic Prizes are awarded to entrepreneurs and are funded by the university, the municipality, and local companies. Prizes are given every year to entrepreneurs and new start-ups. There is a special category of prizes for entrepreneurial students. Prizes are awarded in a ceremony, with the participation of faculty, managers, municipality representatives, students, and companies. The event spreads the entrepreneurial spirit in the region and helps foster e/pship.	**(n=0)** N/A	**(n=1)** **Creation of an E/pship Board** A board of representatives of the university and business park was created. The goal was to strengthen collaboration between the business park and services for SME and for the university.	**(n=1)** **Network of Entrepreneurial universities with South America** The university promoted the creation of a network of entrepreneurial universities with South America - in Colombia, Chile, Argentina and Perú. The purpose of the network is to collaborate on promoting e/pship education in the partner universities, teacher, and student exchange, and build new projects and initiatives among the partner universities.	**(n=1)** **Measuring Impact on Alumni** A preliminary study was conducted on measuring the impact of entrepreneurial activities on students and alumni. The initiative needs the university's overall strategy to be finalised before it can be implemented.

Table 3
Breakdown of the reported entrepreneurship activities across the five thematic categories.

HEI/ COUNTRY	THEMATIC CATEGORIES				
	COL (All activities)	HCD	CSU	SA	DIG
HEI #1 Finland (n=15)	(n=15) Strategic Plan E/Pship; E/pship Action Plan; Training in E/pship Pedagogy; On-line Materials for E/ Pship Teaching & Learning; Student E/pship Society; *Green Campus Open;* Institutional Digital Strategy; Project & Part-time Job Fairs; *Lahti Venture Programme;* E/pship University Board; HEInnovate Discussions; E/pship Intranet Blogs; E/pship Minor Module J. Hyneman Centre; Firmatiimi.	(n=5) Training in E/pship Pedagogy; On-line Materials for E/Pship Teaching & Learning; Project & Part-time Job Fairs; E/pship Minor Module; Firmatiimi.	(n=3) Student E/pship Society; E/pship University Board; J. Hyneman Centre.	(n=5) Strategic Plan E/pship; E/pship Action Plan; Institutional Digital Strategy; E/pship University Board; HEInnovate Discussions.	(n=3) On-line Materials for E/Pship Teaching & Learning; E/pship Intranet Blogs; Institutional Digital Strategy
HEI #2 Germany (n=27)	(n=27) Vice President for Business; Shared Professorships; E/pship Curricular Alignment; Extra-Curricular Devlp.; Motivation Activities; Incubation Programme; Deep Dive MOOCs; E-Learning Centre; Dept of Innovative Education; MUniver City; DT Lab Digital; *Intl. Summer Schools;* *BIPA;* *E-Bridge;* Evaluation Survey; Research Projects; Strategic Advancements Office; Hybrid Institution; Master & Doctoral Programmes; Train-The-Trainer Programmes; Virtual Activities; *DICA, 3D Cluster & Freiraum;* *Global ExChallenges;* *External Auditing & Coaching;* *Endowment;* *Short-term Funding;* *Funding Support.*	(n=11) E/pship Curricular Alignment; Extra-Curricular Devlp.; Motivation Activities; Incubation Programme; Deep Dive MOOCs; E-Learning Centre; Dept of Innovative Education; Research Projects; Master & Doctoral Programmes; Train-The-Trainer Programmes; Virtual Activities.	(n=8) Vice President for Business; Shared Professorships; E-Learning Centre; Dept of Innovative Education; MUniver City; DT Lab Digital; Strategic Advancements Office; Hybrid Institution.	(n=3) E/pship Curricular Alignment; Evaluation Survey Strategic; Advancements Office.	(n=4) Deep Dive MOOCs; E-Learning Centre; DT Lab Digital; Virtual Activities.
HEI #3 Ireland (n=13)	(n=13) E/pship Educators CPD; *National Student Enterprise Competitions;* *National Competition for Intl Programme Collab.;* E/pship Lecture Series; *Erasmus E/pship Programme;* *Student-Industry Collaboration;* *International E/pship Educator Competitions;* Cocoon Programme; Member of HEInnovate Expert Group; New Frontiers Programmme;	(n=6) E/pship Educators CPD; E/pship Lecture Series; Erasmus E/pship Programme; Cocoon Programme; New Frontiers Programmme; Upskilling on Online Teaching & Learning.	(n=3) Supporting Estab. of Research Groups/ Centres; Member of HEInnovate Expert Group; Regional Devlp. Centre.	(n=1) Supporting Estab. of Research Groups/Centres.	(n=1) Upskilling on Online Teaching & Learning.

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Table 3 (*continued*)

HEI/ COUNTRY	THEMATIC CATEGORIES				
	COL (All activities)	HCD	CSU	SA	DIG
	Regional Devlp. Centre; Upskilling on Online Teaching & Learning; Supporting Estab. of Research Groups/Centres.				
HEI #4 Portugal (n=27)	(n=27) Innovative Governance Model; Interdisciplinary university; Pedagogical Innovation; Regional Company Incubator Network; Integrated Information System; Creative Science Park; *ECIU University;* *Certification of Interna QA;* *Integration of 2 HE Sub-systems;* Sustainable Campus & Viver; Distance Learning; Design Factory; *Erasmus Policy Declaration;* University Activity Budget Plan; Foundational Regime; E/pship Education; E/pship Support; *Strategic Partnerships in Business;* *Open Day MIEM;* *Internationalisation of Research Policy;* Department Integration Activities; *Open Science* E/pship Devlp. with Advanced Manuf. Tech.; Business Incubator; *Headhunters;* Technology Platforms; E/Pship Projects.	(n=6) Pedagogical Innovation; Distance Learning; Design Factory; E/pship Education; E/pship Support; E/Pship Projects.	(n=4) Regional Company Incubator Network; Creative Science Park; Design Factory; Business Incubator.	(n=6) Innovative Governance Model; Interdisciplinary UA; Sustainable Campus & Viver; University Activity Budget Plan; Department Integration Activities.	(n=4) Pedagogical Innovation; Distance Learning; Design Factory; Technology Platforms.
HEI #5 Spain (n=7)	(n=7) E/pship Strategy; Weekend Challenge; *Creatic Prizes;* E/pship Board; *E/pial Network S.America*; Measuirng Impact on Alumni; Student E/pship Programmes.	(n=2) Weekend Challenge; Student E/pship Programmes.	(n=1) E/pship Board.	(n=2) E/pship Strategy; Measuring Impact on Alumni.	(n=0)
TOTALS N=89	89	30	19	17	12

Notes:*Figures do not equal totals due to some initiatives belonging to more than one thematic category.
Activities in normal font represent those re-categorized as "intrapreneurial".
Activities that are shaded represent those re-categorized as "hybrid."
Activities in *italics* are those that should remain as "entrepreneurial" or would require significant additional information to determine if a re-categorization to "intrapreneurial" or "hybrid" is merited.

in the entrepreneurial activities reported by the five HEIs across the eight HEInnovate dimensions. We identified these as Collaboration (COL), Human capital development (HCD), Creation of structures and units (CSU), Strategic approach (SA) and Digitalization (DIG). Table 3 shows the breakdown of all 89 self-reported entrepreneurial activities across these five thematic categories, collectively and per HEI. We now discuss these below.

5.2.1. Collaboration (COL)

Collaborative endeavours, including internal and external networking, have been highlighted in the literature as important activities of entrepreneurial universities (Cunningham et al., 2022). The collaboration theme emerged strongly from our data, with all eight-nine entrepreneurial activities reported by the HEIs involving collaboration of some kind. This was evidenced by HEIs' frequent referrals to teams, collaborative projects, working across departments/schools/faculties, bridging between academia and industry, partnerships and a range of knowledge exchange and industry collaboration activities at local, regional, and international level. For example, the Finnish HEI was involved in several student related initiatives that sought to match

students' skills with local companies to enhance industry collaboration, solve problems or help businesses grow through innovation. Collaboration through clustering activities (Germany), dissemination open days (Portugal), participation in the HEInnovate Expert Group and ERASMUS programme (Ireland) and the establishment of an Entrepreneurship Board to exchange knowledge and enhance services to SMEs (Spain) were among just some of the collaborative entrepreneurial activities reported.

Activities reported under the 'Internationalised Institution' dimension of the HEInnovate framework revealed the considerable scope of international collaboration in which our sample HEIs engaged. While the Finnish HEI stressed that, as one of Finland's most international universities, internationalisation was embedded across all their activities, it did not report any specific activities in this category. The German HEI connected with entrepreneurial ecosystems in different countries through a range of initiatives including Summer Schools (in South America, Asia, and South Africa), a virtual acceleration programme (with Bavaria and Israel) where students tackle innovation challenges for industry, and collaboration with other universities through their E-Bridge programme and internships of student teams to solve global challenges. Ireland's Master of Business in Entrepreneurship programme had a long-established collaboration with Heilbronn University in Germany which facilitated a reciprocal intensive week-long residential team project comprising Irish and German students working together to solve simulated business problems and develop joint strategies. The Irish entrepreneurship educators also worked both virtually and in person (via on site visits) with universities in Australia and the US to bring student teams together to collaborate on industry-led projects. The Portuguese HEI reported several international projects focused on innovative and entrepreneurial universities, education, and research, with some of these being EU-funded and one focusing on the Internationalisation of Research policy. The Spanish HEI had created a collaborative entrepreneurship education network amongst entrepreneurial universities in South America. While these activities illustrate the critical role collaboration plays in a HEI's entrepreneurial agenda, the behaviours staff need to adopt in order to operationalise such activities (e.g., networking, problem-solving, teamworking, innovation, proactiveness, boundary-crossing, recognizing and exploiting opportunities) have also been identified as key behavioural dimensions of intrapreneurship (Neessen et al., 2018).

5.2.2. Human capital development (HCD)

Human capital development was an important focus for the HEIs in our sample. Thirty entrepreneurial activities were reported under this thematic category operationalised through entrepreneurship education programmes, pedagogical initiatives and a focus on developing entrepreneurial skills. Human capital development has been highlighted in the literature as playing an important role in building the entrepreneurial university because it constitutes potential entrepreneurs (Guerrero and Urbano, 2012). However, it also constitutes potential intrapreneurs with staff members taking responsibility for turning ideas into profitable finished products through risk-taking and innovation (Pinchot, 1985). HCD activities within our sample were most evident within the HEInnovate dimension of 'Organisational Capacity: Funding, people & incentives' which recognizes the important role played by key resources such as funding, investments, people, expertise, and knowledge, as well as incentive systems required to sustain entrepreneurial growth. Investment in entrepreneurial skills development was evident for students, staff, and local industry across all eight dimensions of the HEInnovate framework. Student-focused structured entrepreneurship education was delivered at either under or postgraduate level, as a compulsory, optional or extra-curricular activity (Germany), and on both a full and part-time basis (all HEIs); some was available online (e.g., via MOOCs). Three HEIs delivered train-the-trainer entrepreneurship programmes for their staff or provided programmes that sought to enhance entrepreneurship pedagogy (Finland, Germany, Portugal). Within this provision, there was a notable focus on team and cross-disciplinary/cross-faculty entrepreneurship education. A strong practical entrepreneurship focus was evident, especially within the Irish, Spanish, and Portuguese HEIs, who linked national entrepreneurship competitions to their taught entrepreneurship modules, incubation support, mentoring and prestigious prizes through student challenges and hackathons. The Portuguese HEI was working hard to promote entrepreneurship across all levels of education, linking up with other institutions to position entrepreneurship education as a lifelong learning endeavour leading to the creation of an entrepreneurial mindset. This HEI also cleverly linked promotion of their institutional core strengths and expertise with the promotion of entrepreneurship education amongst their students through their Tech Platforms. The Irish HEI also focused on staff expertise by highlighting staff's involvement in international entrepreneurship educator competitions and prestigious awards.

Start-up skills development and support included structured training and mentoring programmes, innovation cafés, the provision of business contacts and/or seed funding (four HEIs), as well as access to incubators, proto-labs, or pre-accelerators (four HEIs). Some initiatives focused on generating interest in and motivation for entrepreneurship. While, in most cases, these focused on students, and often on a cross-faculty/cross-discipline basis, in one case their reach extended to staff (Portugal). Mentoring, coaching, and one-to-one meetings were also provided across the HEIs, as were competitions. In the Spanish HEI, regional entrepreneurship prizes were established to promote the spirit of entrepreneurship. From a strategic perspective, many of these activities cleverly combined the promotion of entrepreneurship with the promotion of the HEI's skills, expertise and resources through networking and engaging with local businesses in their region. Given the strong internal organisational dimension of human capital development activities, there is a strong argument for categorizing them as intrapreneurial.

5.2.3. Creation of structures and units (CSU)

The creation of structures and units constituted a key component of Cunningham et al.'s (2022) architectural framework - the different formal organisational units and supports that entrepreneurial universities construct to support and operationalise their entrepreneurial activities. Many of these structures and units are internal to the organisation and, therefore, have strong intrapreneurial characteristics. Nineteen of the entrepreneurial activities reported by our five HEIs fell under this thematic category. While predominately evident within the 'Preparing and Supporting Entrepreneurs', 'Knowledge Exchange' and 'Internationalised Institution' dimensions of the HEInnovate framework, the HEIs in our sample had created a wide variety of entrepreneurial structures and units across all dimensions. These structures and units were both concrete and virtual, established both within and outside of the HEI and operated at both national and international level. They took the form of entrepreneurship research centres/groups established across different faculties (Ireland), the creation of Living Labs, Digital Transformation Labs, a Creative Science Park, and a Design Factory (German and Portuguese HEIs), and international summer schools and a Department of Innovative Education to pilot entrepreneurial pedagogies (Germany). All the HEIs reported having some type of incubator facility to support aspiring entrepreneurs to develop technology or knowledge-based new venture creation, and while these took the form of a separate, mostly physical, organisation that operated along commercial lines, they were owned and governed by the HEI's senior management team and had to adhere to the same operational principles as other departments within the HEI. Hence, they had strong intrapreneurial characteristics.

The German HEI established several novel internal structures in the form of a Vice President for Business post, shared academic/leadership professorships and a Strategic Advancements Office, the latter designed to centralise strategic collaboration, including within entrepreneurship. Other internal and external structures/units created by the HEIs

included student entrepreneurship societies (Finland), a regional company incubator network (Portugal), an entrepreneurship board to encourage collaboration, offer guidance and establish performance metrics (Finland; Spain), and entrepreneurial university networks in South America (Spain). As we demonstrate in the discussion section of this paper, many of these structures/units could justifiably be categorized as intrapreneurial due to their internal positioning and/or their adherence to the HEI's core governance system.

5.2.4. Strategic approach (SA)

A strategic approach is crucial to a HEI's entrepreneurial agenda. This includes the extent to which entrepreneurship is part of a HEI's strategy, has commitment at the senior level and is coordinated across the organisation. Accordingly, leadership has been identified as a key organizational capability in the delivery of the entrepreneurial agenda (Stolze and Sailer, 2021), however, it is also an important intrapreneurial behaviour (Klofsten et al., 2019).

There was considerable evidence of *strategic approaches* being adopted by the HEIs in our sample to facilitate their entrepreneurial activities. Seventeen of their reported entrepreneurial activities fell under this thematic category, being mostly evident within the Leadership & Governance dimension of the HEInnovate framework, which is typically viewed as the lynchpin of the other seven dimensions. Most of the HEIs reported that entrepreneurship (not intrapreneurship) was embedded and/or prioritised within their institutional strategy, either implicitly or explicitly. Entrepreneurial activities were also operationalised in very tangible strategic ways, including but not limited to, the development of action plans specifically for entrepreneurship (Finland; Spain); the creation of a strategic role in the form of a Vice President for Entrepreneurship and the establishment of a dedicated Strategy Department (Germany). The presence of innovative and supportive governance models (Portugal) served to further highlight HEIs' focus on adopting a strategic approach to their entrepreneurial activities, reflecting scholars' acknowledgement of the importance of leadership and supportive structures to enable the entrepreneurial university (Klofsten et al., 2019).

Table 4
Applying the entrepreneurship-intrapreneurship analytical framework to highlight examples of intrapreneurial activities.

Thematic Category	***Activity Examples***	***HEInnovate dimension***	***NVC within the HEI (Pinchot, 1985; Parker, 2009)***	***New product or service within the HEI (Klofsten et al., 2021)***	***Intrapreneurial actors who champion initiative. (Rossano-Rivero, 2019; Klofsten et al., 2021)***	***Promotes innovative, proactive, risk-taking employee or student behaviours (Neesen et al., 2018)***	***Problem-solving or org. renewal strategic tool (Bosma, 2010; Audretsch et al., 2021)***	***Entrepreneurial architecture components (Cunningham et al., 2022)***	
								Org. structure or unit	***Org. support activity***
Collaboration COL	-Projects & Parttime Jobs Fair (FIN)	Knowledge Exch & Collab.		√	√	√	√		***Networking +***
	-Dept of Innovative Education (GER)	Digital Transf. & Capability		√	√	√	√	***Academic dept.***	***E/pship education***
	-Regional Company Incubator Network (POR)	Preparing & Supporting Entrepreneurs	√	√	√	√	√	***Network structure***	***Networking+***
Human Capital Development HCD	-E/pship Pedagogy Module for Staff (FIN)	Entrepreneurial T & L		√	√	√	√		***E/pship education***
	-Master & Doctoral programmes (GER)	Entrepreneurial T & L		√	√	√	√		***E/pship education***
	-New Frontiers Programme (IRL)	Prep. & Supp. Entrepreneurs		√	√	√	√		***E/pship education +***
Creation of Structures & Units CSU	-Office of Vice-President for Business (GER)	Leadership & Governance		√	√	√	√	***Managerial Dept.***	***Strategic support***
	-Creative Science Park (POR)	Knowledge Exch & Collab.	√	√	√	√	√	***Science Park***	***E/pship education support +***
	E/pship Board (SP)								
	Regional Development Centre (IRL)	Knowledge Exch & Collab.		√	√	√	√	***Board***	
		Prep. & Supp. Entrepreneurs	√	√	√	√	√	***Incubator***	
Strategic Approach SA	-Strategic Plan for E/pship (FIN)	Leadership & Governance			√	√	√		***Strategic support***
	-University Activity & Budget Plan (POR)	Measuring Impact			√	√	√		***Financial support***
	-E/pship Curricular Alignment (GER)	Entrepreneurial T & L		√	√	√	√		***Educational support***
Digitalization DIG	-Deep Dive MOOCs (GER)	Digital Transf. & Capability		√	√	√			***E/ship digital edu support***
	-Online E/pship Materials (FIN)	Entrepreneurial T & L		√	√	√	√	***Digital structure***	***E/pship digital edu support***
	-Technology Platforms (POR)	Org. Capacity		√	√	√			***E/pship tech & digital edu support***

Note: Shaded initiatives represent hybrid activities

We view evaluation and impact measurement – a dedicated dimension of the HEInnovate framework – to be directly linked to the strategic approach adopted by the HEIs. Being able to demonstrate the impact of a HEI's entrepreneurial activities helps senior management to determine the extent to which their institutional strategy is working, informs future strategy development and gathers important data for external stakeholders, including funding agencies. Our analysis revealed that four of the five HEIs mentioned measuring the impact of their entrepreneurial initiatives via the monitoring of graduate entrepreneurship activity and the reporting performance metrics to their university board (Finnish HEI). The German HEI conducted student evaluations; organised PhD projects linked to entrepreneurship activities to provide methodological rigour and used external auditing. While the Irish HEI reported no specific impact measurement activity, metrics were available within their annual reports and strategic plans, including within an OECD report. The Portuguese HEI operated an internal quality assurance system in which the regular assessment of entrepreneurship initiatives was embedded. Such activities were also measured via the university's budget plan. These different types of evaluation activities suggest that the HEIs are operating a holistic strategic approach to their entrepreneurial university agenda. That said, there was no mention of intrapreneurship within the HEIs' evaluation or impact measurement processes, suggesting that it is not considered a strategic priority.

5.2.5. Digitalization (DIG)

Digitalization can play a transformative role in the entrepreneurial university agenda (Garcez, et al., 2022; Guerrero et al., 2021), promoting new venture creation and growing entrepreneurial ecosystems (Zahra, et al., 2023). Not surprisingly, the digitalization theme was mainly concentrated within the related HEInnovate dimension (Digital Transformation & Capability), with four of the five HEIs reporting digital initiatives in this category and/or incorporating digitalization within their institution's overall strategy. A total of twelve entrepreneurial activities were reported by the HEIs under this theme. These took the form of various tech platforms and distance learning initiatives.

The German HEI reported several digital entrepreneurship initiatives including a MOOC specifically focused on digital transformation. The German, Irish and Portuguese HEIs had some type of E-Learning or Teaching & Learning Centre with responsibility for digital classrooms and associated electronic platforms. These entities provided technical support for staff and students, encouraged the development of innovative teaching methods using digital technologies, and offered digital upskilling courses. A dedicated Service Desk to help with digital transformation, distance learning programmes and Open Science practices were also mentioned by the Portuguese HEI. Overall, digitalization presented itself as an effective tool that HEIs used to collaborate and develop their human capital through various types of entrepreneurship education programmes. Because digitalization enables entrepreneurship both within and outside of the organisation, it can be strongly associated with intrapreneurial behaviour.

5.3. Drivers, levels and timeframes of activities

Our study also *explored the drivers, levels and timeframes* of the self-reported entrepreneurial activities. We found most initiatives in our sample to be driven by senior management (top-down, n=64). This finding is consistent with HEIs' commitment to an overarching entrepreneurial university agenda. While these were evident across all themes, they were mainly identified within the themes of Strategic Approach and Human Capital Development and reported by the HEIs under the Leadership and Governance and Preparing and Supporting Entrepreneurs dimensions of the HEInnovate framework. We also found several initiatives that were driven by staff members on the ground (bottom-up, n=29),[4] suggesting the presence of several entrepreneurial champions within the HEIs. We identified the majority of these within the Human Capital Development and Collaboration themes and were reported under the Entrepreneurial Teaching & Learning and Knowledge Exchange HEInnovate dimensions.

We found the entrepreneurial activities to be developed to a high level by the respective HEIs. About sixty percent were reported to be at an advanced level, and the balance at the intermediate level. The Strategic Approach and Human Capital Development themes revealed the greatest number of advanced activities. Timeframes were mainly medium to long-term, again reflecting HEIs' overarching commitment to the entrepreneurial university agenda in addition to, perhaps, their recognition of the long-term investment required in such an agenda. Over half the reported activities fell into this category and were mostly reported under the Leadership & Governance, Entrepreneurial Teaching & Learning and Knowledge Exchange HEInnovate dimensions, and identified within the Strategic Approach and Human Capital Development themes.

6. Discussion

6.1. Applying the entrepreneurship-intrapreneurship analytical framework

Using the *HEInnovate* framework for our data collection allowed for structured, detailed reporting of the HEIs' entrepreneurial activities across a range of different dimensions in a consistent manner (Table 2). Further analysing the data according to our five thematic categories allowed us to uncover the nature of these entrepreneurial activities and paved the way for examining their potential intrapreneurial dimensions (Table 3).

In this section, we apply our entrepreneurship-intrapreneurship analytical framework (from Fig. 1) to delve even deeper to highlight the *intrapreneurial* dimensions of these activities.

Of the eighty-nine reported entrepreneurial activities we analysed, we identified sixty-two as having strong intrapreneurial dimensions. Accordingly, we re-categorize these as either predominately *intrapreneurial* activities (52) or *hybrid* activities (10), the latter having both entrepreneurial and intrapreneurial dimensions. We deem the remaining twenty-seven activities reported in our sample to be either correctly categorized as entrepreneurial or requiring further investigation to determine whether an intrapreneurial categorization is merited. This is a substantive revelation, demonstrating that most activities in which HEIs engage as part of their entrepreneurial journey, and by way of fulfilling their third mission obligations, could be categorized as *intrapreneurial* rather than *entrepreneurial*. Table 4 provides some examples of the entrepreneurial activities we categorize as intrapreneurial following the application of our framework.

6.2. Notable findings across the five thematic areas

Collaboration (COL) was embedded in all the reported activities. However, we found little evidence that such collaboration was fully recognised or rewarded. It was present both implicitly and explicitly in the form of internal engagement (e.g., amongst staff members, across hierarchical levels, across faculties/units/departments, and between staff and students), and external partnerships (e.g., with SMEs, multinationals, expert groups, agencies, other HEIs, and schools regionally, nationally, and internationally). It was embedded in those activities we categorized as intrapreneurial across the HEInnovate dimensions, beginning with the development of strategies and action plans within

[4] Four initiatives were categorized as both top-down and bottom-up, and one initiative was categorized as neither.

the Leadership & Governance and Organisational Capacity dimensions, and filtering through the organisation in the form of entrepreneurship programmes (Entrepreneurial Teaching & Learning), incubators (Preparing & Supporting Entrepreneurs), industry projects and jobs fairs (Knowledge Exchange & Collaboration). These activities required individual or multiple intrapreneurial actors to champion new ideas that add value to their HEIs (Klofsten et al., 2021). Consistent with Audretsch et al. (2021), these activities can be viewed as organisation renewal or strategic tools.

In our analysis, we categorize Germany's "Department of Innovative Education" as intrapreneurial because it represents a new service within the HEI, requires innovative individuals to champion it, promotes innovative behaviour among staff through the development of experimental teaching formats and solves teaching resource problems across faculties. In keeping with Cunningham et al.'s architectural framework, this initiative also constitutes a dedicated organisational unit in its own right (e.g., a new academic department) within the HEI. In a similar vein, we consider Portugal's "Regional Company Incubator Network", reported within the 'Preparing & Supporting Entrepreneurs' HEInnovate dimension, to be more intrapreneurial than entrepreneurial because it represents new venture creation within the organisation by delivering commercial services to companies. It too requires innovative individuals to champion it, promotes innovative behaviour among companies and solves problems relating to scarce resources. While we acknowledge that this organisational structure (network structure) is external to the HEI, as previously discussed in this paper, it is owned and governed by the HEI and, as such, is an integral part of the organisation.

Finland's "Projects & Parttime Jobs Fair" initiative is both entrepreneurial and intrapreneurial, hence we categorize it as hybrid. However, we do not ignore its strong entrepreneurial dimension, operationalised through its intention for students to work with local enterprises to solve problems; rather, we highlight the fact that this too constitutes a new service within the HEI, relies on intrapreneurial staff members to organise and lead it, and promotes innovative behaviour among students.

Human Capital Development (HCD) was clearly critical to the five HEIs' activities. This focus on HCD is in keeping with evidence in the literature that HEIs play a critical role in producing human, social and entrepreneurial capital (Etzkowitz et al., 2000) and developing entrepreneurial behaviours (Guerrero and Urbano, 2012). However, while there was some evidence of staff training initiatives (e.g., Train the Trainer and Pedagogy programmes) in our sample, the overwhelming HCD focus was on encouraging, developing and rewarding entrepreneurial skills amongst students and external entrepreneurs/industry. Consistent with Maier and Zenovia (2011), we found a significant lack of incentives and rewards for staff to engage in intrapreneurial or entrepreneurial behaviour. Accordingly, we suggest there is a need to focus on developing the dynamic capabilities needed to spark intrapreneurial behaviour among employees from the bottom up (Klofsten et al., 2019; Neessen et al., 2018). This is important because, consistent with Pinchot (1985), and as Culkin (2008) asserts, many individual staff members may already be operating as *intrapreneurs* because they "take responsibility" and exhibit "assertive risk-taking and innovation" (p.75). Staff may be more likely to engage in *intrapreneurial* rather than *entrepreneurial* activity because they view this type of behaviour (responsibility, assertiveness, and innovativeness) as simply pushing the boundaries of their personal expertise and capabilities, being creative, executing agency and adding value to their work (and, consequently, enriching their organisation). They may even view such activity as much more achievable and potentially less-riskier than the resource-intensive, bureaucratic and less-rewarding activity of traditional entrepreneurship activity which is most often conceptualised as new venture creation.

Among the HCD initiatives we categorize as intrapreneurial or hybrid are Finland's "Entrepreneurship Pedagogy Module for Staff", Germany's "Master & Doctoral Programmes" and Ireland's "New Frontiers Programme." The first two were reported under the Teaching & Learning HEInnovate dimension, and the third under Preparing & Supporting Entrepreneurs. All three initiatives offered academic staff an opportunity to draw on their core capabilities, i.e., teaching, to deliver value for their organisation. Despite the apparent entrepreneurial orientation of these initiatives, we were struck by some of their overwhelming intrapreneurial characteristics, including the fact that they constitute a new product or service within the HEI. In one case (Germany), this new product (e.g., the educational programme) was offered to paying customers and hence represented a new and often profitable revenue stream. All three initiatives relied on intrapreneurial champions to drive them, they promoted innovative behaviour and solved problems relating to a gap in a knowledge or qualification area. We categorize Ireland's "New Frontiers Programme" as hybrid due to its added focus on external new venture creation as an intended output for participants.

In terms of the *Creation of Structures and Units* (CSU), many of the structures identified by Cunningham et al. (2022) were reported by the HEIs in our sample in the form of incubators, entrepreneurship centres, research groups, student societies, departments, science parks and entrepreneurial boards. Many were set up to provide a much-needed service and generate commercial revenues and therefore fit the traditional definition of entrepreneurship (Antoncic and Hisrich, 2003). However, while some may be physically located outside of the organisation, they still belong to and are an integral part of the HEI (e.g., they are owned and managed by the HEI; use the same governance and financial reporting systems; draw on core HEI staff). Therefore, to a large extent, they constitute new venture creation within an existing organisation (Pinchot, 1985), and, hence, we argue that they should be categorized as intrapreneurial activities.

A particularly innovative example of an activity that we categorize as intrapreneurial is the German HEI's "Office of Vice-President for Business" which has responsibility for implementing entrepreneurship strategy. This office could be viewed as representing a new service within the HEI – one where the problem of ensuring entrepreneurship strategy is implemented is solved. It involves a senior innovative individual who takes on the strategic responsibility for entrepreneurship within the organisation, promoting innovative behaviour among staff and students. It also constitutes a new internal department at a senior level within the HEI. This constitutes a novel type of 'structure' which, although created to focus on entrepreneurship, by default will lead and encourage intrapreneurial behaviour among staff. Similarly, Spain's "Entrepreneurship Board" which was set up to strengthen collaboration between the business park and offer services to SMEs, is also a novel structure with many intrapreneurial dimensions. However, due to its stronger external orientation, we categorize this particular initiative as hybrid. Structures of this nature may well prove more beneficial in encouraging intrapreneurial behaviour among staff as they may have less formal bureaucracy associated with them compared to, for example, actual concrete buildings.

Portugal's "Creative Science Park" and Ireland's "Regional Development Centre" are more clear-cut examples of intrapreneurial activities. Here we have two structured units established along commercial lines, hence representing new venture creation entities that are governed by the HEI. They are required to be profitable in order to remain in operation. They provide services, involve intrapreneurial actors to champion them, and promote entrepreneurial behaviour among staff, students, and external companies. They also fit neatly into Cunningham et al.'s architectural framework.

Strategic Approaches (SA) in our sample were most evident in the HEIs' institutional strategic plans, which either included or were entirely focused upon entrepreneurship. However, these plans also permeated throughout the HEIs, cascading down and across hierarchies to act as catalysts and enablers of entrepreneurial behaviours and provide staff with both the license and agency to engage in intrapreneurial activity. It is because of this that we recognise the strong intrapreneurial dimension of HEIs' strategic plans, including the "Strategic Plan for Entrepreneurship" (Finnish HEI), which despite being focused on

entrepreneurship, we categorize here as a hybrid activity. This is because this initiative would have required intrapreneurial champions, promotes intrapreneurial behaviour within the organisation and acts as an organisational renewal tool. Portugal's "University Activity & Budget Plan" is similar in nature hence we also categorize it as hybrid, but it has the added characteristic of measuring impact across the organisation, including the cost of intrapreneurial/entrepreneurial activities. Germany's "Entrepreneurship Curricular Alignment" initiative focuses on aligning the learning outcomes of all its entrepreneurship programmes with the specific syllabus of their subject area across discipline areas. This suggests an effort to contextualize entrepreneurship and embedded it within subject areas. Accordingly, we view this activity as akin to entrepreneurship programme design and delivery, where the programmes themselves constitute new 'products' in their own right, have revenue generating potential, promote entrepreneurial behaviour and enable academic staff to draw on their own core competencies.

Such findings support the view that HEIs recognise the value of adopting entrepreneurial/intrapreneurial strategic approaches to deal with organisational complexities (Bosma et al., 2011). Such approaches also help develop a leadership culture which in turn encourages entrepreneurial and intrapreneurial behaviour among staff (Stolze and Sailer, 2021). That said, the predominance given by HEIs to entrepreneurship over intrapreneurship in their institutional strategies was an interesting finding given the considerable volume of intrapreneurial activity we uncovered in our sample. Here we caution that a strong top-down push on traditional entrepreneurship activities such as new venture creation could be inefficient (Abreu and Grinevich, 2013) or even serve to reduce intrapreneurial/entrepreneurial activity (Philpott et al., 2011). Therefore, we posit that HEIs need to formally embed intrapreneurship within their entrepreneurship strategies and action plans because we believe that it is intrapreneurial behaviour that drives entrepreneurial activity. Just as Klofsten et al. (2019) assert that strong leadership, clear policies and procedures, clear communication and a supportive culture are needed to encourage entrepreneurial behaviour, we posit that similar requirements are needed to encourage intrapreneurial behaviour.

Digitalization (DIG) featured strongly in the entrepreneurial activities reported by the five HEIs. This reflects the general growth across the HEI sector in the use of digital platforms and the digital impact of the recent Covid-19 crisis which forced HEIs to immediately pivot to complete online delivery in March 2020. Among the noteworthy digital examples in Table 4 are the "Deep Dive MOOC" from the German HEI, "Online Entrepreneurship Materials" from the Finnish HEI, and "Technology Platforms" from the Portuguese HEI. We categorize these as intrapreneurial because they constitute different forms of new 'product' development within their organisation via digital structures; they rely on intrapreneurial actors for their operation and they promote entrepreneurial/intrapreneurial behaviour. While each is anchored within the organisation, they are available to stakeholders both within and outside of the HEI, hence they have the ability to generate commercial revenues. While such initiatives are commendable, we argue that HEIs' digitalization experience and capabilities could be better leveraged to promote the intrapreneurial agenda. For example, HEIs' intranets, websites and blogs could be utilised to celebrate staff's intrapreneurial and entrepreneurial achievements both within and outside of the organisation, thus rewarding and encouraging such behaviour.

6.3. Managerial and policy implications

Our findings imply that HEI leaders and departmental managers need to recognise the untapped value of intrapreneurship. At the strategic level, intrapreneurship should be incorporated into the organisation's overarching strategic plan, complementing existing entrepreneurial strategies but expanding across all discipline and functional areas. Senior management needs to encourage staff to pursue creative ideas within the organisation – a secure environment where there is both reduced risk and structured support (Burkholder et al., 2017; Blanka, 2019). There needs to be a focus on rewarding intrapreneurial capabilities that boost the organisation's ability to react quickly and innovatively to internal and environmental changes, and to adapt to and shape new environments (Klofsten et al., 2021). At the operational level, leaders/managers need to raise awareness of the benefits of engaging in intrapreneurship, outline the institutional supports available to staff, and develop appropriate intrapreneurship policies and training programmes. Encouraging and harnessing team-working, collaborations, partnerships, and networks - both within and outside of the HEI – will be critical to sharing knowledge, promoting co-creation and securing commercial partnerships. In this regard, enhancing the HEI's digital infrastructures and capabilities will be important.

7. Conclusions

Using a unique data set drawn from five European HEIs involved in an EU-funded project, our study aimed to examine the entrepreneurial activities in which HEIs engage as part of their quest to become 'entrepreneurial universities.' Our objective was to highlight the *intrapreneurial* dimensions of these activities with a view to proposing that some activities could be (re-)categorized as intrapreneurial rather than entrepreneurial, and to demonstrate that such (re-)categorization could be beneficial. Accordingly, our research question asked: What activities do universities and HEIs engage in on their entrepreneurial university journey, and which of these should be categorized as intrapreneurial rather than entrepreneurial? Addressing this question could help HEI managers better distinguish between the types of activities they engage in as part of their entrepreneurial university journey and determine which ones their staff might be more likely to get involved in. This is important given that academic staff may perceive there to be less risk for them to get involved in intrapreneurial rather than entrepreneurial activities. Intrapreneurial activities also allow individual academics, especially entrepreneurship educators, to utilise their own entrepreneurial competencies from the bottom up and take responsibility for developing new ideas without having to take unnecessary risks or leave the organisation (Audretsch et al., 2021; Klofsten et al., 2021; Neessen et al., 2018; Pinchot, 1985; Rossano-Rivero, 2019). Gaining a deeper understanding of the specific entrepreneurial activities in which HEIs engage could offer valuable insights for other academic institutions starting out on their entrepreneurial journey and enhance effectiveness of third mission delivery.

We set out by suggesting that many of the *entrepreneurial* activities in which HEIs engage could be categorized as *intrapreneurship* rather than *entrepreneurship* yet are not recognised as such. Our findings appear to support this view. As intrapreneurial activities and behaviours drive entrepreneurship, we argue that HEIs could find it beneficial to focus on intrapreneurial rather than entrepreneurial activities, especially if they are seeking to achieve or sustain entrepreneurial university status. As Youssef et al. (2021) attest, intrapreneurial individuals within HEIs are important because they drive entrepreneurship; they can exploit new ideas and opportunities that create meaning and value in their academic work. Indeed, with potentially fewer resources and the appropriate agency, academics may be more likely to develop intrapreneurial rather than entrepreneurial initiatives, yet our evidence suggests that they are not encouraged to do so. Actively encouraging and supporting staff members to engage in intrapreneurship could help add value to the organisation. We posit that human capital development plays a critical role. However, currently, such capital focuses on entrepreneurship education and developing and, indeed, celebrating and rewarding an entrepreneurial mindset in students, while largely neglecting the development of and/or rewarding such a mindset in staff.

7.1. Limitations

We acknowledge that our study may be perceived as being limited by its small sample size and purposive nature. However, our purposive

sample allowed us to retain depth and richness. Furthermore, consistent with Belitski and Büyükbalci (2021), each of our sample HEIs served as a distinct analytical unit offering replications, contrasts, and extensions to the emerging theory (Yin, 2012). The different geographical contexts of the HEIs may have influenced some of the findings and, hence, we make no claims as to the generalisability of our findings. However, we do suggest that our approach is grounded in its "closeness" to real-life situations, e.g., actual behaviour; its proximity to the study of reality, and its multiple wealth of detail" (Flyvbjerg, 2006: 223). Accordingly, our findings have much to offer HEIs at various stages of their entrepreneurial university journey.

We also acknowledge that, in our paper, we implicitly privilege the internal organizational orientation of intrapreneurship, conceptualising it mainly as the creation of something new within an existing organisation (Kraus et al., 2019). However, we also acknowledge that intrapreneurship occurs in several forms and at different organisational levels; is operationalised by a range of individuals and is shaped by both internal and external factors (Audretsch et al., 2021). As with any newly constructed analytical framework and categorization attempt, not everything will fit neatly into boxes and an element of researcher subjectivity is always involved. Hence, we also conclude that not all entrepreneurial activities that occur within university walls can be labelled intrapreneurship.

7.2. Contribution and future research

Our study makes three important contributions. First, it enhances understanding of the nature and scope of the activities in which HEIs engage as part of their entrepreneurial university journey. These activities span all eight dimensions of the HEInnovate framework and cut across five key themes - collaboration, human capital development, creation of structures and units, strategic approaches, and digitalization. Our findings illustrate that these activities could potentially be (re-) categorized as entrepreneurial, intrapreneurial, or hybrid. Acknowledging the scope and depth of activities undertaken by entrepreneurial HEIs, and providing examples of different types of activities, will be particularly valuable for HEIs embarking on their entrepreneurial university journey.

Second, we offer a novel and, we posit, highly valuable analytical framework to highlight the *intrapreneurial* dimensions of HEIs' self-reported entrepreneurial activities. From a theoretical perspective, this framework also represents a conceptualization through which the co-existence of HEIs' entrepreneurial and intrapreneurial orientation might be viewed. Our framework incorporates the eight dimensions of the now well-established HEInnovate framework, familiar to thousands of HEIs; five derived themes common to HEIs' entrepreneurial activities; entrepreneurship/intrapreneurship definitional literatures and Cunningham et al.'s (2022) university entrepreneurship architecture framework. Our analytical framework will be valuable to HEIs, scholars, practitioners, and policy makers in identifying the intrapreneurial dimension of HEIs' entrepreneurial activities and allow these to be better encouraged and exploited. Correctly categorizing such activities could have implications for how HEIs develop their entrepreneurial strategies and how they attract entrepreneurship-related funding.

Third, we signpost scholars toward some promising avenues of future research that we feel are worthy of further investigation in the context of intrapreneurship and the entrepreneurial university. We derive these from the five key themes we identified in our findings.

Collaboration: Our study focused on five independent EU-based HEIs that shared many commonalities yet were differentiated by their respective institutional profiles and geographical contexts. Future research could ask: **What are the potential synergies to be gained by creating shared and collaborative entrepreneurial/intrapreneurial activities across clusters of HEIs, and how might different institutional contexts influence the make-up and success of such synergies?** As our findings demonstrate, no entrepreneurial activity – regardless of its categorization – can be operationalised in isolation.

Human Capital Development: Our study has evidenced the critical nature of human capital development within the entrepreneurial university agenda, demonstrating that intrapreneurship co-exists with a HEI's entrepreneurial orientation (Guerrero et al., 2021). Future research could delve deeper and ask: **What benefits might be derived from focusing on developing staff's intrapreneurial rather than entrepreneurial skills?** Exploring the impact of Brexit on the intrapreneurial behaviour of staff in UK HEIs could be a particularly novel and contemporary avenue for future research.

Structures & Units: While the concept of creating support structures and units within HEIs has received some attention in the academic literature, there has been little investigation into how such structures/units influence staff behaviour, whether entrepreneurially or intrapreneurially. It must be acknowledged that not all university architectural structures need to be concrete and visible. It could be that the types of university architectures that best support intrapreneurial behaviour are possibly those that are intangible, virtual, and less bureaucratic, provided they provide the necessary institutional support and encouragement that staff need. Accordingly, future research questions could ask: **To what extent do traditional entrepreneurial architectures** support **or constrain intrapreneurial behaviour such as opportunity exploitation and organizational renewal amongst staff? Which structures might be more conducive to intrapreneurial behaviour in the future?**

Strategic Approach: Given that entrepreneurial strategies have the potential to provide staff with licence and agency to engage in intrapreneurial activity, future research would benefit from asking: **How do institutional strategies and action plans influence staff's intrapreneurial capabilities? How can intrapreneurship be incorporated into and intertwined with HEIs' existing entrepreneurship strategies? What is the long-term impact of promoting intrapreneurial rather than entrepreneurial HEI activities?**

Digitalization: Our findings evidenced several digitally based activities across the entrepreneurial, intrapreneurial and hybrid categories. However, the potential for digitalization to facilitate and enhance intrapreneurial behaviour among academic staff merits significant further investigation. This area is still in its infancy. Using digital platforms, scholars could examine the intrapreneurial dimension of entrepreneurship activities across a greater number of HEIs, including those outside of the European Union. A key future research question in this regard could be: **How might a digital version of our analytical framework outlined in this paper be developed for this purpose?**

For practitioners, policymakers and HEI senior management, this study both evidences the importance and highlights the potential of acknowledging the intrapreneurial features of entrepreneurial activities when planning and implementing action plans and structures for a HEI's entrepreneurial journey. Recognizing the interconnectedness and differences between the *entrepreneurial* and *intrapreneurial* dimensions of entrepreneurial activities and acknowledging that intrapreneurship is a key driver for entrepreneurship, supports the realization of entrepreneurship in its broadest sense. This is because entrepreneurship is not only associated with new venture creation and research commercialization, but also with innovativeness, risk-taking and a can-do attitude. Better recognition of intrapreneurship could also enhance utilization of digital tools and Artificial Intelligence in the design and delivery of entrepreneurship education programmes.

Like Kirby (2006) we suggest that intrapreneurial (rather than entrepreneurial) behaviour should pervade the whole organisation and be part of a HEIs' core mission and strategy. Therefore, we call on scholars to acknowledge and continue illuminating the important role of intrapreneurship within the broader entrepreneurial university agenda. If HEIs aim to deliver successfully on their third mission commitments and continue their journey toward entrepreneurial university status, then they must accept that building an entrepreneurial architecture on its own will never suffice. This is because every entrepreneurial agenda

needs intrapreneurial individuals to operationalise the strategies and actions contained therein. Accordingly, we call on HEI management to give appropriate agency and licence to their staff to engage in intrapreneurial behaviour, and to celebrate and reward such behaviour.

Data availability

The data that has been used is confidential.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.technovation.2023.102893.

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