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Three steps for universities to become entrepreneurial: a case study of entrepreneurial process and dynamic capabilities

Maksim Belitski^{1,2} · Jurek Sikorski²

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Abstract

Entrepreneurial universities play a crucial role in supporting regional economy and addressing social challenges. Despite the significant contributions in the entrepreneurial university literature, little is still known about the process of entrepreneurial idea development, validation and commercialisation within the university. Inspired by this gap in the knowledge transfer literature we draw on three pillars of entrepreneurial university—teaching, research and commercialisation and explain how entrepreneurial process set up to nurture entrepreneurial opportunities within university develops dynamic capabilities that shape product commercialisation at university. We use the case study of the Henley Centre of Entrepreneurship at University of Reading in the United Kingdom, secondary data sources and sixteen interviews with university ecosystem stakeholders to explain the role of dynamic capabilities in entrepreneurial process for university to become entrepreneurial. The process which describes the entrepreneurs journey comprises five stages could become part of entrepreneurial university curricular and embedding university practices into regional entrepreneurial ecosystem.

Keywords Entrepreneurial process · Entrepreneurial university · Entrepreneurial ecosystem · University of Reading · Knowledge transfer

1 Introduction

Universities are key actors within the entrepreneurial ecosystems and often are on the forefront of global challenges and conflicts (Reuters, 2024). The knowledge and ideas emerge at universities are highly valued by the greater society, enabling the process of entrepreneurship (Siegel et al., 2004; Heaton et al., 2019, 2020; Audretsch & Belitski,

✉ Maksim Belitski
mbelitski@groupe-igs.fr; m.belitski@reading.ac.uk

Jurek Sikorski
jurek.sikorski@henley.ac.uk

¹ ICD Business School, IGS-Groupe, Paris, France

² Henley Business School, University of Reading, Whiteknights Campus, Reading RG6 6UD, UK

2021) with the universities having a mandate to spark economic growth and prosperity and solve societal challenges and problems (Audretsch, 2014).

Although substantial research highlights the role of universities in knowledge creation, dissemination and commercialisation, including university's societal engagement (Civera et al., 2019), there remains a significant gap in our knowledge of the detailed mechanisms and stages of the entrepreneurial process within each of the entrepreneurial universities key pillars—teaching research and commercialisation, sometimes referred as community engagement, business engagement and public policy (Audretsch, 2014; Audretsch & Belitski, 2023a; Compagnucci & Spigarelli, 2020; Gianiodis & Meek, 2020).

Specifically, the literature often overlooks how universities nurture entrepreneurial activities from the conceptual stage through to market realisation. This gap includes a lack of detailed understanding of how university actors such as technology transfer offices (Siegel et al., 2003), commercialisation centres, and centers for entrepreneurship and enterprise, community connections within universities support the entire lifecycle of entrepreneurship—from idea generation to validation to commercialisation and scaling (Kuratko & Morris, 2024; Siegel & Wessner, 2012). Research on entrepreneurial universities yet lacks understanding of how entrepreneurial process can develop dynamic capabilities in teaching, research and commercialisation how it may affect university's third mission (Abreu & Grinevich, 2013; Abreu et al., 2016; Belitski et al., 2019; Compagnucci & Spigarelli, 2020).

Therefore, we ask and answer the following research question: How do university dynamic capabilities facilitate the transition of knowledge from academic environments to market application, particularly their role in establishing a rigorous entrepreneurial process?

Seminal research largely published in the *Journal of Technology Transfer*, has addressed why and how knowledge spillover at university occurs which is “not just focused on ‘knowledge for its own sake’”, and is “the gold standard of scholarly inquiry under the model of the Humboldt University, but rather oriented towards knowledge for the sake of solving specific and compelling problems and challenges confronting society” (Audretsch, 2014: 317). However, more research is needed to explore the nuances of entrepreneurial processes and structural supports to knowledge transfer within universities, in contrast to facilitating university-industry knowledge transfer (Belitski & Heron, 2013). By selecting an entrepreneurial process at one of entrepreneurial universities in the United Kingdom, this study demonstrates how a single entity at the university—center for entrepreneurship—can act as a catalyst for transforming theoretical knowledge into practical solutions leading to idea creation, development, validation and commercialisation. More specifically, this study enables us to examine various stages of entrepreneurial process at university starting from idea generation and validation involving creative thinking and rigorous testing of business ideas; fundraising and resource allocation assisting would be-entrepreneurs and spinoffs in navigating the complexities of securing funding and other necessary resources and finally commercialisation and scaling, facilitating first market entry and growth, resource crowdfunding by university-led initiatives.

Based on a unique case study of the Henley Centre for Entrepreneurship at Henley Business School, University of Reading (UoR) in the United Kingdom we introduce the entrepreneurship process embedded in education and entrepreneurial ecosystem at university (Civera & Meoli, 2018; Guerrero & Urbano, 2012; Guerrero et al., 2015; Link & Sarala, 2019) and represents an open system for business ideas creation, validation and financing. Our case study draws on Eisenhardt (1989) case study approach and includes the 16 years

pathway from the establishment of the Henley Centre for Entrepreneurship in 2007 to become an effective mechanism supporting entrepreneurship throughout the university and beyond.

Our main findings contribute to the extant academic entrepreneurship literature in the following important ways. First, we discover and explain how dynamic capabilities in research and teaching can help reconciling these missions with the entrepreneurial mission extending prior research in entrepreneurial university key pillars (Audretsch & Belitski, 2022b; Radko et al., 2023; Siegel & Wessner, 2012). Second, we demonstrate how dynamic capabilities of a specific unit within a university facilitate not only learning and application of new knowledge within the university but also ensure its transfer to marketable solutions, contributing significantly to the university's third mission. This is achieved through strategic collaborations with external partners within an entrepreneurial ecosystems (Audretsch & Belitski, 2017; Belitski & Büyükbacı, 2021). Finally, we contribute to scholarly understanding of dynamic capabilities formed within the Henley Centre for Entrepreneurship and in the Henley Business School that can impact internal stakeholders—university managers, researchers, faculty and students and external—businesses, local policymakers and other universities (Siegel et al., 2004), extending prior research on entrepreneurial university on the mechanisms of knowledge transfer within the university (Cunningham & Menter, 2021; Klofsten et al., 2019; Guerrero et al., 2021).

2 Understanding entrepreneurial university

Despite the widespread recognition of the three pillars of an entrepreneurial university—teaching, research, and commercialisation (Abreu et al., 2016; Audretsch & Belitski, 2022b)—there remains a notable silence in the literature regarding the specific mechanisms and boundary conditions that facilitate or hinder how knowledge created within universities benefits directly and indirectly communities and industry (Audretsch, 2014; Romero et al., 2021; Audretsch et al., 2022c). It is well acknowledged that entrepreneurial universities have a dual role: to create and discover entrepreneurial opportunities and facilitate the journey of knowledge from creation to commercialization (Civera et al., 2020a, 2020b; Etzkowitz & Leydesdorff, 2000). However, detailed insights into how universities specifically support entrepreneurs through the stages of idea development, validation, fundraising, commercialisation, and scaling are limited (Lehmann et al., 2020). Moreover, there's a lack of understanding of how entrepreneurial ideas within university become a commercial reality and serve market needs.

Significant contributions have been made to understanding the individual, institutional support mechanisms, organisational culture, and entrepreneurial contexts that promote entrepreneurial activities within universities, aiding in the monetization of research (Guerrero & Menter, 2024; Kirby, 2006; O'Shea et al., 2007). Systemic studies, such as those by Cunningham et al. (2021), have explored the architectural structure of entrepreneurial universities, highlighting governance's role in resolving organisational conflicts to promote academic entrepreneurship.

Yet, a theoretical gap remains in comprehensively understanding the dynamic internal processes that drive universities toward entrepreneurial transformation (Cunningham & Menter, 2021). While ordinary capabilities are essential for operational efficiency and focus on the technical aspects of administration and governance (Teece, 2014), dynamic

capabilities are crucial for fostering innovation and adapting to new entrepreneurial roles. These capabilities together aid universities in navigating the shift toward an entrepreneurial paradigm while maintaining competitiveness (Guerrero and Menter, (2024).

Historically, research on entrepreneurial universities has provided insights into how knowledge is transformed into commercial value propositions, with early seminal works laying the groundwork for understanding the adoption of entrepreneurial paradigms, dissecting university missions and strategies, and exploring the inherent conflicts and tensions (Audretsch, 2014; Philpott et al., 2011). Despite these efforts and numerous policy initiatives aimed at fostering world-class entrepreneurial universities, the effectiveness of these initiatives has been mixed, particularly in Europe (Etzkowitz & Zhou, 2008).

Studies like those by O'Shea et al. (2008) have indicated that variations in university spin-off activities can be attributed to differences in academic individual characteristics and the diverse contexts, including industry context within which universities and spinouts operate (Audretsch et al., 2024). For university managers, this presents a challenge in harmonising these varied factors to foster entrepreneurial outcomes effectively.

Overall, the nuanced, multi-layered challenges and internal dynamics that impact the successful implementation of entrepreneurial activities within universities and with industry remain under-researched (Klofsten et al., 2019; Link & Sarala, 2019; Löfsten & Klofsten, 2024). These ambiguities, especially in the roles of scientists as they navigate the interface between academia and industry, and internal capacity constraints, play a significant role in shaping entrepreneurial outcomes within universities. Thus, understanding and enhancing the ordinary and dynamic capabilities in teaching and research are pivotal for universities aspiring to become more entrepreneurial (Guerrero et al., 2021; Guerrero & Menter, 2024).

3 Method

To investigate our research question, we utilise a multiple-stakeholder case design methodology, as suggested by Yin (2013), combined with rapid ethnography and grounded theory approaches to understand “how things happen” (Humphreys & Watson, 2009). This methodology is particularly effective in understanding the dynamics and processes within an entrepreneurial university (Guerrero & Menter, 2024).

Multiple-stakeholder case design and interview analysis were used as complementary emerged as a robust research method that involves studying a case in-depth. In the context of an entrepreneurial university, this involved selecting a centre for entrepreneurship known for entrepreneurial activities and initiatives and use detailed examination of the case, providing insights into how entrepreneurial activities are integrated into the university's culture, operations, and strategy. This approach also follows by interviewing sixteen stakeholders of the University of Reading entrepreneurial ecosystem who have worked for at least three years with University of Reading or aimed to start a business in Reading in collaboration with University of Reading. This approach draws on the rapid ethnography method by Reeves et al. (2016) as our study enables to reveal complex interrelationship between actors of entrepreneurial university and the local ecosystem applied to a distinctive context where stakeholders (students, faculty, venture capital, entrepreneurs) are located.

To ensure a comprehensive understanding of the study sample, sixteen participants from Reading, UK. Each interview acted as a separate analytical unit, with multiple cases

helping to replicate, contrast, and extend the emerging theory, according to Yin (2013). Initially, codes were generated *in vivo*, followed by their categorisation into open codes. These were then refined to establish themes, which facilitated the generation of the theory.

The coding and categorisation processes were iterated until data saturation was achieved for both entrepreneurial ecosystems (EEs). The data collection occurred through face-to-face interviews between September 2022 and September 2023, involving various economic actors from EEs such as researchers, senior managers in multinational companies, directors of technology transfer offices, and professors. Interviews typically lasted from 40 min to an hour, with all conversations recorded and transcribed, resulting in 58 pages of text.

Respondents were chosen using the principle of "purposeful sampling" (Miles & Huberman, 1994), which prioritises the depth and richness of the study findings. To preserve the authenticity of responses, direct quotes from the interviewees were included (Corden & Sainsbury, 2005). Detailed information about the interviewees and the interview questions can be found in Appendices A1 and A2. The approach enables us to quickly immerse ourselves in the entrepreneurial university environment. By acting as participant-observers, researchers can gain a nuanced understanding of the interactions and relationships between various actors within the university's entrepreneurial ecosystem. This method is particularly useful in capturing the real-time dynamics and cultural nuances (Corbin & Strauss, 2014).

Grounded theory, as described by Corbin and Strauss (2014) was employed to analyse data collected from both interviews and cases. In the context of entrepreneurial university, this method can help identify key themes and patterns related to a specific entrepreneurial university unit, including the role of faculty, students, and external partnerships (Wright et al., 2017).

For the case study we used a mix of primary and secondary sources. Primary data included interviews with sixteen stakeholders including the board of the Henley Centre for Entrepreneurship, technology transfer director and managers, head of school, vice-rector on resources, business and engineering students, other administrative staff) and external partners. Secondary data will include content from university websites, research centres, regional reports, companies affiliated with the university, think-tank reports, newsletters, conference papers, and presentations drawing on principles described by Baines and Cunningham (2013). This comprehensive data collection will provide a holistic view of the entrepreneurial university, encompassing both internal dynamics and external interactions.

4 Entrepreneurship process at university of reading

The Henley Centre for Entrepreneurship and its spinout Henley Enterprise Lab are a part of Henley Business School and aim to promote teaching and research in entrepreneurship, as well as support student and alumni targeted initiatives to start businesses locally and internationally through multiple financial incentives (such as a science park, incubator, and competitions) and non-financial incentives, such as social enterprise competition and other rewards, acknowledgments, prizes, and contribution to communities. While being within Henley Business School, the Henley Centre for Entrepreneurship and Henley Enterprise Lab altogether have full control over its funding and operates with a distinct, separate budget. This budget is driven by teaching entrepreneurship courses, consultancy, sponsorship of initiatives like the Henley Summer Start-up Boot Camp, access to funds for entrepreneurs, and fees that businesses pay for consultancy

and business project development. Henley Business School pays faculty and staff who are part of the Henley Centre for Entrepreneurship and Henley Enterprise Lab. The Centre and Lab neither compete with other centres and institutions within the University or Henley Business School, nor does it rely on other centres for knowledge or finance. Faculties and departments may utilise the Henley Centre for Entrepreneurship if they are interested in market testing for products developed in other faculties. The Centre conducts experiments and market testing for products, as well as teaches future entrepreneurs within the university the basics of entrepreneurship theory and practice.

Analysing the interviews transcripts and our own experiences we wanted to demonstrate how entrepreneurship centers at universities can effectively addresses the demand from business, communities and university managers for creation of market opportunities and introducing them in the market. We would like to focus on the mechanisms discovered as a result of interviews with experts and secondary data analysis to demonstrate how entrepreneurship process can evolve from the ideation phase through to validation, fundraising, commercialization and scaling within the university boundaries drawing on Civera et al. (2017) and Civera and Meoli (2023).

Interviewee 8 (I8) notes that “The journey begins with the creation and development of business ideas, where students and researchers identify opportunities through various means such as observing macro-trends, recognising problems needing solutions, or identifying market gaps”. This phase we find to be crucial as it sets the foundation for future entrepreneurial endeavors. I9 further adds that “The Centre and Enterprise Lab facilitates this through programmes like the Business Clinic, where experienced faculty members provide advice and guidance on refining and developing these ideas”. This aligns with the findings of Ardichvili et al. (2003), emphasising the role of personality traits, social networks, and prior knowledge in recognizing entrepreneurial opportunities.

Interviewee 1 (I1) suggested that “This process needs to be is facilitated by student entrepreneurship programmes and courses that can move rapidly beyond traditional classroom teaching to experiential learning” as described by Minola et al. (2016), which is associated with improved employment outcomes for students (Wright et al., 2017). The development of the framework may include university mechanisms to facilitate student ideation and creativity courses to spark entrepreneurship activity (Audretsch & Belitski, 2013), along with a continuum of involvement from pre-accelerators, with the type of accelerator becomes most important (Sohail et al., 2023).

Moving from idea validation to commercialisation, Interviewee 2 (I2) poses that “the Henley Centre for Entrepreneurship provides numerous supports through the Entrepreneurship Hub, which offers a co-working space, an opportunity to share ideas and access to faculty advice”. This is instrumental in transitioning from ideation to a structured business plan ready for the market. Interviewee 8 notes that “Competitions like IDEAFEST further stimulate this transition by providing students with the platform to pitch their ideas, gain feedback, and win funding to develop their ideas further”. This stage is critical as it marks the transition from ideation to commercialisation, which is often not detailed in the literature on entrepreneurial universities.

For those businesses that successfully navigate the initial stages, Interviewee 5 (I5) confirms that “the Henley Centre for Entrepreneurship offers continued support through the Accelerator Programme and access to the Henley Business Angels”. This support is crucial for scaling and sustainability, helping businesses grow beyond their initial setup and align with strategic knowledge and entrepreneurial capital at the university (Audretsch & Belitski, 2022a). Interviewee 16 confirms that “The involvement of Henley Business Angels

and other funding opportunities illustrates the practical application of transitioning from early-stage ventures to established businesses”, and this is important in the transition from business idea to a product or service.

As Interviewee 14 (I14) outlines “The entire process is underpinned by the university’s development of dynamic capabilities in fostering an environment conducive to starting a business”. Interviewee 8 further expands that “This includes teaching modules specifically designed to equip students with the necessary skills for entrepreneurship in the digital economy, and leadership skills in digital organizations”. We believe that these educational components are critical in developing the human capital and ability of entrepreneurial cognition (Korosteleva & Belitski, 2017). “The role of competitions and direct funding mechanisms in accelerating commercialisation is important”, as suggested by Interviewee 5 (I4). Complementing to it Interviewee 3 (I3), states the “impact of these programs on long-term entrepreneurial success and their integration into the broader economic and societal fabric needs to be further developed and explored to develop skills in students and staff to discover and exploit market opportunity”.

The entrepreneurship process at University of Reading thus provides a framework for developing dynamic capabilities of a centre and students to be able to start a business. We draw on the recent research by Civera et al., (2020a, 2020b) and Guerrero and Menter (2024) which enables us to propose and visualise the structured entrepreneurial process based on the interview data. The process was developed and applied at Henley Business School in University of Reading aiming to create an entrepreneur’s journey map for dynamic capabilities development (Fig. 1).

5 Entrepreneurship process and three pillars of entrepreneurial university

5.1 Teaching

New digital economy has produced several challenges in organisation of entrepreneurship processes at the Henley Centre for Entrepreneurship and Henley Enterprise Lab which is focused on students and the teaching of technological and digital skills required to start a

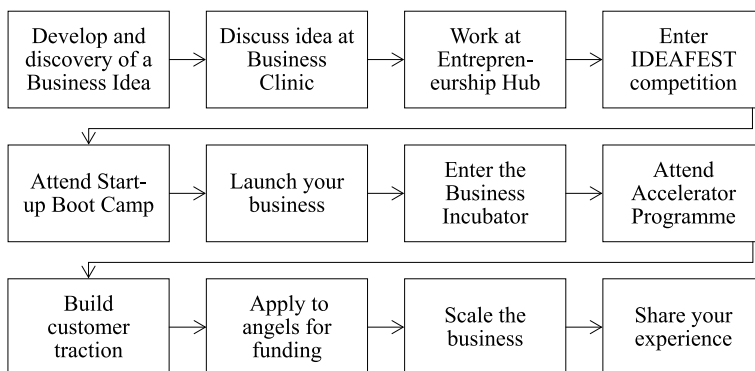


Fig. 1 Entrepreneurial process at the Henley Centre for Entrepreneurship, University of Reading for students and faculty to develop business idea to market

business (Guerrero et al., 2021) and entrepreneurship education (Arranz et al., 2019). It has explained the rapid technical and digital tools enabling to start a business and attract financing. The Henley Centre for Entrepreneurship teaches its students skills and capabilities that are required in the digital world of the entrepreneur both at the undergraduate and post graduate levels.

Interviewee 4 (I4) states that the “development of dynamic capabilities can be done by teaching undergraduate and postgraduate students digital tools and skills, for example through Digital Entrepreneurship module”. I4 further posits “The module enables students to grasp four important aspects of the digital organisation”. Interviewee 7 (I7) argues that “teaching digital skills helps students understand the major features of the digital economy including recent trends in digital technology especially AI as well as teaches students how digital technology shapes novel disruptive business models”. Interviewee 6 (I6) with technology background also confirmed that “teaching digital skills at business schools imparts knowledge of how entrepreneurs use digital marketing methods to approach, attract and acquire customers and finally, the teaching builds understanding of how entrepreneurs exploit different monetization strategies and mechanism in highly competitive digital business contexts”.

At the post graduate level, as highlighted by I4, we have “Leadership in Digital Organisations module in which the role of leadership and frontiers in leadership practice in a pervasive digital environment. This module builds awareness of key digital technologies and discusses their impact on managerial practices, processes, and strategies”.

We argue based on the evidence from interviews and our own reading that entrepreneurial universities’ teaching ordinary and dynamic capabilities support idea development and commercialisation especially the most innovative teaching, by providing the most updated knowledge/skills critical for developing radical innovations.

Innovation is a critical factor for all businesses with a vision to grow and become sustainable. The key question for every business is how to embrace and leverage innovation whether radical or incremental? (Belitski et al., 2021, 2023). The answer is businesses need to do four things which students, managers and faculty need to know in order to engage successfully.

Interviewee 2 recommends that “master the discovery skills required for innovation. Then, create a culture of innovation. Then be customer centric and work with customers to develop business ideas for new products and services and finally, build a sustainable competitive advantage”. The foundations of development of dynamic capabilities at Henley Centre for entrepreneurship follow research by Kim B. Clark, Professor of Business Administration at Harvard Business School. From his research he identified five primary discovery skills that underlie innovation—associating, observing, questioning, networking, and experimenting (Dyer et al., 2019). First and foremost, innovators should be good at associating, observing, questioning and it is important to train students in these skills. Second and third, observing and questioning. Innovators observe things, then question why? If you want to be an innovative person, when you see things, you must pay attention and then wonder why and ask where, when, what, who, how as well as why? These are the innovators’ ‘best friends’ and accompany them wherever they go. Fourth, networking is a skill that innovators use to create and develop ideas by spending time with a diverse group of people with different backgrounds and experiences. By engaging with others, innovators increase the probability that they are going to gain useful insights (Dyer et al., 2009). We contend that innovators are constantly experimenting. Culture of Innovation is a key of entrepreneurial mindset we aim to cultivate and teach. To create a culture in which innovation flourishes requires determination and at the center comprises of the following steps.

As I7 notices “First, we need to put innovation at the heart of strategy, and communicate it to all staff. Second, define jobs around innovation and make it a job requirement. Third, promote team work to facilitate innovation. Innovative companies use internal communication platforms like Slack. Fourth, recognise innovation in every part of the company”. There are many simple ways of doing this like hosting a regular companywide innovation fair as suggested by George (2005). Finally, it is important that innovation is seen to be supported from the top. To go from idea to successful innovation requires a great deal of support and collaboration on ideas internally and with external partners (Audretsch et al., 2023a, 2023b). When people are surrounded by constant communication and encouragement from the top, they can find the courage to try, fail, redo, and try again.

Entrepreneurship education at Henley aims to teach customer-centric skills to students. As I2 suggests: “Customers are one of the external collaboration partners viewed as important for market validation, a source of growth”. Customers for students thinking of starting a business is a source of ideas and knowledge about the market (Belitski & Rejeb, 2022; Guenther et al., 2023). Working alongside customers helps identify six basic needs, and success comes when these needs are served and satisfied with a strong emphasis on delivering what the customer requires. At the Henley Centre for Entrepreneurship I4 states: “faculty teach students to address these needs by asking six questions when testing a product, which a consumer would typically ask a supplier: How can you make my life better in some way? How can you save me time? How can you save me money? How can you help me make more money? How can you help me get greater satisfaction from what I do? How can you improve the way I’m perceived?”.

While customers provide a unique and immediate testing ground for ideas in many sectors, much of the product development is performed without direct market contact or in labs. For instance, the development of a more fuel-efficient car engine is usually done in cooperation with a technical university and engineers in incumbent firms, rather than with customers. This also applies to the development of new drugs, which typically starts in the lab of a pharmaceutical company, sometimes based on the development of a new chemical substance at a university. Companies in industries such as retail trade or information technology, which are a major part of startups at Henley Centre for Entrepreneurship, work closely with customers. Entrepreneurs may want to know if customers liked the cake or a T-shirt, whether it needs to be shorter or longer, or whether a cake needs to contain fewer calories. Universities and entrepreneurship centers have heterogeneous business models and, of course, may rely on different external partners for collaboration.

As part of teaching dynamic capabilities I6 identifies: “Henley Centre for Entrepreneurship on a regular basis invests resources in dynamic capabilities to learn how to create opportunities within the centre and exploiting external opportunities—mainly knowledge from other universities and businesses to ensure sustained performance”. I8 developed the performance measurement applied by Centre such as: “a number of students attending entrepreneurship education, number of startups created, regional impact of the startups created, mainly employment, sales and patents; resources invested in students startups and spinoffs”. In this assumption, the dynamic capabilities of the Centre (new digital courses) have supported the third university mission, especially the most innovative educational trends, by providing the most updated knowledge to business and skills to students for developing entrepreneurial innovations and the knowledge to be transferred and commercialised. Based on these arguments, we propose:

Proposition 1 *Dynamic teaching capabilities of the entrepreneurship process at university positively contribute to the third university mission.*

5.2 Research

Regarding research activities, the contribution of research to innovative or radical disruptions is strongly related to dynamic capabilities based on the configuration/assignment of resources for exploring/exploiting the knowledge (Helfat et al., 2007; Link et al., 2007). In a more practical context, dynamic capabilities play a crucial role in the realm of research activities, particularly in creating innovative or radical disruptions. This hinges on how resources are configured and assigned for the exploration and exploitation of knowledge.

Research citations, publications, and joint R&D projects between a university and external business partners stand as an advanced indicator of dynamic research capabilities (Guerrero & Menter, 2024). They enable the formation of international collaborative projects, drawing together multiple scientists from research centres, labs, or schools across the globe (Romero et al., 2021). An example of research collaboration for product development and commercialization is a partnership between University of Reading and BeneTalk. Interviewee 12 (I12) demonstrated that: “The utilization of grant funding enables collaboration between innovative small to medium-sized enterprises (SMEs), such as BeneTalk in the private sector and university researchers has proven to be instrumental in initiating and expanding businesses”. Furthermore, much of the R&D with commercial applications is taken care of by incumbents, and particularly large incumbent firms. Incumbent firms finance much applied R&D and also some basic R&D (Audretsch et al., 2023c).

“This collaboration with incumbents is important as it allows learning from their R&D and access real-world technological challenges”—posits I12, given an example of BeneTalk company collaboration with University of Reading (Venturenomix, 2023). In this case, £480,000 of total UK R&D Grant Funding was secured to facilitate R&D activity at the University of Reading Science Park. However, this is a very minor share of the R&D-generated knowledge performed by incumbents in collaboration with the university and that ends up in new entrepreneurial firms.

Firms, much like universities, must negotiate organisational trade-offs when deciding on the development of capabilities which further use in the development of new products and services (Wang & Ahmed, 2007). This is especially true for entrepreneurial universities, which have to combine competing priorities, values, and drivers in accomplishing their missions, such as fostering innovation in teaching or research (Radko et al., 2023). Further highlighting this point, Marzocchi et al. (2019) underscore the different pathways that emerge based on allocating and deploying resources and capabilities. Studies by Audretsch (2014) and Civera et al., (2020a, 2020b) indicate that the success of a university’s third mission largely depends on the ordinary and dynamic capabilities of students, researchers and faculty cultivated within the university. Given the importance of localised knowledge spillovers from the university, collaboration between businesses and the university is most beneficial within the close geographical proximities and for firms and universities who invest in dynamic capabilities, and applied research (Audretsch & Belitski, 2023a).

In this context, the centre manager prioritises and allocates resources to those research activities that represent a sustainable competitive advantage (Heaton et al., 2019, 2020). This is in line with the priorities of university stakeholders (Siegel & Wessner, 2012; Siegel & Guerrero, 2021) and contributes significantly to socioeconomic development (Belitski,

2019). Under this assumption, universities' ordinary research capabilities, such as publications, and dynamic research capabilities, such as dissemination, support knowledge transfer and technology commercialization. This is particularly true for the most innovative research (Guerrero & Menter, 2024), which provides the latest knowledge and human talent essential for developing sustained research impacts. Based on these arguments, we propose:

Proposition 2 *Dynamic research capabilities of the entrepreneurship process at university positively contribute to the third university mission.*

5.3 Commercialisation

Commercialisation takes many forms including patenting, licensing, spinning out a company, which was born from the research conducted within the university, consultancy could also be considered commercialisation (Siegel et al., 2004).

The process of commercialisation of products and services and with that knowledge embedded in them demands investment in knowledge and dynamic capabilities at university and with external partners (Audretsch et al., 2021). Ordinary capabilities have thereby been described as a firm's ability to perform well-delineated tasks with a core focus on efficiency (doing things right). Hence, ordinary capabilities in idea development and commercialisation relate to hiring skilled personnel, facilities and equipment, deploying organisational processes and routines as well as administrative coordination of entrepreneurial activity (Teece, 2014). In contrast, dynamic capabilities have been described as the ability to build, renew, and reconfigure resources, i.e., create, extend, and modify a firm's resource base, and translate those into innovation (Audretsch et al., 2023a, 2023b, 2023c; Helfat et al., 2007).

Externally, a university requires to build a system of relationship with stakeholders mentioned by Navarro and Gallardo (2003: 209) as "changes in their environment and greater social demands are confronting universities with the need to implement a process of change that requires continuous improvement and the creation of dynamic capabilities".

Dynamic capabilities thereby enable universities to proactively change and adapt underlying strategies and leverage their resource base (Audretsch & Belitski, 2021), highlighting the essential role of both capabilities to identify opportunities and pursue these with products and services. As an example, at the UoR the process of knowledge commercialisation is overseen by the Knowledge Transfer Centre (KTC) which is also the front door for businesses and a contact point for external stakeholders that seek to collaborate with the UoR.

The KTC in turn collaborates internally with the UoR's 14 schools including the Henley Business School to commercialise research that ranges from licensing knowledge to supporting students and researchers that go on to launch and build companies.

One of the example, is Tim Brownstone featured in two components—teaching and research and he acquired knowledge whilst studying at the UoR and went on to launch KYMIRA. I2 poses: "KYMIRA prides itself on being a life conscious technology company, developing smart garments using proprietary technologies for sports and healthcare markets continues to make strong headway". Tim has been supported by the Henley Centre for Entrepreneurship via coaching and entrepreneurial space accelerator where he regularly delivers talks to students (Minola et al., 2016), both for modules and extra-curricular events such as those led by the student-led Reading Entrepreneurship Society. KYMIRA

is an example of knowledge commercialisation from the university which began when KYMIRA won the Henley Best Start-Up Business Competition 2016, the CEI received investment from members of the Henley Business Angels—a network of high net-worth individuals and sophisticated investors established by the Henley Centre for Entrepreneurship to support spinoffs offering up to 250,000 British pounds in exchange of equity. In his interview I2 said:

"It was an honour to have won the Henley Best Start-Up Business Competition 2016 award against such strong competition. Knowing that KYMIRA is considered a leading innovator in a region with some of the fastest growing and largest tech companies means the world to us all. Trials are underway in the UK and US of our smart textiles with the main knowledge of the heart rate monitoring and sportswear technology was acquired during my years at UoR". Depending on the amount and quality of teaching conducted by faculty members at the centre who are also engaged in research, those involved in knowledge transfer and technology commercialisation activities (Heaton et al., 2019) may be more inclined to focus their time on publications or inventions rather than teaching. Given that resources are limited, center managers must make strategic decisions regarding their allocation. I9 argues that "University managers could redefine faculty tasks based on their profiles and experiences. However, to avoid potential conflicts between teaching and research, it is crucial that managers prioritize projects that perform better or are more profitable, and then tailor the teaching to support these projects". We argue that if research is proven to be profitable, the organisation will not face trade-offs in choosing between alternative capability developments (Guerrero & Menter, 2024; Wang & Ahmed, 2007). Instead, it could strengthen teaching programs that build on understanding the market's and companies' skill requirements (Marzocchi et al., 2019). For example, by inviting CEOs from large companies and independent entrepreneurs for discussions, students and faculty can understand what skills are needed at different stages of business development and how university-organized research can help students develop these skills to be more competitive in the labour market or when starting their own businesses. The allocation and deployment of resources and capabilities can be complementary if dynamic capabilities developed through teaching and research are aligned. As in the entrepreneurial ecosystems (Belitski & Godley, 2020), at universities, dynamic teaching and research capabilities can achieve a synergistic effect given the innovative and entrepreneurial orientation of teaching that draws on research, but also uses research to guide teaching (Cunningham et al., 2021). For instance, I14 states that "the methodological tools taught at the university, derived from research, can then be applied practically in student teams working with entrepreneurs to help them find a route to the market". Interestingly, that in this collaboration, entrepreneurs and students work together to find relevant methods and tools from research and adapt them to create a model for a specific business or industry. In this case, the method that students are taught, which is derived from dynamic research capabilities, is perfectly aligned with the objectives of the business or consultancy project that students undertake with an entrepreneur to deliver the product to the customer, that manifests the third university mission (Siegel & Guerrero, 2021). Based on these arguments, we propose:

Proposition 3 *A complementarity relationship between dynamic teaching and research capabilities is feasible and viable which should be part of the third university mission.*

6 Discussion and conclusion

6.1 Theoretical developments

Previous studies have highlighted that the strategic view of entrepreneurial universities demands more academic debate (Cunningham & Menter, 2021; Klofsten et al., 2019; Minola et al., 2016), especially nowadays, considering several externalities and exogenous effects (Siegel & Guerrero, 2021; Wright et al., 2017). Concerning our study, it is well known that especially dynamic capabilities require time to be configured and implemented and then also for the outcomes to be achieved. In this view, this study contributes to the literature with relevant insights about how these dynamic capabilities (internal determinants) have been strongly related to the German entrepreneurial universities' pathways over the last two decades (Graf & Menter, 2022).

The relevance of dynamic capabilities in the context of the entrepreneurial university mission can be gleaned from the contrast and interplay with ordinary capabilities. While ordinary capabilities focus on efficiently executing well-defined tasks in operations, administration, and governance, dynamic capabilities are pivotal for adapting and thriving in changing environments, which is essential for entrepreneurial universities.

First, dynamic capabilities are crucial in higher education due to the rapidly evolving nature of knowledge, technology, and societal needs. Universities are increasingly expected to be not just centers of learning but hubs of innovation and entrepreneurship. They are used by the Henley Centre for Entrepreneurship in operations, administration, and governance (Teece, 2014), dynamic capabilities are understood as the organisational ability to integrate, build, and reconfigure internal and external capabilities. This shift demands the ability to sense opportunities, seize them effectively, and continuously transform in response to external and internal changes.

Second, the challenge for entrepreneurial universities lies in balancing their traditional roles in teaching and research with the newer demands of commercialization and technology transfer. Dynamic capabilities enable university managers to navigate this complex landscape by reallocating resources, such as skilled personnel and facilities, towards areas that present the most significant opportunities for growth and impact.

Third, adopting dynamic capabilities in universities requires a systemic-level approach. This involves understanding the interdependencies within the university system, such as how teaching impacts research and commercialisation (Teece, 2023). It's not just about managing each of these facets in isolation but also understanding how they influence and enhance each other.

Fourth, dynamic capabilities play a key role in fulfilling the 'third mission' of universities, which involves engaging with and contributing to the broader society (Teece, 2023), often through innovation and entrepreneurship. Recently, Schriber and Löwstedt (2020) have shown the role of ordinary and dynamic capabilities in responding to dynamically changing environments. By integrating dynamic capabilities, universities can better orchestrate their assets and infuse entrepreneurial and innovative behaviors within their communities, thereby enhancing outcomes like knowledge transfer and technology commercialization.

In the context of rivalry, particularly in the higher education sector, dynamic capabilities provide a competitive edge. They enable universities to not just respond to the immediate challenges posed by competitors but also to anticipate future trends and prepare accordingly. Effective management of resources, guided by dynamic capabilities, allows

universities to allocate their resources in a way that aligns with both current needs and future opportunities in the third mission of university (Heaton et al., 2019, 2020).

We argue that the application of dynamic capabilities in the entrepreneurial university context is a strategic necessity as described in Navarro and Gallardo (2003) and more recently in Guerrero and Menter (2024). It enables universities to evolve continuously, balance their multifaceted roles, and remain competitive and relevant in a rapidly changing educational and socio-economic landscape. This approach calls for a systemic understanding of internal processes and a proactive stance in managing resources to accomplish their missions effectively.

Based on our results, this study contributes to the entrepreneurial university literature (Guerrero et al., 2015, 2021) by exposing the contribution of entrepreneurship process in research and new ideas commercialisation. The development of entrepreneurial universities depends on both ordinary and dynamic capabilities which need to be leveraged and managed. Hence, strategic decision-making with regard to the allocation and deployment of resources and capabilities is required (Helfat et al., 2007).

6.2 Practical implications of the case study

Several implications emerge from our study. For university managers, universities should adopt an entrepreneurial orientation to transform old routines into new ones in knowledge based dynamic environments. In this vein, the role of university managers should be to transform universities' activities and shape (entrepreneurial) ecosystems at universities and regions where those are located (Audretsch, 2014; Marzocchi et al., 2019).

This study offers insights into the importance of dynamic capabilities and the competitive nature of employing the entrepreneurship process, emphasizing the need for effective resource management to fulfill the missions of entrepreneurial universities. For the community within these universities, the findings shed light on the supportive roles of teaching and research in fostering entrepreneurial behaviours. This is particularly relevant to the third mission of German entrepreneurial universities, which focuses on radical innovations (Heinonen & Hytti, 2010; Guerrero et al., 2021). However, the success in developing entrepreneurial capabilities will depend not just on the strategies of the universities, but also on the objectives, expectations, and needs of potential university entrepreneurs. An effective blend of educational programs and innovative knowledge-creation scenarios could lead to significant benefits for both potential entrepreneurs and the university. For policymakers, this study underscores the importance of engaging in teaching and research activities and highlights the value of collaboration between universities and business. Such collaboration is crucial for regional value addition through knowledge transfer and technology commercialization.

The Henley Centre for Entrepreneurship and alike can develop entrepreneurial leadership across the institution by leveraging the concepts of ordinary and dynamic capabilities. Ordinary capabilities, focusing on efficiency in well-defined tasks, can be harnessed to streamline the centre's operations, administration, and governance. However, it's the dynamic capabilities that are crucial for fostering entrepreneurial leadership (Guerrero & Menter, 2024). These involve the ability to integrate, build, and reconfigure both internal and external knowledge (Audretsch & Belitski, 2023b) to adapt to changing environments. The Henley Centre for Entrepreneurship can thus serve as a catalyst for embedding entrepreneurial behaviours within the university community, ensuring resilience and alignment with broader ecosystem demands. This systemic approach to entrepreneurial leadership

development addresses the interdependencies between teaching, research, and commercialization, helping university managers navigate these complex dynamics effectively.

The three propositions presented in this paper are put forward to guide universities to become entrepreneurial. Why? Because in a world where change is accelerating in a large part driven by the advances in technology highlighted by the increasingly accepted prediction that the next 5 years will see changes that exceed the changes of the last three decades, universities must adapt and change to survive. To change means to innovate and that is being entrepreneurial. This paper challenges all universities to become entrepreneurial and embrace the entrepreneurial mindset and innovation. Not to be entrepreneurial is to die.

7 Research limitations

The current research presents several limitations, predominantly related to the identification and quantification of the rivalry impacts exerted by ordinary and dynamic capabilities on a university's third mission. First, a prospective progression of this research would involve refining the theoretical framework to enhance comprehension of the rivalry dynamics. This could be achieved, for instance, through the incorporation of information asymmetry or agency theory perspectives. Additionally, the empirical robustness of this study could be strengthened by gathering comprehensive longitudinal data to better encapsulate the strategic resource allocation of entrepreneurial universities.

Secondary limitations include the absence of comparative information about the entrepreneurship process of other universities both in the UK and other countries and no data to explain how the entrepreneurship process has evolved over time and how it might evolve in the future to educate students, equip managers, and enable faculty to deliver high quality teaching in a dynamic and continually changing market and industry.

7.1 Future research agenda

The objective of this paper was to theorise the contribution of entrepreneurship process at university related to teaching, research and commercialisation of knowledge and IP as within university enablers of innovations and entrepreneurial activity.

Based on a unique insight into the Henley Centre for Entrepreneurship at UoR and its embeddedness in the Thames Valley region we can find that development of ideas and commercialisation of those ideas is greatly facilitated by an entrepreneurship process, which at the UoR follows a series of activities which define the third mission.

In our role as social science researchers and university members, we would like to stimulate scholars from different social science fields to re-think more broadly about the opportunities for making an impact with our research focus on the development of entrepreneurial universities' dynamic capabilities and begin doing so more often. We believe that it is the perfect time to "make a difference" and "support the strategic entrepreneurial transformation of our workplaces" through our research, teaching, and the interaction with multiple socio-economic agents.

Appendix A1

List of interviewees in Reading

Number	Interviewee	Core products/services	Sector	Interview role
1	Reading & Wokingham Chamber of Commerce	Support to local business	All	Andy Cowie, President
2	Kymira	Advanced sportswear	Sports	Founder & CEO, Tim Brownstone
3	Rotolight	Advanced LED lighting technology system	Technology	Founder & CEO
4	Henley Centre for Entrepreneurship	Entrepreneurship	Higher Education	Director of Henley Centre for Entrepreneurship
5	Datasift (scale-up)	Financial services, business analytics, artificial intelligence	ICT	CEO, Mike Bagshaw
6	ITS (scale-up)	Food development, reformulation and innovation	Food	CEO
7	Myfalcon (scale-up)	Business consultancy services	IT consulting	Co-Founder, Shahab Karimi
8	Henley Business School, University of Reading	Education, business consultancy, start-ups	Higher Education	Jurek Sikorski, Director of Henley Enterprise Lab
9	Research services—TTO, University of Reading	Education, Licencing, commercialization	Higher Education	Dr Anne-Marie van Dodeweerd Head of Research Services
10	Telios partners (entrepreneur)	Business consultancy services	Knowledge services	Paddy Radcliffe, Co-director
11	Edge Plus Global Ltd (large firm)	Human resource apps for improving work efficiency	Human Resources	Melvyn Lloyd, CEO
12	BeneTalk	Innovation and services	ICT	Jordi Fernandez, CEO
13	The Thames Valley improvement agency (entrepreneur)	Social and welfare services	Social	Andrew Humphreys CEO,
14	MCFT (large firm)	Commercial industrial and kitchen equipment maintenance	High-tech services	CEO, Chris Cragg
15	Innovation Catalyst, Thames Valley Science Park (business incubator)	Business support, angel investment	all	CEO, Ed Cooper
16	Reading Borough Council, Reading (local government)	Business support, public service, opportunities, social care, etc	Public	Peter Sloman, Chief executive

Appendix A2

Interview Protocol for Reading stakeholders

What is your name and surname?

What is your role within your company/ University?

Can you describe your company and its main activities?

How has being located in the Thames Valley influenced your business?

Who are your role models within the entrepreneurial community at University of Reading?

What unique opportunities do you think are available to your collaboration with university?

What is the process of supporting entrepreneurs at university?

Have you secured entrepreneurial financing through the university?

How straightforward was the process to raise local entrepreneurial finance?

What entrepreneurial courses you know at university that facilitate entrepreneurial skills?

How does the modules at the undergraduate and postgraduate level equip students with the necessary skills for the digital economy?

How are students taught to develop innovative business models?

How does the center foster a culture of innovation among its students and faculty?

What methods are used to teach students and entrepreneurs the discovery skills as essential for innovation?

How does the center/university encourage students to engage with real-world customers to validate and develop their business ideas?

What are the key strategies used by the center to help students develop and commercialize new products and services?

How do the dynamic capabilities taught at the center support students in creating sustainable competitive advantages?

Can you give examples of how the center collaborates with external partners to enhance the entrepreneurial education provided to students?

What role do networking and mentoring play in the development of student entrepreneurs at the center?

How does the center measure the success of its initiatives in fostering entrepreneurship among students?

What are the future plans you are aware of entrepreneurial education at university?

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