ENTREPRENEURIAL ECOSYSTEMS AND THE ROLE OF DUTCH HIGHER EDUCATION: THE CASE OF UTRECHT UNIVERSITY

ECOSSISTEMAS EMPREENDEDORES E O PAPEL DO ENSINO SUPERIOR NEERLANDÊS: O CASO DA UNIVERSIDADE DE UTRECHT

Recebido em 08.08.2024 Aprovado em 16.10.2024
Avaliado pelo sistema double blind review
DOI: https://doi.org/10.12712/rpca.v18i3.64022

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Abstract

Entrepreneurial ecosystems have received increased attention both in academia and from policymakers. Higher education institutions are considered among the most impactful organizations in entrepreneurial ecosstems and active stakeholders in the regional provision of support activities towards the creation of new ventures, becoming entrepreneurial universities. There is still room for learning from case studies, especially when focused on leading universities closely connected to regional entrepreneurial ecosystems. This is the case of Utrecht University in the Netherlands. Thus, the focus was in describing the role of this university, through its offer of a wide variety of entrepreneurial activities in the Utrecht region's entrepreneurial ecosystem.
Keywords: Entrepreneurial university. Entrepreneurship. University's third mission. Entrepreneurial ecosystem.

Resumo

Os ecossistemas empreendedores têm recebido cada vez mais atenção tanto no meio acadêmico como por parte dos decisores políticos. As instituições de ensino superior são consideradas entre as organizações de maior impacto nos ecossistemas empreendedores e atores ativos na prestação regional de atividades de apoio à criação de novos empreendimentos, tornando-se universidades empreendedoras. Ainda há espaço para aprender com estudos de caso, especialmente quando centrados em universidades líderes estreitamente ligadas aos ecossistemas empreendedores regionais. É o caso da Universidade de Utrecht, nos Países Baixos. Assim, o foco foi descrever o papel desta universidade, através da sua oferta de uma ampla variedade de atividades empreendedoras no ecossistema empreendedor da região de Utrecht.
Palavras-chave: Universidade empreendedora. Empreendedorismo. Terceira missão da universidade. Ecossistema empreendedor.

Introduction

Entrepreneurial ecosystems (EEs) have been the focus of increasing attention both in the academic world and in the field of public policy (Audretsch & Belitski, 2017; Bischoff & Volkmann, 2018; Spigel, 2020; Stam & Van De Ven, 2021). Among the diverse actors and factors that are discussed as relevant parts of EEs, higher education institutions (HEIs) are considered among the most impactful. They have a significant role in knowledge generation through basic and applied research, as well in generating a talented pool of people, through their educational efforts, that may contribute, either as entrepreneurs or employees, to a thriving EE (Diaconu & Dutu, 2015; Miller & Acs, 2017; Bischoff, Volkmann & Audretsch, 2018; Allahar & Sookram, 2019). Next to these two core missions of HEIs – research and education – they can play many other roles in the EE ranging from providing intermediary services (e.g., with consulting and incubation), acting as a network broker between public and private parties, providing infrastructure (incubators, accelerators, lab space), taking leadership roles for example in regional economic boards, and even in changing institutions and cultures in a country or region.

Many HEIs have incorporated into their structures specialized resources and activities, in the form of incubators and accelerators, aimed at supporting the creation and development of startups (Theodoraki, 2020; Van Rijnsoever, 2020). HEIs, for a long time, have also established technology transfer offices to diffuse knowledge and technology through commercial agreements for new and incumbent firms to explore them by offering new products and services to the market (Sadek, Kleiman & Loutfy, 2015; O'Kane, Cunningham, Menter & Walton, 2021).

This set of activities have evolved into what have been called the university's third mission. In other words, additionally to the university traditional roles of research and education, HEIs are expected to be active stakeholders in the regional provision of support activities whose focus is the creation of new ventures in society (Carayannis, Grigoroudis, Campbell, Meissner & Stamati, 2018; Lahikainen, Kolhinen, Ruskovaara & Pihkala, 2019).

This trend has resulted in a literature theme on entrepreneurship research centered on the so-called entrepreneurial university (EU), that started with pioneering studies by Clark (1998; 2001) and Etzkowitz (1983; 2001). Thus, there is a plethora of HEIs in many parts of the world that are trying to become entrepreneurial through the provision of technology transfer services, entrepreneurial training and education, and dedicated spaces for would be entrepreneurs previously to entering their chosen markets (Oftedal & Iakovleva. 2015; Prokop, 2021; Villani & Lechter, 2021).

The extant literature has approached this research theme usually through empirical studies of single universities. Thus, the focus has been centered on how and with what consequences entrepreneurial universities have been able to execute third mission activities in their local influence region. Despite the increasing number of studies on entrepreneurial universities, there is still room for learning from case studies, especially when focused on leading universities closely connected to regional EEs. This is the case of Utrecht University in the Netherlands. Thus, the focus of this study was concerned with understanding the role of this university, through its offer of a wide variety of entrepreneurial activities in the Utrecht region's EE. In essence, this paper tries to answer, first, whether Utrecht University can be considered an entrepreneurial university? And second, what is its role in the regional entrepreneurial ecosystem?

In order to answer the two questions, a case study approach was adopted. After collecting primary information from Utrecht University's website and annual reports, a set of interviews with key staff from the University faculty and management team provided further information on the role of Utrecht University at its regional EE. The case of Utrecht University was chosen, because of its relevance for higher education in the Netherlands, as the second biggest institution, and also for its comprehensive set of activities aiming at fostering entrepreneurship both with academics and students.

This paper is structured into six additional sections, besides the introduction. The following section is dedicated to presenting a literature review of the previous studies on entrepreneurial universities and their role on EEs. The third section deals with the research procedures adopted for this study. The fourth section brings information about entrepreneurial activities in the Netherlands as a whole and its twelve provinces. The fifth section describes the entrepreneurial activities developed by Utrecht University, followed by a section dedicated to describing Utrecht University's role in the regional EE. The final section discusses the findings in view of the extant literature and points to future research avenues

Entrepreneurial Universities and Their Role in Entrepreneurial Ecosystem

Recent years have witnessed a great transformation in the university's role in society. Audretsch (2014) commented that this transformation followed two stages. The first was the movement from the traditional Humboldt model of university, based on freedom and independence of scholarly inquiry towards an entrepreneurial university, that should be able to transfer technology and facilitate knowledge spill to society (Etzkowitz, Webster, Gebhardt & Terra, 2000). The second stage of this change resides on the assumption by universities of a broader role that contributes and provides "leadership for creating entrepreneurial thinking, actions, institutions, and […] entrepreneurship capital" (Audretsch, 2014, p. 319). This evolving change was also commented by Foss & Gibson (2015, p. 1):

> In addition to the key objectives of excelling in education and research, universities worldwide are increasingly tasked with fulfilling and enhancing the third mission of "service" with a concerted effort to help stimulate and sustain economic development. With this increased emphasis on commercializing research, licensing of technology, creating university spin-offs, introducing entrepreneurship programmes, and expanding university–industry relations, universities are being encouraged to take an entrepreneurial turn.

This new role has been termed in the literature as the university's third mission (Abreu, Demirel, Grinevich, & Karataş-Özkan, 2016; Secundo, Mele, Del Vecchio, & DeGennaro, 2021). Lahikainen, Kolhinen, Ruskovaara and Pihkala (2019, p. 97) suggested that "the entrepreneurial university mission is built on the academic tasks of research and education, with entrepreneurship having been introduced as a third element during the last two decades". However, there can be resistance amidst university staff either, when this initiative streams from a top-down approach by university management (Lahikainen, Kolhinen e*t al.*, 2019) or based on critical opposition from researchers alleging possible negative effects that this mission would produce for free and independent research (Karlsson, Wigren-Kristoferson & Landström, 2015). Other critical vies about entrepreneurial universities can be found in Fairclough (1993), Mautner (2005) and Armbruster (2008). Nevertheless, the idea of an entrepreneurial university has gained widespread attention and support specially after many European countries have stipulated that universities should comply with educational policies that stressed their third mission (Gibb & Hannon, 2006; Philpott, Dooley, O'Reilly, & Lupton, 2011).

There is no consensual definition of what constitutes an EU. Ruiz, Martens and Costa (2020) provided a list of 17 definitions that appeared on published articles between 1998 and to 2015. The most common features in this set of definitions are related to knowledge production and dissemination; fostering new firms' creation both internally and externally; exploring new sources of funding through licensing and commercialization of intellectual property; innovation and strategic exploration of opportunities; and involvement in networks playing an active role in EEs.

Regarding government pressures, for instance, Karlsson, Wigren-Kristoferson and Landström (2015), reporting on the Lund University Entrepreneurial Ecosystem, informed that "third mission" was added in 1997 in the Higher Education Act of the Swedish government. This led to Swedish universities acting more strongly in industry-university cooperation and the fostering of knowledge-intensive entrepreneurship.

Alongside the literature on entrepreneurial universities, another trend has been the investigation of EU ecosystems (Fetters, Greene & Rice, 2010; Fuster, Padilla-Meléndez, Lockett, & Del-Águila-Obra., 2019). However, this line of inquiry has less potential of contributing towards the understanding of entrepreneurial activities in a region. Instead of studying university as EEs, it may be more productive to research on the universities' role in an EE and how this role is played (Diaconu & Duțu, 2015; Huang-Saad, Duval-Couetil & Park, 2018).

In an empirical study in Chinese municipalities, Lai and Vonortas (2019) produced evidence of the HEI's role in fostering EEs. They tested a two-stage model of EEs, where the presence of universities produced an indirect effect on entrepreneurial activities by increasing regional human capital and knowledge creation.

Another aspect usually discussed as part of entrepreneurial universities' activities is the offering of incubator services (Theodoraki, Messseghem & Rice, 2018) and accelerators for startups. Breznitz and Zhang (2019) analyzed University of Toronto's accelerator and its contribution to growth patterns of student startups. The results were positive and showed that the greater benefits were related more to firms' product growth and less to employment growth. This type of service is usually focused on high-technology and innovative new ventures and complement the central role that universities play in the formation of "talent that has the right knowledge to work in the entrepreneurship sector" (Steigertahl & Mauer, 2023, p. 9).

Radko, Beliski and Kalyuzhnova (2023) analyzed the role of four groups of stakeholders (knowledge enablers, knowledge creators, knowledge codifiers, knowledge facilitators) looking for similarities and differences on entrepreneurial outcomes of entrepreneurial universities based on data from 139 UK universities. Results indicated a significant role of business incubators and venture capital in increasing universities' entrepreneurial outcomes.

Jansen, Zande, Stam and Varma (2015) presented a comparative study of three universities involvement with stimulating students' entrepreneurship: Massachusetts Institute of Technology, International Institute of Information Technology Hyderabad and Utrecht University. They proposed a three stage Student Entrepreneurship Encouragement Model that contributed to those HEIs becoming EUs. This model included activities related to a stimulation stage, an education stage, and an incubation stage.

Mathieu, Meyer and De La Potterie explored the links among organizational aspects and entrepreneurial performance at Université Libre de Bruxelles. In their case study they perceived that there was not widespread acceptance of the university's third mission as a legitimate academic activity and suggested that the presence of strong leadership, dedicated parts of the university, such as, technology transfer offices and incubators, and a diverse funding base would be more central to producing entrepreneurial outcomes at the university.

Other university cases are discussed in Foss and Gibson (2015a): University of Stavanger (Oftedal & Iakovleva, 2015); University of Tromsø (Oftedal & Foss, 2015); New York University (Mulloth & Kickull, 2015); University of Texas (Gibson & Butler, 2015); Kymenlaakso University of Applied Sciences (Lindeman, 2015); University of Cambridge (Hodgson, 2015); Kingston University London (Butler & Mador, 2015); Chalmers University (Lundqvist, 2015); and Aalto University (Farny & Kyrö, 2015). In essence, what all the cases have in common, is that at the same time these universities adapted to external pressures for an entrepreneurial turn, they have also influenced their surrounding environment in creative and strategic manners (Foss & Gibson, 2015b).

Research Procedures

The research strategy for this study was based on a qualitative approach. The single case study approach was chosen based on the objective of describing in detail how a university can be involved with

entrepreneurial activities, i. e., a "how" question (Yin 1984). This is a common research strategy used in the context of entrepreneurial universities (Debackere, 2000; Leong, Wee & Yuen-Ping, 2008; Sperrer, Müller & Soos,2016).

Data collection was structured into two main procedures: interviews with relevant Utrecht University actors involved in entrepreneurial activities; and secondary data extracted from Utrecht University's annual reports (UNIVERSITEIT UTRECHT, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018; UTRECHT UNIVERSITY, 2019, 2020) and the university's website[1].

The interviewees were the leaders of four distinct Utrecht University units responsible for third mission activities. The interviewee´s and their university units are not disclosed following confidentiality agreements with them, but altogether their activities were related to entrepreneurship education and research, provision of entrepreneurial support for both internal and external public, dissemination and stimulation of entrepreneurial thinking and behavior across the entire university, and, finally, advocacy of entrepreneurial involvement and investments at Utrecht University. The interviewees involvement with Utrecht University and the regional EE was diverse, spanning from at least three years to more than 10 years of professional work both inside and outside the University. Two interviewees were faculty at the school of economics with leading roles and the others were managerial staff with high-level positions.

The interview procedures followed a semi-structured guide. Questions addressed several aspects of the university and the regional ecosystem aiming to elicit interviewee's perception of the university role in the local EE, the regional EE current status and regional EE's future potential development. The four interviews were fully transcribed, and the responses were compared looking for similarities and differences among them, trying to grasp a comprehensive view of the perceived Utrecht University's role in the regional EE. Thus, a conceptual content analysis procedure was applied based on two categories that were explored with more emphasis during the interviews: the university role in the EE and perceptions about the local EE. The interviews happened between March and April, 2022, and lasted an average of 40 minutes. Three interviews were conducted on site, in the respondents' workplace and the other was online.

Research procedures also involved the search for information about the Netherlands and Utrecht region in terms of the presence of entrepreneurial activities at both national and regional levels. This contextual information is described in the next section

Entrepreneurship in the Netherlands and Utrecht Region

The Netherlands has been part of the Global Entrepreneurship Monitor (GEM) report since 2001. The most recent update of the GEM report for the Netherlands, by the time of the research, refers to the year 2021[2]. According to this report (Zeijden, Kok, Snijders, & Cheikh, 2022), the Total early-stage Entrepreneurial Activity (TEA)[3] has oscillated from 10.3% in 2012 to 14.2% in 2021. On average, in the last 10 years, the Dutch TEA has been 10.5%. The 2021 result places the Netherlands in the sixth place of a list of 19 countries with GDP per capita greater than $ 40 thousand[4] (GEM, 2022).

The GEM report from 2020 (Kok, Zeijden, Stel, Graaf, Snijders & Cheikh, 2020) presented international comparisons between the Netherlands and several countries that were part of the GEM survey in 2019. Netherlands scored better than the average for the other countries in all indicators, except for perceived capabilities to start a new business. For instance, the country´s average for the GEM variable "Perceived

[1] www.uu.nl/en
[2] https://www.gemconsortium.org/file/open?fileId=50950
[3] TEA is defined as the percentage of adults between 18 and 64 years of age who are either actively trying to start a new business (nascent entrepreneurs), or who own and manage a business younger than 3.5 years (young business entrepreneurs).
[4] Canada (1st), Saudi Arabia (2nd), United States (3rd), United Arab Emirates (4th), Qatar (5th), Netherlands (6th), Republic of Korea (7th), United Kingdom (8th), Ireland (9th), Switzerland (10th), Israel (11th), Sweden (12th), Finland (13th), France (14th), Luxembourg (15th), Germany (16th), Japan (17th), Italy (18th), and Norway (19th).

opportunities" (In the next six months, there will be good opportunities for starting a business in the area where I live) was 65, 13 points above other European Union and OECD countries[5]. For "Entrepreneurship as desirable career choice" (In the country, most people consider starting a new business a desirable career choice), the Netherlands scored 86, 28 points above the same set of countries. And, finally, for "Entrepreneurship is given high status" (In the country, those successful at starting a new business have a high level of status and respect), The Netherlands scored 10 points above the average of the same set of countries, totaling 76. Thus, overall, the Netherlands can be viewed as an entrepreneurial economy.

However, GEM data can be criticized by not differentiating between productive or innovative entrepreneurship and more traditional forms of entrepreneurship. A complementary view of entrepreneurship in the Netherlands arises from studies that looked upon its regional EEs.

Stam and Van de Ven (2021) developed an entrepreneurial ecosystem index to examine the quality of EEs in the Netherlands at the province level. The index was based on a modified version of the Stam's (2015) EEs. This framework was operationalized with secondary data from various sources. Stam and Van de Ven (2021) calculated three versions of the index: additive (sum of the normalized scores for each dimension); multiplicative (resulting from the multiplication of the normalized scores for the dimensions); and natural logarithm (the sum of the natural logarithm of the measures for each dimension). The province of Utrecht had the best results in all three indexes, being followed by the Noord-Holland and Zuid-Holland ranked, respectively, in second and third places.

The Entrepreneurial Ecosystem Observatory[6] has issued three reports on the status of the Dutch regional EEs (Cloosterman & Stam, 2020; Hendricksen, Starre, Stam & Toren, 2022; Hendricksen, Starre, Stam & Toren, 2023). The reports present the results of entrepreneurial ecosystems indexes (EEIs) at province and regional levels. The composition of the index is like that applied by Stam and Van de Ven (2021) and allows for the ranking of the regional and provincial EEs. At the province level, for the EEI 2020, Utrecht scored 11.0, being at the second place after Noord-Holland (11.3). Zuid-Holland (10.7), Groningen (10.5) and Noord-Brabant (10.2) were the other provinces that scored higher than the overall score for the Netherlands (10.0). The other provinces scored below this mark: Gelderland (9.6); Overijssel (9.2); Limburg (8.9); Flevoland (8.4); Friesland (7.4); Zeeland (7.4); and Drenthe (7.3).

In summary, both studies indicate that EEs can be quite different depending on their regional position. Thus, understanding and researching EEs might be more fruitful if regional instead of national scopes are adopted.

The EEI 2022 report did not present the 13 Dutch province scores. Instead, the report presents the results for a regional segregation of the country into 40 regions. Nevertheless, the score for Utrecht, considered one of the 40 regions, was available and showed a slight increase (11.3). Thus, in comparison to other Dutch regions, Utrecht has higher levels of entrepreneurial activities. Is Utrecht University in anyway related to this entrepreneurial regional performance? In the next section, a description of the entrepreneurial activities at Utrecht University are described.

Entrepreneurial Activities at Utrecht University

Data from Utrecht University's annual reports between 2011 and 2020 indicate that it is the second largest Dutch higher education institution averaging 31,203 total students per year. This figure represents 11.6% of the students enrolled in the 13 Dutch universities, just below the University of Amsterdam (12.6%).

[5] Mexico, Australia, Canada, Chile, Germany, Greece, Ireland, Israel, Italy, Japan, Latvia, Luxembourg, Netherlands, Norway, Poland, Croatia and Cyprus.
[6] https://www.entrepreneurialecosystemobservatory.nl

In recent years, the number of international students has increased substantially, moving from an average of 6.3% of total students, for the period 2013/2016, to 10.7% for the period 2017/2020.

As the second largest Dutch University in total students, Utrecht University offers a wide set of entrepreneurial opportunities for its students, faculty, and external public. The activities range from offering entrepreneurship courses for different degrees to initiatives aiming at supporting and fostering entrepreneurial actions both inside and outside the university´s campus. There is also many instances of research projects and units dedicated to entrepreneurial issues. Chart 1 summarizes the activities that were identified through systematically searching the UU's website with the term "Entrepreneurship".

An OECD report reviewed the impact of higher education institutions (HEIs) on entrepreneurship and innovation in the Netherlands (OECD, 2018). The report presented the results of information on the Dutch universities and tried to assess their status as innovative and entrepreneurial higher education institutions, defined as:

> designed to empower students and staff to demonstrate enterprise, innovation and creativity in teaching, research, and engagement with business and society. Its activities are directed to enhance learning, knowledge production and exchange in a highly complex and changing societal environment; and are dedicated to create public value via processes of open engagement (OECD, 2018, p. 16).

The report presented the results of a quantitative study based on a set of 37 statements distributed in seven dimensions: Leadership and Governance; Organizational Capacity: Funding, People and Incentives; Entrepreneurial Teaching and Learning; Preparing and Supporting Entrepreneurs; Knowledge Exchange and Collaboration; The Internationalized Institution; and Measuring Impact. Nine Dutch Universities[7], including Utrecht University, were the focus of in-depth studies about their entrepreneurial and innovative status.

In the case of Utrecht University, some of its actions were highlighted in the OECD report. For instance, Utrecht Inc was said to possess an international recognition, ranking amongst the top six in the 2015 European ranking of University Business Incubators (OECD, 2018, p. 65). Also, Utrecht University's interdisciplinary focus, was mentioned with its focus in teaching, research, and value creation activities around four strategic themes (p. 97). An example is the

> The Young Innovators programme (that) runs for one year and can be undertaken alongside any master's programme. For the first half of the year, students work on current societal challenges, for example sustainable housing for refugees, food waste, off-label drugs, transition labs, how to make a city safer through art, and accessible health services (OECD, p. 98)

Fostering the involvement of students in knowledge exchange and value creation activities is also an important activity in an innovative and EU. In this domain, Utrecht University was involved in the "City Deals" initiatives, where "cities, the government and societal partners have committed themselves to support (economic) growth, quality of life and innovation in the Dutch city-networks" (p. 127). Thus, with different partners in the municipalities of Zaanstad, Leeuwarden, Enschede, Utrecht, and Eindhoven, Utrecht University developed actions towards "inclusive city" with a focus on the social domain.

[7] Amsterdam University of Applied Sciences, Rotterdam University of Applied Sciences, Arnhem and Nijmegen University of Applied Sciences, University of Amsterdam, Maastricht University, Twente University, Utrecht University, Vrije Universiteit Amsterdam, and Erasmus University Rotterdam.

Chart 1 – Entrepreneurial activities at Utrecht University

UTRECHT UNIVERSITY SCHOOL OF ECONOMICS – ENTREPRENEURSHIP SECTION
Research activities related to entrepreneurial ecosystems, innovation and entrepreneurship, social and sustainable entrepreneurship and entrepreneurship and internationalization. Projects on entrepreneurship: FIRES - Financial and Institutional Reforms to build an Entrepreneurial Society; IRIS - Integrated and Replicable Solutions for Co-Creation in Sustainable Cities; Entrepreneurship courses in International Entrepreneurship to local residents.
THE UTRECHT UNIVERSITY CENTRE FOR ENTREPRENEURSHIP (UTRECHTCE)
UtrechtCE is dedicated to creating an academic environment in which students and employees can be entrepreneurial by facilitating and actively encouraging a community of teachers on entrepreneurial education; providing an up-to-date overview of all the entrepreneurial education on offer for students and professionals, both within and outside the curriculum; and organizing events around entrepreneurship for students, researchers and entrepreneurs.
SOCIAL ENTREPRENEURSHIP INITIATIVE (SEI)
SEI has been developed from the Faculty of Law, Economics and Governance and focus on entrepreneurship as a positive contribution to society. With an interdisciplinary approach, it functions as a hub that develops and disseminates knowledge through research, education (for professionals) and the public debate with interdisciplinary cooperation involving scholars and practitioners from diverse backgrounds. Themes: finance, public procurement, innovative business models, managing and monitoring social value creation.
CENTRE FOR ACADEMIC TEACHING AND LEARNING
Teaching community: Special Interest Group for connecting and sharing experiences in entrepreneurial education. Teachers' workshop on Entrepreneurial Education (Designing Entrepreneurial Education). Newsletter on Entrepreneurial Education.
ENTREPRENEURIAL EDUCATION AT UTRECHT UNIVERSITY (UNDERGRADUATE)
Business, Finance & Management: Classic business courses on finance, business models, marketing, management, etc. Innovation & Startup: Action-oriented education around innovation, startups and/or intrapreneurship. Skills & Challenges: Challenge-based learning and education aimed at training entrepreneurial skills. Societal Impact: These courses take the United Nations Sustainable Development Goals as their starting point and/or deal with social entrepreneurship, sustainable entrepreneurship, or cultural entrepreneurship. Examples of courses: Essentials of Entrepreneurship; Introduction to Finance and Accounting; Venture Marketing; Internship Entrepreneurship & Innovation; Corporate Entrepreneurship & Innovation; Social entrepreneurship as a challenge; Sustainability, Health, and Innovation; Organization & Innovation; Sustainable Resource Use; Life Cycle Assessment; Digital Innovation.
ENACTUS UTRECHT
The student organization for social and sustainable entrepreneurship in Utrecht. The focus is on challenges in social problems, using entrepreneurship to tackle them, so that a better and sustainable world is made possible. Enactus Utrecht is part of an international network with more than 1,700 teams and 4,200 companies, spread over 36 countries.
ENTREPRENEURIAL EDUCATION FOR MASTER'S & PHD STUDENTS
Utrecht University offers several master's programmes on entrepreneurship: Bio Inspired Innovation; Business Development and entrepreneurship; Science and business management; Sustainable business and innovation; Business and social impact.
CO-CURRICULAR ENTREPRENEURIAL EDUCATION
Da Vinci Project (Honours College): interdisciplinary honours programme on sustainability for 2nd- and 3rd-year bachelor's students: six groups of five students originating from different scientific backgrounds work together on a specific sustainable development-related challenge provided by an external partner, ranging from private sector to local and national governments. Utrecht University Business Course: Student-led honours programme where 30

of UU & UMCU's best students learn about entrepreneurship and consultancy. Avicienna Excellence Program: Co-curricular programme for excellent master's and PhD students focused on innovation in healthcare through interdisciplinary collaboration. Young Innovators: Honours programme for all master's students of UU and UMCU, aimed at personal leadership, sustainable innovation and societal challenges in order to build regenerative societies.
ENTREPRENEURIAL EDUCATION NETWORK
The Entrepreneurial Education Network unites professionals in entrepreneurial learning and entrepreneurship, who work in and around higher education. It provides opportunities to exchange ideas and experiences with colleagues from other institutions and network. The Entrepreneurial Education Network was initiated by the Strategic Alliance between Utrecht University, UMC Utrecht, Eindhoven University of Technology and Wageningen University & Research.
SUPPORT FOR ENTREPRENEURS ON CAMPUS AND IN THE UTRECHT REGION
Research Support Offices/Utrecht University: Every faculty has a Research Support Office (RSO) that assists researchers throughout the entire funds and grant acquisition process. RSO staff can assist in identifying potential funds, provide advice on national and international grant opportunities and support researchers in writing grant applications and drawing up budgets. Utrecht Holdings is the Knowledge Transfer Office (KTO) of Utrecht University and University Medical Center Utrecht. Its focus is on the utilization and commercialization of academic research. Utrecht Holdings' activities include screening and scouting of promising research; advising on knowledge utilization, grants and consortium building; early-stage market, business and legal advice; intellectual property protection and licensing; controlling of patent applications and patents; leading the formation of new companies, including legal and financial structuring; providing investment capability; and life science incubator and housing facilities.
UTRECHTINC
The startup incubator of Utrecht, connected to Utrecht University, the Utrecht University Medical Center, and the Utrecht University of Applied Sciences. In 2020, reached the mark of 230 startups that went to market, representing over 2,000 active job positions and a collective turnover above €100 million. Its activities include support for market validation of business models, science-based validation, student startup validation and acceleration.
UTRECHT SCIENCE PARK
Utrecht Science Park is an independent foundation established on 12 December 2012 by Utrecht University, University Medical Centre Utrecht, HU University of Applied Sciences Utrecht, the Municipality of Utrecht and Province of Utrecht. The Utrecht Science Park Foundation aims to add social and economic value to the regional economy. The Foundation strives to achieve this goal by encouraging and strengthening cooperation between knowledge institutions and innovative companies, developing alliances in the region, offering facilities to fledgling entrepreneurs, attracting business activity, improving facilities, promoting liveability, and raising Utrecht Science Park's profile as a business location for knowledge-intensive activity.
UNIVERSITY MEDICAL CENTER UTRECHT
UMC Utrecht is a leading international university medical center generating, testing, sharing, and applying knowledge on health, illness, and health care for the benefit of patients and society. Examples of recent programmes: Ureka Mega Challenge: in-house competition challenges everyone with a good idea to come up with a new concept, product, or technical invention that can improve health care. When a winner is selected, they receive coaching and seed capital to realize their idea and bring it to the patient. Pontes Medical: Pontes medical bridges the gaps between specialists, researchers, health care providers, businesses, and investors in order to develop and test new products and bring them to market. Unovate: focuses specifically on healthcare-related innovations and unpatentable developments in medical technology. Unovate connects UMC Utrecht to the business world of innovation in healthcare, developing innovative concepts for care, research, and education.

Source: Research data, 2022

As can be seen by the information depicted in this section, Utrecht University has developed in the last decade towards becoming an EU. The set of entrepreneurial activities that are developed in the university shows a quite diverse range of concerns with different stakeholders (students, academics, and the general population). This is a common feature that is emphasized both in theoretical (Shattock, 2010; Sam &

Seijde, 2014; Klofsten, Fayolle, Guerrero, Mian, Urbano, & Wright, 2019) and empirical papers (Palfreyman, 1989; Urbano & Guerrero, 2013) in the field of entrepreneurial universities. In the next section, we describe the results of the four interviews aiming to highlight if and how Utrecht University has developed an active role in the Utrecht Region EE.

The Perception of Leading Staff about Utrecht University's Role in the Regional Entrepreneurial Ecosystem

As mentioned in the research procedures section, four managers of distinct Utrecht University units were interviewed in order to elicit their perceptions about a set of issues related to the position of Utrecht University in the regional EE. Chart 2 presents extracts from each interview on the selected topics. Following the confidentiality agreements, the interviewees were coded as E1, E2, E3, and E4.

Chart 2 – Perceptions about Utrecht University role in the regional entrepreneurial ecosystem

UTRECHT UNIVERSITY'S ROLE IN THE REGIONAL ENTREPRENEURIAL ECOSYSTEM
1. Developer of talent: more than 35 000 students, annual inflow and outflow of about 8,000 bachelor and 5,000 master students, and about 4000 PhD students *2. Creator and diffusor of (scientific) knowledge, with about 6.000 academic staff members (excluding Faculty of Medicine), 240 million euros invested in research per year* *3. Somewhat less prominent network developer, regional leader, intermediary services (incubator), investor (UU holdings), cultural change (entrepreneurship programs).* *4. Major initiatives included: Valorization program 2011-2016: including acceleration of center for entrepreneurship, incubator Strategic themes (Institutions for Open Societies, Pathways to Sustainability, Dynamics of Youth, Life Sciences) with hubs/platforms, reaching out to external organizations for knowledge circulation.* (E1)
1. We have taken quite an important role as a university, we are driving really innovation in the area *2. Most of the time, we are shaking at the offices of the private partners to join us in some innovation mission we have coined* *3. Not to be arrogant, but I think without the University of Utrecht, not so much would happen over the last ten years in our region, talking about innovation and new entrepreneurship* *4. I can say that University Utrecht took a good measure about ten years ago, to go into the idea of strategic teams. It was appealing for outside partners. And we really made more public-private partnerships than in the past, I believe.* (E2)
1. The role of the university is supposed to be very important. And we see very, we see, from left to right, some positive results or outcomes of that, but we are not there yet. *2. For entrepreneurship, you need to have some basic limits like the pyramid of Maslow. You should have some basic layers that should be fulfilled. For me, the basic layer to make a university an important leader in the startup world is the entrepreneurial thinking. So the entrepreneurial mindset for students should be much more penetrated than it is right now. So that's step one.* *3. Number two is we don't see that many science-based startups, and that has to do with the entrepreneurial mindset but also has to do with the circumstances that the university creates to put the scientists on a platform to accelerate. And what we see right now is that a scientist has chosen academia and is supposed to stay in academia.* *4. So, what we have seen is a) the university has invested in University Utrecht Holdings, sort of holdings company of the university, which is where the IP is licensed and where they can do some investments in startups. That was a good thing; b) they invested in establishing an incubator where the scientist who hasn't had business ideas can validate his or her thoughts and bring it to the next level; c) the university has invested in the Center for Entrepreneurship. The investment in the Center for Entrepreneurship is very limited, but at least there is something, and we need now to give that some extra energy and some extra power to make it bigger.* (E3)
1. Of course, we are the provider of talent. Talent is very necessary in our region. *2. We are now starting to form a network where the leadership is, there is, we are working together. Utrecht University is part of that and is now becoming a leader.*

3. In the last three years, the things that we have mostly done is not towards the outside, but more towards the inside. So prepare the university for entrepreneurship in general so that students can go out and academics can find their way within the university to start their own venture. *4. In the last three years, we have started to build in the Center for Entrepreneurship, where we are the first stop for those entrepreneurial minds.* (E4)

Source: Research data, 2022

Overall, the four respondents stressed the role of Utrecht University as talent and knowledge provider. Their perceptions were quite similar regarding the relevance of Utrecht University's entrepreneurial activities in Utrecht region. However, E3 commented that most of the entrepreneurial activities were developed with an internal focus, and less frequently with an external one. E1 could provide figures about the Utrecht University's outputs in terms of talent and scientific production, confirming its relevance to the region. Nevertheless, E1 also stressed a minor role for Utrecht University as network developer, regional leadership, and cultural change. E2's perception was quite positive stressing Utrecht University's strong role in innovation. Finally, E3, although recognizing that the university's role should be very important, highlighted a few weaknesses related to the students and academics' entrepreneurial mindsets and, a minor presence of science-based startups in the university incubation programs.

Finally, when asked about their perceptions on the current status of the regional EE, they recognized it to be still young, although with some strengths and weaknesses as can be seen in chart 3.

Altogether, the activities developed by UU in the entrepreneurship domain reveal traces of an entrepreneurial university that is having a growing presence in its regional EE. It has developed in recent years most of the EU's activities revealed by Ruiz, Martens and Costa (2020), such as, knowledge production and dissemination, fostering new firms' creation, seeking new sources of funding and exploring innovation opportunities. Regarding the domain of students' entrepreneurship, UU delivers activities that are fully in accordance with Jansen, Zande, Stam and Varma's (2015) Student Entrepreneurship Encouragement Model, including the stimulation of an entrepreneurial spirit among its students, provision of several entrepreneurial education opportunities and incubation and mentoring services. For its faculty, there are plenty of guidance and mentoring services as well, emphasizing commercializing research, licensing of technology, and stimulating university spin-offs as pointed by Foss and Gibson (2015). On the other hand, in relation to UU's external reach, there seems to be yet some significant room for improvement, since, as mentioned by a couple of interviewees, most of UU's entrepreneurial activities present an internal orientation, lacking an active involvement in external networks and leadership in its regional EE, an important EU role suggested by Ruiz, Martens and Costa (2020).

CHART 3 - Perceptions about the regional entrepreneurial ecosystem

REGIONAL ENTREPRENEURIAL ECOSYSTEM CURRENT STATUS: STRENGTHS AND WEAKNESSES
The regional ecosystem is one of best in Europe with respect to access to resources, institutional and physical infrastructures. It lacks strong leadership and a well-connected core group of players. *The region is home to many innovative activities, including radical ones at startups (coming out of multimillion startups like Gitlab, Merus, GenMab) and incumbents (e.g. the leading online platform of the Netherlands Bol.com, leading engineering firms). There is a huge diversity of sectors, with a concentration in knowledge-intensive business services.* (E1)
The only thing we are missing is a good reputation as a startup environment in Utrecht, because most of the facilities are quite ok. Money is almost floating through the streets for spinoffs. I think the conditions are sometimes better than the funnel, and I mean that are not so many people trying to start a company, so there is a limited influx of new companies. While the conditions are quite good to start a company, but then to grow into a scale-up, maybe we need to do better. (E2)

The local ecosystem here in Utrecht is still a relatively young ecosystem. So, ten years ago, the only place you could go for startup-related information was UtrechtInc, and in the last ten years, a lot of things changed. We are really in the center of the Netherlands, and from here, one hour or one and a half hour, and you can reach eight or nine universities. So, also for talent, it's a very interesting location to establish yourself. But, when you look at funding, funding opportunities were not really good in the Utrecht area, and that improved rapidly thanks to the introduction of the ROM Utrecht Region and their funds, and money attracts money. One of the things we identified two years ago was that leadership was lacking in the Utrecht region. Since that ROM, a regional development company, was established, we also integrated Startup Utrecht within the ROM. On paper, that all sounds very good, and yes, there was a bit more leadership, but now it's time to step up again and keep on pushing the leadership message in the region. So, if you would ask me to rate leadership right now, I would say 6,5 on a scale from 1 to 10. (E3)
If I have to say something about Utrecht, that would be the social hub, there is the health hub and maybe some mobility hub as well. But we don't have more focal, focus, for instance. But I would say the networks are starting, but leadership and focus is missing. (E4)

Source: Research data, 2022

Final Remarks

In this paper, the focus was on understanding and describing the role of Utrecht University in it is regional EE. Based on information collected in various sources and on interviews with selected staff members of the university, a comprehensive view of the wide variety of entrepreneurial activities developed inside Utrecht University was grasped. It was also identified, through the interviewees' responses that there is quite a long way for Utrecht University to accomplish a more impactful role in its regional EE.

As in many other cases reported in the extant literature, Utrecht University has a prominent role as talent and knowledge producer. Through many of its activities, Utrecht University has also contributed to instilling an entrepreneurial mindset in students and researchers, thus leading to the strengthening of the local entrepreneurship culture. It can be said that a lot has been done, some actions need better coordination, both internally and externally (with other actors in the ecosystem) and, also, new actions to be initiated. And the ecosystem itself, represented by its diverse actors, can begin to demand more from its university, in order to develop the region. Besides, Utrecht University showed that it realized the importance of its role in the environment, in some cases without deliberation directly for this, however in other situations, with intention and plan of doing and reaching results. And more than that, some of the leaders can see and admit the necessity and urgency of changes, like more actions around points which the university needs to become better or providing other means and directions.

Nevertheless, answering the two questions that led to this research effort, the results point to Utrecht University being an entrepreneurial university that is constantly improving its third mission activities. And is building a leading role in the regional entrepreneurial ecosystem that can be seen in its efforts to follow a comprehensive strategy of knowledge diffusion for society, stimulating entrepreneurial activities in Utrecht region.

The research findings may have implications for public policy formulation related to the interface between education and entrepreneurship. The wide scope of entrepreneurial activities developed by Utrecht University can be taken as a model for stimulating the entrepreneurial path for other universities. In this sense, public policies may be needed to lead university managers and staff to try and develop entrepreneurial activities more thoroughly. This would imply the necessity of tackling issues such as pedagogical changes in the provision of courses, creation of new units focused on services to potential entrepreneurs, the improvement of already existing incubators, accelerators, technological parks and technology transfer offices, the development of an entrepreneurial culture and provision of financial resources for the implementation of new activities inside the universities.

Finally, further studies may help us understand the role of higher education institutions in EEs. Although, case studies such this one may produce useful knowledge for improving and increasing universities' entrepreneurial activities, longitudinal studies trying to explore the outputs and impacts of universities in

EEs are still lacking. Also, comparative case studies could be useful for evaluating best practices for entrepreneurial universities in EEs.

The authors are grateful to Conselho Nacional de Desenvolvimento Científico e Tecnológico for the support - process 403056/2023-3

References

Abreu, M., Demirel, P., Grinevich, V., & Karataş-Özkan, M. (2016). Entrepreneurial practices in research-intensive and teaching-led universities. *Small Business Economics, 47*(3), 695-717.

Allahar, H., & Sookram, R. (2019). A university business school as an entrepreneurial ecosystem hub. *Technology Innovation Management Review, 9*(11), 15-25.

Armbruster, C. (2008). Research Universities: autonomy and self-reliance after the Entrepreneurial University. *Policy Futures in Education, 6*(4), 372-389.

Audretsch, D. B. (2014). From the entrepreneurial university to the university for the entrepreneurial society. *The Journal of Technology Transfer, 39*(3), 313-321.

Audretsch, D. B., & Belitski, M. (2017). Entrepreneurial ecosystems in cities: establishing the framework conditions. *The Journal of Technology Transfer, 42*(5), 1030-1051.

Bischoff, K., & Volkmann, C. K. (2018). Stakeholder support for sustainable entrepreneurship - a framework of sustainable entrepreneurial ecosystems. *International Journal of Entrepreneurial Venturing, 10*(2), 172-201.

Bischoff, K., Volkmann, C. K., & Audretsch, D. B. (2018). Stakeholder collaboration in entrepreneurship education: an analysis of the entrepreneurial ecosystems of European higher educational institutions. *The Journal of Technology Transfer, 43*(1), 20-46.

Breznitz, S. M., & Zhang, Q. (2019). Fostering the growth of student start-ups from university accelerators: an entrepreneurial ecosystem perspective. *Industrial and Corporate Change, 28*(4), 855-873.

Butler, C. L., & Mador, M. (2015). Kingston University London: Using entrepreneurship programmes to attract talent and to enhance educational impact. In L. Foss & D. V. Gibson (Eds.), *The Entrepreneurial University: Context and Institutional Change* (pp. 90-112). London: Routledge.

Carayannis, E. G., Grigoroudis, E., Campbell, D. F. J., Meissner, D., & Stamati, D. (2018). 'Mode 3' universities and academic firms: thinking beyond the box trans-disciplinarity and nonlinear innovation dynamics within coopetitive entrepreneurial ecosystems. *International Journal of Technology Management, 77*(1/2/3), 145-185.

Clark, B. R. (1998). The entrepreneurial university: demand and response. *Tertiary Education and Management, 4*(1), 5-16.

Clark, B. R. (2001). The entrepreneurial university: new foundations for collegiality, autonomy, and achievement. *Higher Education Management, 13*(2), 9-24.

Cloosterman, E., & Stam, E. (2020). *Entrepreneurial Ecosystem Index 2020. Een kwantitatieve vergelijking van regionale ecosystemen voor ondernemerschap in Nederland.* Utrecht: Entrepreneurial Ecosystem Observatory.

Debackere, K. (2000). Managing academic R&D as a business at K.U. Leuven: context, structure and process. *R&D Management, 30*(4), 323-328.

Diaconu, M., & Duţu, A. (2015). The Role of the modern university in supporting the entrepreneurial ecosystem. *European Journal of Interdisciplinary Studies, 7*(1), 11-24.

Etzkowitz, H. (1983). Entrepreneurial scientists and entrepreneurial universities in American academic science. *Minerva, 21*(2/3), 198-233.

Etzkowitz, H. (2003). Research groups as 'quasi-firms': the invention of the entrepreneurial university. *Research Policy, 32*(1), 109-121.

Etzkowitz, H., Webster, A., Gebhardt, C., & Terra, B. R. C. (2000). The future of the university and the university of the future: evolution of ivory tower to entrepreneurial paradigm. *Research Policy, 29*(2), 313-330.

Fairclough, N. (1993). Critical discourse analysis and the marketization of public discourse: the universities. *Discourse & Society, 4*(2), 133-168.

Farny, S., & Kyrö, P. (2015). Entrepreneurial Aalto: Where science and art meet technology and business. In L. Foss & D. V. Gibson (Eds.), *The Entrepreneurial University: Context and Institutional Change* (pp. 150-166). London: Routledge.

Fetters, M., Greene, P. G., & Rice, M. P. (Eds.). (2010). *The development of university-based entrepreneurship ecosystems: Global practices*. Edward Elgar Publishing.

Foss, L., & Gibson, D. V. (Eds.). (2015b). *The entrepreneurial university: context and institutional change*. London: Routledge.

Foss, L., & Gibson, D. V. (2015a). The entrepreneurial university: case analysis and implications. In L. Foss & D. V. Gibson (Eds.), *The Entrepreneurial University: Context and Institutional Change* (pp. 249-279). London: Routledge.

Fuster, E., Padilla-Meléndez, A., Lockett, N., & Del-Águila-Obra, A. R. (2019). The emerging role of university spin-off companies in developing regional entrepreneurial university ecosystems: The case of Andalusia. *Technological Forecasting and Social Change, 141*, 219-231.

Global Entrepreneurship Monitor (GEM). (2022). *Global Entrepreneurship Monitor 2021/2022 Global Report: Opportunity Amid Disruption*. London: GEM.

Gibb, A. A., & Hannon, P. (2006). Towards the entrepreneurial university? *International Journal of Entrepreneurship Education, 4*, 73-110.

Gibson, D. V., & Butler, J. S. (2015). Creating and sustaining high-technology development in Austin, Texas. In L. Foss & D. V. Gibson (Eds.), *The Entrepreneurial University: Context and Institutional Change* (pp. 35-66). London: Routledge.

Hendricken, T., van der Starre, B., Stam, E., & van den Toren, J. P. (2022). *Entrepreneurial Ecosystem Index 2022: Wendbaarheid in tijden van covid-19*. Utrecht: Entrepreneurial Ecosystem Observatory.

Hendricken, T., van der Starre, B., Stam, E., & van den Toren, J. P. (2023). *Entrepreneurial Ecosystem Index 2023: Regionale en nationale ontwikkelingen in internationaal perspectief*. Utrecht: Entrepreneurial Ecosystem Observatory.

Hodgson, R. (2015). High-technology entrepreneurship in a university town: The Cambridge story. In L. Foss & D. V. Gibson (Eds.), *The Entrepreneurial University: Context and Institutional Change* (pp. 67-89). London: Routledge.

Huang-Saad, A., Duval-Couetil, N., & Park, J. (2018). Technology and talent: Capturing the role of universities in regional entrepreneurial ecosystems. *Journal of Enterprising Communities: People and Places in the Global Economy, 12*(2), 92-116.

Jansen, S., van de Zande, T., Brinkkemper, S., Stam, E., & Varma, V. (2015). How education, stimulation, and incubation encourage student entrepreneurship: Observations from MIT, IIIT, and Utrecht University. *The International Journal of Management Education, 13*(2), 170-181.

Karlsson, T., Kristofferson-Wigren, C., & Landström, H. (2015). The evolution of Lund University's entrepreneurial ecosystem from 1980 to 2012. In L. Foss & D. V. Gibson (Eds.), *The Entrepreneurial University: Context and Institutional Change* (pp. 131-149). London: Routledge.

Klofsten, M., Fayolle, A., Guerrero, M., Mian, S., Urbano, D., & Wright, M. (2019). The entrepreneurial university as driver for economic growth and social change: Key strategic challenges. *Technological Forecasting & Social Change, 141*, 149-158.

Kok, J. de, van der Zeijden, P., van Stel, A., van der Graaf, A., Snijders, J., & Cheikh, N. (2020). *Global Entrepreneurship Monitor the Netherlands 2019 National Report*. Zoetermeer, NL.

Lahikainen, K., Kolhinen, J., Ruskovaara, E., & Pihkala, T. (2019). Challenges to the development of an entrepreneurial university ecosystem: The case of a Finnish university campus. *Industry and Higher Education, 33*(2), 96-107.

Lai, Y., & Vonortas, N. S. (2019). Regional entrepreneurial ecosystems in China. *Industrial and Corporate Change, 28*(4), 875-897.

Leong, B., Wee, A. K. S., & Yuen-Ping, H. (2008). Is an enterprise framework necessary for an entrepreneurial university? A comparison of technology start-ups in Singapore and Sweden. *Science and Public Policy, 35*(9), 647-656.

Lindeman, A. (2015). Kymenlaakso University of Applied Sciences, Finland in search of university-wide entrepreneurial action. In L. Foss & D. V. Gibson (Eds.), *The Entrepreneurial University: Context and Institutional Change* (pp. 167-189). London: Routledge.

Lundqvist, M. (2015). Chalmers: An entrepreneurial university institutionalizing the entrepreneurial? In L. Foss & D. V. Gibson (Eds.), *The Entrepreneurial University: Context and Institutional Change* (pp. 113-130). London: Routledge.

Mathieu, A., Meyer, M., & van P. de La Potterie, B. (2008). Turning science into business: A case study of a major European research university. *Science and Public Policy, 35*(9), 669-679.

Mautner, G. (2005). The entrepreneurial university: A discursive profile of a higher education buzzword. *Critical Discourse Studies, 2*(2), 95-120.

Miller, D. J., & Acs, Z. J. (2017). The campus as entrepreneurial ecosystem: The University of Chicago. *Small Business Economics, 49*(1), 75-95.

Mulloth, B., & Kickul, J. R. (2015). New York University: Nurturing entrepreneurship in New York City. In L. Foss & D. V. Gibson (Eds.), *The Entrepreneurial University: Context and Institutional Change* (pp. 18-34). London: Routledge.

O'Kane, C., Cunningham, J. A., Menter, M., & Walton, S. (2021). The brokering role of technology transfer offices within entrepreneurial ecosystems: An investigation of macro–meso–micro factors. *The Journal of Technology Transfer, 46*(6), 1814-1844.

OECD/EU. (2018). *Supporting entrepreneurship and innovation in higher education in the Netherlands*. Paris: OECD Publishing.

Oftedal, E., & Foss, L. (2015). UiT The Arctic University of Norway challenges at the Arctic crossroads. In L. Foss & D. V. Gibson (Eds.), *The Entrepreneurial University: Context and Institutional Change* (pp. 190-220). London: Routledge.

Oftedal, E., & Iakovleva, T. (2015). Stavanger: From petroleum focus to diversified competence through crisis and consensus. In L. Foss & D. V. Gibson (Eds.), *The Entrepreneurial University: Context and Institutional Change* (pp. 221-248). London: Routledge.

Palfreyman, D. (1989). The Warwick way: A case study of entrepreneurship within a university context. *Entrepreneurship & Regional Development: An International Journal, 1*(2), 207-219.

Philpott, K., Dooley, L., O'Reilly, C., & Lupton, G. (2011). The entrepreneurial university: Examining the underlying academic tensions. *Technovation, 31*(4), 161-170.

Prokop, D. (2021). University entrepreneurial ecosystems and spinoff companies: Configurations, developments, and outcomes. *Technovation, 107*, 1-14.

Radko, N., Belitski, M., & Kalyuzhnova, Y. (2023). Conceptualizing the entrepreneurial university: The stakeholder approach. *The Journal of Technology Transfer, 48*(3), 955-1044.

Ruiz, S. M. de A., Martens, C. D. P., & Costa, P. R. da (2020). Entrepreneurial university: An exploratory model for higher education. *Journal of Management Development, 39*(5), 705-722.

Sadek, T., Kleiman, R., & Loutfy, R. (2015). The role of technology transfer offices in growing new entrepreneurial ecosystems around mid-sized universities. *International Journal of Innovation and Regional Development, 6*(1), 61-79.

Sam, C., & van der Sijde, P. (2014). Understanding the concept of the entrepreneurial university from the perspective of higher education models. *Higher Education, 68*(6), 891-908.

Secundo, G., Mele, G., Del Vecchio, P., & DeGennaro, G. (2021). Knowledge spillover creation in university-based entrepreneurial ecosystems: The role of the Italian "Contamination Labs." *Knowledge Management Research & Practice, 19*(1), 137-151.

Shattock, M. (2010). The entrepreneurial university: An idea for its time. *London Review of Education, 8*(3), 263-271.

Sperrer, M., Müller, C., & Soos, J. (2016). The concept of the entrepreneurial university applied to universities of technology in Austria: Already reality or a vision of the future? *Technology Innovation Management Review, 6*(10), 37-44.

Spigel, B. (2020). *Entrepreneurial ecosystems: Theory, practice, and futures*. Cheltenham: Edward Elgar.

Stam, E. (2015). Entrepreneurial ecosystems and regional policy: A sympathetic critique. *European Planning Studies, 23*(9), 1759-1769.

Stam, E., & van de Ven, A. (2021). Entrepreneurial ecosystem elements. *Small Business Economics, 56*(2), 809-832.

Steigertahl, L., & Mauer, R. (2023). Investigating the success factors of the Nordic entrepreneurial ecosystem – Talent transformation as a key process. *The International Journal of Entrepreneurship and Innovation, 24*(1), 7-18.

Theodoraki, C. (2020). A holistic approach to incubator strategies in the entrepreneurial support ecosystem. *M@n@gement, 23*(4), 13-27.

Theodoraki, C., Messeghem, K., & Rice, M. P. (2018). A social capital approach to the development of sustainable entrepreneurial ecosystems: An explorative study. *Small Business Economics, 51*(1), 153-170.

Universiteit Utrecht. (2012). *Het Jaarverslag 2010*. Utrecht: Universiteit Utrecht.

Universiteit Utrecht. (2012). *Het Jaarverslag 2011*. Utrecht: Universiteit Utrecht.

Universiteit Utrecht. (2013). *Het Jaarverslag 2012*. Utrecht: Universiteit Utrecht.

Universiteit Utrecht. (2014). *Het Jaarverslag 2013*. Utrecht: Universiteit Utrecht.

Universiteit Utrecht. (2016). *Het Jaarverslag 2015*. Utrecht: Universiteit Utrecht.

Universiteit Utrecht. (2017). *Het Jaarverslag 2016*. Utrecht: Universiteit Utrecht.

Universiteit Utrecht. (2018). *Het Jaarverslag 2017*. Utrecht: Universiteit Utrecht.

Universiteit Utrecht. (2019). *Het Jaarverslag 2018*. Utrecht: Universiteit Utrecht.

Urbano, D., & Guerrero, M. (2013). Entrepreneurial universities: Socioeconomic impacts of academic entrepreneurship in a European region. *Economic Development Quarterly, 27*(1), 40-55.

Utrecht University. (2020). *The Annual Report 2019*. Utrecht: Utrecht University.

Utrecht University. (2021). *The Annual Report 2020*. Utrecht: Utrecht University.

van Rijnsoever, F. J. (2020). Meeting, mating, and intermediating: How incubators can overcome weak network problems in entrepreneurial ecosystems. *Research Policy, 49*(1), 1-15.

Villani, E., & Lechner, C. (2021). How to acquire legitimacy and become a player in a regional innovation ecosystem? The case of a young university. *Journal of Technology Transfer, 46*(3), 1017–1045.

Yin, R. (1984). *Case study research, design and methods*. Beverly Hills, CA: Sage.

Van der Zeijden, P., Kok, J. de, Snijders, J., & Cheikh, N. (2022). *Global Entrepreneurship Monitor Nederland 2021 Nationaal Rapport*. Zoetermeer, NL: Panteia.

Villani, E., & Lechner, C. (2021). How to acquire legitimacy and become a player in a regional innovation ecosystem? The case of a young university. *Journal of Technological Transfer, 46*(3), 1017–1045.

Yin, R. (1984). *Case study research, design and methods*. Beverly Hills, CA: Sage.

Zeijden, P. van der, Kok, J. de, Snijders, J., & Cheikh, N. (2022). *Global Entrepreneurship Monitor Nederland 2021 Nationaal Rapport* (51 p.). Zoetermeer, NL: Panteia.