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## **Editorial: Quo vadis entrepreneurial university? The need for multi-levels of analysis**

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### **Thomas Clauss\***

Philipps-University of Marburg,  
School of Business and Economics,  
Universitätsstraße 25 A,  
35037 Marburg, Germany  
Email: thomas.clauss@wiwi.uni-marburg.de  
\*Corresponding author

### **Tobias Kesting**

Apollon University of Applied Sciences,  
Universitätsallee 18,  
28359 Bremen, Germany  
Email: tobias.kesting@apollon-hochschule.de

### **Kristel Miller**

Ulster Business School,  
Jordanstown Campus,  
Ulster University,  
Shore Road, Newtownabbey,  
Belfast, BT37OQB, Northern Ireland  
Email: k.miller@ulster.ac.uk

### **Arno Meerman**

Science-to-Business Marketing Research Centre,  
Münster University of Applied Sciences,  
Johann-Krane-Weg 27, 48149 Münster, Germany  
Email: meerman@fh-muenster.de

**Biographical notes:** Thomas Clauss is an Assistant Professor for Management and Innovative Value Creation Concepts at the Philipps University of Marburg. He received his PhD from the University of Hamburg. His research areas are business model innovation, buyer-supplier collaboration and innovation as well as digitalisation and service orientation. His research appeared in leading international journals such as *Industrial Marketing Management*, *R&D Management* or *Transportation Research Part A*.

Tobias Kesting is a Professor for General Business Management and Marketing at the APOLLON University of Applied Sciences in Bremen. He holds a doctoral degree from the IHI Zittau (currently part of TU Dresden). His primary research areas are knowledge and technology transfer, innovation management and marketing. He publishes his research in international journals

(e.g., *Industrial Marketing Management*, *International Journal of Technology Management*) and edited books. He furthermore works as a scientific consultant (specialising in organisational marketing/management process issues) and as Director of the University Industry Innovation Network (UIIN) scientific board.

Kristel Miller is a Senior Lecturer in Strategy at the Ulster University where she obtained her doctoral degree. Her primary research interests are in the areas of university to industry knowledge transfer, technology commercialisation, university business model innovation and SME innovation capabilities. She has published in various internationally recognised journals such as *R&D Management*, *Technovation*, *Production Planning and Control* and *Studies in Higher Education*.

Arno Meerman is the co-Founder and CEO of the University Industry Innovation Network. In his role, he leads its publications, events and UIIN's research and consulting activities. His research focuses on university-business cooperation and university engagement. He was a Project Manager and researcher on several European and national research projects. Since January 2016, he is the responsible Project Manager of the State of University-Business Cooperation in Europe study, the largest study yet undertaken in this field. He is also the Director for Business Development at the Science-to-Business Marketing Research Centre, a research centre at Münster University of Applied Sciences.

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## 1 Introduction

Universities have emerged as key anchor institutions within regions (Smallbone et al., 2015). Strong relationships between universities, government and industry have been found to be fundamental to competitive advantage and growth (Van Looy et al., 2011; Guerrero et al., 2015). However, as a result of developments in science, the collaborative and multidisciplinary nature of frontier research, the introduction of the Bayh Dole Act, reduction of state funding and changing expectations and demands from business and society (Guerrero et al., 2014), universities have been faced with unprecedented challenges. This has questioned their purpose, role, organisation and scope (OECD, 2012), requiring them to rethink their business models and become more entrepreneurial (McAdam et al., 2017). This goes beyond traditional teaching, research and technology transfer activities at both an individual and organisational level but encapsulates the development of an ecosystem which is underpinned by strong networks and co-creational knowledge transfer with government, industry and wider society (Guerrero et al., 2016). Furthermore, universities are now expected to undertake applied research, encourage and support start-ups and develop both staff and graduates to have the appropriate skills and mind-sets to facilitate creativity and entrepreneurship (Hughes and Kitson, 2012; Guerrero et al., 2015; Abreu et al., 2016). This has given rise to the concept of the entrepreneurial university.

It is envisioned by policy makers that an entrepreneurial university should act as a natural incubator for entrepreneurial activities (Etzkowitz, 2004; Guerrero et al., 2014) both within and outside in the surrounding ecosystem. Indeed, university funding is increasingly linked to the impact universities are said to have on society both nationally

and internationally (McAdam et al., 2017). Best practice examples of entrepreneurial universities can be seen at MIT, Stanford University, University of Cambridge, Aalto University, University of Michigan and University of Auckland to name a few. However, these examples are exceptions rather than the norm. In reality, many universities still struggle to fully understand what they need to do to become entrepreneurial. This is largely due to the complexity of their business models and networks of diverse stakeholders with varying goals and objectives which causes challenges in implementing any type of change (Miller et al., 2014).

The term entrepreneurial university is now used unequivocally throughout policy and academic research, therefore it is at this juncture there is a need to take stock of existing research to help clarify the current state of research and facilitate future advancements in the area. This special issue builds on and complements existing research on entrepreneurial universities by providing both conceptual and empirical papers which synthesises prior research, uncovers emerging themes and presents new insights which will help researchers, policy makers and practitioners understand the actions needed to help to continue to develop entrepreneurial universities. A conceptual framework has been developed which helps frames the papers and will form the basis for this introduction to the special issue.

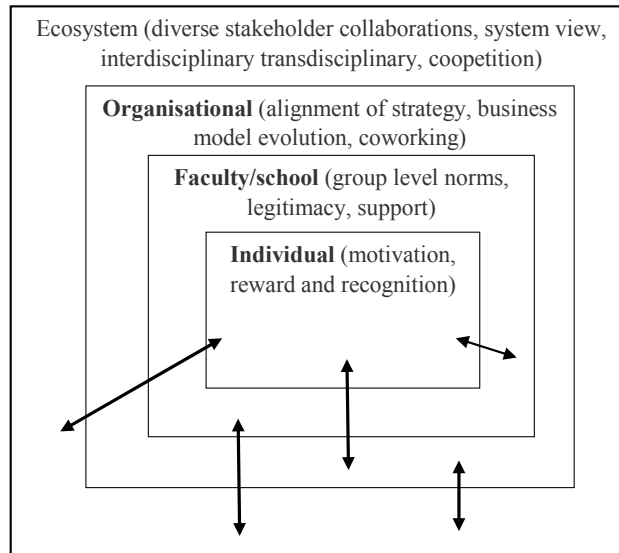
## **2 The entrepreneurial university: need for multi-levels of analysis**

The articles in this special issue draw on research which spans over 30 years. It was clear by the research papers that the entrepreneurial university is a complex entity. It is highlighted by the papers in this special issue that there is a need for multiple levels of analysis to fully understand the complexities of an entrepreneurial university. From the literature, it is evident that these levels can be categorised as being the individual, faculty/school, organisational and ecosystem. However, throughout these levels, there are interdependencies which make it impossible to visualise an entrepreneurial university as comprised of activities which exist completely in solos (Carayannis et al., 2016; Etzkowitz, 2012). Figure 1 presents a holistic, multi-level view of the entrepreneurial university which comprises of knowledge exchange and interaction within and between each of the stages.

The ordering of the papers in this special issue takes a bottom-up approach to first explore the intricacies of the entrepreneurial university at an individual level where it is identified by Miller et al., that individual actors' efforts and activities ultimately impact the ability of a university to be entrepreneurial. Their research specially addresses the changing role of the academic as a result of the need to more fully engage with industry and undertake more impactful activities. They present a systematic literature review to categorise the types of activity that academics typically engage in and identify the motivations and challenges they face. Their findings identify two distinct types of academics within an entrepreneurial university, an academic entrepreneur who engages in formal commercialisation activities and entrepreneurial academics who engages in a wider range of often informal knowledge transfer activities with industry and diverse regional stakeholders. Miller et al., identify the need for future research into entrepreneurial academics and how the challenges these particular academics face in regard to resources, legitimacy, rewards and recognition are influenced by policies at the

faculty/school and organisational level (as reflected in Figure 1). This leads us to our next three papers which explore the need for universities to implement appropriate organisational designs, structures and business models which facilitate the interactions between internal and external stakeholders to encourage more entrepreneurial activities.

**Figure 1** Holistic view of the entrepreneurial university



Bouncken's research specifically focuses on the organisational design of the entrepreneurial university where she conceptualises the rise of coworking and the benefits this can have for entrepreneurship within universities. She presents a discussion of how universities facilitate and embed coworking spaces throughout their campuses which will help foster collaboration and knowledge exchange between academics, students, industry and wider society which will hopefully lead to new start-ups, problem solving and innovation within existing businesses and more innovative course development and delivery. She identifies that coworking spaces have the potential to build up an entrepreneurial community which is fundamental to being an entrepreneurial university.

Next, Markuerkiaga et al. research presents a performance-based typology of entrepreneurial universities highlighting that the concept of an entrepreneurial university is on a spectrum where contextual factors both internal and external to the university may influence their entrepreneurial abilities, resources and indeed their aspirations regarding their level of entrepreneurial activities. Their findings identify clusters of entrepreneurial universities which are categorised as being en route, emerging and advanced entrepreneurial universities. From this research, it is evident that universities should have an awareness of their current entrepreneurial activities and where they sit on the spectrum of entrepreneurial universities versus where they would like to be. This will help direct organisational mission and strategy so that interventions and actions within universities are designed in line with allowing them to reach their aspirations to being entrepreneurial.

Research by Abdelkafi et al. explores the changing business model of universities. They analyse the emergence of vocational education business models within

entrepreneurial universities as a route to extending their role and impact on society, developing more collaborative links with industry and also providing a source of income to aid universities in becoming more self-sustaining. Their case study analysis presents finding of universities in different development stages of embedding vocational education into their remit. Challenges and lessons learned are identified. Providing more applied education is a core expectation of entrepreneurial universities therefore this research signals the need for greater exploration into the changing business models of universities as they strive to be more entrepreneurial.

The last two papers identify the importance of viewing how the entrepreneurial university is situated within the wider innovation ecosystem.

The research of Clauss et al. systematically reviews literature by taking a stakeholder based view of the entrepreneurial university. They show that most of the previous research focused on particular stakeholders of the entrepreneurial university (e.g. researchers, students, firms, etc.) or on dyadic interactions of stakeholders (i.e., researcher-university collaboration). They identify the complexities of stakeholder relationships and the importance of collaboration between stakeholders internally within the university but also externally within the wider ecosystem. In their research, it is identified that the entrepreneurial university has been conceptualised in prior research in various ways, from a very narrow approach which only incorporates technology commercialisation to more recently being conceptualised as involving all elements of the university. They put forth the need to view the entrepreneurial university as a system, therefore as reflected in Figure 1, it is difficult to view aspects of an entrepreneurial university in isolation when they are impacted by and can impact on other parts of the system. They identify areas for future research with particular emphasis on under researched stakeholders such as administrators, support staff and students who are important to help universities achieve their entrepreneurial mission.

The last paper in the special issue by Carayannis et al., proposes a new conceptualisation of the entrepreneurial university through reflecting on how it has progressed in line with demands of society. They draw upon Gibbons et al. (1994) modes of knowledge production principals to suggest a new type of entrepreneurial university, a 'Mode 3' university which engages in both linear and nonlinear innovation to meet the demands and expectations of economies in the 21st century. They identify that 'Mode 3' universities engage in a wide range of research from basic to collaborative which is both interdisciplinary and transdisciplinary and go beyond what is traditionally thought to be entrepreneurial. They suggest that a 'Mode 3' university will engage in co-competition with industry and facilitate cross-employment which help develop high order learning within both universities and industry. Furthermore, they present the need for entrepreneurial universities to implement a fractal infrastructure and design thinking which involves taking a multi-layered approach to activities across research, education and innovation and recognising their interdependencies upon mutually complementary networks and knowledge. Their reflections on prior literature on entrepreneurial universities and reconceptualisation of a 'Mode 3' universities opens up numerous avenues for debate and future research.

Each of the papers in the special issue present new insights however, there is a common theme throughout the papers which stresses the independencies across the various stakeholder, faculties and departments which all need to operate in harmony to fully develop an entrepreneurial university.

Summing up the findings of the papers featured in this special issue, three key conclusions can be made. First, research on the entrepreneurial university needs to consider different level foci, namely ecosystem, organisational, faculty and individual levels. This systemic view goes beyond unidirectional knowledge flows and stressed the need for a holistic perspective considering the variety of stakeholders involved. Second, it is identified that innovation in the entrepreneurial university context not only refers to classic issues such as patenting, but relates to organisational design changes such as coworking spaces, as seen in Bouncken's paper, or business model innovation, as presented by Abdelkafi et al. Hence, it becomes obvious that such broader understanding of innovation requires strategic planning and organisational embedment, i.e., a strategy department or an R&D department within the university, which takes over the responsibility for such developments. Mirroring these reflections with our conceptual model illustrated in Figure 1, the arrows indicate knowledge flow and linkages between the varying levels of the entrepreneurial university. This leads us to our final conclusion that none of the levels addressed should be viewed in isolation. They are intertwined with each other and activities on one level typically have implications at least for the two neighbouring levels and vice versa.

Taking an entrepreneurial view of universities is not an organisational level phenomena. It requires the need to consider the systemic context within which it operates and the interactions and knowledge flows of stakeholders internal and external to the university environment. This systemic, integrated view of the entrepreneurial university opens up a breeding ground for future research. We will conclude with the identification of a number of future research directions spanning the varying levels as noted in Figure 1. At an individual level, Miller et al. suggest that future research should focus on changes to academics' roles as a result of the need for universities to become more entrepreneurial. For example, what value can different types of academics contribute to the entrepreneurial university business model through their varying modes of engagement with industry? How can different types of entrepreneurial behaviour within academics be encouraged? How do academics adapt to changes to their academic work?

To date, there has been limited research regarding how the faculty/school context influences entrepreneurial activities (Bercovitz and Feldman, 2006; Grimaldi et al., 2011). This is surprising considering that the strategy, norms and resources available within the faculty/school within which an academic resides will influence their willingness and ability to engage with industry. Thus faculty/school level contexts have implications at the individual and organisational level. Indeed, Clauss et al. identify the need for research on the role administrators and coordinators at a faculty/school level can have on entrepreneurial activities. Furthermore, they identify to explore how faculty/school contexts can develop student entrepreneurial activities which will feed into the wider entrepreneurial mission of the university. Similarly, Miller et al. identify the need to explore how faculty/school level norms influence academics willingness to engage with external stakeholders,

At an organisational level, Bouncken suggests the need to explore how universities can design spaces which allow the combination of academic and business knowledge and activities. They identify the need for research on coworking spaces and how can they be leveraged for mutual benefit and lead to the generation of new innovations and ventures. Building on this, it is suggested that research should explore how universities could be structurally redesigned to facilitate joint research with organisations across disciplines. Furthermore, Abdelkafi et al. research calls for more research on how universities can

develop the capabilities needed to develop their business models to become more entrepreneurial. Changes at the business model level will ultimately have implications spanning across levels. Lastly, at an ecosystem level, Carayannis et al. suggest future research need to explore how linear and nonlinear models of innovation can work in harmony within ecosystems. Building on this, they identify the need for research exploring how interdisciplinary and transdisciplinarity can be supported and developed within universities and the wider innovation ecosystem. Furthermore, Clauss et al. identify the need for future research to take a holistic perspective of the entrepreneurial university and how this is part of a wider ecosystem. This could involve studies mapping the interactions universities have with ecosystem stakeholders and the influence this may have on entrepreneurial activities. Lastly, it is important to acknowledge the more recent concept of the ‘engaged university’. The role of the engaged university appears to overlap with the concept of the entrepreneurial university, particularly regarding stakeholder interactions and collaboration. Furthermore, Carayannis et al., identify that universities have a duty to contribute to both national and societal welfare which is in line with the remit of an engaged university (Brenzitz and Feldman, 2012). Future research should explore similarities and differences between the entrepreneurial university and engaged university to help progress this field.

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