**Entrepreneurial University Business Models: Core Drivers, Challenges and Consequences**

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1. **Introduction**

Knowledge-based economy has resulted in fundamental drivers for change within universities impacting both their mission and activities (Audretsch, 2014; Hayter et al. 2018; Marzocchi et al. 2019). Traditionally, universities mission was to predominantly teach and conduct research (Hayter et al. 2018). However, intense national and international competition for students and faculty, a changing income base and increased need for universities to demonstrate their impact within the societies they reside, has required universities to become more entrepreneurial in order to ensure their long-term sustainability (Guerrero et al. 2014). This has resulted in a ‘third mission’, which emphasises the important role of knowledge transfer from universities as a source of innovation (Audretsch et al., 2006; Etzkowitz, 2002; Fayolle and Redford, 2014; Mascarenhas et al. 2017). Universities are now expected to contribute directly to the economic development of regions (Guerrero et al. 2016). This third mission has given rise to the advent of ‘entrepreneurial universities’ (Clark, 1998; 2004). An entrepreneurial university is one which performs ‘entrepreneurial’ activities such as licences, collaborative research with private firms, spinoffs and engages in different knowledge transfer activities which have an impact on society (Siegel et al. 2007; Guerrero et al. 2016; Kalar et al. 2015) and acts as a catalyst for academic entrepreneurship (Shane, 2004).

To be ‘entrepreneurial’ requires not only the transformation of the core value activities of a traditional university but requires greater engagement with external stakeholders such as industry, government and wider society (Mascarenhas et al. 2017; Clauss et al. 2018). Indeed research has highlighted the economic impact entrepreneurial universities have beyond their own institutional boundaries (see Guerrero et al. 2016, Howlett, 2010). Within an entrepreneurial university the focus is not only on new knowledge production but on knowledge dissemination, which has an impact on wider society (Goddard and Vallance, 2013). Therefore engaging more in ‘entrepreneurial’ activities requires changes to the core dominant logic of the university. The dominant logic of an organization reflects the norms of how they operate (Roessler et al. 2019). Universities’ traditional dominant logic is to provide high quality education, the creation of new knowledge and scientific advancement. However, the ‘third mission’ of universities puts emphasis on the commercialization of knowledge. Whilst these activities can be and should be complementary, scarce resources and capabilities require trade-off decisions to be made regarding what mission and activities universities prioritise. Many universities want to maintain their core traditional mission and need to ensure they can react to changes in their external environment (Passaro et al. 2017). However, universities are limited by the path dependency of their structures, practices and identity concepts (Krucken, 2003). Consequently, scholars and policy makers alike have become increasingly interested in how universities business models can react to the external drivers for change and become more entrepreneurial. Teece (2010) identifies that a business model *“describes the design or architecture of the value creation, delivery, and capture mechanisms it employs”*. All organisations either explicitly or implicitly employ a business model, where a business model is designed to help an organization realise their overall strategy (Casadesus-Masanell and Ricart, 2010). Yet research and understanding of university business models is limited (McAdam et al. 2017).

Organizations need to innovate and change their business model in response to changes in their environment (Demil and Lecocq, 2010; Schneider and Spieth, 2013). Therefore changes to the core mission of universities requires changes to their respective business model to reflect new value creating and capture activities (Miller et al. 2014; McAdam et al. 2017). However, there is a lack of understanding on how to design entrepreneurial university business models (Etzkowitz et al., 2019) and the challenges and consequences of being more entrepreneurial may have for universities (Cunningham et al. 2017). This chapter aims to arrive at a research agenda focused on furthering theory and practice on the development of entrepreneurial university business models.

**2 Literature Review**

**2.1 Understanding and Designing the Entrepreneurial University Business Model**

There has been increased interest in the entrepreneurial university business model as a mechanism for value creation and economic growth within regions (Guerrero et al. 2016; McAdam et al. 2017). Despite research and policy stressing the need for university business models to become more entrepreneurial (e.g. see Audretsch et al., 2006; Etzkowitz, 2002; Fayolle and Redford, 2014; Mascarenhas et al. 2017), the concept of the entrepreneurial university business model is often discussed theoretically and superficially with a lack of understanding of its defining design features and complexity (Foss and Saebi, 2017; Claus et al. 2017). The business model of the entrepreneurial university is usually described through discussion of the drivers for change discussed in the next section. However, only a few studies have empirically attempted to understand the components and design of the entrepreneurial university business model.

Research by Miller et al. (2014) was the first empirical study to attempt to understand the core changes required to the design of university business models to transition to become entrepreneurial. They draw upon Amit and Zott (2001) to view the university business model as comprising of 1) business model content, which are the daily activities performed, 2) business model structure, which is the ways in which activities are linked and 3) business model governance, which identifies the actors involved with each activity. They suggest that the entrepreneurial business model can be mapped out in relation to the change in activities, structures and external stakeholders (see Table 1 where the extension to the traditional business model is in italics). Miller et al. (2014) suggest that to be entrepreneurial, a university needs to open up their business model. The design of the entrepreneurial business model is negotiated with both internal and external stakeholders. Furthermore, power relationships between internal and external stakeholders can limit the ability for universities to be entrepreneurial. Whilst their research helps to map the activities involved, they do not explore how different types of universities may negotiate different types of business model designs or the challenges universities encounter in implementing more entrepreneurial business models.

Table 1: Activity-Based View of the University Business Model

|  |  |  |
| --- | --- | --- |
| **Activity-Based View** | **Traditional University Business model** | **Entrepreneurial University Business Model** |
| Content | Teaching, research, knowledge dissemination, providing a skilled workforce | Teaching, research, knowledge dissemination, providing a skilled workforce, ***entrepreneurship education, internationalization, university-industry collaboration, developing intellectual property, spin outs, licences, new venture creation*** |
| Structure (how activities are linked) | Academic registry, admissions, research office, schools for specific faculties | Academic registry, admissions, research office, departments for specific faculties, ***TTOs, research and impact centers, international offices, business development staff, technology transfer procedures/mechanisms, incubators, science parks*** |
| Governance (who performs the activities) | University (academics, administrative staff, strategic staff members) government, industry | University (academics/***principal investigators, TTO staff, industry liaison staff,*** administrative staff, strategic staff members); government (***regional development agencies, national government***), industry |

*Source: Adapted from Miller et al., (2014)*

Research by McAdam et al. (2017) builds on work by Miller et al. (2014) to suggest that the transition to an entrepreneurial business model can take years for a university to achieve. Their research on how two universities of different types made changes to the design of their business model over time suggests that universities need to have a clear strategy regarding how their entrepreneurial activities will complement and align to their core traditional mission, otherwise this will result in a hybrid business model design. A hybrid business model design emerges when an organisation has competing dominant logics (Furr, 2016). McAdam et al. (2017) stress that university stakeholders need to agree upon which missions and activities they wish to prioritise and ensure alignment across all departments and faculties otherwise this can lead to both temporary and permanent business model disequilibrium (Demil and Lecocoq, 2010; Pache and Santos, 2010). Business model disequilibrium occurs when there are multiple and conﬂicting stakeholder objectives which compete for legitimacy and scarce resources. Pache and Santos (2010) highlight that disequilibrium can be permanent or temporary and is the result of hybridity in the business model. Hybrid business model designs are not always negative if strategically managed. However, universities are bureaucratic organisations bound by path dependency, making it difficult for them to change their business model. Consequently, McAdam et al. (2017) found that universities seeking to transition to become an entrepreneurial university often encounter a transient period where they inadvertently operate hybrid business models in an attempt to balance their traditional and entrepreneurial missions. This then leads to conflicting objectives between stakeholders where individuals compete for legitimacy and scarce resources. Whilst their research provides interesting insights, their research was focused only on the technology transfer remit of universities and they do not consider the interdependency between the different remits of a university.

Gaus and Riath (2016) appears to be the only study to date which attempts to understand the holistic design of a university business model. They demonstrate how the processes of value creation, delivery and capture have changed across the varying remits with the emergence of entrepreneurial university business models based on Osterwalder and Pigneur’s (2010) business model canvas. The different remits of teaching, research and technology transfer are separate modules of value creation within the overarching university business model. They also map out the different designs of university business models of different types showing that public and private universities need different incentives and governance structures to stimulate more entrepreneurial activities. Their research identifies the different components of an entrepreneurial university business model, however they do not empirically explore the challenges of aligning the different value propositions across a university.

From the literature, it is evident that the design of the university business model can be viewed in different ways. The first is to view a university as one business model with different value propositions or alternatively to focus on the individual value creation activities i.e. either teaching, research or technology transfer (third remit) as being separate business models. The ambiguity in understanding how the entrepreneurial business model is conceptualized and designed gives rise to its complexity and adds to the challenges universities face in developing more entrepreneurial business models.

More research is needed on understanding the design of entrepreneurial university business models and the intrinsic factors that influence their design. To help this, the core drivers for change will now be delineated in order to understand the challenges and consequences these may have for entrepreneurial university business models.

**2.1 Core drivers, challenges, consequences and implications for university business models**

A vast amount of literature has emerged over the past decade on entrepreneurial universities (see Etzkowitz 2002; Philpott et al. 2011; Guerrero and Urbano, 2012; Audretsch, 2014; Centobelli et al. 2019). There are systematic and fundamental drivers for change that are influencing the nature of the academia as well as how universities are organised, managed and lead. These drivers are influencing all the activities of universities from the programmes on offer, the research that is being undertaken, to levels of engagement individual faculty members have with business and society. Through a review of the most pertinent literature, five core drivers which have significant challenges and consequences for universities business models have been identified (see Table 2), which forms the basis for opportunities for future research.Reacting to these drivers and challenges has consequences for the strategic direction of universities and consequently on the design of their business models.

**Driver 1 - Changing Income and Funding Model**:

*Challenge*: Research conceptualises the entrepreneurial business model through their discussion of the changing income and funding model (Lapovsky, 2019). This research identifies that universities are starting to behave like businesses due to experiencing changes in their income base as public investment in supporting their activities is declining (Buchbinder and Newson, 1988, Geuna, 1998, Rolfe, 2003; Gaus and Raith, 2016). It is feared that entrepreneurial income seeking activities will come at the expense of dedicating resources at furthering pure science (Philpott et al. 2011). Furthermore, rising costs of providing education along with increasing competition both nationally and internationally has meant that universities have had to examine other sources of income. In essence they have to diversify, protect and grow their income stream.

*Consequence*: Universities have sought to implement a range of initiatives that enables them to survive and thrive. This has meant for example changes in organisation structures (Guerrero et al. 2016), increased internationalisation of student cohorts (Minola et al. 2016), an expansion of engagement with industry to support research activities (Perkmann et al., 2013; Fan et al. 2019), creation of university foundations and the reconfiguration of programme offerings, developing new academic departments and changing the roles and responsibilities of academic staff (Geuna, 1998; Hedgepeth, 2000; Knight 2013; Warwick. 2014).

Universities have become leaner organisations with the outsourcing of non-core activities such as IT (Allen, 2002), reduction in administrative support to support the university community and an increasing investment in systems and interfaces that are user self-service centric (Gupta et al. 2005, Russell, 2010). This has also lead to more financially orientated planning within universities to ensure that they have the financial resources to invest in activities that enhances their competitive position (Pilbeam, 2012). Diversifying the entrepreneurial university income and funding model is essential for the survival and meeting current and anticipated demands from the various stakeholders (see Estermann and Pruvot 2011). Universities have invested in setting up and growing technology and knowledge transfer offices and putting in place policies and procedures to support faculty and industry engagement (see Baglieri et al 2018; Fitzgerald and Cunningham 2016; Sideri and Panagopolos, 2018). This has lead to the development of university based or supported research centres/institutes, incubators, accelerators and science parks. (see Phan et al., 2005; Link and Scott, 2017; Stayton and Mangematin, 2019; Dolan et al, 2019).

*Implications for the University Business Model:* Universities need to extend their range of value creation activities, make changes to their revenue model, seek operational efficiencies and include additional stakeholders into both the governance and operational levels of their business models. They also need to ensure effective management of any hybrid business models and mitigate against any business model disequilibrium.

**Driver 2 - Corporatism and Managerialism:**

*Challenge*: Universities are primarily organised around disciplines and departments Traditionally such units held significant decision making autonomy over their own activities and future direction. However, what has changed significantly is how these departments and faculties are managed and lead (Musselin, 2013, Parker, 2011; White et al, 2011). Universities have centralised decision making that has lessened the automony of units and individual faculty members have with respect to their activities and future directions. (Martin, 2016; Salancik and Pfeffer, 1974: Jarzabkowski, 2002)

*Consequence:* Restructuring of universities and departments to maintain overall university performance and competitiveness has resulted in a growing managerialism within universities (see Deem, 2001, Kolsaker, 2008, Lawrence and Sharma, 2002). In some universities there has been a retrenchment of mission and activities. Some universities have closed or merged disciplines and moved to a more centralised approach to annual planning (Gates 1997; Parker 2011). Deans and Heads of Department’s are not only responsible for managing academic affairs but also for planning and delivering activities as set out in annual operational and financial plans across teaching, research and knowledge engagement (Davis et al. 2016) including delivery of technology and knowledge transfer performance targets (see Newson, 1994). Overall these structural changes have created additional tensions in aligning overarching university mission to the strategic ambition and operational plans at local levels within academic units. These tensions have consequences for individual faculty members in terms of their priorities, resources, rewards and incentives (see Mangematin et al. 2014). Therefore, there is a need for universities to develop talent management systems and career paths for academics and administrators. A further consequence is the development of new mechanisms to allocate activities, resources and workloads within faculties to ensure delivery of activities against annual operational plans (see Philpott et al. 2011; Winter and O’Donohue, 2012). Universities are increasingly using performance management systems to manage all staff and align this to operational planning within faculties/departments (see Taylor and Baines, 2012). However, simultaneously, universities are more becoming more centralised regarding decision-making relating to core functions, thereby reducing the actual decision making automony of Deans, Heads of Department and individual faculty members.

*Implications for the University Business Model:* This driver is leading to the need for interdependency across value creation activities in different disciplines. This requires new structures and organisational units, such as technology transfer offices to align value creation activities within a more entrepreneurial business model. Furthermore, a focus on maximising efficiency requires university wide systems to manage teaching, research and finances. .

**Driver 3 - Competition:**

*Challenge:* Depending on national government policy and the regulatory environment within national markets, there is increasing and often intense competition among universities for students, research funding and faculty (see Brankovic, 2018; Frank and Gowar, 2019; Grewal et al. 2008).

*Consequence:* Universities increase their societal visibility through marketing campaigns aimed at students and their parents/guardians. Competition also has forced universities to articulate the unique or distinctive aspects of their university (see Maringe, 2006). Therefore, universities use different ranking systems to affirm their competitive position and distinctiveness (Hazelkorn, 2007; Johnes, 2018; Rindova et al. 2018). The changing financial model of universities means that they are now competing internationally. International student fee income is becoming an important income stream (Cantwell, 2019). To succeed in international markets, the distinctiveness of a university needs to pervade many nationalities and countries, be credible and evidenced. National and international university rankings systems are used by universities as evidence of their standing, eminence and performance (Fowles et al. 2016; Elken et al. 2016). To compete internationally some universities have established campuses off-shore (eg. Escriva-Beltran et al. 2019; Smith, 2009; Healey, 2019), while other have entered different strategic alliances typically centred on academic programmes (Clarke and Hermens, 2001; Saffu and Mamman, 1999). Moreover, universities are not only competing for students but are also seeking to develop closer relationships with businesses and sectors that are important to local, regional and national environments (see Stevens and Bagby, 2001; Howlett, 2010). This has lead to the creation of new units and the recruitment of professional staff to support technology and knowledge transfer between universities and business.

*Implications for the University Business Model* : Universities need to re-define their value propositions for diverse stakeholders and hese need to be evidenced by impact and be communicated more widely outside and within the university environment. This also means the need for new structures and organisational units, where a more entrepreneurial business model should be designed around more effective international and industry engagement and co-value creation with an expanded set of stakeholders.

**Driver 4 - Economic Imperative:**

*Challenge*: Increasingly policy makers are viewing universities and their academic staff as key actors in economic development and contributing to economic growth (Cunningham et al. 2017). The economic imperative centres on knowledge transfer, skill development and employability. Research has demonstrated the economic impact that entrepreneurial universities can have on all missions (Carroll and Smith, 2006; Guerrero et al. 2016; Siegfried et al, 2017).

*Consequences*: Universities globally are expanding their mission to what is termed third mission activities; which encompasses both knowledge transfer and commercialisation activities such as spin-outs, spin-ins, licences, incubation, business plan competitions etc (Benneworth et al. 2015; Pinheiro et al. 2015). Universities have put in place policies and incentives to encourage the university community to pursue such activities (Bruneel et al. 2010; Cunningham and Harney, 2006; Cunningham et al. 2020; Dooley and Krik, 2007; Siegel et al. 2003). For example, universities are supporting initiatives designed to support student start-up by sponsoring and encouraging participation in business plan start-up competitions (Watson and McGowan, 2017; Watson et al. 2018) and providing student incubation space and support (Culkin, 2013).

To enhance skills development, universities are aligning programme content and learning objectives with the skills required by industry (Baker and Henson, 2010). Industry needs employment ready graduates to have the knowledge, skills and capacity to contribute effectively to their operations and performance from the first date of employment. Consequently, this is influencing programme and module content, placement opportunities, patterns of delivery and assessment approaches within degree programmes (see Crebert, 2004). National and international placement opportunities –are offered across undergraduate and postgraduate programmes to support the employability of their student cohorts (Crebert et al, 2004; RezaeiZadeh et al. 2017). Within modules there is an increasing emphasis on skills development that are transferable to a work environment. Moreover, there is a growth of entrepreneurship, management and business modules across university faculties to further support knowledge acquisition, skills development and employability of students (Garavan and O’Cinneide, 1994; Nabi et al. 2017). In addition, some universities are launching niche degree programmes at undergraduate and postgraduate levels that blends business with other discipline areas. There are even instances of whole degrees where students become an entrepreneur, set up their own business and get a degree (Blackwood et al. 2015). Also universities have initiated and or are part of incubator and new venture creation programmes where participants can validate their business idea, write a business plan, set up and launch their venture (see Bennett et al. 2017; Gately and Cunningham, 2017; Munari et al. 2017; Piterou and Birch, 2016).

*Implications for the University Business Model* : Universities need to balance social and civic impact with economic value and returns. Therefore, value propositions need to be impact centred and a greater focus on activities, which generate impact. This requires new value creation activities and new internal organisational structures and units to support more entrepreneurial activities.

**Driver 5 - Academic Work and Human Capital Development**

*Challenge:* The nature and demands of academic work have changed significantly (see Cannizzo and Osbaldiston, 2016; Leišytė, 2016) as well as the expectations required from academic staff (Cunningham et al, 2016 a&b; O’Kane et al. 2020). These expectations focus on all aspects of the academic work role – i.e. teaching, researching and service contributions as well making an impact outside the university to relevant stakeholders (Miller et al. 2018b). The nature of academic work is constantly changing, alongside the conditions of employment for academics (see Allen and Gupta, 2016; Kenny, 2017). International mobility of academic talent combined with intense demand for academic talent means that academics are becoming more descerning about choosing universities that will support their career aspirations and research ambitions (Contwell, 2011).

*Consequence:* Universities are investing more resources in career development particularly for early career academics (Acker and Gill, 2005). For example, universities are putting in place specific career paths and supports for early career academics so that they transition to a tenured academic track position. In tandem with this, universities are now more formally recognising engagement with industry and entrepreneurial activities as part of performance, promotional and rewards systems (O’Gorman, et al, 2008; Link et al. 2017; Nicolaou and Souitaris, 2016). This has seen a growth in academic entrepreneurship within universities (Audretsch et al. 2015; Link et al. 2015) and shaped different types of academic entrepreneurship i.e. academic entrepreneurs and entrepreneurial academics (see Miller et al. 2018b). Moreover, universities are attempting to adopt a more entrepreneurial culture among faculty and students (Bienkowska et al. 2016; Guerrero et al. 2016; Laskovaia et., 2017) and provide institutional entrepreneurial supports (see Dolan et al. 2019; Saeed et al, 2015; Soetanto and Jack, 2016; Meoli and Vismara, 2016).

*Implications for the University Business Model*: Universities need to meaningfully support human capital management, extend value creation activities, invest in entrepreneurial education and supports and engage with a wider range of stakeholders to ensure equity and diversity.

Table 2: Core drivers, challenges, consequences and implications for university business models

|  |  |  |  |
| --- | --- | --- | --- |
| **Core Drivers** | **Challenges** | **Consequences** | **Implications for the University Business Model** |
| *Changing Income and Funding Model* | * Public funding declining * Rising costs of education * Need to balance research, teaching and impact | * Balancing traditional and entrepreneurial activities for long term sustainability * Strategic alignment across all activities * Intense and scaling of industry engagement and value co-creation * Multiple business models required | * Extend range of value creation activities * Changing revenue model * Scope and Scale * Operational Efficiencies * Additional stakeholders and governance |
| *Corporatism and managerialism* | * Fostering interdisciplinary activities * Enhancing institutional and individual performance management | * Over centralisation stifles creativity, entrepreneurship and innovation * Longer decision making * Multiple business models needed | * Interdependency across value creation activities in different disciplines * New structures and organisational units * Efficiency * Investment in organisation systems * Talent management development |
| *Competition* | * Development of new teaching models and programmes * Expand   internationalisation to maintain sustainability   * Deeper and wider collaborations with industry * Effective marketing strategies and brand positioning | * Recalibration of balance between domestic and international markets * Multiple business models needed | * Clear defined value propositions focused on impact * Communicating the value activities of the university * New business models for internationalisation and industry engagement * Extending governance stakeholders to enhance value co-creation * New structures and organisational units |
| *Economic imperatives* | * Contribute to economic development and growth * Foster entrepreneurship in both staff and students * Increasing skills development and employability | * Extensive staff support for extended activities * Staff confusion on which activities to focus on and prioritize * Lack of strategic alignment across activities * Multiple business models needed | * Need to balance social and economic value * Extended range of value creation activities * Value propositions focused on impact * Entrepreneurial education for staff and students to aid entrepreneurship and innovation * New structures * New business models for economic value |
| *Academic work and human capital development* | * Extended remit * Global demands for academic talent * Need for entrepreneurship support and skills * Gender disparity | * Performance mechanisms which give recognition to entrepreneurial and traditional activities * Entrepreneurial culture * Entrepreneurial supports * Different business models require different types of academics (entrepreneurial academics and academic entrepreneurs) | * Extended range of value creation activities * Entrepreneurial education * Need to engage with a wider range of stakeholders |

**3. A Research agenda**

Universities globally are undergoing a fundamental changes driving new activities and changing the structure and governance mechanisms of universities. This chapter has identified five key drivers for change for universities to become more entrepreneurial. However, how universities are able to effectively respond to the identified challenges and consequences presents a research agenda. There is a paucity of research that specifically addresses entrepreneurial university business models despite both researchers and policy makers acknowledgement of the need for change. Therefore, adopting a business model lens can help researchers to advance understanding of business models and entrepreneurial universities. To this end we suggest five main research avenues to pursue.

1. *Design of the entrepreneurial university business model*

A lot remains unknown on the different business model designs entrepreneurial universities use to maintain their long-term sustainability in light of changing funding mechanisms, increasing societal challenges such as climate change and to mitigate shocks in the external environment (such as Covid-19 and political shocks like Brexit). This involves the need to explore different contexts where universities adopt singular, multiple and hybrid models. This will extend the work of Miller et al. (2014), McAdam et al., (2017) and Gaus and Raith (2016) through unravelling the nature, scope, purpose, multitude, interconnectivity and alignment of different types of entrepreneurial university business models. This is important, where universities increasingly need to address competing missions – both economic and societal as they seek to secure their long-term sustainability and societal relevance. Some key research questions include; How are the tensions between economic and societal orientated business models managed? How are the boundaries between business models delineated and what organizational mechanisms, organizing principles and process are used to support and mediate internal competition or enhance complementarities? Does separate but interdependent business models help limit the chances of business model hybridity, aid resources allocation and improve strategic alignment across their extended range of value creating activities within an entrepreneurial university?

Future studies should also examine how universities design entrepreneurial business models that are responsive the changing external environments and internal pressures through the deployment of a variety of resource allocation models. However, in designing new business models that attempt to balance competing interests, a strand of research needs to focus on what impact does multiple business models have on the autonomy of individual academic. This may explore to what extent does it changes the institutional support structures and how does it influence teaching, research and their mission activities. Research is also needed on the implications of changes to the business model design in relation to gender, equality and diversity.

Moreover, it is unclear how business models are developed and implemented within an entrepreneurial university. What processes and artifacts are used and who and/or what units drive business model creation? To develop a more entrepreneurial business model, existing organizational structures need to be aligned to such business models to support implementation and consistent execution. Research is needed to understand if entrepreneurial universities create new organizational units, or take a centralized and decentralized approach in the management of business models? At a micro level, we still have limited knowledge on how entrepreneurial universities attempt to balance individual unit autonomy and responsiveness while maintaining overall institutional coherency with respect to institutional purpose. Moreover research is needed on how the design of the entrepreneurial university business model may have implications for performance particularly with respect to culture, structures, processes and their engagement within the local region, national context and internationally.

1. *Antecedent factors and the operationalisation of university business models*.

There is a need for further research on how entrepreneurial university business models operationalise different income and funding models, that enables a university to support economic and societal orientated missions. In particular micro level comparative studies would enable in-depth exploration of factors that influence the actual design of entrepreneurial university business models. In exploring this agenda research questions that could be pursued include: Who designs entrepreneurial universities business models and what institutional and structural barriers do they face in their design and implementation? Does the adaption of business model thinking and approaches radically change income and funding model, managerialism and how university employees are nurtured, developed and supported? How can university business models balance and mediate economic imperative against societal and civic responsibilities? What antecedent factors prevents business model disequilibrium within university business models?

3. *Stakeholder engagement and types of entrepreneurial university business models*

Universities through formal and informal mechanisms at individual and at an institutional level are constantly engaging with stakeholders from industry, government and society through their three missions. Moreover, such stakeholders are placing greater demands on universities to respond to their agendas such as the decarbonisation of industry, reducing waste etc. A lot remains unknown on what types of entrepreneurial university business models enhance and expand stakeholder engagement both internally and externally to address societal grand challenges as well as individual stakeholder interests. Appropriate design of an entrepreneurial university business model offers the potential to engage with stakeholders in a more dynamic, collaborative and sustainable manner resulting in shared value creation. Some future research questions should focus on how do entrepreneurial universities use different types of business models to engage with stakeholders? What complexities arise from embedding diverse stakeholders into different processes? Does developing processes for external stakeholders engagement change the business models of entrepreneurial universities? Research is needed on the evolution and transformation of business models to further understand the types of entrepreneurial university business models which supports long term stakeholder engagement. Research is also needed on how universities overcome tensions associated with economic and social goals of external stakeholders? How do entrepreneurial universities define, create and capture value for stakeholders? Finally, research should explore how adaptive entrepreneurial universities become as a result of using a business model approach.

1. *Business modeling to meet economic, social and policy demands*

There is a need to explore how entrepreneurial universities business models can become more flexible to respond to a variety of economic and social public policy demands. Entrepreneurial universities need to be discerning with respect to what demands that they need to address and allocate appropriate resources. Some of these demands are outside the mission and scope or there is no discernable value for the university. They also need to decide what economic, social and policy demands not to respond to that would potentially create business model disequilibrium. Key questions include how can entrepreneurial university business models be designed to make them better able to adapt to short term public policy demands and pressures placed by national, region and local policy makers and institutional political structures? To what extent do the demands placed on entrepreneurial universities influence stakeholder engagement, university and department level dominant logics? How do entrepreneurial universities use business modeling to anticipate and respond to economic, social and policy demands? What are the process and structures that support the alignment of business models meeting these demands with entrepreneurial university resource allocation and decision making processes?

5. *Entrepreneurial university business models to support academic work*

The entrepreneurial university business model has implications on the nature of academic work. This will involve taking a micro level perspective to explore key research questions such as: How can academic staff develop the skills and capabilities to deliver upon and balance value creation and capture activities across the range of remits? For example, do academics have the necessary skills to engage with industry and society? If not, how can they develop these skills? How do entrepreneurial university business models shape the measurement of value capture and value logics of academic work? What challenges do academics face in engaging in a wider set of activities, which may expand disciplines and involve a wider set of stakeholders? How can academics manage these demands and what implications will this have on entrepreneurial university business model creation? Do the changing entrepreneurial university business model demand different types of academics such as practice-orientated academics versus traditional academics? What challenges would more practice orientated academics face in embedding themselves into university institutional systems? How will reward and promotional systems change to reflect an extended range of activities within a more entrepreneurial business model?

**Conclusion**

Universities play an important role in the evolution of economies and societies. In times of national and international crisis such as Covid-19 and Brexit within the UK, universities remain the anchors within regions, where their human capital and infrastructure are used to address immediate societal and economic pressures. Scientific communities through national and international research collaborations are addressing grand societal challenges and new educational offerings are developed by universities to respond to specific industry needs and broader societal demands. Consequently, universities need to become more entrepreneurial due to evolving external pressures.

University communities have the human capital capabilities to instigate, contribute and lead complex industry and societal problems and challenges. Over many centuries universities have been adept at evolving while holding onto their core values and purpose that sets them distinctly apart from other institutions. Using a business model lens provides researchers with opportunities to unearth how universities are evolving to embrace the entrepreneurial university agenda serving the economic as well as the broader societal and common good agendas. Expanding and deepening the research agenda on entrepreneurial university business models will open up new empirical and theoretical avenues, but also can provide much needed evidence based practical and policy insights.. The overall intention of our contribution is provide some research directionality to this emergent research agenda.

**References**

Ackers, L., and Gill, B. (2005) Attracting and retaining ‘early career’ researchers in English higher education institutions. *Innovation*, 18(3), 277-299.

Allen, D., Kern, T., and Mattison, D. (2002). Culture, power and politics in ICT outsourcing in higher education institutions. *European Journal of Information Systems*, 11(2), 159-173.

Allen, R. and S. Gupta (2016) ‘Academic Leadership’and the Conditions of Academic Work’, *In Academic Labour, Unemployment and Global Higher Education* (pp. 81-102). Palgrave Macmillan UK.

Amit, R. and C. Zott (2001) Value creation in e-business. *Strategic Management Journal*, 22, 493-520.

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

Audretsch, D.B., Lehmann, E.E. and Paleai, S. (2015) Academic Policy and Entrepreneurship: a European Perspective. *The Journal of Technology Transfer*, 40 (3), 363-368.

Baker, G., and Henson, D. (2010) Promoting employability skills development in a research-intensive university. *Education+ Training*, 52(1), 62-75.

Baglieri, D., Baldi, F., and Tucci, C. L. (2018) University technology transfer office business models: One size does not fit all. *Technovation*, *76*, 51-63.

Bennett, D., D.P.B. Yábar, and J.R. Saura (2017) University Incubators May Be Socially Valuable, but How Effective Are They? A Case Study on Business Incubators at Universities, *In Entrepreneurial Universities* (pp. 165-177). Springer International Publishing.

Benneworth, P., de Boer, H., and Jongbloed, B. (2015) Between good intentions and urgent stakeholder pressures: institutionalizing the universities' third mission in the Swedish context. *European journal of higher education*, 5(3), 280-296.

Bienkowska, D., Klofsten, M., & Rasmussen, E. (2016). PhD Students in the Entrepreneurial University‐Perceived Support for Academic Entrepreneurship. *European Journal of Education*, 51(1), 56-72.

Blackwood, T., A. Round, L. Pugalis, and L. Hatt (2015) Making sense of learning: insights from an experientially-based undergraduate entrepreneurship programme. *Industry and Higher Education,* 29 (6), 445-457.

Brankovic, J. (2018). The status games they play: unpacking the dynamics of organisational status competition in higher education. *Higher Education*, *75*(4), 695-709.

Bruneel, J., d’Este, P., and Salter, A. (2010) Investigating the factors that diminish the barriers to university–industry collaboration. *Research policy*, 39(7), 858-868.

Buchbinder, H. and Newson, J. (1988) Corporate-University Linkages in Canada: Transforming a Public Institution. *Higher Education,* 20 (4), 355-379.

Cantwell, B. (2011) Transnational mobility and international academic employment: Gatekeeping in an academic competition arena. *Minerva*, 49(4), 425-445.

Carroll, M.C., and B.W. Smith (2006) Estimating the economic impact of universities: The case of Bowling Green State University, *The Industrial Geographer*, 3(2), 1.

Cannizzo, F., and N. Osbaldiston (2016) Academic work/life balance: A brief quantitative analysis of the Australian experience, *Journal of Sociology*, 52 (4), 890-906.

Cantwell, B. (2019) Are international students cash cows? Examining the relationship between new international undergraduate enrolments and institutional revenue at public colleges and universities in the US. *Journal of International Students*, 5 (12), 512-525.

Casadesus-Masanell, R., and Zhu, F. (2013) Business model innovation and competitive imitation: The case of sponsor-based business models. *Strategic Management Journal*, 34, 464-482.

Centobelli, P; Cerchione, R; Esposito, E; Shashi. (2019) Exploration and exploitation in the development of more entrepreneurial universities: A twisted learning path model of ambidexterity. *Technological Forecasting and Social Change*, 141, 172-194.

Clark, B.R. (1998) Creating Entrepreneurial Universities: Organizational Pathways of Transformation. Issues in Higher Education. Pergamon.

Clark, B. R. (2004). Delineating the character of the entrepreneurial university. *Higher Education Policy*, 17(4), 355-370.

Clarke, T., and Hermens, A. (2001). Corporate developments and strategic alliances in e-learning. *Education+ Training*, 43(4/5), 256-267.

Clauss, T., A. Moussa and T. Kesting (2018) Entrepreneurial university: A stakeholder-based conceptualization of the current state and an agenda for future research. *International Journal of Technology Management*, 77 (1-3), 109-144.

Clauss T. (2017) Measuring business model innovation: Conceptualization, scale development, and proof of performance. *R & D Management*, 47 (3), 385–403.

Cunningham, J. A., M. Guerrero and D. Urbano (2017) Entrepreneurial Universities—Overview, Reflections, and Future Research Agendas, In, *Entrepreneurial Universities Technology and Knowledge Transfer,* The World Scientific Reference on Entrepreneurship: Volume 1, (pp. 3-19).

Cunningham, J. A., P. O’Reilly, B. Dolan, C. O’Kane and V. Mangematin (2017) Entrepreneurship: a study of Scientists in the principal investigator role*,* In*, Gender and Entrepreneurial Activity,* (pp.221), Elgar: UK.

Cunningham, J. A., P. O’Reilly, P., O’Kane and V. Mangematin (2016a) Publicly funded principal investigators as transformative agents of public sector entrepreneurship, In*, Essays in Public Sector Entrepreneurship* (pp. 67-94), Springer International Publishing.

Cunningham, J. A., V. Mangematin, C. O’Kane and P. O’Reilly (2016b) ‘At the frontiers of scientific advancement: the factors that influence scientists to become or choose to become publicly funded principal investigators’. *The Journal of Technology Transfer,* 41 (4), 778-797.

Cunningham, J.A., M. Menter and K. Wirsching (2019) Entrepreneurial ecosystem governance: a principal investigator-centered governance framework, *Small Business Economics*, 52 (2), 545-562.

Cunningham, J. A., O’Reilly, P. Hooper, D., Nepelski, D., & Van Roy, V. (2020). *The Role of Project Coordinators in European Commission Framework Programme Projects. Results of the Innovation Radar PC Survey in FP R&I Projects* (No. JRC120015). Joint Research Centre (Seville site).

Crebert, G., M. Bates, B. Bell, C.J. Patrick and V. Cragnolini (2004) Developing generic skills at university, during work placement and in employment: graduates' perceptions, *Higher Education Research & Development*, 23 (2), 147-165.

Culkin, N. (2013) Beyond being a student: An exploration of student and graduate start-ups (SGSUs) operating from university incubators. *Journal of Small Business and Enterprise Development*, 20(3), 634-649.

Cunningham, J. and B. Harney (2006), ‘*Strategic Management of Technology Transfer, the New Challenge on Campus*’, Oak Tree Press: Cork.

Davis, A., Jansen van Rensburg, M. and P. Venter (2016) The impact of managerialism on the strategy work of university middle managers, *Studies in Higher Education*, 41 (8), 1480-1494.

Deem, R. (2001) Globalisation, New Managerialism, Academic Capitalism and Entrepreneurialism in Universities: is the local dimension still important? *Comparative Education,* 37 (1), 7-20.

Demil, B. and X. Lecocq (2010) Business Model Evolution: In Search of Dynamic Consistency, *Long Range Planning*, 43, 227–246.

Dolan, B., Cunningham, J. A., Menter, M., & McGregor, C. (2019). The role and function of cooperative research centers in entrepreneurial universities. *Management Decision*.

Dooley, L., and Kirk, D. (2007). University-industry collaboration: Grafting the entrepreneurial paradigm onto academic structures. *European Journal of Innovation Management*, 10(3), 316-332.

Elken, M., E. Hovdhaugen and B. Stensaker (2016) Global rankings in the Nordic region: challenging the identity of research-intensive universities?’ *Higher Education*, 72 (6), 781-795.

Escriva-Beltran, M., Muñoz-de-Prat, J., & Villó, C. (2019). Insights into international branch campuses: Mapping trends through a systematic review. *Journal of Business Research*. Forthcoming.

Estermann, T., and Pruvot, E. B. (2011). *European universities diversifying income streams*. European University Association.

Etzkowitz, H. (2002) Incubation of Incubators: Innovation as a triple helix of university-government relationships. *Science and Public Policy,* 29 (2), 115-128.

Fan, H-L; Huang, M-H, and Chen, D-Z. (2019) Do funding sources matter? The impact of university-industry collaboration funding sources on innovation performance of universities, *Technology Analysis and Strategic Management*, 31 (11), 1368-1380.

Fayolle, A. and Redford, D. T. (2014). *Handbook of Research in Entrepreneurship Education: Entrepreneurial University Handbook,* Cambridge: Edward Elgar Publishing

Fitzgerald, C. and J.A. Cunningham (2016) Inside the university technology transfer office: mission statement analysis, *The Journal of Technology Transfer*, 41(5), 1235-1246.

Fitzgerald, C., and Cunningham, J. A. (2016) Inside the university technology transfer office: mission statement analysis. *The Journal of Technology Transfer*, *41*(5), 1235-1246.

Frank, J., and Gowar, N. (2019). *English universities in crisis: Markets without competition*. Policy Press.

Furr, N. (2016) Hybrid business models look ugly but they work. *Harvard Business Review*, March, 30.

Gaus, O. and M.G. Raith (2016) Commercial transfer: a business model innovation of the Entrepreneurial University, *Industry and Higher Education*, 30, 103–201.

Garavan, T. N. and B. O′ Cinneide (1994) Entrepreneurship education and training programmes: a review and evaluation–part 1, *Journal of European Industrial Training,* 18 (8), 3-12.

Gately, C. and J.C. Cunningham (2017) Technology Entrepreneurs; Relational capital; New Venture Formation; Start-Ups; Social Context; Networks; Relationship Building; Leveraging Knowledge Experts, *Journal of Intellectual Capital*, 15 (4), 516-536.

Gates, G. S. (1997) Isomorphism, homogeneity, and rationalism in university retrenchment. *The Review of Higher Education*, *20*(3), 253-275.

Geuna, A. (1998). The internationalisation of European universities: a return to medieval roots. *Minerva*, 36 (3), 253-270.

Goddard, J., and Vallance, P. (2013). *The university and the city*. Routledge.

Grewal, R., Dearden, J. A., and Llilien, G. L. (2008) The university rankings game: Modeling the competition among universities for ranking. *The American Statistician*, *62*(3), 232-237.

Guerrero, M., J.A. Cunningham and D. Urbano (2015) Economic impact of entrepreneurial universities’ activities: An exploratory study of the United Kingdom’, *Research Policy*, 44 (3), 748-764.

Guerrero, M., Urbano, D., Fayolle, A., Klofsten, M., and Mian, S. (2016) Entrepreneurial universities: emerging models in the new social and economic landscape. *Small Business Economics*, *47*(3), 551-563.

Guerrero, M., Urbano, D. and Cunningham, J. (2014) Entrepreneurial Univerities in Two European regions: A Case Study Comparison, *The Journal of Technology Transfer*, 39 (3), 415-434.

Guerrero, M. and Urbano, D. (2012) The Development of the Entreprneeurial University. The *Journal of Technology Transfer*, 37 (1), 43-74.

Gupta, A., Kanthi Herath, S., and Mikouiza, N.C. (2005) Outsourcing in higher education: an empirical examination. *International Journal of Educational Management*, *19*(5), 396-412.

Hayter, C.S. Nelson, A.J., Zayed, S. and O’Connor, A.C. (2018) Conceptualising academic entrepreneurship ecosystems: A review, analysis and extension of the literature. The *Journal of Technology Transfer,* 43 (4), 1039-1082.

Hazelkorn, E. (2007) The impact of league tables and ranking systems on higher education decision making. *Higher education management and policy*, *19*(2), 1-24.

Hedgepeth, R. C. (2000) How Public College & University Foundations Pay for Fund-Raising. *Association of Governing Boards of Universities and Colleges*.

Howlett, R. J. (2010), *Knowledge transfer between UK universities and business’*, *Innovation through Knowledge Transfer*, 1-14.

Jarzabkowski, P. (2002) Centralised or decentralised? Strategic implications of resource allocation models. *Higher Education Quarterly*, *56*(1), 5-32.

Johnes, J. (2018). University rankings: What do they really show?. *Scientometrics*, *115*(1), 585-606.

Kalar, B. and Antoncic, (2015) The entrepreneurial university, academic activities and technology and knowledge transfer in four European countries. *Technovation*, 36-37, 1-11.

Kenny, J (2017) Academic work and performativity. *Higher Education*, 74( 5), 897-913.

Knight, J. (2013) The changing landscape of higher education internationalisation–for better or worse?. *Perspectives: Policy and practice in higher education*, *17*(3), 84-90.

Kolsaker, A. (2008) Academic professionalism in the managerialist era: A study of English universities, *Studies in Higher Education*, 33 (5), 513-525.

Krucken, G. (2003) Learning the ’New, New Thing’. On the role of path dependency in University structures. *Higher Education,* 46 (3), 315-339.

Laskovaia, A., Shirokova, G., and Morris, M. H. (2017). National culture, effectuation, and new venture performance: global evidence from student entrepreneurs. *Small Business Economics*, 49(3), 687-709.

Lapovsky, L. (2018) The changing business model for Colleges and universities. Forbes, 6th Feb.

Lawrence, S. and U. Sharma (2002) Commodification of education and academic labour—using the balanced scorecard in a university setting. *Critical perspectives on accounting*, 13 (5-6), 661-677.

Leišytė, L. (2016) New public management and research productivity–a precarious state of affairs of academic work in the Netherlands. *Studies in Higher Education*, 41 (5), 828-846.

Link, A. N., Siegel, D. S., and Wright, M. (Eds.). (2015). *The Chicago handbook of university technology transfer and academic entrepreneurship*. University of Chicago Press.

Link, A. N., and Scott, J. T. (2017) US university research parks. In *Universities and the Entrepreneurial Ecosystem*. Edward Elgar Publishing.

Link, A. N., Siegel, D. S., and Bozeman, B. (2017) An empirical analysis of the propensity of academics to engage in formal university technology transfer. In *Universities and the Entrepreneurial Ecosystem*. Edward Elgar Publishing.

Mangematin, V., O’Reilly, P., and Cunningham, J. (2014). PIs as boundary spanners, science and market shapers. *The Journal of Technology Transfer*, 39(1), 1-10.

Maringe, F. (2006) University and course choice: Implications for positioning, recruitment and marketing’, *International Journal of Educational Management*, 20 (6), 466-479.

Martin, B. R. (2016) What’s happening to our universities?. *Prometheus*, *34*(1), 7-24.

Parker, L. (2011) University corporatisation: Driving redefinition. *Critical perspectives on accounting*, *22*(4), 434-450.

Marzocchi, C., F. Kitagawa, and M. Sánchez-Barrioluengo (2019) Evolving missions and university entrepreneurship: academic spin-offs and graduate start-ups in the entrepreneurial society, *Journal of Technology Transfer,* 44 (1), 167-188

[Mascarenhas, C.](https://www.emerald.com/insight/search?q=Carla%20Mascarenhas), [Marques, C.](https://www.emerald.com/insight/search?q=Carla%20Susana%20Marques), [Galvão, A.](https://www.emerald.com/insight/search?q=Anderson%20Rei%20Galv%C3%A3o) and [Santos, G.](https://www.emerald.com/insight/search?q=Gina%20Santos) (2017) Entrepreneurial university: towards a better understanding of past trends and future directions. [*Journal of Enterprising Communities: People and Places in the Global Economy*](https://www.emerald.com/insight/publication/issn/1750-6204), 11 (3), 316-338

Meoli, M., & Vismara, S. (2016) University support and the creation of technology and non-technology academic spin-offs. *Small Business Economics*, 47(2), 345-362.

McAdam, M., K. Miller and R. McAdam (2017) University business models in equilibrium – engaging industry and end users within university technology transfer processes, *R&D Management*, 47 (3), 458-472.

Miller, K., R. McAdam and M. McAdam (2018a) A systematic literature review of university technology transfer from a quadruple helix perspective: toward a research agenda, *R&D Management,* 48 (1), 7-24.

Miller, K., A. Alexander, J.A. Cunningham and E. Albats (2018b) Entrepreneurial academics and academic entrepreneurs: A systematic literature review*, International Journal of Technology Management*, 77 (1-3), 9-37.

Miller, K., M. McAdam and R. McAdam (2014) The changing university business model: a stakeholder perspective, *R&D Management,* 44, 265–287.

Minola, T., Donina, D.,and Meoli, M. (2016) Students climbing the entrepreneurial ladder: Does university internationalisation pay off? *Small Business Economics*, Vole 47, No, 3, 565-587.

Munari, F., M. Sobrero, and L. Toschi (2017) Financing technology transfer: assessment of university-oriented proof-of-concept programmes, *Technology Analysis & Strategic Management*, 29 (2), 233-246.

Musselin, C. (2013) How peer review empowers the academic profession and university managers: Changes in relationships between the state, universities and the professoriate. *Research Policy*, 42(5), 1165-1173.

Nabi, G., F. Liñán, A. Fayolle, N. Krueger and A. Walmsley (2017) The impact of entrepreneurship education in higher education: A systematic review and research agenda. *Academy of Management Learning & Education,* 16 (2), 277-299.

Nicolaou, N., and Souitaris, V. (2016) Can perceived support for entrepreneurship keep great faculty in the face of spinouts? *Journal of Product Innovation Management*, 33(3), 298-319.

Newson, J. A. (1994) Subordinating democracy: The effects of fiscal retrenchment and university-business partnerships on knowledge creation and knowledge dissemination in universities. *Higher Education*, 27(2), 141-161.

Osterwalder, A. and Pigneur, Y. (2010) Business model generation: A handbook for visionaries, game changers and challengers, Wiley.

O’Gorman, C., Byrne, O., and Pandya, D. (2008) How scientists commercialise new knowledge via entrepreneurship. *The Journal of Technology Transfer*, 33(1), 23-43.

O'Kane, C., Mangematin, V., Zhang, J. A., & Cunningham, J. A. (2020). How university-based principal investigators shape a hybrid role identity. *Technological Forecasting and Social Change*, *159*, 120179.

Pache, A.C. and F. Santos (2010) When worlds collide: the internal dynamics of organizational responses to conﬂicting institutional demands. *Academy of Management Review,* 35, 455–476.

Parker, L. (2011). University corporatisation: Driving redefinition. *Critical Perspectives on Accounting*, 22(4), 434-450.

Passaro, R., Quinto, I. and Thomas, A. (2017) The impact of higher education on entrepreneurial intention and human capital*. Journal of Intellectual Capital,* 19 (1), 135-156

Perkmann, M., Tartari, V., McKelvey, M., Autio, E., Brostrom, A., D’Este, P., Fini, R., Geuna, A., Grimaldi, R., Hughes,A., Krabel, S., Kitson, M., Llerena, P., Lissoni, F., Salter, A. and Sobrero, M. (2013) Academic engagement and commercialisation: A review of the literature on university Industry relations. *Research Policy,* 42 (2), 423–442.

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

Pilbeam, C. (2012) Pursuing financial stability: a resource dependence perspective on interactions between pro-vice chancellors in a network of universities. *Studies in Higher Education*, 37(4), 415-429.

Pinheiro, R., Langa, P. V., and Pausits, A. (2015) The institutionalization of universities’ third mission: Introduction to the special issue. *European Journal of Higher Education*, 5(3), 227-232.

Piterou, A. and C. Birch (2016) The role of Higher Education Institutions in supporting innovation in SMEs: university-based incubators and student internships as knowledge transfer tools’, *In Impact: The Journal of Innovation Impact*, 7 (1), 72.

Phan, P. H., Siegel, D. S., and Wright, M. (2005) Science parks and incubators: observations, synthesis and future research. *Journal of business venturing*, 20(2), 165-182.

RezaeiZadeh, M., M., Hogan, J., O’Reilly, J. Cunningham and E. Murphy (2017) Core entrepreneurial competencies and their interdependencies: insights from a study of Irish and Iranian entrepreneurs, university students and academics. *International Entrepreneurship and Management Journal*, 13 (1), 35-73.

Rindova, V. P., Martins, L. L., Srinivas, S. B., and Chandler, D. (2018) The good, the bad, and the ugly of organizational rankings: A multidisciplinary review of the literature and directions for future research. *Journal of Management*, *44*(6), 2175-2208.

Roessler, M., Schneckenberg, D. and Velamuri, V. (2019) Situated entrepreneurial cognition in corporate incubators and accelerators: The business model as a boundary object. *IEEE Transactions in Engineering Management*, Forthcoming.

Rolfe, H. (2003). University strategy in an age of uncertainty: the effect of higher education funding on old and new universities. *Higher Education Quarterly*, *57*(1), 24-47.

Russell, A. (2010) Outsourcing Instruction: Issues for Public Colleges and Universities. Policy Matters: A Higher Education Policy Brief. *American Association of State Colleges and Universities*.

Saeed, S., Yousafzai, S. Y., Yani‐De‐Soriano, M., & Muffatto, M. (2015) The role of perceived university support in the formation of students' entrepreneurial intention. *Journal of Small Business Management*, *53*(4), 1127-1145.

Salancik, G. R., and Pfeffer, J. (1974). The bases and use of power in organizational decision making: The case of a university. *Administrative Science Quarterly*, 453-473.

Saffu, K., and Mamman, A. (1999). Mechanics, problems and contributions of tertiary strategic alliances: the case of 22 Australian universities. *International journal of educational management*, 13(6), 281-286.

Schneider, S. and P. Spieth (2013) Business Model Innovation: Towards an Integrated Future Research Agenda, *International Journal of Innovation Management*, 17, 1-34

Shane, S. (2004). Academic entrepreneurship: University spinoffs and wealth creation. Cheltenham: Edward Elgar Publishing

Sideri, K., and Panagopoulos, A. (2018). Setting up a technology commercialization office at a non-entrepreneurial university: an insider’s look at practices and culture. *The Journal of Technology Transfer*, *43*(4), 953-965.

Siegel, D. S., Wright, M., and Lockett, A. (2007) The rise of entrepreneurial activity at universities: organizational and societal implications. *Industrial and Corporate Change*, *16*(4), 489-504.

Siegfried, J. J., A.R. Sanderson and P. McHenry (2007) The economic impact of colleges and universities, *Economics of Education Review,* 26 (5), 546-558.

Siegel, D. S., Waldman, D. A., Atwater, L. E., and Link, A. N. (2003). Commercial knowledge transfers from universities to firms: improving the effectiveness of university–industry collaboration. *The Journal of High Technology Management Research*, 14(1), 111-133.

Smith, L. (2009). Sinking in the sand? Academic work in an offshore campus of an Australian university. *Higher Education Research and Development*, 28(5), 467-479.

Soetanto, D., and Jack, S. (2016). The impact of university-based incubation support on the innovation strategy of academic spin-offs. *Technovation*, 50, 25-40.

Stayton, J., and Mangematin, V. (2019) Seed accelerators and the speed of new venture creation. *The Journal of Technology Transfer*, 44(4), 1163-1187.

Stevens, J. M. and J.W. Bagby (2001), ‘Knowledge transfer from universities to business: Returns for all stakeholders?’ *Organization,* 8(2), 259-268.

Taylor, J., and Baines, C. (2012). Performance management in UK universities: implementing the Balanced Scorecard. *Journal of Higher Education Policy and Management*, 34(2), 111-124.

Teece, D. J. (2010) Business models, business strategy and innovation. *Long Range*

*Planning,* 43, 172-194.

Warwick, P. (2014). The international business of higher education–A managerial perspective on the internationalisation of UK universities. *The International Journal of Management Education*, *12*(2), 91-103.

Watson, K. and P. McGowan (2017), ‘Technology Nascent Entrepreneur Experiences of Start-up Competition Participation’. *In Technology-Based Nascent Entrepreneurship* (pp. 279-308). Palgrave Macmillan, New York.

Watson, K., P. McGowan and J.A. Cunningham (2018) An exploration of the Business Plan Competition as a methodology for effective nascent entrepreneurial learning. *International Journal of Entrepreneurial Behavior and Research*, 24 (1), 121-146.

Winter, R. P., and O'Donohue, W. (2012) Academic identity tensions in the public university: which values really matter? *Journal of Higher Education Policy and Management*, 34(6), 565-573.

White, K., Carvalho, T., & Riordan, S. (2011) Gender, power and managerialism in universities. *Journal of Higher Education Policy and Management*, 33(2), 179-188.