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## **Impact in university-business cooperation – theoretical perspectives and future directions**

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## 1 Background

This *JITTC* special issue, entitled ‘Impact in university-business cooperation’, is largely based on selected contributions from two conferences, namely the 2013 University-Industry Interaction Conference ‘Challenges and solutions for fostering entrepreneurial universities and collaborative innovation’ in Amsterdam, Netherlands (May 2013) and the 13th International Science-to-Business Marketing Conference ‘Cross Organisational Value Creation’ in Winterthur, Switzerland (June 2014). Both conferences addressed the increasing relevance of partnerships and networks when it comes to value creation and innovation in today’s knowledge society.

Focusing on inter-organisational activities, this issue is dedicated to university-business cooperation (UBC), i.e., interactions between academia and businesses. Such cooperation is not a new phenomenon (Levie, 2014). Yet, given the dynamics in both business and academic environments, its relevance has been increasing (Geuna and Rossi, 2015; Rasmussen and Rice, 2012). While businesses seek access to knowledge, technology and specialists supporting their innovation efforts, universities are becoming more and more dependent on third-party funding to maintain their research and other activities (Amadi-Echendu et al., 2006; Hemmert et al., 2014; Hewitt-Dundas, 2012; Kliewe et al., 2013; Perkmann et al., 2013). In this context, UBC provides multiple chances for both actors, such as getting access to specialised knowledge (Bstieler et al., 2015) and making use of complementary skills for joint knowledge creation and innovation generation (e.g., Hemmert et al., 2014; Perkmann and Schildt, 2015).

Thus, considering the increased importance in both theory and practice as well as with regard to policy measures (Lambert, 2003; Mindruta, 2013), interaction between academia and businesses, aimed at disseminating knowledge, turns out to be crucial in today’s knowledge-based society as it bears the potential to ensure long-term growth and competitiveness (Perkmann et al., 2013; Rothaermel and Ku, 2008; Vaidya et al., 2012). In addition, there is a growing consensus that universities and non-university research institutes have to show a turn on research investments made by public bodies (Geuna and Rossi, 2015; Marcure, 2004).

While the increasing extent of UBC activities as well as its outcomes (such as, e.g., the number of patents and spin-offs, licensing income or the monetary value of consulting services provided by academia) have received considerable attention in research (e.g., Vaidya et al., 2012), studies on the impact of UBC and the measurement of this impact are still limited. Up to now, there has been no commonly accepted or agreed upon

framework for assessing the impact of UBC, e.g., its contribution to the innovativeness, productivity and competitiveness of organisations, regions and entire nations. This impact measurement, however, is crucial for the further advancement of UBC activities in general, as it will enable the different stakeholders to focus on those making a true contribution rather than just providing easily measurable outcomes. Hence, this special issue is dedicated to different perspectives of impact in UBC, hereby providing implications for more detailed further discussions as well as future research directions.

What we basically derive from these five papers is that there are two ways of capturing ‘impact in UBC’. These can be concretised as follows: first, the question arises as to which strategies, structures and approaches, as well as framework conditions (Davey et al., 2011), do actually make an impact on the cooperation (‘impact on UBC’). Second, interest is given to the impact that UBC has on its stakeholders, i.e., all those who are affected by the results of the cooperation activities (Freeman, 1984), thus ‘impact of UBC’.

These two separated perspectives of ‘impact on UBC’ and ‘impact of UBC’ provide a more holistic overview on such cooperation. A similar overview emphasising researcher-researcher cooperation, hereby focusing on both environmental factors and drivers as well as outcomes of such activities, has recently been published by Bozeman et al. (2013). Our two-perspective approach is also in line with the general understanding of the term ‘impact’. For example, Oxford Dictionaries (2015) define impact as “[a] marked effect or influence” with the Oxford Advanced Learner’s Dictionary (2015) referring to “the powerful effect that something has on somebody/something”. Hence, dealing with impact in UBC may refer to the impact of something/someone on UBC (input perspective from the cooperation viewpoint) or the impact of UBC on something/someone (output perspective from the cooperation viewpoint). Following this differentiation of impact, past research on this topic can be categorised as follows:

The following list exemplarily highlights past research on the impact on UBC:

- Berman (1990)
- Mueller (2006)
- Bozeman and Gaughan (2007)
- Crespo and Dridi (2007)
- Arvanitis et al. (2008)
- Perkmann and Walsh (2009).

Examples of research on the impact of UBC include:

- Link and Siegel (2005)
- Plewa (2010)
- Laursen et al. (2011)
- Bruneel et al. (2010)
- Perkmann et al. (2013).

## 2 Special issue contributions

The following paragraphs provide an overview of the structure of this special issue and the organisation and order of the papers. The issue highlights the two introduced viewpoints on impact – ‘impact on UBC’ (rather, process or driver-oriented) and ‘impact of UBC’ (outcome-oriented).

The first two contributions of this special issue focus on process-oriented influence factors as prerequisites (impact on UBC) for providing impact in UBC.

In their paper on ‘The motivations of research teams and their cooperation with industry’, Irene Ramos-Vielba, Celia Díaz-Catalán and Josefa Calero examine motivational structures with respect to UBC engagement of groups of academics in Spanish universities and public research centres and from different disciplines. The authors derive three motivational factors, namely, research resources, applicability and income. The results show certain alignments between motivations and knowledge transfer channels, e.g., between commercialisation spirit and intellectual property rights (IPR) activities. In addition, the authors identify linkages between the disciplines and the extent of used knowledge transfer channels.

The paper of Michael D. Santoro, ‘Organising for knowledge and technology-related outcomes in industry-university relationships’, examines key characteristics of industry-university (I/U) relationships, namely, characteristics with respect to dynamic capabilities and knowledge- and technology-related outcomes. His study on industrial firms cooperating with university research centres identifies communication and close geographic proximity as the key characteristics of such relations. The study furthermore reveals a moderating effect of the length of I/U relationships on the effect of university communications, geographic proximity, and an organic firm structure on I/U outcomes.

The last three papers deal with the outcome-related view on impact – university reputation, productivity, as well as economic and social development.

In the third paper, entitled ‘University-industry technology transfer: a systems approach with policy implications’, Cory R.A. Hallam, Bernd Wurth and Ruben Mancha develop a systems perspective of the university-industry technology transfer process that incorporates the relationships between certain technology transfer channels. This model shows that the technology transfer process and its impact extend the traditional scope of university technology transfer offices (TTOs). The findings suggest that universities consider their reputation for technology transfer and R&D as key assets when they make policy decisions regarding industry interactions via licensing, consulting or collaborative research agreements. Excluding these reputational aspects and focusing on short-term revenue maximisation instead is inadequate and can negatively impact the results from technology transfer activities due to secondary feedback structures.

‘Estimating the economic effects of university-industry collaboration’, the study of Michael Mark, Rasmus Lund Jensen and Maria Theresa Norn deals with the economic effects of cooperation between academia and industry in Denmark and beyond and analyses the impact of university-industry cooperation on productivity development of companies. By applying propensity score matching, the authors examine co-financed R&D projects, acquisition of R&D and R&D collaboration and find that companies engaged in such types of collaboration experience stronger financial growth compared to other, non-cooperating companies. The results furthermore show that companies repeatedly cooperating with academia have a more stable productivity growth pattern in comparison with those with on-off collaboration.

Leire Markuerkiaga, Juan Ignacio Igartua and Nekane Errasti's article on 'Factors fostering entrepreneurial universities to develop academic entrepreneurship activities: an assessment of European universities' focus on the identification of the most critical factors conditioning the entrepreneurial university. The authors' study across Europe, based on a structural equation model (SEM) finds networking (such as, e.g., partnerships with external organisations), mobility (i.e., the exchange of students, academics and industrial collaborators between academia and businesses) and staff development through entrepreneurship education to be the most relevant factors promoting economic and social development through academic entrepreneurship activities.

As highlighted in the contributions of this special issue, the authors provide concrete approaches and models for measuring impact in UBC. Their elaborations can be differentiated into impact on and impact of cooperation. The first (Ramos-Vielba et al.) and second paper (Santoro) address impact from a process-oriented view and thus analyse the impact on UBC. In their limitation section, both studies also refer to the need to provide more detailed impact measurement approaches, e.g., by putting emphasis on a joint focus on both universities and businesses, or both the organisational and individual perspective, hereby providing a more multidimensional view on impact measurement. The last three papers, dealing with the impact of such cooperation, provide systemic and measurement models to capture such impact. In outlining future research directions, all three contributions eventually call for extensions and concretisations of their models, in particular with regard to integrating further external factors, potential influence factors and the relations between factors.

### **3 A ten-point agenda for future research on UBC**

In addition to the specific future research recommendations extracted from the papers of this issue, we observed and identified several more general research directions at the last three annual conferences of the University Industry Innovation Network (UIIN, 2015). With a total number of just over 1,000 participants at the three events, coming from 52 countries, the conferences provided a good opportunity to gain insights into the wider research area. We are convinced that dedicating time and effort to these trends and needs is crucial for making a true impact on the field. Given that the observation of research trends and needs had been made over a period of three years, we are convinced that these trends and needs are in fact stable and not just contemporary phenomena. The following list concretises the observed research directions. Its order is deliberately random, i.e., it explicitly does not relate to a specific categorisation of these directions with regard to a specific degree of importance or urgency.

- **Impact of UBC**

The main topic of this special issue has also been observed during the three UIIN conferences. Many different studies on the impact of UBC exist and the impact dimensions seem to be fairly clear; however, there is still no agreed way on how to measure these impact dimensions. Hence, future research should focus on developing practical measurement models and processes, which can be used to investigate the impact of UBC.

- Employability ('back to the roots')

With the academic education and training of the highly qualified workforce of tomorrow being the main purpose of universities since the very beginning, this topic seems to be enjoying a revival. Next to technical competencies (e.g., engineering and information and communication technology (ICT) in Europe, given the talent shortage in this area), a specific interest in training entrepreneurial thinking and acting but also transversal skills was identified. In particular, companies call for future efforts in the employability field as this would directly impact and benefit their core business.

- Organisational vs. individual level research

Considering that UBC activities starting within universities are primarily initiated by individual researchers, the eventual success and success perception regarding such cooperation largely depends on the degree of willingness and commitment of professors to engage in UBC. While numerous prior research emphasises the organisational environment as a starting point for promoting UBC, future research may focus more on considering the linkages between organisational interface and individual perspectives on UBC, i.e., in providing UBC frameworks, more behavioural issues should be taken into account to better match organisational measures with individual drivers and motivational factors critical for UBC engagement.

- Usage of good and next practices in UBC

Nowadays, many collections of good practices can be found in the UBC field. However, it is still unclear how to best evaluate the cases and adapt them to the individual environment. This situation eventually results in the need to conduct further research to exploit the full value of the experiences already gained in similar settings. In addition to the further exploration of good practices, next practices, referring to promising concepts whose success is not yet validated, are another area to be explored further. Given the competitive pressure, universities, businesses, intermediaries and further stakeholders do not only need to build upon validated success stories (good practice), but identify, evaluate and adapt concepts already at an earlier stage where the success is unclear (next practice).

- Entrepreneurial universities and engaged universities

While the development of entrepreneurial universities has been gaining more and more interest among scientists and practitioners in the last few years (the term was developed decades ago), a rising interest in university engagement can be observed. Some researchers focus on university engagement with respect to societal benefits (e.g., university-society relationships), others dedicate their work towards economically engaged universities, primarily referring to the further integration of universities in regional innovation systems.

- Drivers in UBC

Having observed a focus of past UBC research on barriers and how to break them down, we have identified a minor shift in recent years towards the aim to better understand drivers and how they can be better promoted. In other words, it seems

that UBC barriers are well-defined and that the actors are aiming to reduce them as much as possible. The next step is to put more emphasis on UBC drivers. This can be justified as follows: with respect to promoting UBC activities, the reduction of barriers is in vain as long as there are no driving forces to promote UBC and support actors to engage in such activities. In other words: UBC engagement first needs effective drivers and, as the next step, it benefits from lowered barriers, which should result in increased engagement.

- UBC ecosystem

If something has become clear over the past decades, it is that the topic of UBC is a comprehensive and complex one, integrating many different elements. It seems that many of the different elements have been studied (to at least some degree) and that the focus has moved to investigating the links between these elements. Thus, there is a growing interest in understanding UBC from a more holistic or ecosystem perspective.

- The business side of UBC

Having focused the majority of research on UBC on the university and intermediary side, the need for better understanding of the business side can be observed. No matter if the past focus was influenced by the fact that generating data in the university setting is easier, or that the idea was to focus on the supply side (universities offering their research competencies, capacities and results) before dedicating more time to the demand side (represented by businesses), more and more interest is given to understanding the business side of the UBC equation.

- Academic entrepreneurship and academic administration entrepreneurship

The increasing resource constraints, as well as fiercer international competition for research funding, make universities consider acting in a more entrepreneurial way in order to cope with the dynamic environmental conditions they are facing. In this respect, it is worth considering measures on how to foster entrepreneurial thinking and acting among academics and administrative staff. Thereby, the results of entrepreneurial activities do not necessarily have to be a start-up, the transfer of technology or any other external-oriented engagement, but could as well include optimisation measures within the university, such as, e.g., the improvement of internal processes or structures.

- Patents and collaboration

Last but not least, it seems that the topics of patenting (or IPRs) and collaboration are merging more and more. Rather than splitting the topics, as is also being done in practice by having a separate TTO and a corporate relationship office, researchers and practitioners are exploring the overlapping and the value this contains. There is a growing view that patents and IPR are an important part of collaboration activities, but also that relationship factors play a key role in patenting and intellectual property management.

This research agenda implies that there is still a long way to go with respect to fully exploiting the value derivable from UBC activities. Yet, it is also important to acknowledge the impact that past research and practice have already had and still do

have. Therefore, we dedicate this to all those researchers and practitioners dedicating their valuable time and energy to the field.

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