DRIVERS AND BARRIERS TO UNIVERSITY-INDUSTRY RELATIONSHIPS: THE ROLE OF RELATIONSHIP MARKETING.

Zané Dippenaar
Department of Business Management
University of the Free State
South Africa
DippenaarZ@ufs.ac.za

Dr. Karen Booysen
Department of Business Management
University of the Free State
South Africa
BooysenK@ufs.ac.za

ABSTRACT:

Universities and industry partners enter into a relationship for different motives. Consequently, university-industry relationships (UIRs) are yet to receive attention from relationship marketing (RM) researchers. Hence, the research problem for this study is to identify international drivers and barriers to university-industry relationships in order to argue best practices for South Africa.

This study is based on an extensive literature review in order to contextualize UIRs in Europe, whereas results from the Qualitative research identified the drivers and barriers in South Africa. The sampling method used for this study was purposive sampling as a type of Non-probability sampling. Moreover, the population for this study consisted of six technology transfer offices (TTOs) at universities based in South Africa. Analysis was conducted, and is reported in two steps, the identification of themes and a discussion of these results.

Although many similarities have been found between the drivers and barriers of Europe and those of South Africa, a number of differences, unique to South Africa, have also been found. As such, the short distance between the university and the industry partners in Europe is identified as a driver, but in South Africa the remote locations of the TTOs is perceived as one of the main barriers. Furthermore, for both South Africa and Europe, bureaucracy and a lack of funding have been identified as the two of the main barriers to forming UIRs. Moreover, previous research identified trust and commitment as the main drivers of university-industry relationships, however, the empirical results have indicated that access to know-how and industry relevant research and development are the main drivers for industry partners to enter relationships with universities, and for universities it is funding opportunities and access to testing facilities.

The main limitation of this study is the restriction for respondents, as only 6 from more than 15 contacted technology transfer offices were able to participate in this study. Furthermore, the main contribution of this study is within the development of a basis for research in a university-industry environment through combining the well-known theory of relationship marketing with the developing area of technology transfer. Moreover, this study explored how relationship marketing can enhance overall collaboration strength and success and consequently have a direct economic impact on university performance.

INTRODUCTION

The rapid increase of global innovation and the speed of transformation in competition have forced public and private sector establishments to integrate their work in order to cultivate the dissemination of knowledge and technology inside national innovation frameworks. Following the pace at which knowledge is created and shared, innovation-orientated relationships have already increased in numerous countries since 2000 [1], [2]. It is in this regard that universities and their relationships with industry partners assume a fundamental role in the present knowledge economy [3], [4].

Regardless of the fact that an expanded significance of relationships seem to exist between private sector institutions and universities (for the benefit of both parties and society at large) [1], [5]–[8], the concept of a 'relationship' has neither been characterized nor plainly discussed in a university-industry environment [1]. This can be due to the fact that commercialization and TT literature has, to a substantial degree, concentrated on transactional rather than relational trades, consequently research on UIRs stay constrained [9], [10].

Furthermore, authors (for instance [11] and [12]) have emphasized the importance of relationships between universities and industry partners, even though the business-to-business streams of the RM and services marketing literatures had the tendency to focus mainly on the private sector. Changes universities are facing, according to Turk-Bicakci and Brint (2005) is that, in addition to researching and teaching, the role of universities has also become to contribute actively to society through forming relationships with local industry partners. According to Lantos (1994) and Frasquet, Calderón and Cervera (2012); building UIRs helps to moderate the gap between the industry partners and universities. However, academic research about relationships between universities and industry partners is limited [16]. In this regard, Plewa and Quester (2007) have indicated that the concept of "relationship" has not yet been adequately discussed within an UIR context.

This article proceeds as follows: The background and literature review of the study is stated as well as the research question and the primary and secondary objectives of the study. Furthermore, an overview of the research methodology, which will be used to gather information, will be provided. In conclusion, the result will be presented along with conclusions, including the limitations and contributions of the study.

BACKGROUND AND LITERATURE REVIEW

Fig. 1 provides an outline of the background and literature review, which will be discussed in the next two sections.

A. *University-Industry Relationships (UIRs) and Technology Transfer (TT)*

Technology transfer can be reflected as "the transfer of technology from the originating to the operating point" [18]. In other words, within a UIR environment, technology transfer

consist of the transfer of technology from the university (the originating research locus) to industry partners (the operating locus closer to the market) [1]. Additionally, TT not only involves the transfer of information rights, but also the transfer of skills including knowledge [19]. Furthermore, TT is a process wherein knowledge and technology are spread across or within organizations and subsequently absorbed and integrated into the organizations [1], [20]. For the purpose of this study, knowledge and technology are transferred from universities to industry partners.

To encourage and support TT, large amounts of universities have established technology transfer offices (TTOs). TTOs are mainly responsible for running the commercialization process and for the protection of IP created by the university [21]. As said by Tahvanainen and Hermans (2011), a TTO can be regarded as a knowledge converter, an impact amplifier, and a process facilitator. Nevertheless, universities are not similarly effective in commercializing their knowledge [23]. Furthermore, TTOs also fulfil a double boundary spanning role through bridging the gaps between universities and external experts, companies and financiers [24], [25].

The responsibilities of TTOs frequently include not only TT, but also research commercialization. Commercialization is "the process of turning inventions into marketable products" [29]. Furthermore, according to Stock and Tatikonda (2000), the process of research commercialization, relies upon the technology and more over on the TTO.
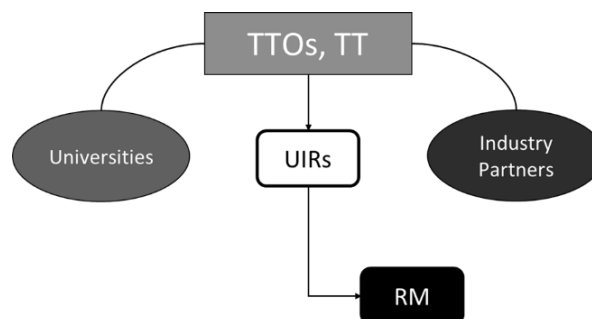

Fig. 1: Literature Review Outline

Numerous definitions for UIRs can be identified in existing literature. However, the researcher identified the definition as stated by Kliewe (2015) as the definition which was used in this article for UIRs: "University-Industry Relationships refers to interactions between trusting and committed stakeholders in the form of collaborative research, contract research, consultancy and/or staff mobility. Through bi-directional resource exchanges, the university as well as its business partner aim to maximize value creation, not only for themselves, but also for further, indirect stakeholders."

B. *University-Industry Relationships (UIRs) and Relationship Marketing*

According to Plewa and Quester (2008) relationship marketing (RM) has developed as "one of the most prolific areas of marketing theory and practice". Furthermore, as stated by Frasquet, Calderón and Cervera (2012), "the benefits of building strong and collaborative relationships between firms are the core of RM". Previous research on RM focused on relationships between suppliers or buyers and manufacturers [16]. RM is viewed as mainly relevant in a service sector for instance education, since a strong relationship between universities and industry partners will possibly help to overcome the hesitation that the intangibility of the product cause [32]. However, a scarce amount of recent studies has

applied the principles of RM to the higher education sector. These studies have typically focused more on the relationship of universities with students [33] and more frequently, between firms and university research centers [13], [34].

Universities function in an environment defined by increased competition, changes in funding systems, fast technological progress, and stakeholders that are more demanding. Consequently, these changes force universities to address the foundation of their competitiveness [13]. Turk-Bicakci and Brint (2005) stated that the role of universities, in addition to researching and teaching, is to contribute actively to society through forming relationships with local industry partners. According to Frasquet, Calderón and Cervera (2012); building UIRs helps to moderate the gap between the business communities and academic, they also state that UIRs can be highly favorable as this improves and enriches educational and research objectives. However, academic research about relationships between universities and industry partners is limited [16] to such an extent that Plewa and Quester (2007) have indicated that the relationship concept has not yet been adequately discussed within an UIR context.

The first time the term RM was used leads back to Berry (1983), who introduced the term "RM" as a "modern concept" in marketing and recommended that RM can be defined as "attracting, maintaining and … enhancing consumer relationships" [4], [36], [37]. Although RM literature recognize that customer acquisition was, and would still continue be, part of a marketers' duties, this perspective highlighted that "a relationship view of marketing implied that maintenance and development were of equal or perhaps even greater importance to the company in the long run than customer acquisition" [37]. Companies pursue RM principles design strategies in order to cultivate lasting relationships with their most valuable customers. This is a result of the fact that "customer retention is much more important than attracting new customers" [36]. RM, in contrast with traditional marketing, identified the need to communicate differently with different customers, dependent on the customers' relationship with the business, and not to treat all the customers the same way.

Plewa (2005) developed a RM definition in a study based on UIRs by incorporating both Gronroos' (1994) and Harker's (1999) definitions: "RM involves proactively identifying, creating, developing, maintaining, enhancing and, when necessary, terminating relationships that are trusting, committed and interactive in nature with selected customers [partners], in order to create mutual value over time" [1].

Although the definition of Plewa (2005) offers a good foundation for a RM definition within the UIR environment, Kliewe (2015) proposed three modifications to address the limitations of Plewa's (2005) definition with respect to UIRs and developed following definition: "RM involves proactively identifying, creating, developing, maintaining, enhancing and, when necessary, terminating relationships that are trusting, committed and interactive in nature with selected stakeholders in order to facilitate the exchange of resources. The ultimate goal is to maximize relationship value creation and the creation of sustainable competitive advantages."

For the purpose of this study, the researcher decided to adapt Kliewe's (2015) definition and developed the following definition: "RM involves proactively identifying, creating, developing, maintaining, enhancing and, when necessary, terminating relationships that are trusting, committed and interactive in nature with selected industry partners in order to

facilitate the successful transfer of technologies. The ultimate goal is to maximize relationship value creation and the creation of sustainable competitive advantages."

C. *Relationship Drivers of University-Industry Relationships (UIRs)*

Drivers are factors, which facilitate the university and industry partners to engage in UIRs. In essence, they are factors that are responsible for the motivation to undertake UIRs and can be divided into two categories namely business drivers and relationship drivers [40]. Business drivers refers to the business factors that motivate UIRs, while relationship drivers are identified as drivers that relate to the relationship between the university and the industry. The different barriers to enter UIRs in Europe are summarized in Table 1 (in the left column) on Page 8 (Adapted from Davey, Baaken, Muros, et al., 2011).

Universities that have established more engaged relationships with their industry partners focuses strongly on the drivers of UIRs. Moreover, Davey, Baaken, Muros, et al. (2011) found that relationship drivers are the drivers that serves as the biggest facilitators of UIRs. In this regard the existence of mutual trust and commitment are argued to be the main relationship drivers, and consequently significantly impacts on UIRs [1], [13], [40], [41].

D. *Relationship Barriers of University-Industry Relationships (UIRs)*

Barriers are those constraints that restrict or obstruct the ability of the university to engage in UIRs. The different barriers to enter UIRs in Europe are summarized in the left column of Table 2, on Page 8 (Adapted from Davey, Baaken, Muros, et al., 2011).

Lack of funding and an excess of bureaucracy at all levels were identified as paramount barriers to UIRs, however removal of these barriers does not necessarily create UIRs [40], [42]. This highlights the importance of identifying the factors that will contribute to the creation of UIRs.

RESEARCH QUESTION

In the context of UIRs, there is a sparse amount of empirical research which examines relationship success or outcomes between universities and industry partners [12], [43]. Nevertheless, different motives for universities and industry partners entering a relationship has been revealed through previous literature as identified by Plewa, Quester and Baaken (2005) [12], [17]. Universities are thought to benefit mainly in economic terms, as well as financial support for future research [9], complemented by benefits such as the application of basic research results to industry problems [43]. In contrast, the aim of organizations when entering a research-oriented relationship, is to acquire knowledge, technology and access to talent [6], [17]. Nevertheless, UIRs are yet to receive attention from RM or services marketing researchers.

Furthermore, even though both universities and industry partners can potentially benefit from a strong UIR [6], [9], [12], [43], there is still an existing gap in the collaboration between them [45]. This can be due to the fact that TT literature has taken an essentially transactional, instead of a relational, perspective, despite the amplified relevance of UIRs [17]. Hence, the research problem identified for this study is the identification of international drivers and barriers to university-industry relationships in order to argue best practices for South Africa.

RESEARCH OBJECTIVES

A. *Primary Research Objective*

To identify international drivers and barriers to university-industry relationships in order to argue best practices for South Africa.

B. *Secondary Research Objectives*

- To review concepts and theories on technology transfer, university-industry relationships and relationship marketing.
- To investigate the drivers and barriers to forming university-industry relationships in Europe.
- To investigate the drivers and barriers to forming university-industry relationships in South Africa.
- To determine the importance of relationship marketing in university-industry relationships.
- To provide recommendations and solutions in order to enhance the university-industry relationships.

RESEARCH METHODOLOGY

According to Wiid and Diggines (2013), methodology is defined as "the description of the research design, the sampling method and the methods used for gathering and analyzing data". The research approach adopted in this study is qualitative, and of an exploratory nature, which allows us to develop, clarify, and change concepts and ideas [47].

Qualitative research has been used as an exploratory research design as it provides the researcher with an understanding of underlying reasons, opinions, and motivations. The core disadvantage of qualitative research is that it is time consuming as it entails extensive data collection. Nevertheless, it is indeed acceptable when bearing in mind that the main benefit that the researcher will be able to achieve is to obtain measures, which are grounded in the data, obtained from the participants of the study. Consequently, the data, even though time consuming to gather, is of a considerably higher quality [48].

For the purpose of this study, the purposive sampling technique as a type of Non-probability sampling was used, by means of choosing respondents who are in line with the chosen criteria for the study. This study's sampling technique was purposeful in the sense that it was not intended to be "representative", but that it is possible to have the features (for instance, technology transfer office managers at South African universities) that the researcher aimed to study. The results obtained from this type of sampling is not "generalizable to the wider population but they may be generalizable at a conceptual level" [49].

The population for this study will consisted of six members of TTOs from six universities in South Africa. These six universities were chosen based on the established relationship between their TTO's and the Department of Research Development at the University of the Free State, where the researcher is currently employed. Therefore, there is already interaction between the researcher and the various TTO's, which made it cost, and time, effective to make contact with them.

In order to secure the participation of the TTOs, the researcher sent an email containing a consent form as well as the interview questions (as a courtesy for them to prepare) along with a request for a possible date to schedule the interview. . In order to encourage response to emails sent, the researcher phoned the potential participants to follow up.

The data obtained from the Qualitative research was analyzed using the Interactive Qualitative Approach (IQA). The IQA offers tools and processes in order to analyze the information collected in the phone/Skype interviews. Both induction and deduction were used in the process of coding the data obtained [50]. Furthermore, the identification of themes will be essential to this process and this identification of affinities are thematically structured groupings. By using, a process of inductive coding, affinities will be identified. Northcutt and McCoy (2004) define affinities as "sets of textual references that have an underlying common meaning or theme synonymous to factors or topics". The researcher then made use of axial coding processes in order to reorganize and refine, defining the range of meaning for each affinity [50], [51].

For the purpose of ensuring or improving reliability, emphasis will fall on synchronic reliability. This refers to the extent of similarity of observations, from different sources (the different TTOs who will be interviewed), within a specified time frame [52].

ETHICAL CONSIDERATIONS
The researcher will address ethical issues by ensuring that:

- The respondents would be guaranteed of confidentiality and anonymity throughout the whole process.
- The participants gave their informed consent to partake in this research study.
- This study would not harm the participants, even though in no way advancing the respondents.
- The respondents will be introduced to the research background.

RESULTS
The qualitative data gathered from the interviews were analyzed in six steps, including (Booysen, 2015):

A. Transcription

Transcribing the data refers to "the process of writing a summary of the recorded interview" (Booysen, 2015). Transcribing the data gathered in this study took roughly 2 hours per interview.

B. Coding

While listening to the recordings of the interviews, the researcher made further notes and identified relevant statements, words, or sections. This process of labelling these concepts, statements, words, sections or differences in the interview data is known as "coding" [53].

Conceptualizing the essential patterns emerged from the data, is the main aim of the coding process. After this, the most important codes are identified and categories into themes.

Themes are concepts or statements, which are alike and grouped together in order to create a uniform entity.

C. *Labelling and Describing Themes*

After the results gathered from the interviews were summarized and analyzed, two key themes stood out. These themes are:

- Drivers of UIRs
- Barriers of UIRs

The drivers of the UIRs include factors that TTOs perceive as drivers/motives for entering UIRs in South Africa and what they think "drive" industry partners to enter a UIR in South Africa. The "barriers to UIRs" contains factors that serve as barriers for both the TTO and the industry partners to enter a UIR in South Africa.

D. *Results and Discussion*

Henceforth, the themes should be described. The description of the links between the identified themes provides the key results of the study. The results for each theme identified, is illustrated in Table 1 and 2 under the results for South Africa. Within the next sections, the results for each theme will be discussed and compared with the drivers and barriers for entering UIRs in Europe.

1) *Drivers of UIRs*

From Table 1, it can be seen that there is a large degree of similarities between the drivers in Europe and South Africa. These similarities will now be grouped into the main drivers identified:

a) *Access to Knowledge*

One of the drivers identified in European literature, was the "interest of the industry in accessing scientific knowledge". When the TTOs were asked to identify drivers for industry partners to enter UIRs in South Africa, all of them answered "access to know-how, information and expert knowledge". Furthermore, one of the drivers for TTOs to enter UIRs was access to market intelligence and knowledge. In other words, a main driver to enter UIRs is access to scientific and market knowledge.

b) *Commercialisation*

Another driver identified within the literature findings was the "commercial orientation of universities". During the interviews, all of the TTOs agreed that the commercialization of projects with industry partners occur must faster and are more successful, than the projects without industry partners.

c) *Access to Facilities and Technology*

"Access to development facilities and industry-sector research" was one of the drivers found in the literature study. Similar to this, the empirical result indicated that TTOs perceive the opportunity to access testing facilities in order to test and demonstrate their research, as one of the drivers to enter UIRs. Furthermore, the interviewees mentioned that "access to state of the art technology" at universities is also a possible driver for industry partners to enter UIRs.

d) *Employment Opportunities for Students*

"Screening opportunities for employment of students" were identified as a driver for industry partners to enter UIRs. Although this was not identified as a driver for TTOs, they also benefit from it by providing student with possible job opportunities. Furthermore, it provides "students access to practical real world questions and research projects", which will help them when entering the employment environment. This supports the literature finding that "employment of university staff and students by industry partners" are a driver for both TTOs and industry partners to enter UIRs.

e) *Funding Opportunities*

Regarding funding opportunities, the empirical results highlighted that industry partners are driven to enter UIRs in order to increase their profit. Whereas TTOs are entering UIRs for the funding opportunities such as royalties and seed funding. This confirms the literature finding that states that a possible driver could be the "opportunity of accessing funding/ financial resources for working with industry partners".

Apart from the numerous similarities, a few differences also occurred. None of the interviewees (TTOs) mentioned neither trust nor commitment as potential drivers of TTOs or industry partners to enter UIRs. Instead, they have mentioned drivers such as access to testing facilities, access to knowledge, funding, licensees, etc. This indicate a transactional, rather than relational orientated mind-set. Further notable drivers for TTOs to enter UIRs include industry driven research, which enables universities to create industry relevant research outputs, and long-term contract research. One of the most mentioned drivers for industry partners was access to intellectual property, patents and licenses, and access to research and development relevant to their needs.

2) *Barriers of UIRs*

In Europe, bureaucracy and a lack of funding was identified as the main barriers to entering UIRs for both TTOs and industry partners. However, comparing the literature findings and the empirical findings from the qualitative data, the following main barriers to enter UIRs, was identified from the perception of TTOs in South Africa:

a) *Bureaucracy*

The majority of the interviewees mentioned bureaucracy within universities to be a barrier to entering into, or building UIRs. This confirms the literature findings stating that bureaucracy is one of the main barriers to UIRs.

b) *Confidentiality Issues*

The TTOs identified "confidentiality" as a barrier to forming UIRs. This is better explained by the literature findings which identified "the need for business to have confidentiality of research results" and industry partners' "fears that their knowledge will be disclosed".

c) *Financial Issues*

Within the previous sections, drivers of UIRs, funding opportunities were identified as a driver of UIRs. However within this section, the lack of funding, or financial issues, were identified as a barrier to UIRs. The empirical results highlighted that "cost of running a successful TTO" are a great barrier to forming UIRs. This includes travel costs to create or maintain relationships with industry partners as well as costs regarding intellectual property,

patents, etc. As previously mentioned, the literature findings highlighted that a lack of funding is one of the main barriers to forming UIRs.

d) ***Remote Locations of TTOs***

As seen in Table 2, "short geographical distance between the university and the industry partners" were identified as a driver for relationships. This is noteworthy since, within the results of the interviews, it was found that the remote locations of the TTOs in South Africa and the long distances between them and their industry partners is perceived as one of the main barriers.

a) ***"Not Speaking the Same Language"***

A barrier, which stood out from the interviews with the TTOs, was the fact that universities and the industry does not "speak the same language". This includes different time schedules, deadlines, conflicting motivations and values, different modes of language and communication, etc. This can be 'n barrier when responsibilities and expectation should be discussed.

Table 1: Comparison between Drivers for Industry Partners and TTOs to Enter UIRs IN Europe and South Africa.

Europe	South Africa – Industry Partners	South Africa - TTOs
Presence of mutual trust.	Access to IP, patents and licenses	Long term contract research
Presence of mutual commitment.	Develop prototypes	Funding (royalties, seed funding)
Understanding of common interest by the university and the industry partners.	Research and development (Relevant to their needs and their industry)	Gives students access to practical real world questions and research projects.
Access to development facilities and industry-sector research.	Access to state of the art technology	Industry driven research
Shared goals.	Access to "Know how"	Licensees
Interest of the industry in accessing scientific knowledge.	Screening opportunities for employment of students	To test and demonstrate technologies
Previous relation with industry partners.	Improvement of their products, competitive advantage	Successful and faster commercialization
Flexibility of the industry partner.	Information and expert knowledge	Access to markets for our products
Commercial orientation of universities.	Transparent legal agreements	Market intelligence/market knowledge
Employment of University staff and students by industry partners.	First sight of new inventions	To create industry relevant research outputs.
Cooperation as effective means to address societal challenges and issues.	Profit	It gives the TTO good targets to focus on from a research perspective

			TEA
Short geographical distance between the university and the industry partners.			
Opportunity of accessing funding/ financial resources for working with industry partners.			Testing facilities
			Potential international reach
			HR capacity building

Table 2: Comparison between Barriers for Industry Partners and TTOs to Enter UIRs IN Europe and South Africa.

Europe	South Africa
Lack of external funding for UIRs.	Issues around IP, ownership
Lack of financial resources of the industry partners.	Cost of running a successful TTO
Lack of university funding for UIRs.	Bureaucracy
The existing financial crises.	Confidentiality
The focus on producing practical results by business.	Not speaking the same language
The need for business to have confidentiality of research results.	Location, we are based in a remote town. Far from the market decision-makers
Business fears that their knowledge will be disclosed.	Time schedules of universities is very different from industry
Industry partners lack awareness of university research offerings/activities.	
Conflicting motivations/values between universities and industry partners.	Unsuccessful products, services and research outputs, not meeting milestones and deadlines TTO
Universities' lack awareness of opportunities from UIRs.	
Bureaucracy external to or within the universities.	
Inadequate ability of industry partners to absorb research findings.	
Differing mode of language and communication between universities of industry partners.	
Sparse contact people with scientific knowledge within the industry.	
Difficulty in finding the suitable industry partners.	
No fitting contact persons within either the universities of industry partners.	

RECCOMENDATIONS

Granting that numerous universities still acknowledge entrepreneurial activities in addition to licensing and patenting as the main tasks of TTOs, in order to produce high additional

profits from prospective UIRs, TTOs should endeavor to form continuing relationships with industry partners. Furthermore, enhanced communication and improved trust will not only have an impact on a university's ability to transfer technologies, but also enhance the success of UIRs. Hence, recommendations to improve UIRs will now be discussed.

Firstly, and most importantly, it is recommended that TTOs should take a relationship-oriented approach towards UIRs. In order to do so, and to enhance the quality of UIRs, regular interaction with industry partners is crucial.

Secondly, TTOs should promote the value that UIRs can generate for both the university and industry partners through marketing and advertising. This can be achieved through communication that is more frequent, in order to guarantee the creation of mutual value, trust and commitment in UIRs. Therefore, communication strategies must be managed to allow the growth of a common understanding of each parties' responsibilities, which ought to be developed by means of two-way informal communications (electronic or informal face-to-face communications) and formal communications (written information and formal face-to-face communications). Furthermore, TTOs, especially the TTOs in remote locations, should make everts to travel to the industry partners and meet with them face-to-face. This will especially be useful at the beginning of relationships with industry partners.

Thirdly, TTOs should consider marketing their success stories and experience in order to build and encourage trust, which are essentially RM strategies. Furthermore, TTOs should make sure the expected outcomes, products and services, upon agreed upon deadlines. This will also maintain mutual trust. Since confidentiality issues was identified as a main barrier to forming UIRs, it is also important to encourage trust in the fact that industry partners' knowledge and the result won't be disclosed.

Fourthly, TTOs should create an understanding with academics and the university that industry partners are essential to make an impact on society. It is also recommended that TTOs should encourage senior management's support for relationship building and highlight the importance of employee empowerment in order to overcome bureaucracy and inflexibility.

Lastly, it is recommended that both TTOs and industry partners should attempt to encourage a mutual understanding of the expectations of both the industry partners and the TTO, from the start. For instance, they should outline different and mutual expectations as well as identify and discuss conflicts of interest. Furthermore, both parties, for future references, should keep a written or digital copy of notes on the expectations communicated. Additionally, they should make sure to communicate changes in expectations throughout the relationship.

CONTRIBUTION OF THE STUDY

The main contribution of this study is within the development of a basis for research in a university-industry environment through combining the well-known theory of RM with the developing area of TT. This will also construct a distinctive learning opportunity for practitioners and theorists in both RM and TT areas.

This study will contribute to TT and RM theory through improving the successful practice and understanding of UIRs, and conceptualizing the relationships characterized by universities and industry partners. Furthermore, the study will provide managerial implications for industry partners and universities.

Moreover, this study will explore how RM can enhance overall collaboration strength and success and consequently have a direct economical impart on university performance. Thus, UIR quality can act as a predictor for long-term TTO success, which is often difficult to determine. Overall, the aim is to move the focus towards more forward-looking relationship-centric approaches for patenting/licensing and entrepreneurship TTO activities and away from traditional transaction-orientation.

LIMITATIONS AND FUTURE RESEARCH

Although this research study contributes to both practice and theory, there are limitations that have to be noted.

The first limitation of this study is the restriction for respondents, as only six (from the ten contacted) TTOs participated in this study. Furthermore, the sample used for this study was comprised of participants from different research and industry backgrounds. However, industry-specific research can be conducted to identify differences between UIRs. In addition, during the interviews, the questions and results were mostly based on the overall understanding of the interviewee rather than their own specific UIR. Moreover, since research have concentrated on South Africa only, the generalization of findings to other countries are restricted.

Given the large amount of failing relationships and the importance of UIRs around the world [6], further research in the area of UIRs combined with RM is unmistakably necessary. A further area for future research can be to extend the investigation of the study to TTOs at technology Universities and/or colleges in South Africa. Furthermore, the study can also be extended internationally. For instance, a comparison can be made between different countries.

This study have only focused on TTO managers at universities and their experience/perceptions of UIRs in South Africa. However, it is recommended for future research to also evaluate to what extent factors at different levels within universities, as well as the interaction between the levels, affect effective relationships between universities and industry partners. For instance, the level of the university itself, departments or research groups, and faculties. Furthermore, future research should look at UIRs from a RM perspective within a network context, for instance, including relationships with the government cooperative and research centers. Lastly, further research is required to improve the understanding of how TTOs can purposefully encourage particular relationship outcomes.

REFRENCES

[1]   C. Plewa, "Key Drivers of University-Industry Relationships and the Impact of Organisational Culture Difference; A Dyadic Study," University of Adelaide, 2005.

[2]   OECD [Organisation for Economic Co-operation and Development], *Science, Technology and Industry Outlook*. Paris: Organisation for Economic Co-operation and Development., 2000.

[3] S. Arvanitis, U. Kubli, and M. Woerter, "University-Industry Knowledge and Technology Transfer in Switzerland: What University Scientists Think about Co-Operation with Private Enterprises," *Res. Policy*, vol. 37, no. 10, p. 18651883, 2008.

[4] T. Kliewe, "Value Creation in University-Industry Relationships: A View On Stakeholder and Relationship Value from The Perspective of Academics in England," Coventry University Business School, 2015.

[5] M. Baba and T. Kamibeppu, "Contemporary Development of Research Cooperation in University-Industry Relations in Japan," *Ind. High. Educ.*, vol. 14, no. 1, pp. 17–23, 2000.

[6] S. C. Cyert and P. S. Goodman, "Creating Effective University-Industry Alliances: An organisational Learning Perspective.," *Organ. Dyn.*, vol. 26, no. 4, pp. 45–57, 1997.

[7] J. Stackhouse, J. Sultan, and J. Kikrland, "Research Management in African Universities: Report of a Benchmarking Seminar," Durban, South Africa, 2001.

[8] ARC [Australian Research Council], "Mapping the Nature and Extent of Business-University Interactionin Astralia.," 2001.

[9] G. Harman, "University-Industry Research Partnerships in Austalia: Extent, Benefits and Risks"," *High. Educ. Res. Dev.*, vol. 20, no. 3, pp. 245–264, 2001.

[10] C. Lee, C. Tinsley, and P. Bobko, "Cross-Cultural Variance in Goal Orientations and Their Effects," *Appl. Psychol. An Int. Rev.*, vol. 52, no. 2, pp. 272–297, 2003.

[11] E. M. Mora-Valentı́n, A. Montoro-Sánchez, and L. A. Guerras-Martı́n, "Determining Factors in the Success of R&D Cooperative Agreements Between Firms and Research Organizations," *Res. Policy*, vol. 58, no. 3, pp. 20–38, 2004.

[12] J.-P. Schneider, A. Kock, and C. Schultz, "Understanding University Industry Technology Transfer: Relationship Management Approaches of Leading Universities in Europe And USA," *World Technop. Rev.*, vol. 4, no. 2, pp. 62–78, Jun. 2015.

[13] C. Plewa and P. Quester, "A dyadic study of '"champions"' in university-industry relationships," *Asia Pacific J. Mark. Logist.*, vol. 20, no. 2, pp. 211–226, 2008.

[14] L. Turk-Bicakci and S. Brint, "University-Industry Collaboration: Patterns of Growth for Low and Middle Level Performer," *High. Educ.*, vol. 49, pp. 61–89, 2005.

[15] G. Lantos, "Faculty Internships: A Means to Bridge the Academician/Practicioners Gap.," *J. Prod. Brand Manag.*, vol. 3, no. 4, pp. 15–30, 1994.

[16] M. Frasquet, H. Calderón, and A. Cervera, "University-Industry Collaboration From a Relationship Marketing Perspective : An Empirical Analysis in a Spanish University," *High. Educ.*, vol. 64, no. 1, pp. 85–98, 2012.

[17] C. Plewa and P. Quester, "Key Drivers of University- Industry Relationships: The Role of Organisational Compatibility and Personal Experience," *J. Serv. Mark.*, vol. 21, no. 5, pp. 370–382, Aug. 2007.

[18] T. . Guerin, "Transfer of Australian Environmental Research on the Insecticide Endosulfan to Anhui Province, China," *J. Environ. Sci.*, vol. 11, no. 4, pp. 443–448, 1999.

[19] S. Radosevic, *International Technology Transfer and Catch-up in Economic Development*. Edward Elgar Publishing, 1999.

[20] B. Bozeman, "Technology Transfer and Public Policy: A Review of Research and Theory," *Res. Policy*, vol. 29, no. 4–5, pp. 627–655, 2000.

[21] G. D. Markman, P. H. Phan, D. B. Balkin, and P. T. Gianiodis, "Entrepreneurship and University-Based Technology Transfer," *J. Bus. Ventur.*, vol. 20, no. 2, pp. 241–263, Mar. 2005.

[22] A. J. Tahvanainen and R. Hermans, "Making sense of TTO production function: university technology transfer offices as process catalysts, knowledge converters and impact amplifiers," Research Institute of the Finnish Economy (ETLA), Helsinki, 2011.

[23] G. Secundo, C. De Beer, and G. Passiante, "Measuring university technology transfer efficiency: a maturity level approach," *Meas. Bus. Excell.*, vol. 20, no. 3, pp. 42–54, Aug. 2016.

[24] A. Huyghe, M. Knockaert, M. Wright, and E. Piva, "Technology Transfer Offices as Boundary Spanners in the Pre-SpinOff Process: The Case of a Hybrid Model.," *Small Bus. Econ.*, vol. 43, no. 2, pp. 289–307, 2014.

[25] A. Huyghe, M. Knockaert, E. Piva, and M. Wright, "Are researchers deliberately bypassing the technology transfer office? An analysis of TTO awareness," *Small Bus. Econ.*, vol. 47, no. 3, pp. 589–607, Oct. 2016.

[26] D. S. Siegel, R. Veugelers, and M. Wright, "Technology Transfer Offices and Commercialization of University Intellectual Property: Performance and Policy Implications.," *Oxford Rev. Econ. Policy*, vol. 23, no. 4, pp. 640–660, 2007.

[27] M. Perkmann *et al.*, "Academic engagement and commercialisation: A review of the literature on university–industry relations," *Res. Policy*, vol. 42, no. 2, pp. 423–442, Mar. 2013.

[28] P. H. Phan and D. S. Siegel, "The Effectiveness of University Technology Transfer.," *Found. Trends Entrep.*, vol. 2, pp. 77–144, 2006.

[29] G. Harman, "Australian university research commercialisation: perceptions of technology transfer specialists and science and technology academics," *J. High. Educ. Policy Manag.*, vol. 32, no. 1, pp. 69–83, 2010.

[30] G. N. Stock and M. V. Tatikonda, "Typology of project-level technology transfer processes," *J. Oper. Manag.*, vol. 18, no. 6, pp. 719–737, 2000.

[31] G. G. Markman, P. T. Gianiodis, and P. H. Phan, "Fulltime Faculty or Part-Time Entrepreneurs.," *IEEE Trans. Eng. Manag.*, vol. 55, no. 1, pp. 29–36, 2008.

[32] S. Philbin, "Process model for university- industry research collaboration," *Eur. J. Innov. Manag.*, vol. 11, no. 4, pp. 488–521, Oct. 2008.

[33] T. Henning-Thurau, M. F. Langer, and U. Hansen, "Modelling and Managing Student Loyalty. An Approach Based on the Concept of Relationship Quality," *J. Serv. Res.*, vol. 3, no. 4, pp. 331–344, 2001.

[34] E. M. Mora, A. Montoro, and L. A. Guerras, "Determining Factors in the Success of R&D Cooperative Agreements Between Firms and Research Organizations," *Res. Policy2*, vol. 33, no. 1, pp. 17–40, 2004.

[35] L. L. Berry, "Relationship Marketing," Berry, L.L. Shostack, G.L. Upah, G.D., Chicago, IL, 1983.

[36] S. Hollensen and M. O. Opresnik, *Marketing*, vol. 1, no. 1. Vahlen, 2015.

[37] J. Egan, *Relationship Marketing: Exploring Relational Strategies in Marketing*, Fourth. Pearson education, 2011.

[38] C. Gronroos, "Quo Vadis, Marketing: Toward a Relationship Marketing Paradigm," *J. Mark. Manag.*, vol. 10, no. 5, pp. 347–360, 1994.

[39] M. J. Harker, "Relationship Marketing Defined? an Examination of Current Relationship Marketing Definitions," *Mark. Intell. Plan.*, vol. 17, no. 1, pp. 13–20, 1999.

[40] T. Davey, T. Baaken, V. Muros, and A. Meerman, "Barriers and Drivers in European University-Business cooperation," *State Eur. Univ. Coop. Final Rep. - Study Coop. between High. Educ. Institutions public Priv. Organ. Eur.*, p. 18, 2011.

[41] J. Bruneel, P. D'este, and A. Salter, "Investigating the Factors that Diminish the Barriers to University-Industry Collaboration.," *Res. Policy*, vol. 39, no. 7, pp. 858–868, 2010.

[42] S. Ó. Unnsteinsdóttir, "Industry-University relations from the industry perspective," 2014.

[43] Y. S. Lee, "The Sustainability of University-Industry Research Collaboration: An Emperical Assessment.," *Multivar. Behav. Res.*, vol. 25, no. 2, pp. 111–133, 2000.

[44] C. Plewa, P. Quester, and T. Baaken, "Relationship Marketing and University–Industry Linkages: A Conceptual Framework," *Mark. Theory*, vol. 5, no. 4, pp. 433–456, 2005.

[45] R. Raver, "One Step At A Time: Bridging the Gap Between Academia and Industry," *The Grad Student Way*, 2012. [Online]. Available: http://thegradstudentway.com/blog/?p=251. [Accessed: 26-Jan-2017].

[46] J. Wiid and C. Diggines, *Marketing Research*, 2nd ed. South Africa: Juta & Co. Ltd., 2013.

[47] L. Closs, G. Cardozo Ferreira, A. Freitas Soria, C. Hoffmann Sampaio, and M. Perin, "Organizational Factors that Affect the University-Industry Technology Transfer Processes of a Private University," *J. Technol. Manag. Innov.*, vol. 7, no. 1, pp. 104–117, Mar. 2012.

[48] J. W. Creswell, *Research Design: Qualitative, Quantitative and Mixed Methods Approaches*, 2nd ed. London, Sage Publishers, 2003.

[49] M. Grzegorczyk and D. Trzmielak, "Relationship barriers and drivers of knowledge transfer and technology commercialization – a Polish and international ...," in *The ISPIM Americas Innovation Forum*, 2014, no. December.

[50] K. Booysen, "An Evaluation of Support Institutions in Enhancing the Commercialisation Process," University of the Free State, 2015.

[51] N. Northcutt and D. McCoy, *Interactive Qualitative Analysis. A Systems Method for Qualitative Research*. London: Sage Publication Limited, 2004.

[52] B. L. Berg, *Qualitative Research Methods for the Social Sciences*. New York: Pearson Education Limited, 2007.

[53] K. Löfgren, "Qualitative analysis of interview data: A step-by-step guide.," 2013. [Online]. Available: https://www.youtube.com/watch?v=DRL4PF2u9XA. [Accessed: 28-Nov-2017].