Marketing—Making a Difference for Entrepreneurial Universities

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Abstract In the knowledge economy, Higher Education Institutions (HEIs) are facing increasingly competitive environments. On the one side knowledge is now produced in a variety of organisations, so therefore universities are no longer the only producers or sources of knowledge. Universities are also competing with other education providers due to the growing offers of commercial education providers with a strong vocational dimension, and the emergence of new technologies in the higher education market offering virtual programs (Ferreira et al. 2007). Against this background HEIs are now operating in markets where it is imperative for them to make usage of marketing instruments if they want to succeed and remain sustainable. In this vein, the two core activities of HEIs, research and education, are addressing different markets and target groups. Consequently HEIs need to apply marketing, its toolbox and instruments to be successful in those markets, and they need to be entrepreneurial to access them. In this paper the markets for research in HEIs are examined more closely. The paper describes the particularities of a Marketing approach for science and recommends a comprehensive "Science-to-Business Marketing" approach, exhibiting and combining knowledge from different Marketing disciplines.

Keywords Higher education institutions · University-business cooperation · Science-to-business marketing · Knowledge transfer · Entrepreneurial university · Research marketing

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C. Plewa and J. Conduit (eds.), *Making a Difference Through Marketing*,
DOI 10.1007/978-981-10-0464-3_18

Introduction

Higher Education Institutions (HEIs) are seen as a crucial element of a functioning regional innovation system (Freeman 1987). Modern regional economic development places the university in a more prominent role (Gunasekara 2006) in both innovation and human resource value chains of industry (Wilson 2012). The HEI has become an integral component of an entirely entrepreneurially oriented innovation process for the benefit of society (European Commission 2005; UNESCO 2002–04) and is playing an increasingly important role in the innovation chain.

The notion of the university as an entrepreneurial organisation has gained a great deal of attention within the international collegiate landscape in recent years through the concept of the entrepreneurial university (Etzkowitz 1983; Davey 2015). The entrepreneurial university paradigm incorporates the central role that universities have assumed in regional development (Woollard et al. 2007), and has been subsequently used by policy makers, academics and practitioners to describe those universities succeeding in their 'third mission' (Lambert 2003), this being the capitalisation of knowledge.

Encapsulating the understanding of the entrepreneurial university taken in this paper, Shane (2005) positions the entrepreneurial university, with its research mission, as a quadrant within the innovation matrix (Bouette 2004) and consequently as part of a market-oriented process (Laine et al. 2008). Universities are assigned a significant role in the innovation process and regard their influence on the other three quadrants (industrial R&D, industry cluster, and technology) as extremely strong and indispensable. This view that universities are an essential part of the innovation process has been adopted by a growing number of authors (Pavitt 2001; Etzkowitz and Leydesdorff 2000; Etzkowitz 1998; Franco and Haase 2010).

Given that value chain integration involves a market-orientation, an active market-driven commercialisation of research is necessitated. The fact that business thought and action are growing factors in the organisation of higher education is evidence of this. For example, the application of business tools such as controlling the balanced scorecard, or the value chain, to HEIs requires a reconsideration and analysis of the factors that determine the use of these tools or even makes their application possible in the first place (Plewa et al. 2006; Baaken and Kesting 2009).

Engagement with HEIs' entrepreneurial orientation and the attendant acceptance of markets within the collegiate environment make marketing a task of the university's business orientation (Bok 2003). Representing the growing market-orientation of HEIs, this article will focus on the role of marketing in universities that behave entrepreneurially and show that this role is an important one for modern and entrepreneurial universities which want to succeed in their markets (Baaken et al. 2008).

Entrepreneurial Universities Are Market-Focussed

A core characteristic of the entrepreneurial university is research cooperation and commercialisation, a concept generally referred to as knowledge and technology transfer (Liyanage et al. 2009). The term 'knowledge and technology transfer' itself implies that knowledge and technology are transferred from a provider to a recipient (Corsten 1987; Audretsch 2002; Walter 2003). In other words, scientific research is transferred from a supplier to a customer.

The expression 'knowledge and technology transfer' therefore actually implies the existence of a market, as an exchange in the sense of a service and reward (financial or payment in kind) ensues. This can be described as a market for research services (research market). In scientific or academic literature, it is not uncommon to find terms such as 'producer' or 'provider' for originators of knowledge and technologies, or 'user' or 'taker' for the recipients of knowledge and technologies (e.g. Astor 2003; Walter 2003).

However, a transfer from a university to real-world practice can only occur if the object of the transfer meets a need, and if the customer recognises a benefit in adopting it. Therefore, the starting point for a successful transfer should be to take into consideration the needs and interests of potential users (Kesting 2012). This ensures that the research transfer is orientated towards the interests of both parties.

In the terminology of Gibbons et al. (1994), there is a noticeable change in the generation of knowledge at universities and higher education colleges from 'Mode 1' (theoretical knowledge) to 'Mode 2' (application-orientated knowledge). In their opinion, scholarship is currently undergoing a transitionary period, which will result in a new understanding of what is meant by the word. In order to make this epochal change more easily understood, the authors differentiate between traditional scholarship and post-traditional scholarship. In the former dominant model of reference, research is predominantly carried out within a self-referential academic framework, whereas in the latter, research is carried out in collaboration with clients or users in order to work out problems and co-develop solutions (Knie et al. 2002; Gouthier et al. 2006).

Etzkowitz and Leydesdorff (2000) also see a change in the academic system, and depict it in their 'triple helix' model as being a new kind of triple interaction relationship between science, industry and politics, shown in Fig. 1.

According to the authors, this represents the key to innovation in a knowledge-based society (Etzkowitz and Leydesdorff 1997; Leydesdorff 2000; Leydesdorff and Etzkowitz 2001; Etzkowitz 2004). The stronger relevance of knowledge in the innovation process across broader society leads Martin and Etzkowitz (2000) to the theory that knowledge arising in the universities as part of the information society will become the motor of the economy and of society as a whole. The triple helix concept aligns closely with the concept of the entrepreneurial university described earlier (Davey 2015).

Correspondingly, Slaughter and Leslie (1997) state that there is a transnational trend in respect to HEIs towards 'academic capitalism'. In their study of the US,

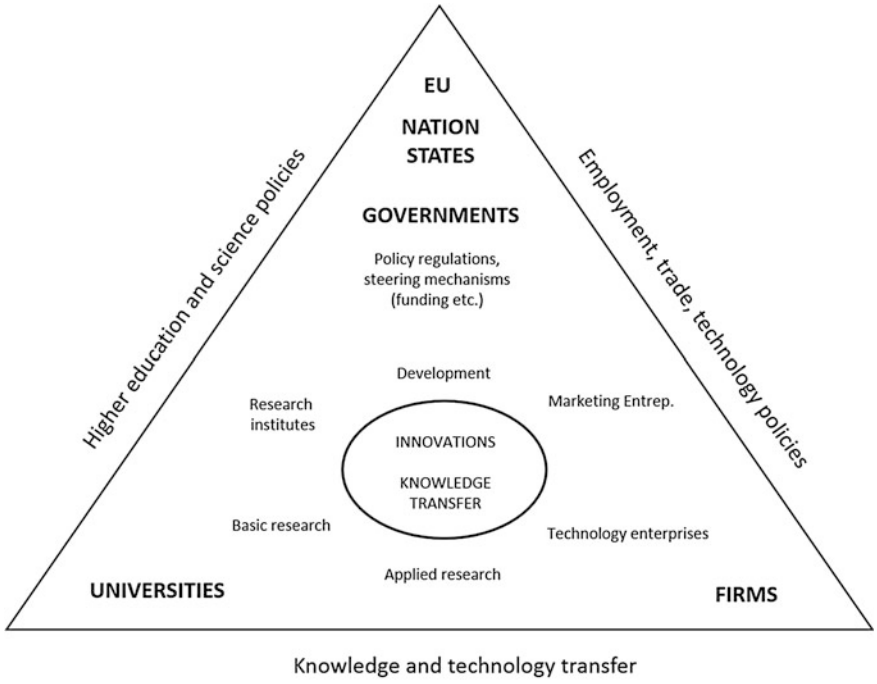

Fig. 1 Triple helix model (Etzkowitz and Leydesdorff 1995, p. 31)

Canadian, British and Australian higher education systems, they show that the shortage of public resources will lead to the more business-orientated establishments and marketing strategies increasingly gaining in importance.

On top of this Shane (2005) and Audretsch and Keilbach (2004) assign the entrepreneurial university a considerable role in the innovation process, and see their influence on industry, clusters and technologies as being extremely high and effective. In recent years, this thematising of the university as an entrepreneurial organisation, coupled with an actively market-driven commercialisation of research, has found increasing resonance in the international higher education sector (e.g. Berger 2008; Baaken and Plewa 2004; Kesting 2012).

The rise of this "entrepreneurial university" approach establishes novel perspectives within organisations, which entitles the consideration of marketing and management issues in the thinking and actions of academics (Kesting et al. 2014, p. 8). For example, universities now focus on creating more sustainable relations between organisations, an objective pursued under a relationship marketing perspective, and depicted by the stairway model to strategic partnerships (refer to Fig. 2). The stairway model is a research-based tool developed by the Science-to-Business Marketing Research Center (STBMRC) (Dottore et al. 2010; Kliewe et al. 2012) to guide universities' co-operators from their initial contact up

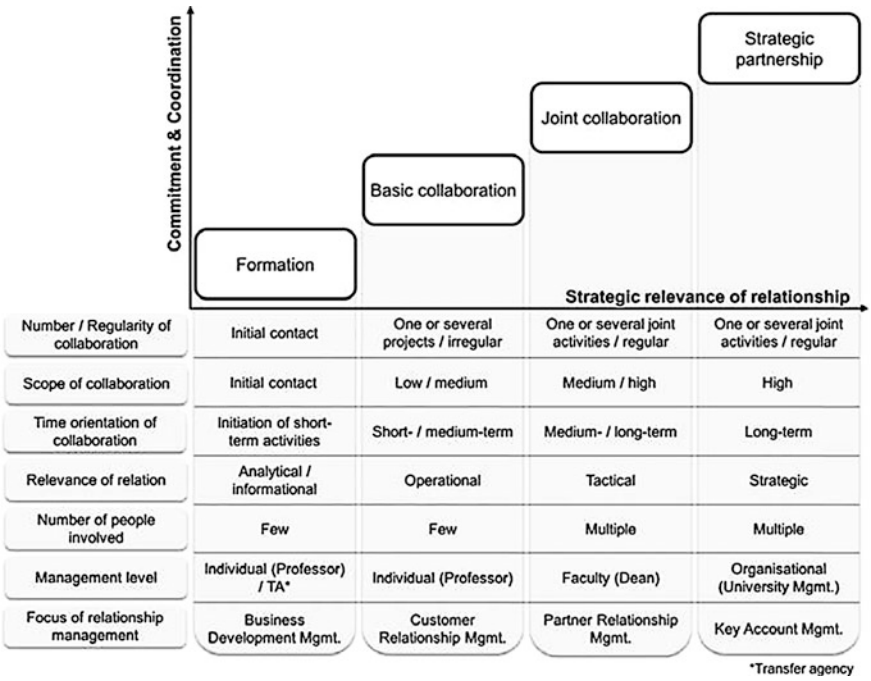

Fig. 2 Stairway model to strategic partnership (Science-to-Business Marketing Research Centre 2010, p. 100)

to the formation of a strategic partnership. This strategic partnership level entails a deeper relationship between partners (Kesting et al. 2014).

In this vein, the concrete application of marketing strategies and instruments in higher education management becomes also part of the debate on higher education establishments' entrepreneurial orientation, which leads to the introduction of marketing as an essential component of the entrepreneurial university.

A market-oriented entrepreneurial university applies also to traditional missions of the university, such as its "education mission". Following this approach, universities are required to accomplish their duty and, as well, meet stakeholder's expectations.

On the one hand, universities need to meet students' expectations by preparing them for the economy in which they will operate, (Galloway et al. 2005). On the other hand, industry is increasingly demanding universities provide the right professionally trained graduates. This means the development of closer and more efficient cooperation with industry and the wider economic world to match the supply and demand for the skills needed in the knowledge economy (Wagner 2012; Davey 2015).

Science-to-Business Marketing Crucial for Entrepreneurial Universities

Science-to-business marketing is the term used to describe the advent of market-orientated entrepreneurial modes of thought and behaviour in universities and other research institutes (Baaken 2013). It is characterised by academic and scientific stakeholders actively seeking customers (users, applicants, clients) for their research results and services, and conveying them in return for suitable reward. Especially when the research undertaken is already orientated towards the needs of the market and the potential benefits for later users, the entrepreneurial universities' offerings satisfy businesses' market expectations, meaning that transfer is smooth and successful (Baaken 2007).

The term 'science-to-business marketing' therefore covers all those activities which (Baaken 2013):

- give knowledge and technology transfer a new conceptual basis due to the orientation towards the market and customers, and
- serve to build up, develop and manage relationships between research institutes and business undertakings (in the broadest sense of the term[1]), in the sense of forging stronger partnerships in future.

To achieve this, science-to-business marketing borrows from three different marketing disciplines: university marketing (in the sense of being the marketing agent), knowledge marketing (the object being marketed) and business-to-business marketing (the marketing's target group), shown in Table 1.

The following three sections clarify these borrowings, which go to make up science-to-business marketing: transfer attempts from university marketing, a discipline that is still at an early stage of its development, from the novel area of knowledge marketing, and finally from the well-established arena of business-to-business marketing (Baaken et al. 2005).

How Science-to-Business Marketing Borrows from University Marketing

The divergence of university marketing[2] from traditional marketing is a result of the fact that universities are not typical 'businesses'. Their academic members and staff

[1] 'Business undertaking' in its broadest sense also encompasses non-profit organisations and public bodies. However, we will here make a distinction between public bodies as 'recipients (clients, customers, applicants), as opposed to them as institutions for funding research.

[2] In literature, university marketing is often understood to mean acquisition marketing (of highly qualified staff, or more specifically, university graduates) by businesses, as part of their staff recruitment processes (e.g. Wefers 2008 and many others). However, this interpretation is not used

Table 1 Marketing disciplines as suppliers of competencies for science-to-business marketing

Science-to-business marketing composition			
Discipline	University marketing	Knowledge marketing	Business-to-business marketing
Focus	The marketing agent	The object being marketed	The marketing target group
Process	Who is doing the marketing?	What is being marketed?	Who is the recipient of the marketing?
Agents	Universities, research institutes	Knowledge, technologies, results of research, findings	Businesses, organisations in a broader sense

have a wide-ranging freedom when it comes to shaping their openly defined fields of activity. Such levels of freedom would be unthinkable in business organisations. They form a relevant target group and can be embedded into market-orientated processes.

In universities, the focus today, with a certain level of implicitness, is increasingly on the importance of brand development, of strengthening their profile, on the university's 'customers' and of the importance of the deployment of university marketing (Pappu and Quester 2013). These developments do not always sit so easily with the university tradition, whose origins are in the 'Humboldtian' ideal, the freedom of research and teaching and the freedom of scholarship that is enshrined in institutional constitutions. This requirement for higher education establishments to orientate themselves towards the market and the customer goes against the grain of the longstanding understanding that research and teaching are traditionally explicitly decoupled from market considerations.

At present, the frameworks that higher education establishments have to work within, and the range of tasks that they carry out, are being considerably changed by the world of politics, in respect of:

- Expansion of universities' autonomy, accompanied by an expectation of an expanded spectrum of tasks,
- Benchmark-based allocation of funds, at the same time accompanied by reductions in public funding,
- Evaluation of the universities and their performance parameters.

In the same vein national and international competition for students, qualified lecturers, cooperation partners and third party funding is also increasing.

Universities are reacting to this and making their management and marketing more professional. This process of professionalisation is making deep inroads into the universities' structures and processes. For example, the universities' finance systems are being changed from public-budget management to cost-performance

(Footnote 2 continued)

in this paper. In this case, the application of marketing used by universities for the purposes to market academic services such as courses and research results.

accounting systems. HR departments and personnel development systems are gaining ground. Marketing specialists are recommending that universities apply a marketing philosophy (Bok 2003; Marcure 2004), and are even demanding that they demonstrate a consistent orientation towards the needs of the market (Meffert 2007; Baaken 2013).

Furthermore, Meffert (2007) defines the characteristics of unified university marketing at the most widely differing levels of university management:

- Philosophical aspect: conscious orientation towards needs
- Segmentation aspect: target-specific market cultivation
- Strategic aspect: determination of a long-term action plan
- Organisational aspect: organisational enshrinement of the concept
- Action aspect: application of marketing instruments in a way that is appropriate to the objectives

Meffert (2007) hereby addresses the needs of target groups. His view implies that universities' range of services be orientated towards these needs, and that they should go beyond the purely communicative activities to which universities' marketing publications have hitherto been dedicated.

In other countries, this approach is something that has been discussed for a long time, and has indeed partly crept in. American universities are at the pinnacle of these developments towards innovative university marketing. Indeed, the implementation of a marketing approach is already well established across a spectrum Anglo-American universities (Balmer 2001; Binsardi and Ekwulugo 2003).

A university's services and markets can be divided into core services (research, teaching and transfer of knowledge and technology) and the services that go beyond these. These include further training, promoting students' social interests, international cooperation with other universities, as well as the pastoral and supportive services (student advice bodies, social offerings, cultural offerings…). Therefore, from a marketing perspective, the university provides its customers with a core benefit and an additional value. According to Müller-Böling (2007), higher education establishments are comparable to multi-product firms. They provide different services to different groups of customers.

Whether the term customer can be used for all of a university's target groups and interest groups is however open to discussion. This is because their diversity is considerable and they display unique differences. What is recognisable from this statement is that there are external and internal target groups. The external core target group of science-to-business marketing comprises organisations (in the broadest sense) that acquire research services or results. Those are usually businesses, but can also be non-commercial organisations, including public institutions, public authorities or public service organisations.

Virtually all publications on university marketing concentrate on the communi-cation side of the marketing process. They are therefore not dedicated to the plane of strategic marketing, but focus instead on a rather operative branch of marketing. In terms of content, this literature stream essentially tackles the objectives of market presence, visibility, recognition and awareness, along with attaining

these objectives using communication instruments and channels (Brüser 2006; Voss 2009; Siebenhaar 2008). Other publications embrace research marketing or knowledge marketing (University Dortmund 2003; Mager et al. 2003; Merten 2009), or Obermaier's publication on research to business. The latter stakes the claim that it contributes new theories (or theoretical components) to research or university marketing. However, this work too stalls at the action level of communication (Obermaier 2009).

It is remarkable that these publications firstly deal with (just) communication and secondly are targeted to the general public, forming part of a communication policy, as if they were a greater part of the instruments required for university marketing. Notwithstanding the importance of communication, the public only has an indirect function as the universities' target group. It is not the primary recipient of science-to-business marketing, since its representatives do not directly pay for research. But in the sense of public relations work, this group can definitely be the recipient, in order to achieve political results. Nevertheless, the public cannot be regarded as universities' customers, as they do not obtain any direct services. The primary target group is potential students, and in the sense of science-to-business marketing—as explained above—particular industries.

How Science-to-Business Marketing Borrows from Knowledge Marketing

The term 'knowledge marketing' covers the marketing of knowledge and its transfer to third parties in exchange for financial payment or payment in kind. In developed industrial countries it forms the economic basis for the country's future. Not without reason is the future knowledge-based economy regularly referred to as the vision and orientation of a sustainable economic system.

Knowledge is also important on the micro-economic level, because knowledge is one of the most important resources that a company has. Its creation and development are therefore a central role of management (Schmitz and Zucker 2003; Sjide v.d. and Ridder 1999). From an economic view, knowledge can be described as all "…investment-related, explicative, intrinsic, cognitive mental constructions…" (Rode 2001, p. 11). It therefore demonstrates an explanatory function; it is verifiable and consists of insights, know-what, know-why, know-how and know-who (Rode 2001).

Surprisingly, there is hardly any literature dealing with the marketing of knowledge. However in contrast, there is an abundance of literature that covers the term 'knowledge management'. This limited to businesses' internal dissemination of knowledge, and does not tackle the passing on of knowledge to external recipients in exchange for remuneration. Even Kuhn's work on "Marketing auf konzerninternen Wissensmärkten" (How to market knowledge internally on corporate organisations' markets) deals entirely with businesses' internal markets (Kuhn 2003).

According to Rode, knowledge marketing should be understood as a commodity-specific sub-discipline (Rode 2001). Knowledge commodities can be defined as "…all products and services whose main aim is that a recipient of the knowledge (who need not be the direct client) communicates with a knowledge bearer for the purposes of transferring knowledge." (Rode 2001, p. 13).

According to this, the separation of knowledge from other commodities is a result of its purpose and not the results obtained. Furthermore, Rode also names three peculiarities of knowledge commodities that serve to differentiate them further from economic commodities: a knowledge commodity is dependent on the recipient, as the recipient himself influences how it is used. Additionally, the transfer of knowledge is by its nature very time-consuming. The third characteristic property is that the knowledge bearer and his knowledge can only be protected against unauthorised disclosure, reproduction or use with great difficulty (Rode 2001).

Figure 3 provides an overview of the structure of a knowledge market, its commodities and stakeholders. In a knowledge market, providers can be businesses or institutions. Stakeholders in the area of pure research, whose objective is knowledge that does not yet exist, comprise researchers in universities, public research institutes and large companies, for example. Application research and development research are however based on existing knowledge. The aim of these types of research is to develop it further, for example by developers and engineers. On the other hand, the area of practical knowledge is based on knowledge that has already been applied, and on the provider's side, is represented by experienced consultants or staff in businesses and public authorities.

Therefore, knowledge marketing, as applied to the object being marketed, has a shaping influence on science-to-business marketing.

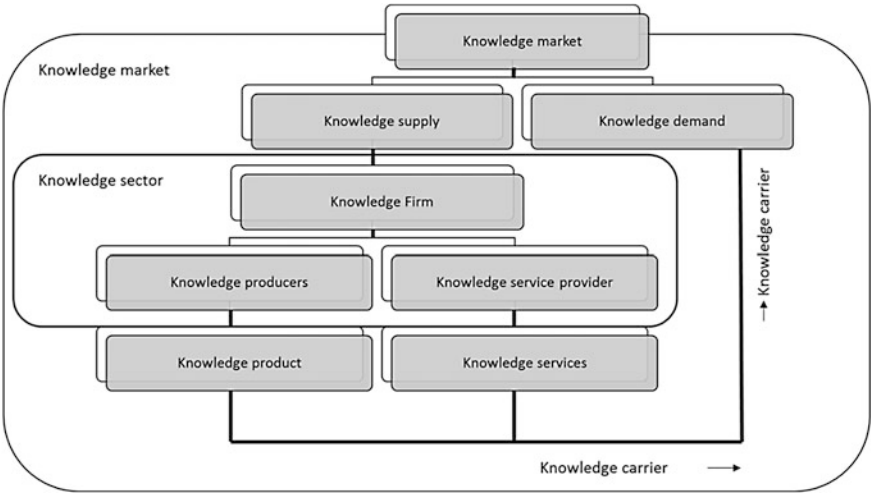

Fig. 3 Structure of a knowledge market (Baaken 2004b, p. 7)

How Science-to-Business Marketing Borrows from Business-to-Business Marketing

The term 'business-to-business marketing' primarily describes a market in respect of its stakeholders and the relationships that exist between them.

Demand generated by the end-customer or consumer triggers a resulting chain of demands that has a considerable influence on the business-to-business market. There are both decisive similarities as well as decisive differences that must be taken into account when looking at both markets as a unified whole. Even though an important difference is that, in business-to-business marketing, businesses act in the role of purchasers, the decisions themselves are made by human beings (Kotler and Pfoertsch 2006). These individuals take risks in their decisions that are of both a professional and personal nature.

However, the procurement process in business-to-business markets is clearly more rational and structured than in consumer goods markets (Baumgarth 2012). Individuals responsible for purchasing decisions in business-to-business markets follow the needs of their own business, and must be able to justify their decisions to co-workers in the company (Pförtsch and Schmid 2005; Brennan et al. 2014).

Because of the comparably high personal risks, for example due to technological innovations, purchasers have to rely above all on their own experience. Furthermore, their decisions are based on the trust that they have in a provider. Business-to-business marketing deals mostly not with the acquisition of individual products, but of comprehensive solutions to problems that have been specially tailored to individual customer requirements (Pförtsch and Schmid 2005; Backhaus and Muehlfeld 2005).

To adapt business-to-business marketing mechanisms into a theory that can then be transferred to HEIs, it makes sense to categorise the interaction processes between buyers and sellers in business-to-business markets (Pförtsch and Schmid 2005; Medlin 2004). Literature contains a great number of supply-orientated or demand-orientated categorisation approaches and typologies, which are researched in the context of their various classification criteria. These include, for example, product characteristics, processing levels and the perceived complexity of products. With many of these typologies, the transaction is in the foreground (transaction approach). The typology of business-to-business transactions of Kleinaltenkamp and Plinke (2002) devotes itself to two dimensions of observation: (i) the frequency of repeated procurement processes between the market parties, and (ii) the 'inter-activity' or intensity of the cooperation between the partners.

The above-mentioned transactions in business-to-business markets are generally characterised by uncertainties on both sides when it comes to the decision-making process. The high complexity of the products and services, along with the associated reciprocal integration of the business partners into the value-adding process, make a reliable, comprehensive assessment much more difficult, on the part of the supplier as well as the entity making the demand (Medlin 2004). This has the effect that, to compensate for any uncertainties that may arise, there is greater resort to experience

and trust considerations. The latter is also characterised by image, brand and the existing business relationships (relationship approach) (Pappu and Quester 2013).

Both the transaction approach and the relationship marketing literature have an effect on science-to-business marketing. Individual transactions between business partners can also be found in technology transfer. In this environment, trust is established as a primary concept. Several authors have presented in the literature dealing with the private sector, the positive effect of trust on performance in general and on the utilisation of research in particular (e.g. Farrelly and Quester 2003). Trust becomes even more relevant in the context of transfer from university to industry, given the uncertainty involved in collaborating with a party from a different sector (Plewa et al. 2005).

The transaction approach is then used to provide theoretical support for a 'knowledge and technology transfer'. Alongside this, science-to-business marketing represents a second pillar to the relationship-marketing concept, since it increasingly signifies a long-term connection between the partners at a strategic level.

Dealing with Internal Target Groups in Science-to-Business Marketing

From the relational and services marketing perspective, authors have also reported on the importance of individuals (champions) engaging in relationship development with industry partners, where the time spent in building and cultivating the relationship is important for commitment (e.g. Howell et al. 2005; Plewa and Quester 2008).

However, building and cultivating relationships is not a natural role for academics, so this issue represents one of the peculiarities of science-to-business marketing. From this perspective, science-to-business marketing is a "2-sided-marketing" endeavour. This means that the external (potential) clients are only one target group to consider. S2B Marketing has to deal also with internal target groups, which are key players in this process. Academics, researchers and administrative staff are not prepared for working together with external parties since this is not part of their career criteria for promotion.

As opposed to commercial enterprises, in which staff are primarily behind the business's marketing objectives, the academic system is not market-driven, but knowledge-driven. Researchers do not pursue their careers so as to be able to establish relationships with business and work together with them. Instead, they are driven by the academic pursuit of knowledge, and not uncommonly, have visions of a technological or academic breakthrough. Their job satisfaction therefore comes predominantly from tasks whose content is largely self-defined. The conveyance of knowledge to students is a part of this.

However, an intrinsic motivation to collaborate with external organisations cannot be discounted per se. In the context of science-to-business marketing, however, the readiness and willingness to cooperate with the business sector often

needs some initial encouragement (e.g. Baaken 2007; Sijde v.d.; Cuyvers 2003). This can take the form of argumentative persuasion, agreement about objectives, but also from incentives offered by university heads or management teams (Frey and Neckermann 2008).

As a result of universities engaging in activities beyond to what they traditionally do, managing a balance between general academic duties and activities of collaboration with industry is a challenging task (Jones-Evans 1997). In this respect, "time" is also a valuable resource for academics and should be considered as part of an incentives system. This assignment of time as a resource can be in the form of a reduction in teaching workload, allocation of human resources, such as student assistant hours, or space, among others.

In any case only a target-orientated incentives system, along with clearly worked out benefits for university members, can provide the basis for a successful university-business cooperation (Osterloh and Frey 2008; Davey et al 2011; Baaken 2013).

Discussion and Conclusion

Science-to-Business Marketing Driving Knowledge and Technology Transfer in the Entrepreneurial University

Over the last thirty years especially, knowledge and technology transfer has been the subject of much discussion and academic discourse, with the literature focusing more on obstacles and difficulties (e.g. Atzorn and Clemens-Ziegler 2010) than in drivers for University-Business-Cooperation (Davey et al. 2011). Only very few publications focus on drivers (Fernand and Cohendet 2001; Plewa 2010) for University-Business-Cooperation. Clearing away obstacles and barriers will not result in a smooth, trouble-free transfer. However if drivers are strong enough they will easily overcome all barriers. This paper has set up an enlightened focus on drivers, the adoption of marketing principles and instruments being some of them.

Just as is the case with businesses, if a modern university is to contribute in a more meaningful way to society, the university's market-orientated strategy must be based on information about the market. Market research and market analysis self-evidently belong to the range of marketing tasks, and therefore also to university marketing. Nevertheless, universities do not generally have a market-orientated culture, and the level of experience in dealing with market research and market analysis is low. Very often, strategies are simply formed on the basis of assumptions, and not on verified, 'defined' circumstances. So far, needs assessments, market potential analyses, studies on the universitys' awareness levels and image, customer satisfaction measurements and customer loyalty analyses have not made any headway in higher education establishments (Baaken 2004a).

From the viewpoint of a research institution in future, they will need to develop an understanding of the market that recognises processes and addresses these

expectations and the various interests involved. This understanding of the market should include, on the one hand, the services (products and services) of the research institute itself, and on the other, it should also include a customer-orientated transfer of the services. Early recognition and acceptance of the various interests and needs, as well as taking them into consideration even during the knowledge creation and development process, forms the starting point for a market orientation in science-to-business marketing.

This understanding of the market entails a focus not only on processes, but also on outcomes and impacts, as well as the benefits experienced by individuals or institutions involved in this transfer (Franco and Haase 2010). These improved outcomes, can include a range of tangible and intangible benefits such as improved teaching, or increased income from research (Davey et al. 2014).

Early involvement of the customer in the development process goes hand in hand with a change in the traditional transfer process. Whereas academic or scientific achievement was once mostly isolated from potential user markets, the new, collaborative model connects academia and business right from the moment that the decision is made to begin a research project (Kesting 2012). At this point, both parties determine which research content will be worked on and how it will be methodically targeted. The involvement of the market in the knowledge creation process and new technologies factors in specific applications and potential right from the very beginning, and therefore creates a prerequisite for successful introduction to the market later.

An important finding in science-to-business marketing in relation to the transfer is that this does not represent a one-sided transfer of scientific knowledge from the university to the business. It is much more the case that there is a reciprocal exchange, that is to say, an interaction between both stakeholders, and for which on the research side, the practical consideration remains very much in the foreground. Businesses therefore provide the researchers with all the information that they need in order to be able to match the service that they provide to the requirements of the organisation making the request. In other words, the process secures the market relevance of scientific findings even before the research process or the research itself has begun (Holtkamp et al. 2005; Kröcher 2005).

The transfer of knowledge and technology also includes the tacit conveyance of experience, knowledge of the (potential) interactions between different technologies, and application know-how from operational practice in the institution undertaking the research. This is how (strategic) partnerships in business/science relationships come into being (Baaken 2010).

A Summary of Theses

The summary of this paper is made through four theses:

Thesis 1 Science-to-business marketing creates its own individuality based on special features taken from three areas: the entity carrying out the marketing

(university or research institute), the object of the marketing (research) and the nature of the market (business as customer), together with high levels of uncertainty when it comes to decision making, which is due to the asymmetry of knowledge.

Thesis 2 Science-to-business marketing therefore diverges from the topic area of university marketing. This applies especially to the traits of the entity undertaking the marketing (the peculiarity of the university as active agent), from knowledge marketing, the object being marketed (the peculiarity of the object being marketed), and from business-to-business marketing, the target group of business, with its complex decision making processes (peculiarity of the market).

Thesis 3 The business-to-business marketing´s transactional approach focuses on individual business transactions and their special market mechanisms. From this perspective, the transfer of knowledge and technology will be aligned to market demands. In this respect, the business-to-business marketing concept and relationship marketing offer potential for science-to-business marketing.

Thesis 4 One of the primary peculiarities of science-to-business marketing is that an organisation that was traditionally never orientated towards markets must now at least in part orientate itself to them, as in future it will need to compete. This reorientation must take place within a framework of change management, both on an organisational level (processes and structures) as well as at the individual level of the university members. This change can occur as a result of changes in attitude and behaviour (for example, through an incentive system) induced either internally or by third parties. 'Internal marketing' therefore plays a decisive role.

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