

The quality of inter-organizational relations and the intention of commercialization of knowledge by academic entrepreneurs – a theoretical approach and outline of research

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Introduction

Universities and their immediate surroundings are places that play a key role for contemporary societies in the field of education and generating the latest knowledge¹. Over the past decade, researchers have started to see university and its environment as a special ecosystem supporting entrepreneurs in developing their business ideas².

Academic entrepreneurship ecosystems are established by a network of different institutions and entities: universities, business incubators, technology transfer centres, financial support institutions, etc. involved in supporting academic entrepreneurship. High-quality relationships between entities engaged in this ecosystem can affect the loyalty of the partners involved in such cooperation – their behaviour,

1 M. Perkmann et al., *Academic Engagement and Commercialization: A Review of the Literature on University-Industry Relations*, "Research Policy" 2003, vol. 42, no. 2, p. 423.

2 D.M. Hechavaria, A. Ingram, *A Review of the Entrepreneurial Ecosystem and the Entrepreneurial Society in the US: An Exploration with the Global Entrepreneurship Monitor Dataset*, "Journal of Business & Entrepreneurship" 2014, vol. 26, no. 1, pp. 1–35; D.J. Isenberg, *How to Start an Entrepreneurial Revolution*, "Harvard Business Review" 2010, vol. 88, no. 6, pp. 2–11; A. Sherwood, *University and the Entrepreneurship Ecosystem*, [in:] S. Globerman, J. Clemens (eds), *Demographics and Entrepreneurship: Mitigating the Effects of an Aging Population*, Fraser Institute, Canada 2018, pp. 239–283.

willingness to become involved and help – and are thus an important factor conducive to achieving a better result of cooperation in terms of the commercialization of knowledge. In general, entrepreneurial ecosystems regulate the nature and quality of entrepreneurial activities and also set up the types of organizational forms that will be accepted as legitimate (e.g. the creation of a new spin-off).

The current direction of European policy is focused on the development of innovative undertakings, which causes, among others, increased interest in academic entrepreneurship, the search for new forms of technology transfer, stimulation of developing academic spin-off companies, and motivating the academic environment to take economic initiatives. The topic of the academic entrepreneurship ecosystem is already present in the literature on the subject and in recent years the meaning of the support ecosystem as a key factor in extending academic entrepreneurship has been underlined. The ecosystem is understood often as a “connector” that bridges people, ideas and resources in academia, and local communities are particularly important for early stage projects, as they facilitate access to stakeholders in the community who are in a position to offer often required critical support³.

However, there is a lack of conceptual grounds that would create a field to start empirical research in the context of research on how high quality relations between entrepreneurial scientists and their partners from the widely understood entrepreneurial ecosystem can influence the intention of commercializing research results.

The article answers the following research questions in detail:

- Q1: What institutions/entities play an important role in building an ecosystem supporting academic entrepreneurship?
- Q2: What factors shape the quality of inter-organizational relationships in supporting academic entrepreneurship?
- Q3: How can we examine the impact of high-quality inter-organizational relationships on intentions to commercialize knowledge by academic entrepreneurs (what variables can the model to explore this dependency contain)?

The article uses the desk research method, with the aim of diagnosing the main research trends in the study of the quality of inter-organizational relationships and their impact on the willingness to commercialize research results by the academic community. By analysing the available literature, the variables key to developing a construct for measuring the quality of inter-organizational relations might thus be brought into focus.

The article is organized as follows. Section 1 (above) is an introduction. Section 2 provides a review of the modest but emerging literature that explores the essence

3 C. Maia, J. Claro, *The role of a Proof of Concept Center in a university ecosystem: An exploratory study*, “Journal of Technology Transfer” 2013, vol. 38, no. 5, p. 641.

of university entrepreneurship, its ecosystem, and the importance of inter-organizational relationships that can support academic entrepreneurs. Part 3 discusses the methodological approach used in this study. Finally, conclusions, limitations and implications for future research are discussed.

Theoretical background

Academic entrepreneurship and its ecosystem

In recent years, the concept of academic entrepreneurship – also referred to as technological entrepreneurship, innovative entrepreneurship, intellectual entrepreneurship and technostarters, among other names – has developed all over the world. The term “academic entrepreneurship” was originally intended to refer to the extension of entrepreneurship to the academic community and only to distinguish between companies based on academic knowledge and those based on other knowledge. Dominant definitions in English-language literature subsequently changed the concept of establishing profit-oriented enterprises at universities and focused on the basic role of university spin-offs. Later, other authors proposed a view on academic entrepreneurship as a way of transferring knowledge from the university environment to the market. This broader interpretation of academic entrepreneurship covered any academic interaction with business entities that forms the basis for creating market value. In a simpler approach, academic entrepreneurship is defined as the synthesis and integration of scientific, academic and commercial activities. This is often characterized by formal arrangements for the commercialization of intellectual property of academic goods through knowledge (e.g. business consultancy or industry-commissioned research), technology transfer (e.g. patents or licences), and transfer of products or services through established spin-off companies⁴. Academic entrepreneurship takes place at the level of individuals or groups operating independently or within faculties or other university units that create new organizations or initiate innovation within or outside the university⁵.

While early publications on the subject of academic entrepreneurship focused mainly on measuring the frequency of knowledge transfer at universities (patents,

4 R. Radosevich, *A model for entrepreneurial spin-offs from public technology sources*, “International Journal of Technology Management” 1995, vol. 10, pp. 879–893.

5 J.W. Tijssen, *Universities and industrially relevant science: toward measurement models and indicators of entrepreneurial orientation*, “Research Policy” 2006, vol. 35, no. 10, pp. 1569–1585.

licences, spin-offs) and analysing initiatives that could affect the effectiveness of this activity⁶, attempts are increasingly being made to analyse the entities and factors that shape the ecosystem of academic entrepreneurship or show the results of effective cooperation between ecosystem participants⁷. Entrepreneurial ecosystems include numerous entities and various processes at many levels of stakeholder cooperation⁸. The idea underlying the widespread use of the term ecosystem in social sciences was developed in the 1980s and 1990s, but it only spread after the work of Moore⁹, one of the first researchers to introduce the concept of the ecosystem in the business environment. The definitions of the entrepreneurial ecosystem indicate that it is “a set of networked institutions designed to help entrepreneurs go through all stages of the development process of a new venture”¹⁰. This can be understood as a network of services in which the entrepreneur is at the centre of activities and the measure of his success is the effective commercialization of scientific knowledge¹¹.

An entrepreneurial academic support ecosystem has many dimensions. It includes entrepreneurship incubators, accelerators, grants, and business plan competitions. Such an ecosystem also has vital formal and informal rules and regulations for governing the entrepreneurial activities of academic society¹². As part of the process of supporting academic entrepreneurship, there are a number of relationships between various entities, i.e. the university itself, employees, students, doctoral students, enterprises and other units and environmental factors. The quality of relations between the entities involved in supporting academic entrepreneurship can be understood as the added value shaped by the type of bond between the subjects of exchange characterized by the degree of compatibility of organizational cultures, decision-making styles and the convergence of perceived values. A more detailed analysis of the entities involved in supporting academic entrepreneurship (in which it is important to maintain long-term relationships

6 D.S. Siegel, D. Waldman, A. Link, *Assessing the impact of organizational practices on the relative productivity of university technology transfer offices: an exploratory study*, “Research Policy” 2003, vol. 32, pp. 27–48.

7 M. Perkmann et al., *Academic Engagement...*

8 D.J. Isenberg, *How to Start...*

9 J.F. Moore, *A new ecology of competition*, “Harvard Business Review” 1993, May – June, pp. 75–86.

10 *Ibidem*.

11 *The Aspen Network of Development Entrepreneurs. Entrepreneurial ecosystem diagnostic toolkit*, Aspen Institute, UK 2013.

12 D. North, *Institutions, Institutional change and economic performance*, Cambridge University Press, Cambridge 1990; E. Autio et al., *Entrepreneurial innovation: The importance of context*, “Research Policy” 2014, vol. 43, pp. 1097–1108.

with the environment) reveals three groups: entities closely related to academic entrepreneurship (AE), entities that are a potential environment for AE, and partners that can support AE (Figure 1). Properly nurtured relationships between these entities may contribute to the intensification of entrepreneurial activities of persons referred to as academic entrepreneurs.

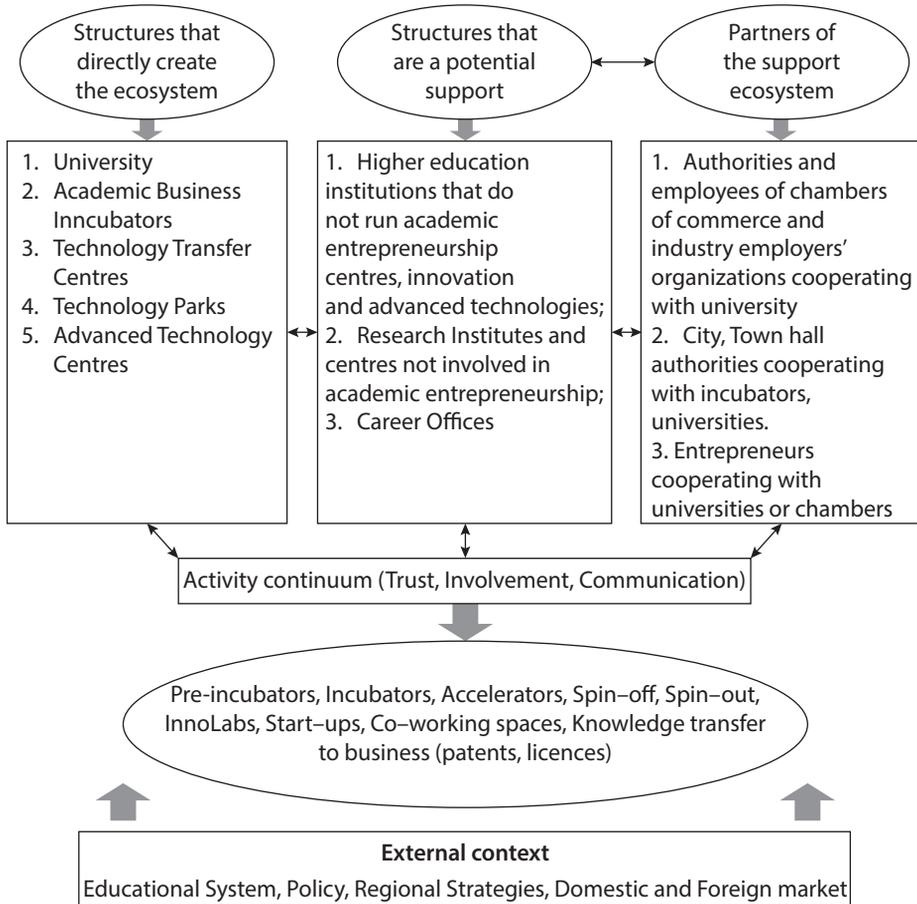


Figure 1. Ecosystem of academic entrepreneurship support

Source: own study based on a literature review.

Ecosystem entities, known as ‘links’ connecting people, ideas and resources in academia and local communities, are particularly important for projects at an early stage as they facilitate access to community stakeholders who are able to offer the often required critical support. The following features of an ecosystem have been identified in the relevant literature: exceptional character – which confirms why it is difficult to copy the way the Silicon Valley ecosystem works;

multidimensional and unambiguous relationships in the ecosystem, where high-quality relationships between the various entities in the ecosystem are based on trust, satisfaction and commitment.

University authorities are the natural source initiating the process of promoting academic entrepreneurship and shaping the support ecosystem, and its main recipients are scientists, students, graduates, doctoral students and lecturers. The university also has the option of separating the unit within its structure, acting to support academic entrepreneurship (e.g. an incubator, career office, entrepreneurship centre) or have its representatives in the structure of other supporting institutions (e.g. science and technology parks, technology transfer centres). The proposal to create a support structure may also emerge from outside, e.g. from another institution, i.e. a regional development foundation or entrepreneurship development agency implementing a project from external funds, e.g. from EU funds. It is the initiators creating the support structure that are expected to be most involved in coordinating the process of academic entrepreneurship.

Quality of inter-organizational relations

In order for the academic entrepreneurship support ecosystem to deliver the assumed results, i.e. to intensify the entrepreneurial attitudes of people associated with the university, there must be interaction between the academic community and support entities that is based on commitment, trust and cooperation. In other words, the relationship between support participants must be of high quality.

The quality of relations between entities involved in supporting academic entrepreneurship can be understood as added value shaped by the type of links between exchange entities, and is characterized by the degree of compliance of organizational cultures, their decision-making styles and a convergence of perceived values¹³. A properly shaped level of quality of relations between these entities may contribute to the intensification of entrepreneurial activity of persons called academic entrepreneurs. There are many previous studies discussing the concept of relationship quality¹⁴. The concept has been defined from different perspectives (re-

13 U. Kobylińska, *Barriers and Factors Influencing the Level of Cooperation of Businesses with Public Administration Institutes: Poland as a Case Study*, [in:] V. Potocan, P. Kalinic, A. Vuletic (eds), *26th International Scientific Conference on Economic and Social Development – “Building Resilient Society”: Book of Proceedings*, Varazdin Development and Entrepreneurship Agency, Zagreb 2018, pp. 222–231.

14 C.P. Lin, C.G. Ding, *Evaluating group differences in gender during the formation of relationship quality and loyalty in ISP service*, “Journal of Organizational and End User Computing” 2005, vol. 18, no. 2, pp. 38–62; P. Atthanasopoulou, *Relationship quality: a critical literature review and research agenda*, “European Journal of Marketing” 2009, vol. 43, no. 5–6, pp. 583–610;

relationship quality features, relationship strength, relationship quality scale, quality dimensions, etc.).

In the relevant literature, the quality of relationships is defined variously as:

- a general evaluation of relationship strength and the extent to which a relationship meets the needs and expectations of the parties involved based on a history of successful or unsuccessful encounters or events¹⁵;
- a higher-order construct, which includes factors such as trust, commitment, communication, an absence of conflict, satisfaction, deciding to what extent the relationship can meet the needs of a given entity¹⁶.

However, for most researchers, the quality of relationships is based on three aspects: trust, commitment and satisfaction¹⁷. Recent studies also show other variables important for the quality of relationships, i.e. communication understanding and no conflict of interest¹⁸.

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- H. Doaei, A. Rezaei, R. Khajei, *The Impact of Relationship Marketing Tactics on Customer Loyalty: The Mediation Role of Relationship Quality*, "International Journal of Business Administration" 2011, vol. 2, no. 3, pp. 83–93; M.H. De Cannie're, P. De Pelsmacker, M. Geuens, *Relationship Quality and Purchase Intention and Behavior: The Moderating Impact of Relationship Strength*, "Journal of Business Psychology" 2010, vol. 25, pp. 87–98; W. Ulaga, A. Eggert, *Relationship Value and Relationship Quality: Broadening the Nomological Network of Business-to-Business Relationships*, "European Journal of Marketing" 2006, vol. 40, pp. 311–327; J. Emami, M. Layevaridi, S. Fakharmanesh, *An Integrated Model in Customer Loyalty Context: Relationship Quality and Relationship Marketing View*, "Australian Journal of Basic and Applied Sciences" 2013, vol. 7, no. 2, pp. 399–407.
- 15 C.P. Lin, C.G. Ding, *Evaluating group differences...*
- 16 L. Danik, *Wpływ kultury na jakość relacji w międzynarodowej współpracy przedsiębiorstw*, Oficyna Wydawnicza SGH, Warszawa 2017.
- 17 T.L. Baker, P.M. Simpson, J.A. Siguaw, *The impact of suppliers' perceptions of reseller market orientation on key relationship constructs*, "Journal of the Academy Marketing Science" 1999, vol. 27, p. 50; T. Hennig-Thurau, K.P. Gwinner, D.D. Gremler, *Understanding Relationship Marketing Outcomes: An Integration of Relational Benefits and Relationship Quality*, "Journal of Service Research" 2002, vol. 4, no. 3, pp. 230–247; B. Ashai et al., *Assesing relationship quality in four business-to-business markets*, "Marketing Intelligence & Planning" 2009, vol. 27, no. 1, pp. 86–102; J.M. Barry, P.M. Doney, *Cross-Cultural Examination of Relationship Quality*, "Journal of Global Marketing" 2011, vol. 24, no. 4, pp. 305–323; H.H. Huang, P. Wan-Ping, *Effects of promotion on relationship quality and customer loyalty in the airline industry: The relationship marketing approach*, "African Journal of Business Management" 2011, vol. 5, no. 11, pp. 4403–4414.
- 18 K. Ghzaief, F. Akrouf, *Dimensions and Antecedents of Relationship Quality in a Business-to-Business Context: An Exploratory Study*, "Journal of Supply Chain and Customer Relationship Management" 2012, vol. 2012, pp. 1–17; J.J. Hoppner, D.A. Griffith, R.C. White, *Reciprocity in Relationship Marketing: A Cross-Cultural Examination of the Effects of Equivalence and immediacy on Relationship Quality and Satisfaction with Performance*, "Journal of International Marketing" 2015, vol. 23, no. 4, pp. 64–83; L.C. Leonidou, D. Palihawadana, M. Theodosiou, *An integrated model of the behavioural dimensions of industrial buyer-seller relationship*, "European Journal of Marketing" 2006, vol. 40, no. 1–2, pp. 145–174.

The literature on the subject shows the positive effects of high-quality inter-organisational relations, i.e. the results of cooperation¹⁹, the expected length of cooperation²⁰; willingness to recommend²¹, rarer opportunistic behaviour²², and the impact on future intentions to maintain relationships²³. Such positive effects of high-quality relationships can also be seen in the context of cooperation between academic entrepreneurs and institutions supporting them. Also, insights have been published regarding the importance of good relationships and support from ecosystem entities:

- good relations of scientists with special units at their universities, such as research centres, have a positive impact on their involvement in entrepreneurship²⁴;
- the importance of supporting academic entrepreneurs from universities and faculties²⁵ as well as technology transfer centres in commercializing research results²⁶;
- the presence of a formal relationship in technology transfer mechanisms is generally positively related to commercialization²⁷;
- there may be a temporal relationship between involvement and commercialization, in the sense that earlier involvement of scientists in cooperation with industry can subsequently lead to commercial production²⁸.

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- 19 B. Ramaseshan et al., *Power, satisfaction and relationship commitment in Chinese store – tenant relationship and their impact on performance*, “Journal of Retailing” 2006, vol. 82, no. 1, pp. 63–70.
- 20 L. Crosby, K. Evans, D. Cowles, *Relationship quality in services selling: An interpersonal influence perspective*, “Journal of Marketing” 1990, vol. 54, pp. 68–81.
- 21 J.K. Huntley, *Conceptualization and measurement of relationship quality: Linking relationship quality to actual sales and recommendation intention*, “Industrial Marketing Management” 2006, vol. 35, no. 6, pp. 703–714.
- 22 J.T. Bowen, S. Shoemaker, *Loyalty: A Strategic Commitment. Cornell Hotel and Restaurant, “Administration Quarterly”* 1998, vol. 39, no. 1, pp. 12–25.
- 23 M. Perkmann et al., *Academic Engagement...*
- 24 B. Bozeman, M. Gaughan, *Impacts of grants and contracts on academic researchers’ interactions with industry*, “Research Policy” 2007, vol. 33, no. 5, pp. 694–707.
- 25 J. Owen-Smith, W.W. Powell, *To Patent or Not: Faculty Decisions and Institutional Success at Technology Transfer*, “The Journal of Technology Transfer” 2001, vol. 26, p. 99.
- 26 A. Lockett et al., *The creation of spin-off firms at public research institutions: Managerial and policy implications*, “Research Policy” 2005, vol. 34, no. 7, pp. 918–933; D.S. Siegel, D. Waldman, A. Link, *Assessing the impact of organizational practices...*
- 27 D. Siegel, P. Phan, *Analyzing the Effectiveness of University Technology Transfer: Implications for Entrepreneurship Education*, [in:] G. Libecap (ed.), *University Entrepreneurship and Technology Transfer*, “Advances in the Study of Entrepreneurship, Innovation and Economic Growth” 2005, vol. 16, Emerald Group Publishing Limited, Bingley, pp. 1–38.
- 28 M. Perkmann et al., *Academic Engagement...*

Given the broader spectrum of modern university activities, is perceived as having the largest role in creating the right quality of relationships between entities directly or indirectly related to academic entrepreneurship, activating entrepreneurship and ensuring lasting, appropriate quality of relationships between various stakeholders. To a large extent, the position of local and regional technology parks, incubators, and university technology transfer offices depends on strong, trust-based and committed relationships between the university, local government and business. Social psychologists say that commitment and trust play a key role in shaping motivation and behaviour in relationships²⁹. All these institutions are responsible for creating a climate favourable to entrepreneurship, promoting and disseminating knowledge about entrepreneurship in the form of training, promotional campaigns, organization of advisory points, etc. These activities should become a priority in the process of overcoming one of the most serious barriers to the development of good relations between entities involved in promotion of academic entrepreneurship, namely mental barriers, lack of awareness of the benefits of commercializing science and fear of the risks associated with running your own business.

Methodology and conceptual model

The article uses the desk research method, which aimed to:

- identify factors shaping the quality of relationships maintained in supporting academic entrepreneurship;
- identify the relationship between the quality of relationships in the area of supporting academic entrepreneurship and the intention to commercialize knowledge.

An analysis of the relevant literature was intended in particular to bring into focus the variables important in the development of a construct for measuring the quality of inter-organizational relations. As a result of this literature review, a theoretical model was proposed to examine the quality of inter-organizational relations and their impact on the intention of commercialization of knowledge by academic entrepreneurs.

The construct for testing the quality of inter-organizational relations proposed in this article contains criteria described and discussed in the literature. These include such variables as trust, commitment, communication, satisfaction, no conflict of interest, and expected benefits. After considering the review of the literature on the study of the quality of inter-organizational relations, a construct was

²⁹ J. Wieselquist et al., *Commitment, pro-relationship behaviour, and trust in close relationships*, "Journal of Personality and Social Psychology" 1999, vol. 77, no. 5, p. 942.

proposed explaining the variables shaping the quality of relationships (RQ) and its impact on entrepreneurship attitudes of the academic community (IC) (Figure 2). Six variables were recognized as predecessors of the variable “relationship quality” – trust (T), communication (C), engagement (E), satisfaction (S), no conflict of interest (NC), and expected benefits (EB). Each of the variables in the model has its justification in literature or previous empirical studies.

Items proposed by Leonidou et al.³⁰, Danik³¹, Ulaga and Eggert³² can be used to measure the variable “trust”. Items proposed by Tung and Carlson³³ and Hoppner et al. 2015³⁴ can be used to measure variable “engagement”. Items proposed by Leonidou et al.³⁵, Lages³⁶ and Hennig-Thurau et al.³⁷ can be used to measure the variable “communication”. Items proposed by Leonidou et al.³⁸, Lages³⁹ and Hennig-Thurau et al.⁴⁰ can be used to measure “satisfaction”. Items proposed by Hoppner et al.⁴¹ and Danik⁴², can be used to measure the variable “no interest conflict”. Items proposed by Danik⁴³ and Whipple et al.⁴⁴ can be used to measure the variable “expected benefits”. It was assumed that all the indicated variables have a positive impact on the quality of relationships in supporting academic entrepreneurs.

In connection to the above, Appendix 1 gives examples of specific items that explain the main variables of the model and can be included in the survey questionnaire.

30 L. Leonidou, D. Palihawadana, M. Theodoiou, *An integrated model...*

31 L. Danik, *Wpływ kultury...*

32 W. Ulaga, A. Eggert, *Relationship Value...*

33 B. Tung, J. Carlson, *Modeling a Formative Measure of Relationship Quality and Its Effects: Evidence From the Hong Kong Retail Banking Industry*, “Services Marketing Quarterly” 2013, vol. 34, no. 2, pp. 139–158.

34 J.J. Hoppner, D.A. Griffith, R.C. White, *Reciprocity in Relationship Marketing...*

35 L. Leonidou, D. Palihawadana, M. Theodoiou, *An integrated model...*

36 C. Lages, C.R. Lages, L.F. Lages, *The RELQUAL scale: a measure of relationship quality in export market ventures*, “Journal of Business Research” 2005, vol. 58, no. 8, pp. 1040–1048.

37 T. Hennig-Thurau, K.P. Gwinner, D.D. Gremler, *Understanding Relationship Marketing Outcomes...*

38 L. Leonidou, D. Palihawadana, M. Theodoiou, *An integrated model...*

39 C. Lages, C.R. Lages, L.F. Lages, *The RELQUAL scale...*

40 T. Hennig-Thurau, K.P. Gwinner, D.D. Gremler, *Understanding Relationship Marketing Outcomes...*

41 J.J. Hoppner, D.A. Griffith, R.C. White, *Reciprocity in Relationship Marketing...*

42 L. Danik, *Wpływ kultury...*

43 *Ibidem.*

44 G.N. Nyaga, J.M. Whipple, D.F. Lynch, *Examining supply chain relationships: Do buyer and supplier perspectives on collaborative relationships differ?*, “Journal of Operational Management” 2010, vol. 28, no. 2, pp. 101–114.

In addition, based on the literature review, an assumption was made regarding the positive impact of the quality of relations between academic entrepreneurs and their supporting institutions on the intention of commercialization of knowledge by academic entrepreneurs (Figure 2).

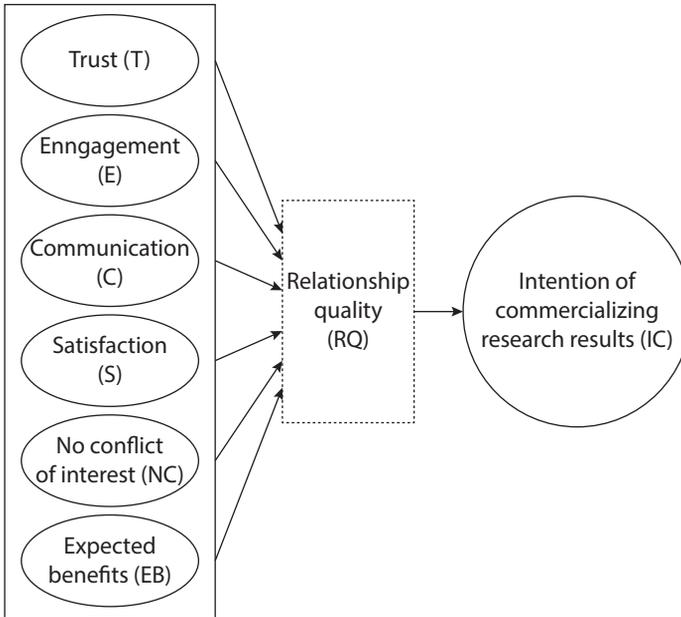


Figure 2. Theoretical model of intention to commercialize research results by academic entrepreneurs and the impact of relationship quality

Source: own elaboration.

Modelling using structural models can be proposed as the main method for model verification. Modelling helps fill the scientific cognitive gap in key variables shaping the quality of relationships in the environment of the academic entrepreneurship support ecosystem and its impact on intentions to commercialize research results. The study plans to use statistical techniques such as descriptive statistics, discriminant analyses for many groups.

A pilot study using a questionnaire can be carried out among research workers involved in research and/or teaching at a selected technical or medical university, where there is a greater likelihood of commercializing research results than at other types of universities. After testing the research tool and eliminating unnecessary or incomprehensible questions, such research can be carried out on a larger scale or as part of an international comparison.

Discussion and conclusions

This study is an early preparatory phase for a broader study of the impact of high-quality inter-organizational relationships on the intentions of commercialization of knowledge by the academic community. In particular, attempts were made to answer the research questions contained in the introduction to the study. To the question of what institutions/entities play an important role in building the ecosystem supporting academic entrepreneurship, the literature indicates that the university is the natural place initiating the process of promoting academic entrepreneurship. The university also has the option of separating the unit within its structure, acting to support academic entrepreneurship (e.g. incubators, career offices, entrepreneurship centres) or may have representatives in the structure of other institutions supporting the ecosystem (e.g. science and technology parks, technology transfer centres). Taking into account its broader spectrum of activity, a modern university is perceived as having the greatest role in creating the right quality of relations between entities directly or indirectly connected with academic entrepreneurship, activating entrepreneurship and ensuring lasting, appropriate quality of relations between various stakeholders. To a large extent, the position of local and regional technology parks, incubators, as well as university technology transfer offices depends on strong trust and commitment-based relations between the university, local government and business.

Answering the question about the factors that shape the quality of inter-organizational relationships, for most researchers, the quality of relationships is based on three dimensions: trust, commitment and satisfaction. Recent studies also show other variables important for the quality of relationships, i.e. communication or involvement in the relationship and no conflict of interest. These variables can be taken into account in preparing a questionnaire for testing the level of relationship quality in support of academic entrepreneurship among the academic community.

Regarding the last research question as to how we can examine the impact of high-quality inter-organizational relationships on the intention of commercialization of knowledge by academic entrepreneurs, after literature analyses and the results of available empirical research, a research tool was proposed to examine the impact of specific factors of relationship quality and their impact on the intention of commercialization of knowledge among academic entrepreneurs (Appendix 1).

The model developed in the article explaining predictors of the quality of relationships and its impact on the intention of commercialization of knowledge by academic entrepreneurs (Figure 2) may significantly enrich the literature related to the entrepreneurial intentions of academic teachers with such aspects as:

- the role of high quality inter-organizational relations in supporting academic entrepreneurship;
- factors shaping high quality inter-organizational relations in supporting academic entrepreneurship;
- the impact of high-quality inter-organizational relationships on intentions to commercialize knowledge.

The planned study is innovative due to the context of its implementation. There are no national studies available on the identification of factors affecting the quality of relationships that support academic entrepreneurship and its impact on the intention of commercialization of knowledge. The concept has also important implications for practitioners. First, for policy makers who, in addition to incorporating the results of commercialization into many of their assessment processes, should also promote entrepreneurial culture at universities based on high quality inter-organizational relations and shaping high-quality relationships across the entire academic entrepreneurial support system. Therefore, the author believes that it is worth comprehensively identifying the main determinants of the intention to commercialize knowledge, related to high quality relations with partners of supporting ecosystem. Secondly, the model suggests that managers of universities must be aware that the best way to promote entrepreneurship in their institutions is to create the conditions necessary to increase the entrepreneurial attitudes of their employees through various projects (training, study, cultural) aimed at strengthening creativity and shaping entrepreneurial values.

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Appendix 1. Main predictors of relationship quality and intentions to commercialize research results, based on literature

No.	Construct/Items
I. TRUST	
1	Trust is key to my relationships with partners in the field of implemented projects
2	The partner I work with is trustworthy
3	The partner's behaviour during cooperation is predictable
4	I don't want to disappoint my partner and my partner doesn't want to disappoint me
II. ENGAGEMENT	
5	The partner fulfils his obligations when I work with him
6	The partner desires good relations with me in developing my projects
7	I am very involved in relationships with my partner during cooperation
8	The partner understands my needs
9	The partner does not want to disappoint me during the cooperation
III. EXPECTED BENEFITS FROM COOPERATION	
10	Cooperation with a partner gives me more benefits than if I had carried out the project myself
11	It is not possible to carry out my projects without a partner
12	Cooperation with a partner reduces the risk of my project's failure
13	A partner's support is key to commercializing my research results
IV. COMMUNICATION	
14	The flow of information is correct between me and the partner
15	Together with the partner, we have developed a way of providing information
16	I don't hide any information from my partner
17	The partner does not hide any information from me
V. SATISFACTION FROM COOPERATION	
18	I am pleased with the cooperation with a partner in supporting me in the implementation of projects
19	Cooperation between me and my partner is going well
20	I sense a good rapport while working with a partner
21	Satisfaction is greater when I implement a project with the support of a partner
VI. NO CONFLICT OF INTEREST	
22	Any conflict with the partner is resolved through negotiation and compromise
23	There are often conflicts in cooperation with a partner
24	The conflict with the partner is calculated in the risk of the project being undertaken
VII. INTENTION TO COMMERCIALIZE KNOWLEDGE AND TECHNOLOGY TRANSFER	
25	I intend to work with the future partner(s) in the field of commercialization of my research results/involvement in business activities/technology sales and transfer/commercialization of knowledge in the form of patents, licences, utility models, consultations, commissioned works, reports
26	I will certainly cooperate with support institutions in the field of knowledge commercialization
27	If I had to choose whether to act alone as an entrepreneur or in cooperation with a partner, I would choose cooperation
28	I definitely plan to commercialize the results of my research
29	I intend to maintain good relations with my partner(s) in the area of knowledge commercialization in the future

References

- Ashai B., Smirnova M., Kouchtch S., Yu Q., Barnes B.R., Naudé P., *Assesing relationship quality in four business-to-business markets*, "Marketing Intelligence & Planning" 2009, vol. 27, no. 1, pp. 86–102.
- Athanasopoulou P., *Relationship quality: a critical literature review and research agenda*, "European Journal of Marketing" 2009, vol. 43, no. 5–6, pp. 583–610.
- Autio E., Kenney M., Mustar P., Siegel D., Wright M., *Entrepreneurial innovation: The importance of context*, "Research Policy" 2014, vol. 43, pp. 1097–1108.
- Baker T.L., Simpson P.M., Siguaw J.A., *The impact of suppliers' perceptions of reseller market orientation on key relationship constructs*, "Journal of the Academy Marketing Science" 1999, vol. 27, pp. 50–57.
- Barry J.M., Doney P.M., *Cross-Cultural Examination of Relationship Quality*, "Journal of Global Marketing" 2011, vol. 24, no. 4, pp. 305–323.
- Bowen J.T., Shoemaker S., *Loyalty: A Strategic Commitment*. Cornell Hotel and Restaurant, "Administration Quarterly" 1998, vol. 39, no. 1, pp. 12–25.
- Bozeman B., Gaughan M., *Impacts of grants and contracts on academic researchers' interactions with industry*, "Research Policy" 2007, vol. 33, no. 5, pp. 694–707.
- Crosby L., Evans K., Cowles D., *Relationship quality in services selling: An interpersonal influence perspective*, "Journal of Marketing" 1990, vol. 54, pp. 68–81.
- Danik L., *Wpływ kultury na jakość relacji w międzynarodowej współpracy przedsiębiorstw*, Oficyna Wydawnicza SGH, Warszawa 2017.
- De Cannie're M.H., De Pelsmacker P., Geuens M., *Relationship Quality and Purchase Intention and Behavior: The Moderating Impact of Relationship Strength*, "Journal of Business Psychology" 2010, vol. 25, pp. 87–98.
- Doaei H., Rezaei A., Khajei R., *The Impact of Relationship Marketing Tactics on Customer Loyalty: The Mediation Role of Relationship Quality*, "International Journal of Business Administration" 2011, vol. 2, no. 3, pp. 83–93.
- Emami J., Layevardi M., Fakhmanesh S., *An Integrated Model in Customer Loyalty Context: Relationship Quality and Relationship Marketing View*, "Australian Journal of Basic and Applied Sciences" 2013, vol. 7, no. 2, pp. 399–407.
- Ghzaïel K., Akrouf F., *Dimensions and Antecedents of Relationship Quality in a Business-to-Business Context: An Exploratory Study*, "Journal of Supply Chain and Customer Relationship Management" 2012, vol. 2012, pp. 1–17.
- Hechavaria D.M., Ingram A., *A Review of the Entrepreneurial Ecosystem and the Entrepreneurial Society in the US: An Exploration with the Global Entrepreneurship Monitor Dataset*, "Journal of Business & Entrepreneurship" 2014, vol. 26, no. 1, pp. 1–35.
- Hennig-Thurau T., Gwinner K.P., Gremler D.D., *Understanding Relationship Marketing Outcomes: An Integration of Relational Benefits and Relationship Quality*, "Journal of Service Research" 2002, vol. 4, no. 3, pp. 230–247.
- Hoppner J.J., Griffith D.A., White R.C., *Reciprocity in Relationship Marketing: A Cross-Cultural Examination of the Effects of Equivalence and immediacy on Relationship Quality and Satisfaction with Performance*, "Journal of International Marketing" 2015, vol. 23, no. 4, pp. 64–83.
- Huang H.H., Wan-Ping P., *Effects of promotion on relationship quality and customer loyalty in the airline industry: The relationship marketing approach*, "African Journal of Business Management" 2011, vol. 5, no. 11, pp. 4403–4414.
- Huntley J.K., *Conceptualization and measurement of relationship quality: Linking relationship quality to actual sales and recommendation intention*, "Industrial Marketing Management" 2006, vol. 35, no. 6, pp. 703–714.

- Isenberg D.J., *How to Start an Entrepreneurial Revolution*, "Harvard Business Review" 2010, vol. 88, no. 6, pp. 2–11.
- Kobylińska U., *Barriers and Factors Influencing the Level of Cooperation of Businesses with Public Administration Institutes: Poland as a Case Study*, [in:] V. Potocan, P. Kalinic, A. Vuletic (eds), *26th International Scientific Conference on Economic and Social Development – "Building Resilient Society": Book of Proceedings*, Varazdin Development and Entrepreneurship Agency, Zagreb 2018, pp. 222–231.
- Lages C., Lages C.R., Lages L.F., *The RELQUAL scale: a measure of relationship quality in export market ventures*, "Journal of Business Research" 2005, vol. 58, no. 8, pp. 1040–1048.
- Leonidou L., Palihawadana D., Theodosiou M., *An integrated model of the behavioural dimensions of industrial buyer-seller relationship*, "European Journal of Marketing" 2006, vol. 40, no. 1–2, pp. 145–174.
- Lin C.P., Ding C.G., *Evaluating group differences in gender during the formation of relationship quality and loyalty in ISP service*, "Journal of Organizational and End User Computing" 2005, vol. 18, no. 2, pp. 38–62.
- Lockett A., Wright M., Siegel D., Ensley M.D., *The creation of spin-off firms at public research institutions: Managerial and policy implications*, "Research Policy" 2005, vol. 34, no. 7, pp. 918–933.
- Maia C., Claro J., *The role of a Proof of Concept Center in a university ecosystem: An exploratory study*, "Journal of Technology Transfer" 2013, vol. 38, no. 5, pp. 641–650.
- Moore J.F., *A new ecology of competition*, "Harvard Business Review" 1993, May – June, pp. 75–86.
- North D., *Institutions, Institutional change and economic performance*, Cambridge University Press, Cambridge 1990.
- Nyaga G.N., Whipple J.M., Lynch D.F., *Examining supply chain relationships: Do buyer and supplier perspectives on collaborative relationships differ?*, "Journal of Operational Management" 2010, vol. 28, no. 2, pp. 101–114.
- Owen-Smith J., Powell W.W., *To Patent or Not: Faculty Decisions and Institutional Success at Technology Transfer*, "The Journal of Technology Transfer" 2001, vol. 26, pp. 99–114.
- Perkmann M., Tartari V., Mckelvey M., Autio E., Broström A., D'Este P., *Academic Engagement and Commercialization: A Review of the Literature on University-Industry Relations*, "Research Policy" 2003, vol. 42, pp. 423–442.
- Radosevich R., *A model for entrepreneurial spin-offs from public technology sources*, "International Journal of Technology Management" 1995, vol. 10, pp. 879–893.
- Ramaseshan B., Yip L.S.C., Pae J.H., *Power, satisfaction and relationship commitment in Chinese store – tenant relationship and their impact on performance*, "Journal of Retailing" 2006, vol. 82, no. 1, pp. 63–70.
- Sherwood A., *University and the entrepreneurship ecosystem*, [in:] S. Globerman, J. Clemens (eds), *Demographics and Entrepreneurship: Mitigating the Effects of an Aging Population*, Fraser Institute, Canada 2018, pp. 239–283.
- Siegel D.S., Phan P., *Analyzing the Effectiveness of University Technology Transfer: Implications for Entrepreneurship Education*, [in:] G. Libecap (ed.), *University Entrepreneurship and Technology Transfer*, "Advances in the Study of Entrepreneurship, Innovation and Economic Growth" 2005, vol. 16, Emerald Group Publishing Limited, Bingley, pp. 1–38.
- Siegel D.S., Waldman D., Link A., *Assessing the impact of organizational practices on the relative productivity of university technology transfer offices: an exploratory study*, "Research Policy" 2003, vol. 32, pp. 27–48.
- The Aspen Network of Development Entrepreneurs. Entrepreneurial ecosystem diagnostic toolkit*, Aspen Institute, UK 2013.
- Tijssen J.W., *Universities and industrially relevant science: toward measurement models and indicators of entrepreneurial orientation*, "Research Policy" 2006, vol. 35, no. 10, pp. 1569–1585.

- Tung B., Carlson J., *Modeling a Formative Measure of Relationship Quality and Its Effects: Evidence From the Hong Kong Retail Banking Industry*, "Services Marketing Quarterly" 2013, vol. 34, no. 2, pp. 139–158.
- Ulaga W., Eggert A., *Relationship Value and Relationship Quality: Broadening the Nomological Network of Business-to-Business Relationships*, "European Journal of Marketing" 2006, vol. 40, pp. 311–327.
- Wieselquist J., Rusbult C.E., Foster C.A., Agnew C.R., *Commitment, pro-relationship behavior, and trust in close relationships*, "Journal of Personality and Social Psychology" 1999, vol. 77, no. 5, pp. 942–966.

Abstract

The main purpose of this article is to develop a framework to study the impact of high-quality inter-organizational relationships (between scientists and supporting institutions) on academic entrepreneurs' willingness to commercialize research results. The concept of the theoretical model was developed on the basis of a literature review and available empirical research results. The specific objectives of the article include the identification of key institutions supporting academic entrepreneurs, and the identification of factors building the quality of inter-organizational relations. The developed model is only a preliminary and partial proposal to measure the intent of commercializing research results by academic entrepreneurs, taking into account one of the important aspects of this process, namely the quality of relationships.

Keywords: academic entrepreneurship, inter-organizational relations, quality of relationships